Unequal Impact II:
Māori and Non-Māori Cancer Statistics by Deprivation and Rural–Urban Status 2002–2006

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Citation:
Robson B, Purdie G, Cormack, D. 2010. *Unequal Impact II: Māori and Non-Māori Cancer Statistics by Deprivation and Rural–Urban Status, 2002–2006*. Wellington: Ministry of Health.

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Published in August 2010 by the Ministry of Health, PO Box 5013, Wellington 6145, New Zealand

ISBN 978-0-478-36619-8 (print)
ISBN 978-0-478-36620-4 (online)
HP 5173

This document is available on the Ministry of Health's website:
http://www.moh.govt.nz

FOREWORD

Tēnā koutou katoa

It is my pleasure to present this chart book *Unequal Impact II: Māori and Non-Māori Cancer Statistics by Deprivation and Rural–Urban Status*. This chart book follows on from *Unequal Impact: Māori and non-Māori cancer statistics 1996–2001*. The early chart book identified disparities in cancer between Māori and non-Māori for stage at diagnosis, incidence, and mortality.

In recent years, considerable work has taken place to enhance the aspects of the system that are doing well, make improvements in the areas where things could be done better, and develop innovative ways to meet the needs of cancer patients and their whānau. While there has been improvement, particularly in the area of cervical cancer, overall the burden of cancer continues to disproportionately impact on Māori.

We must continue in our drive for better services that deliver high quality, patient-centred health care. We must look to work together to ensure services are based on best practice. Early diagnosis and early treatment are two areas in particular where we could enhance the effectiveness of services to ensure the needs of all patients are being met.

We need to know how well we are doing. Tracking our progress, through top quality equity analysis, relies on quality data collection. Some of the greatest gains come through understanding what is happening for people with cancer nationally, regionally and locally. Quality ethnicity data is one of these areas that help to identify the impact of cancer on Māori, and determine where the health system could be doing better.

This chart book is the first to provide information about the incidence and mortality of cancer and urban-rural status, and deprivation in Aotearoa/New Zealand. It provides comprehensive analyses of the variations in cancer incidence, mortality, stage at diagnosis, and survival by area deprivation and by rural-urban status from 2002 to 2006. One of the benefits of work like this is that it challenges our assumptions. It helps to define where, for example, the real differences between urban and rural populations are.

There are still significant disparities in the incidence rate for all cancers combined between Māori and non-Māori. Of particular concern is that the overall cancer mortality rate for Māori is considerably higher than that of non-Māori. These differences persist by urban-rural status and socioeconomic position; with those most affected living in the most deprived areas.

The unequal impact of cancer on Māori is avoidable. Health outcomes can be significantly improved through mechanisms that improve access to health and disability services. Every system, policy, service, process and health professional plays a role in the active reduction of these disparities.

I would like to acknowledge the authors and all those involved in the development of this work. It is a significant contribution to the information required to design, develop, implement, and monitor a system that could be more equitable and competent for Māori.

Teresa Wall
Deputy Director-General, Māori Health
Ministry of Health

ACKNOWLEDGEMENTS

Tēnei te mihi whānui atu ki a koutou katoa e pāngia nā e te mate pukupuku me ō koutou whānau, ki a koutou e whakapau kaha nā ki te whakaiti i te ngau kino o te mate pukupuku i roto i a Ngāi Māori me te papānga o tēnei ki ō rātou whānau, ki a koutou hoki e mahi ana i te rāngai hauora Māori. Tēnā koutou, tēnā koutou, tēnā rā koutou katoa.

Te Rōpū Rangahau Hauora a Eru Pōmare, a Māori health research centre at the Wellington School of Medicine and Health Sciences, University of Otago, was contracted by Te Kete Hauora, Ministry of Health, to provide a comprehensive and detailed overview of Māori and non-Māori cancer outcomes and inequalities in Aotearoa/New Zealand. This is the second report in the series.

We would like to thank the individuals and organisations that supported this report and contributed their expertise and information, including Karen Schwoerer, Chris Lewis, Jane Zhang, Michael Baker, June Atkinson, and Alan Ambury. We also acknowledge the valuable input of the peer reviewers: Simon Bidwell, Ricci Harris, Monique Leerschool, Diana Sarfati, Kim Smith, Dr Madeleine Wall, Vladimir Stevanovic, on early drafts, and Natalie Talamaivao, John Childs, Dr George Gray, Pearl Carre, and Sarah Hill, for review of later drafts.

CONTENTS

List of Tables

LIST OF FIGURES

INTRODUCTION

Cancer remains a major cause of illness and death in Aotearoa/New Zealand. The first chartbook *Unequal Impact: Māori and non-Māori cancer statistics 1996–2001* (Robson, Purdie, Cormack 2006) identified significant disparities in cancer incidence, mortality, stage at diagnosis, and survival between Māori and non-Māori. Further investigation of these disparities is critical to provide a comprehensive and detailed base from which to inform cancer control strategies, the development of services and community interventions, and actions to increase equity of access and outcome.

Disparities between populations in cancer incidence and outcomes are influenced by differences in exposures to risk and protective factors, differential access to preventive services, screening, early diagnosis, timely and effective treatment, support services, and palliative care. Survival disparities may be affected by stage at diagnosis; the timeliness of journeys through curative or palliative treatments; the scope, relevance, quality, and effectiveness of services or treatments available; comorbid conditions affecting the chances of being offered or receiving adjunct therapies; and differential access to appropriate support services.

This chartbook of Māori and non-Māori cancer statistics *Unequal Impact II: Māori and non-Māori cancer statistics by deprivation and rural urban status 2002–2006* provides analyses of variations in cancer incidence, mortality, stage at diagnosis, and survival in Aotearoa/New Zealand, by small area socioeconomic deprivation and rural–urban residency. In particular, it measures disparities by area deprivation (using the NZDep2001 index) and by rural–urban status (using the New Zealand Urban/Rural Profile classification). The chartbook uses national cancer registrations and mortality data from 2002 to 2006 for analysing incidence and mortality rates, and data from 1996–2006 (inclusive) for analysing stage at diagnosis and survival disparities. The results provide insights into the role of deprivation and rurality in disparities in cancer incidence and outcomes between Māori and non-Māori. The purpose of this publication is to present key data and analyses, rather than in-depth discussion of findings.

The chartbook is divided into five sections. The background section provides contextual information, a brief description of the data sources and methods used to analyse the data, and data on the distribution of Māori and non-Māori populations by deprivation and rural–urban status. The second section summarises selected findings from throughout the chartbook, focused on all cancers combined and seven key cancers (breast, cervical, colorectal, lung, prostate, stomach, uterine). The next three sections include the detailed tables, firstly on Māori and non-Māori outcomes, then by area deprivation, then by rural–urban status. The appendices provide further detail on the methods, the denominators created for this book, and the adjusters developed to account for the estimated undercount of Māori cancer registrations in the period 2002–2006.

The right to health applies to all populations, whether affluent or less well-off, whether living in remote areas or in large urban centres, whether male or female, whether tangata whenua or tangata o te tiriti. This report aims to support cancer control efforts in Aotearoa/New Zealand to work towards achieving equity across the cancer continuum of care in order to meet the right to health for all.

SECTION 1:

Background

SOCIOECONOMIC POSITION, RURALITY, AND CANCER

Disparities in cancer incidence and outcomes persist in Aotearoa/New Zealand, although there is promising movement towards equity for specific cancers, such as cervical cancer (Mcleod et al 2010). Ethnic disparities in health arise through differential access to risk and protective factors for health, differential access to health care, and differential quality of care (Jones 2001). Socioeconomic position and/or rural–urban status have the potential to influence disparities through a range of avenues and mechanisms.

The relationship between cancer and both socioeconomic position and rural/urban status may vary for Māori and non-Māori. In New Zealand, as in other countries, markers of socioeconomic position (such as income, employment, living standards and deprivation) and geographical distribution of the population are patterned by ethnicity. This patterning is in turn driven by broader social, historical, and political forces, including colonisation and racism (Reid & Robson 2007). In terms of a causal pathway, the fundamental structures, systems and power relations within society drive social categorisations, including ethnicity (or 'race') (Williams 1997) and shape the distribution of social goods and resources. That is, ethnic disparities in socioeconomic status and in other social and environmental determinants of health result from the entrenched unequal power relations that underpin and sustain a racialised society.

Socioeconomic position and cancer

The relationship between various measures of socioeconomic position and health has been well-documented, both internationally and within the domestic context (Crampton et al 2000; Howden-Chapman & Tobias 2000; Wilkinson & Marmot 2003). In New Zealand, there is compelling evidence of the differential distribution of socioeconomic determinants of health by ethnicity (Robson et al 2007). Socioeconomic position impacts on the distribution of and exposure to risk factors, and on access to health care and health services (Ward et al 2004). In addition, socioeconomic position has cumulative effects over lifetimes.

Measuring socioeconomic position

Socioeconomic position has been defined as "... the socially derived economic factors that influence what positions individuals or groups hold within the multiple-stratified structure of a society" (Galobardes 2007: 23). It is a broad term that encompasses a range of different ways that socioeconomic circumstances can be conceptualised and measured. Indicators of socioeconomic position that have been used in investigating relationships with health outcomes include education, income, employment status, occupation, living standards, wealth, poverty and deprivation. Measurement can be absolute or relative, at an individual or an area-based level, using single or composite measures. The choice of measure to be used depends on the underlying research questions, as well as practical considerations such as data availability and completeness.

In Aotearoa/New Zealand, deprivation measures have become increasingly widely used in measuring and monitoring social outcomes and disparities between social groups.

International evidence on socioeconomic position and cancer

In general, an increased risk of overall cancer incidence and mortality has been found to be associated with lower socioeconomic status, a pattern that is particularly pronounced for some specific types of cancer (Byers et al 2008; Faggiano et al 1997; Freeman et al 2004; Krieger et al 2006; Mackillop et al 2000; Melchior et al 2005; Tomatis 1997; Ward et al 2004). The exact nature of this relationship depends on the type of cancer and the outcome under investigation, as well as the measure of socioeconomic status. Cancers most consistently associated with higher risk in lower socioeconomic groups include those of the lung, stomach, oesophagus, cervix, oral cavity and pharynx, and liver (Singh et al 2003). Social differentials in cancer incidence relate to differences in exposures as well as, for some cancers, screening (Mackillop et al 2000).

The socioeconomic gradient is generally steeper for cancer mortality than for incidence (Faggiano et al 1997). Although overall cancer mortality rates have declined in many settings in recent years, there is some evidence to suggest that socioeconomic inequalities in cancer mortality are growing over time (Singh et al 2003).

Social variations in cancer survival have also been documented internationally, with cancer survival worse for lower socioeconomic groups relative to higher socioeconomic groups for cancers overall (Coleman et al 2004; Kogevinas & Porta 1997; Singh et al 2003; Woods et al 2006), as well as for some specific cancer sites (Dalton et al 2008; Kravdal 2000; Schrijvers Mackenbach, et al 1995; Schrijvers Coeburgh, et al 1995; Shack et al 2007; Singh et al 2003). Similarly to mortality trends, there is some suggestion of increasing socioeconomic disparities in survival in recent decades. Improvements in survival are generally larger for those people residing in affluent areas compared to those living in deprived areas for many cancers (Coleman et al 2004; Shack et al 2007).

Stage at diagnosis has been explored in relationship to its role in explaining socioeconomic disparities in survival. The association is not entirely consistent. Some studies have demonstrated a relationship between lower socioeconomic status and more advanced stage at diagnosis for certain cancers, including colorectal (Parikh-Patel et al 2006), female breast, cervical (Singh et al 2004), and prostate cancer. In general, the likelihood of being diagnosed at a localised stage is lower among people residing in poorer areas, and the likelihood of being diagnosed at an advanced stage higher (Ward et al 2004). However, stage at diagnosis does not fully explain socioeconomic survival differences (Kravdal 2000; Shrijvers Mackenbach et al 1995; Singh et al 2004), and significant survival differences remain after adjusting for stage at diagnosis (Kravdal 2000; Singh et al 2004).

There is some evidence of an association between various measures of socioeconomic status and access to cancer care and cancer services, including treatment. This includes differences in access to early detection and screening services and to treatment for various cancers (Bradley et al 2001; Greenwald et al 1998; Madison et al 2004; Singh 2003).

Socioeconomic position, ethnicity and cancer in Aotearoa/New Zealand

There is a small but growing pool of research in Aotearoa/New Zealand investigating the interactions between ethnicity, socioeconomic position and cancer. For example, the New Zealand Census Mortality Study (NZCMS) demonstrated that socioeconomic inequalities impacted on ethnic inequalities in cancer death rates over the 1980s and 1990s, although to a lesser degree than for cardiovascular diseases and injuries (Ministry of Health & University of Otago 2006). A recent study found that Māori and Pacific women were more likely to have breast tumours with poorer prognosis than non-Māori/non-Pacific women, as did women living in more deprived areas. The increased risk for Māori and Pacific women remained after adjusting for socioeconomic deprivation (McKenzie et al 2008).

Other research has considered the relationships between socioeconomic position and cancer in New Zealand separately from ethnic inequalities in cancer. A deprivation gradient in overall cancer risk, as well as for some specific cancer sites, has been demonstrated in New Zealand, with a 20% higher risk of cancer for those people living in the most deprived quintile (relative to the least deprived) (PHI 2002). A deprivation gradient has also been identified for cancer mortality for all cancers combined and for some specific cancer types, with the relationship between deprivation and cancer mortality stronger than that for incidence (PHI 2002).

Increasing inequalities in cancer mortality by social status have been documented for the 1980s and 1990s (Ministry of Health & University of Otago 2006; Shaw et al 2005). During this period, male total cancer mortality rates decreased for all income groups, however, the largest decrease was for those people in the high-income group. For females, total cancer mortality rates declined for those in the high-income group, while they remained stable for the middle-income group and increased for low-income females (Ministry of Health & University of Otago 2005), resulting in increasing gaps in cancer mortality rates.

Recently, there has been some analysis of socioeconomic inequalities in cancer survival, and the role of extent of disease at diagnosis. A study by Jeffreys et al (2009) demonstrated socioeconomic disparities in survival for most cancer sites, with higher deprivation associated with poorer survival. Differences in the distribution of extent of disease at diagnosis explained some, but not all, of these disparities (Jeffreys et al 2009).

Finally, there is some evidence of disparities in access to breast and cervical screening among those living in deprived areas (Ministry of Health 2004; Sadler et al 2004). The reporting of successful strategies for improving screening coverage among Māori women in deprived areas (Thomson et al 2009) provides evidence that such disparities are not immutable.

While the New Zealand evidence is limited, it is broadly consistent with the patterns identified in international epidemiological literature.

Rural–urban status and cancer

Rural–urban status may impact on health in different ways. Firstly, exposure to risk and protective factors for health is likely to vary by rural–urban status however this is measured. This differential exposure was demonstrated in the findings of the 2002/03 New Zealand Health Survey (NZHS), which identified that living in main urban areas was associated with lower likelihood of eating the recommended daily servings of fruit and vegetables, or being physically active. Current smoking was more likely in women living in minor urban towns and rural centres, than among those living in main urban centres or true rural areas (Ministry of Health 2007). Secondly, rural–urban status can impact on access to health services. In the 2002/03 NZHS, rural females were less likely to have seen a GP than urban females but reported lower levels of unmet need. The NatMedCa study of patient contacts in general practices found patients of rural practices received fewer tests, investigations, prescriptions, and cervical smears than urban patients, but similar rates of referrals (Ministry of Health 2004).

Asthana et al (2002) suggest that rural areas may be characterised by “suppressed demand for services” due to a self-reinforcing cycle of low levels of provision, low expectations of provision and a culture of self-reliance. However, participants in studies of Māori health care experiences report significant hardships resulting from the hidden costs of ‘distance deprivation’ among rural residents, particularly for those with low incomes (Fraser 2006; Rameka 2006). These costs include transport, accommodation, food, and hospital car park rates. Even if reimbursement is available, whānau must still be able to meet the costs up-front (Jansen et al 2009; Rameka 2006).

Classifying rural–urban areas

The concepts of rurality and urbanicity are complex and there is no agreed definition of rurality in New Zealand or internationally. Different definitions are employed for different purposes within and across sectors, including health. A review of rural deprivation in the United Kingdom identified the following measures:

- settlement size
- population density/scarcity
- accessibility to services (nearest neighbour distance, distance or travel times to higher level service centres)
- land use or economic activity (e.g. a baseline percentage of those involved in primary industries such as agriculture, resource extraction)
- peripherality (physical aspects include terrain such as extensive coastline, mountains or poor roads, climate, remoteness; social aspects include low incomes, ageing population)
- Multivariate classifications, which use a variety of factors including population density, occupation, distance, etc (Asthana et al 2002).

The New Zealand Standard Areas Classification uses settlement size to define urban areas (main, secondary, minor) and rural areas (rural centres, true rural) (Department of Statistics 1992). The Rural Ranking Scale, used by the Ministry of Health to allocate payments to rural practitioners utilises aspects of accessibility and peripherality (e.g. travel time from the practice to a major hospital, travel time to the nearest GP, travel time to the most distant boundary of the practice, number of regular peripheral clinics). The Ministry of Education's Isolation Index allocates funding to schools based on the school's distance from larger population centres (as a measure of access to necessary goods and services).

The Rural/Urban Profile Classification was developed by Statistics New Zealand from the 2001 Census (Statistics New Zealand 2005). Apart from main urban areas (with a population of 30,000 or more), other areas were re-categorised based on the proportion of residents employed in larger urban areas (i.e. commuters). Main urban areas remain the same as the Standard Urban Area classification (areas with 30,000 or more people). Satellite urban communities include a high proportion of commuters (with ready access to urban services). Independent urban areas are towns and settlements with little dependence on urban areas (i.e. a low proportion employed in main urban centres). The profile distinguishes four categories of rural areas based on employment location – areas with high, moderate, and low urban influence, and highly remote/rural areas. Employment location is the defining variable of the Urban/Rural Profile index, using data from the Census of Populations and Dwellings, 2001 to compare a person's usual residence address with their workplace address.

The Rural/Urban Profile classification includes aspects related to population size, accessibility to urban services, and peripherality (or remoteness), and was therefore chosen as the measure of rural–urban status for this chartbook.

Rural–urban status and deprivation

Deprivation may have differential impact in rural areas compared to urban areas. Three types of deprivation have been recognised as contributing to this:

- Resource deprivation (low income, housing)
- Opportunity deprivation (lack of availability of services such as health, recreation)
- Mobility deprivation (higher transport costs, inaccessibility of jobs, services, facilities) (Shaw 1979 cited in Asthana et al 2002).

Resource deprivation may be present in urban and rural areas, but opportunity and mobility deprivation relate specifically to geography (Asthana et al 2002). In addition, the degrees of resource deprivation, opportunity and mobility deprivation may vary between populations within an area type. If societal and institutionalised discrimination is operating, Māori may experience greater degrees of opportunity or mobility deprivation than non-Māori in a particular area type. In New Zealand, the economic restructuring of the 1980s and 1990s had a differential impact on rural areas and small towns compared to main urban areas. The impact may also have been differential between rural areas with a high Māori population and those with a lower proportion of Māori. There is some indication that the distribution of health practitioners in rural areas favours the South Island, while rural areas in the North Island are experiencing a reduction in health professionals (Fraser 2006). Research exploring Māori cancer patients' experiences resulted in suggestions related to making the cancer journey easier for rural whānau, including more frequent rural specialist clinics, and flexible accommodation arrangements (Walker et al 2008).

Rural–urban status, ethnicity and cancer

Internationally, the relationship between rural–urban status and cancer is not entirely consistent (Peters & Jackson 2005). While there is some evidence of higher incidence of cancers in urban areas for overall cancers and for many specific cancer sites (Dalton et al 2008; Doll 1991), the pattern varies by country, and by type of cancer (Coughlin et al 2006; Wilkinson & Cameron 2004).

Poorer survival from cancer (all combined, prostate, cervical) has been reported for remote areas of New South Wales (Jong et al 2005), and for rural areas in France (Pozet et al 2008), compared with urban areas. A study in Western Australia found rural and urban women had different treatment for breast cancer, which accounted for the rural survival disadvantage (Mitchell et al 2006). Differences in the rates of breast conserving surgery between urban and rural women were also reported in Victoria, with urban women having higher rates of breast conserving surgery after adjusting for patient and tumour characteristics (Kok et al 2006).

The evidence of rural–urban differences in stage at diagnosis is mixed. A higher likelihood of unstaged and later stage cancer at diagnosis was found for rural compared with urban residents in the United States (Liff et al 1991). Other studies have not found differences in stage at diagnosis between rural and urban residents (Blair et al 2006). A recent study in the United States of Surveillance, Epidemiology and End Result (SEER) data identified that rural residence was not associated with an increased likelihood of later stage of disease at diagnosis, but rather that for colorectal and lung cancer, urban residence was associated (Paquette & Finlayson 2007). In a study looking at the relationship between residence, socioeconomic status and stage at diagnosis for colorectal cancer, it was found that SES was strongly associated with stage at diagnosis for urban residents, with a positive high-SES gradient. However, there was no significant association for large towns or small rural towns (Parikh-Patel et al 2006). And rural–urban status did not impact on likelihood of having a later stage at diagnosis for the same level of SES.

There is limited New Zealand evidence on the relationship between rural–urban status and cancer. The 2002/03 New Zealand Health Survey found that self-reported lifetime prevalence of cancer was similar between rural and urban areas overall (Ministry of Health 2007). However, within the group living in the most deprived areas, urban residents had higher prevalence than rural residents. Within the medium deprivation areas, rural males had higher cancer prevalence than urban males.

There is an absence of literature, both domestically and internationally, that investigates the relationships between ethnicity, rural–urban status and cancer incidence and outcomes, including examination of the role of the differential distribution of rural–urban status by ethnicity in ethnic inequalities in cancer.

Analyses in this chartbook

This chartbook uses cancer registration and death registration data to examine:

- Māori and non-Māori cancer incidence, mortality, stage at diagnosis and survival
- the relationship of area deprivation with cancer incidence, mortality, stage at diagnosis and survival for Māori and non-Māori
- the relationship of rural–urban status with cancer incidence, mortality, stage at diagnosis and survival for Māori and non-Māori
- the contribution of the differential distribution of deprivation to cancer disparities between Māori and non-Māori
- the contribution of the differential distribution of rural–urban status to cancer disparities between Māori and non-Māori.

DATA SOURCES AND METHODS

The key data sources and methods used in the chartbook are briefly described below. Detailed information on the methods used in the chartbook is included in Appendices 1–3.

Numerators

Data on cancer registrations and deaths were sourced from the New Zealand Cancer Registry and the New Zealand Health Information Service (NZHIS) mortality data collection for the period 1 January 1996 to 31 December 2006. The data was extracted on 14 September 2009. Cancer site and cause of death were classified according to ICD-10-AM (see Appendix 1 for further detail on ICD codes used and data inclusions and exclusions).

Ethnicity classification

Appendix 1 provides detailed information on the classification of ethnicity. A summarised outline is provided below.

For the calculation of mortality rates, anyone recorded as Māori on the death registration (either alone or in combination with another ethnic group/s) was classified as Māori. Everyone else was classified as non-Māori.

For the calculation of cancer registration rates, adjusters were created and applied to the number of Māori cancer registrations to 'adjust' for the undercount of Māori in the datasets (see Appendix 3 for further detail).

For cancer survival and stage at diagnosis anyone recorded as Māori on the cancer registry (either alone or in combination with another ethnic group/s) was classified as Māori. Everyone else was classified as non-Māori. The data was not adjusted.

Denominators

Population information was sourced from Statistics New Zealand's revised estimates of the mid-year resident Māori ethnic group population and total New Zealand population for 1996–2006. Age-sex-ethnicity-specific population estimates for each year were used as denominators in calculating cancer incidence and mortality rates for aggregated years, aggregated (for the years 2002–2006) or as single years for the yearly rates.

Age-sex-ethnicity-specific mid-year resident Māori and non-Māori population estimates per NZDep2001 decile or quintile were developed to calculate incidence and mortality rates by area deprivation for the period 2002–2006 (see Appendix 2 for further detail).

Similarly, age-sex-ethnicity-specific mid-year resident Māori and non-Māori population estimates per Urban/Rural Profile Classification category were developed to compute incidence and mortality rates by rural–urban status for the period 2002–2006 (see Appendix 2 for further detail).

Cancer registrations within each deprivation or urban–rural category served as denominators in analyses stage at diagnosis (see Appendix 1 for further detail).

Area deprivation

The NZDep2001 index was used to measure socioeconomic deprivation. NZDep2001 is an area-based index of socio-economic deprivation, which ranks small areas from the least deprived (decile 1) to the most deprived (decile 10). The index combines nine variables from the 2001 Census (see Appendix 1 for more detail), reflecting eight domains of deprivation (Salmond & Crampton 2002).

Rural–urban status

The Urban/Rural Profile Classification developed by Statistics New Zealand was used to determine rural–urban status using the domicile code at the time of diagnosis. The classification was grouped into three types of area: main urban, independent urban (small towns), and rural communities (see Appendix 1 for more detail).

Stage of disease at diagnosis

Extent of disease information on the cancer registration was used to determine stage at diagnosis for cancer registrations. Stage at diagnosis was classified as:

- localised
- regional (spread to adjacent tissue or organ and/or involves regional lymph nodes)
- distant (spread to distant organs, tissues or to distant lymph nodes)
- unknown.

Appendix 1 provides further information on the Summary Staging Classification.

Age-standardised rates

Rates were age-standardised to the 2001 Māori population (males and females combined) using five-year age groups up to 84, then 85+. Rates are generally expressed as a rate per 100,000. 95% confidence intervals (CIs) are presented for rates. Readers should be aware that the use of the Māori population standard means that results presented in this chartbook may not be directly comparable with those reported elsewhere.

Hazard ratios

Hazard ratios (HRs) were calculated to estimate the relative risk of cancer-specific death after diagnosis, for Māori and non-Māori, adjusted for sex and age at diagnosis. In addition, adjustments were made for area of residence at the time of registration (deprivation, rural–urban category) and stage at diagnosis. 95% confidence intervals (CIs) and p-values are presented. Hazard ratios were also used to model deprivation gradients and relative risks between rural or independent urban residents and main urban residents.

Odds ratios

Odds ratios (ORs) adjusted for sex and age at diagnosis were calculated to estimate the odds of being diagnosed at a certain stage for Māori compared to the odds for non-Māori, using logistic regression. An odds ratio higher than 1.00 indicates Māori have higher odds than non-Māori and an odds ratio lower than 1.00 indicates Māori have lower odds than non-Māori.

Rate ratios

Rate ratios are generally calculated as the age-standardised rate for Māori divided by the age-standardised rate for non-Māori. A rate ratio higher than 1.00 indicates Māori have a higher rate than non-Māori. Conversely, a rate ratio below 1.00 indicates Māori have a lower rate than non-Māori.

In some tables we present rate ratios that compare cancer registration rates for Māori living in independent urban communities (small towns) with those of Māori living in main urban areas. These indicate whether Māori small town residents have a higher (or lower) risk than Māori living in large cities. These tables also include ratios for rural Māori compared to main urban Māori residents. Similar calculations are presented for non-Māori separately.

Poisson regression was used to model the association between cancer incidence or mortality and area deprivation, and/or rural–urban categories for Māori and non-Māori. Males and females were modelled separately. It was also used to estimate the contribution of deprivation or rural–urban status to Māori: non-Māori disparities in incidence and mortality. Detailed information on the modelling and model reporting is included in Appendix 1.

Interpretation Issues

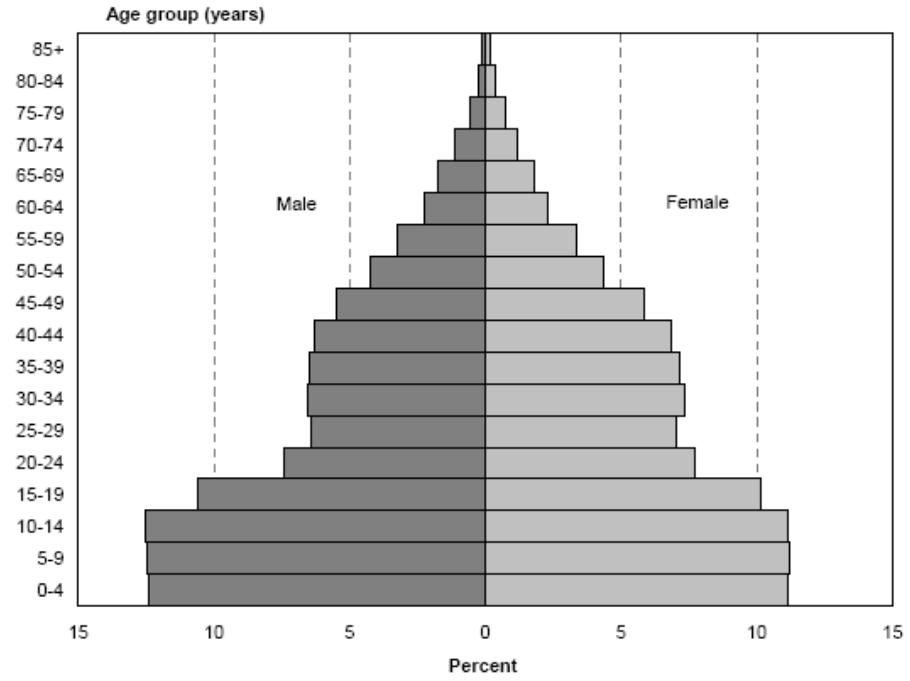
- Readers should be aware that the use of the Māori population standard and the method of classifying ethnicity mean that results presented in this chartbook may not be directly comparable with those reported elsewhere.
- The use of ethnicity as recorded on the cancer register in survival analysis and stage at diagnosis means that some Māori are likely to be classified as non-Māori. However, it would be a small proportion and, therefore, should not have a large impact on results.
- Readers should be mindful that the site-specific groups (such as brain cancer, bone cancer, or thyroid cancer) in fact reflect groupings of diseases that can affect different age groups, and may have very different aetiologies and/or prognoses. They should therefore not be treated as one disease.
- There is the potential for some misclassification in the ICD coding using these types of datasets.
- The hazard ratios presented in this report do not take account of confounding by type of cancer within each cancer site (e.g. small-cell lung cancer versus non-small-cell lung cancer). There may also be residual confounding within stage categories as extent of disease (EOD) is a relatively crude measure of stage.
- Our use of the terms ‘significant’ or ‘not significant’ refer to the statistical sense (i.e. $p< 0.05$) rather than importance or clinical significance.
- The term ‘cancer incidence’ refers to the cancer registration rate. Similarly, ‘cancer mortality’ refers to the cancer death rate.
- The ability to detect significant differences, for Māori in particular, may be limited because of the small numbers of cases in some instances (e.g. rare cancers by deprivation). As statistical significance is related to sample size, where real differences exist, they are more likely to be detected for non-Māori than for Māori. “Not significant” does not mean that a difference does not exist.

POPULATION DISTRIBUTIONS AND MAPS

This chapter presents the distributions of the Māori and non-Māori populations by age, area socioeconomic deprivation, and urban/rural areas.

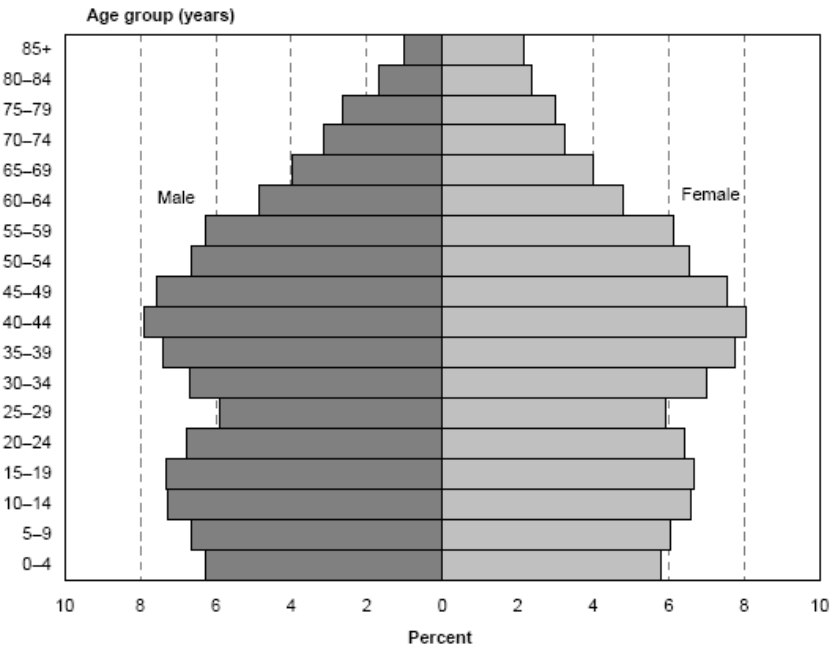
Distribution of Māori and non-Māori populations by age, 2006

Figure 1.1: Age distribution of the Māori population, males and females, 2006



Source: Census of Population and Dwellings, 2006

Figure 1.2: Age distribution of the non-Māori population, males and females, 2006



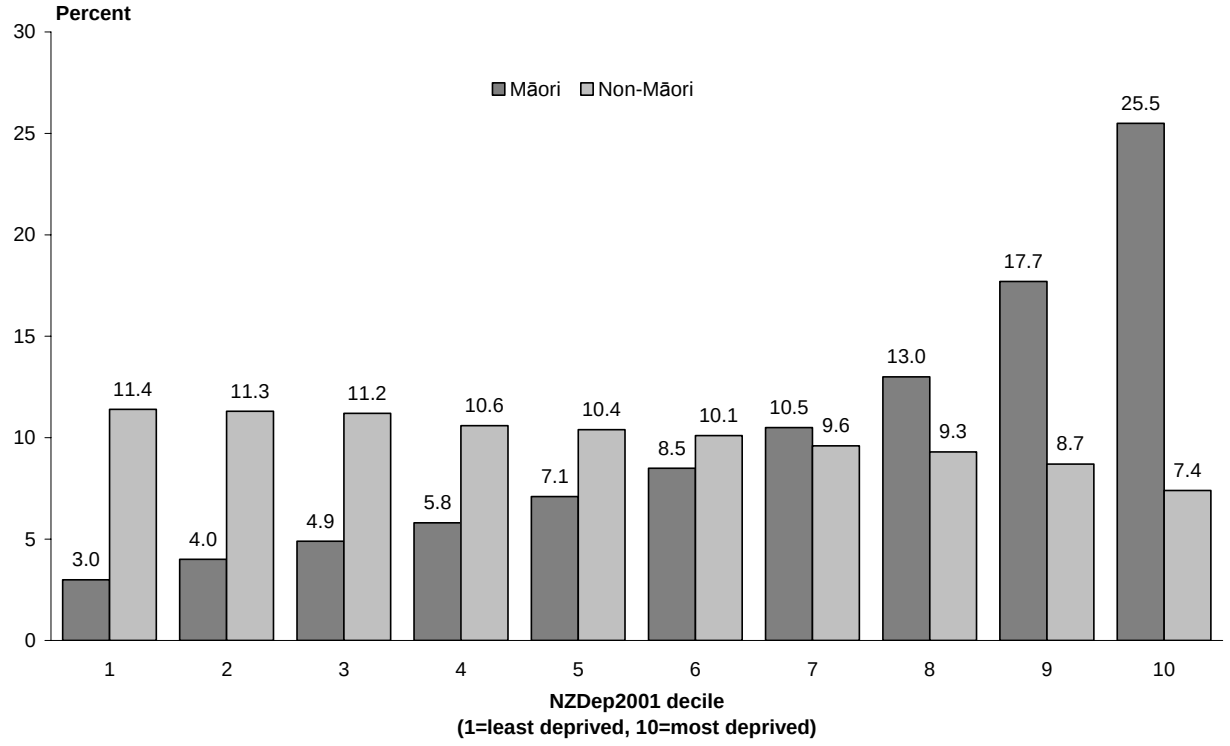
Source: Census of Population and Dwellings, 2006

Distribution of Māori and non-Māori populations by area deprivation (NZDep2001 decile)

The NZDep2001 Index of Deprivation measures the relative socioeconomic deprivation of small areas. It is important to note that the index applies to populations in small areas, not to individuals or households. Individual or household socioeconomic deprivation levels will vary within each area deprivation level and will also vary between Māori and non-Māori populations within a deprivation level. Within a deprivation decile or quintile, the Māori population is likely to have a higher level of deprivation than the non-Māori population (residual confounding). Thus, the deprivation index cannot measure all socioeconomic differences within a population or between Māori and non-Māori.

Figure 1.3 shows the distribution of Māori and non-Māori populations by small-area deprivation decile in the 2001 Population Census, using the NZDep2001 index.[1] Areas in decile 1 are the least deprived areas and those in decile 10 are the most deprived.

Figure 1.3: Distribution of Māori and non-Māori populations by area-deprivation, 2001



Source: Census of Population and Dwellings, 2001

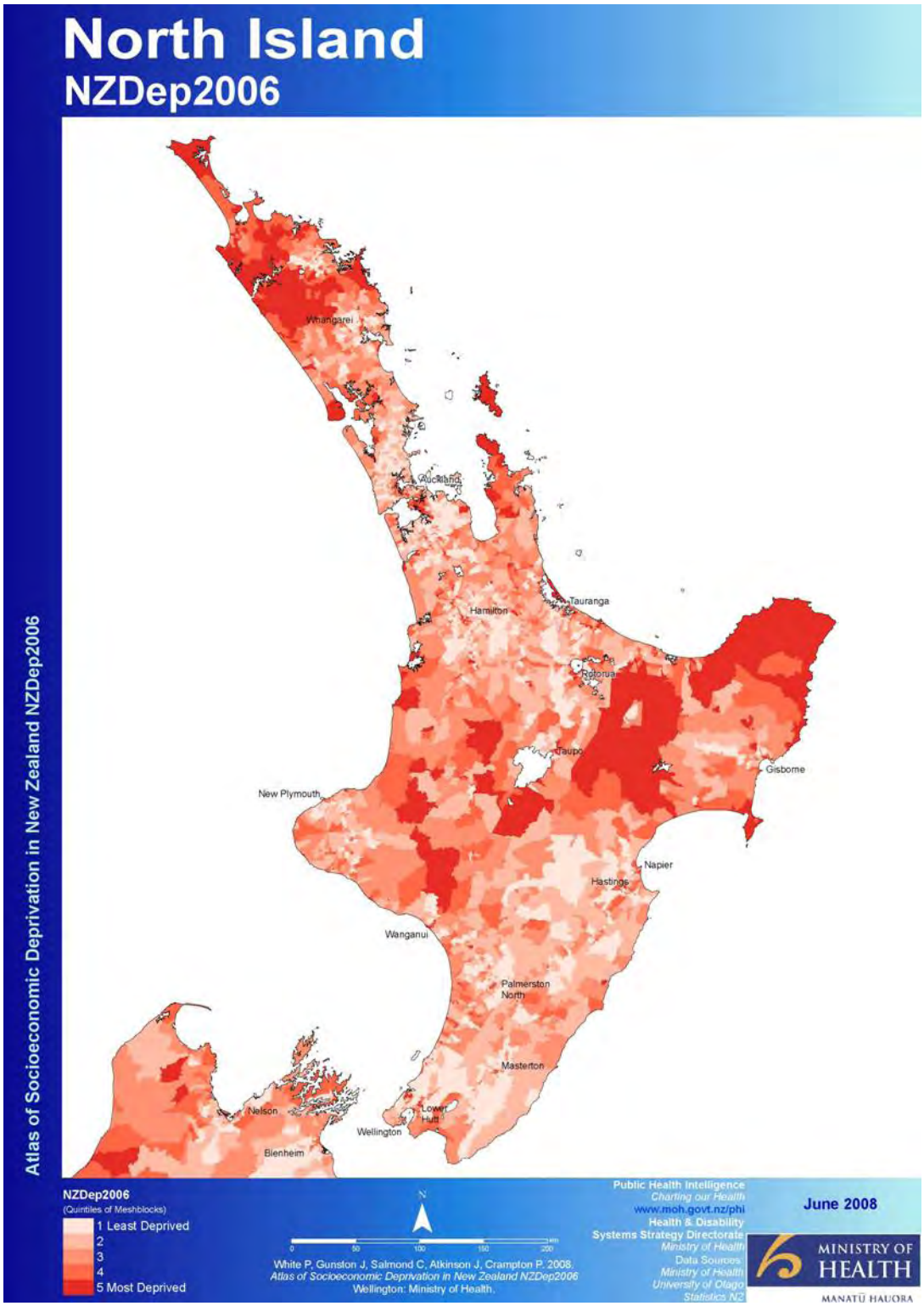
The Māori population is highly over-represented in the most deprived deciles, while the non-Māori population is skewed towards the least deprived deciles. This maldistribution is also reflected in other socioeconomic measures (such as household income, employment status, education) (Robson et al 2007; Ministry of Health and University of Otago 2006) and indicates that Māori are disproportionately affected by the consequences of socioeconomic deprivation. The profound impact and the underlying historical and contemporary drivers of this inequity are discussed further by Bargh (2007); Reid and Robson (2007); Durie (1998).

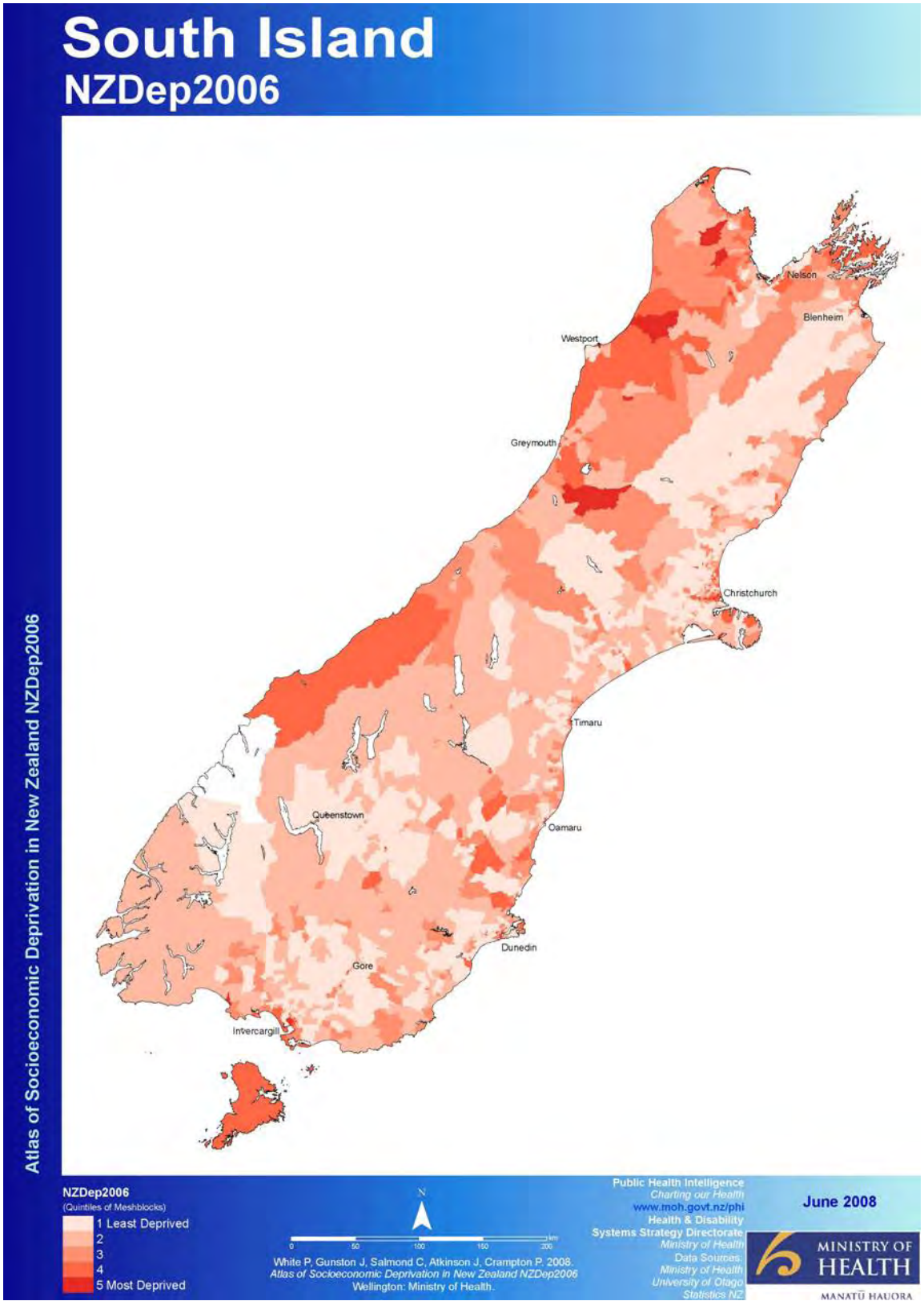
The following maps of Te Ika a Maui (North Island) and Te Waipounamu (South Island) show the deprivation level of areas by NZDep2006 quintile. The lighter shaded areas are the least deprived

[1] The denominators used for deprivation analyses in this chartbook are derived from estimates of the mid-year resident population in each NZDep2001 area during the years 2002–2006. The distributions of the Māori and non-Māori populations in the population estimates are very similar to those depicted here. See Appendix 2 for more detail.

(quintile 1) and the darkest coloured the most deprived (quintile 5). Further maps of the NZDep2006 index by DHB can be found in the Ministry of Health's Atlas of Socioeconomic Deprivation in New Zealand NZDep2006 (White et al 2008). The deprivation levels of urban areas are more visible in the detailed maps of the Atlas (http://www.moh.govt.nz).

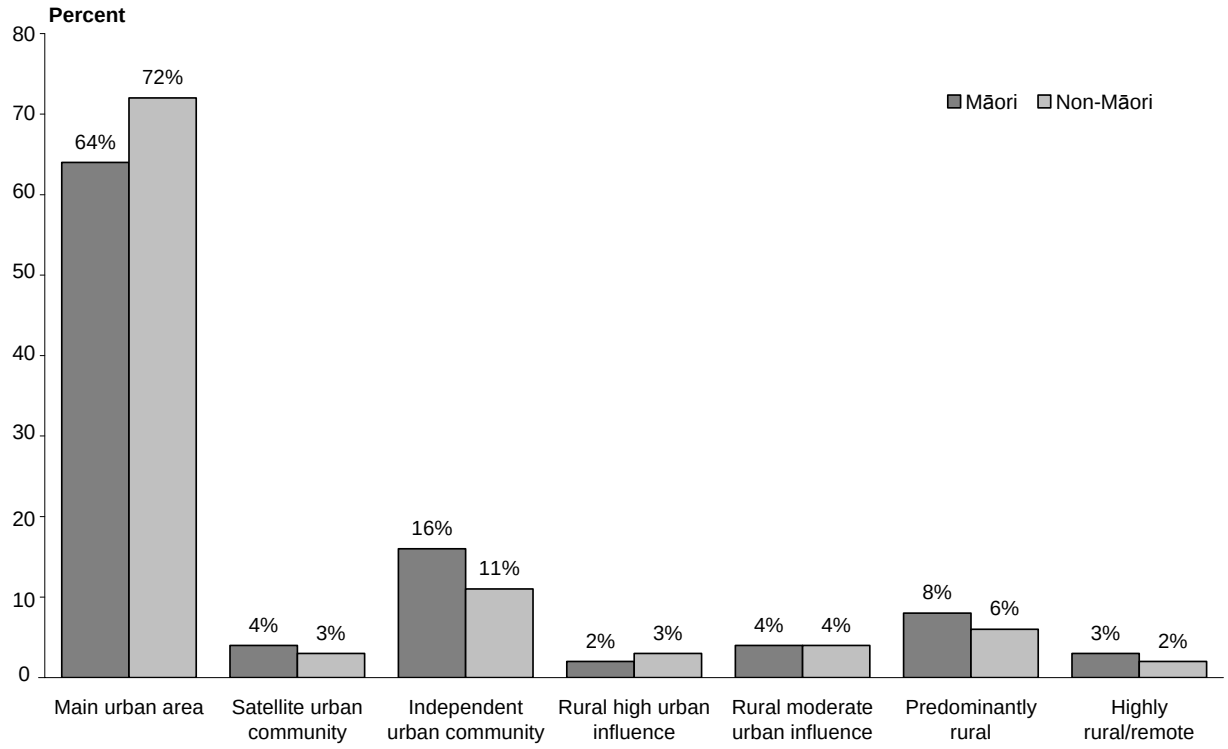
Figure 1.4: Maps of socioeconomic deprivation in New Zealand NZDep2006




South Island
NZDep2006
Atlas of Socioeconomic Deprivation in New Zealand NZDep2006
Nelson
Blenheim
Westport
Greymouth
Christchurch
Timaru
Queenstown
Oamaru
Dunedin
Gore
Invercargill
NZDep2006
(Quintiles of Meshblocks)
1 Least Deprived
2
3
4
5 Most Deprived
N
0 50 100 150 200 km
White P, Gunston J, Salmond C, Atkinson J, Crampton P. 2008.
Atlas of Socioeconomic Deprivation in New Zealand NZDep2006
Wellington: Ministry of Health.
Public Health Intelligence
Charting our Health
www.moh.govt.nz/phi
Health & Disability
Systems Strategy Directorate
Ministry of Health
Data Sources:
Ministry of Health
University of Otago
Statistics NZ
June 2008
MINISTRY OF HEALTH
MANATŪ HAUORA

Distribution of Māori and non-Māori populations by rural–urban residency

Figure 1.5: Urban/rural distribution of Māori and non-Māori populations, Census of Population and Dwellings, 2001



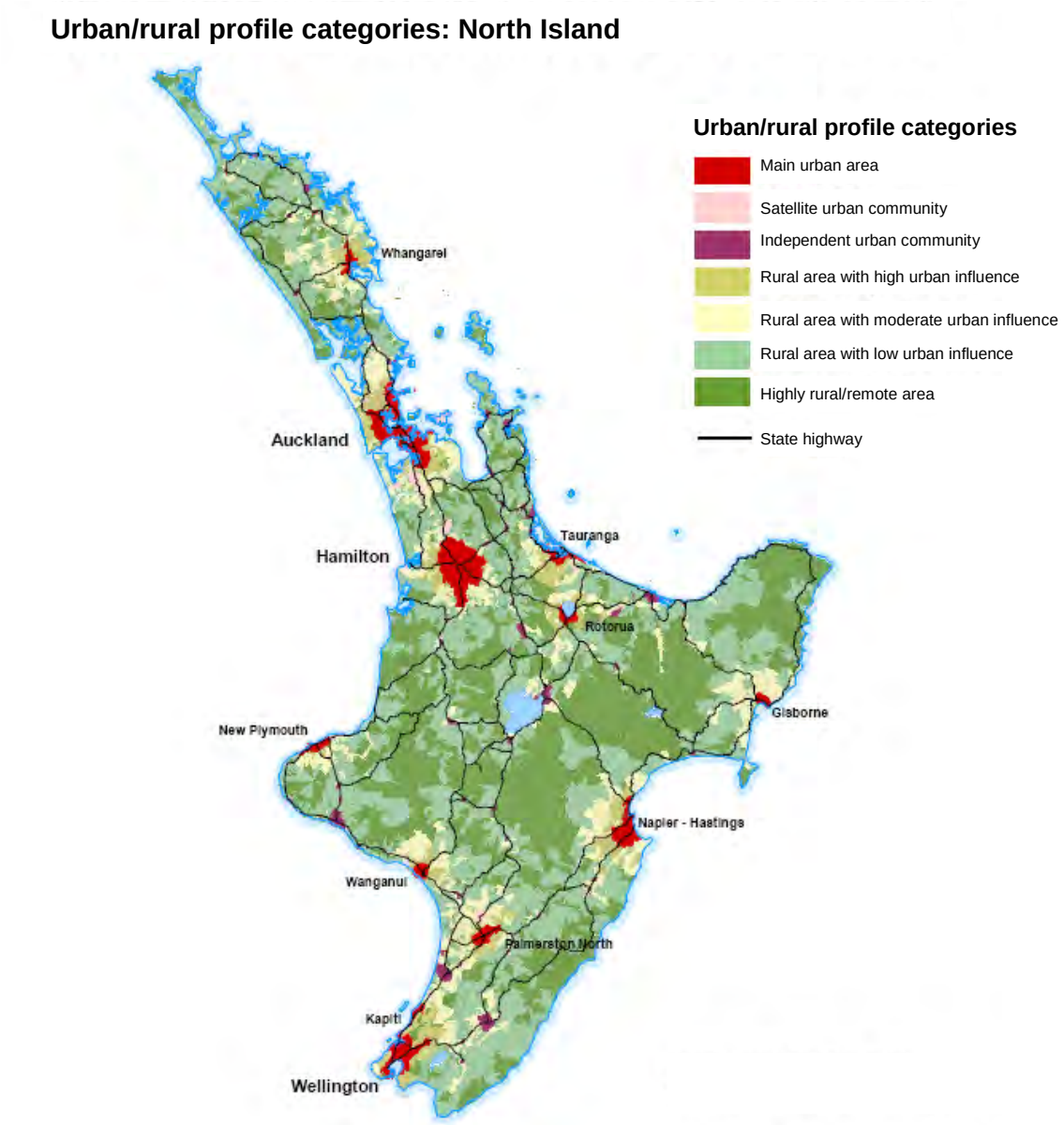
The majority of both the Māori and the non-Māori populations live in main urban areas (Figure 1.5). A higher proportion of non-Māori live in main urban areas than Māori (72% compared to 64%), and in rural areas with high urban influence. Māori are more likely than non-Māori to live in all other rural areas, in independent urban, and satellite urban communities.

For this chartbook, categories from the Statistics New Zealand Urban/Rural Profile Index were aggregated into three categories to avoid problems with small numbers in some categories:

- **Main urban:** includes main urban areas and satellite urban communities
- **Independent urban:** includes only independent urban communities
- **Rural:** includes all rural categories including areas with high, moderate, low urban influence, and highly rural/remote areas. This is equivalent to areas with less than 1000 people.

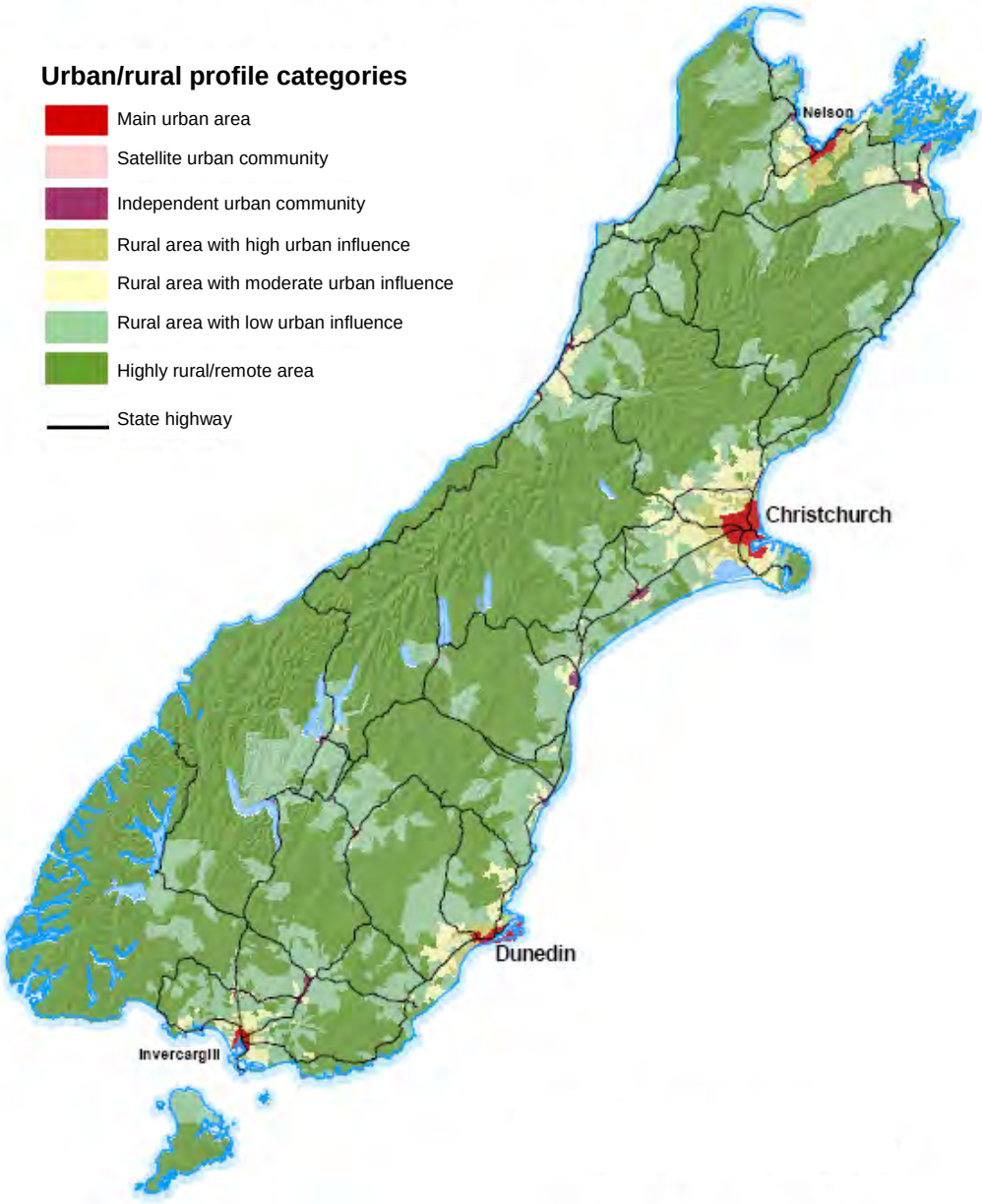
The following maps show how areas in Te Ika a Maui (North Island) and Te Waipounamu (South Island) are categorised in the 2001 Urban/Rural Profile Classification. Urban areas are shaded red and rural areas green. Maps that are more detailed can be found on the Statistics New Zealand website (http://www.stats.govt.nz).

Figure 1.6: Maps of urban/rural profile categories, 2001



Source: Statistics New Zealand, Census of Population and Dwellings, 2001.

Urban/rural profile categories: South Island



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SECTION 2:

Selected Findings

ALL CANCERS COMBINED 2002–2006

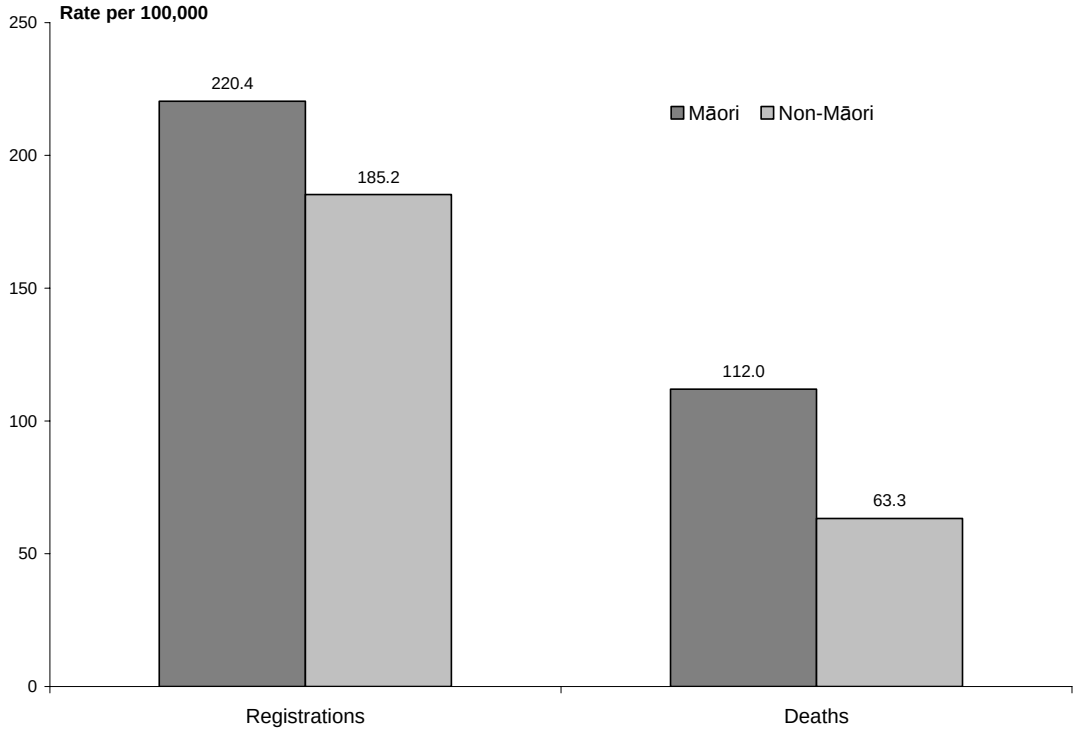
This chapter presents Māori and non-Māori cancer registration and mortality rates for all cancers combined for the period 2002–2006. Detailed tables are provided in sections 3–5.

Both sexes

During the period 2002–2006, there were around 1,460 new cancer registrations per year on average among Māori and approximately 744 cancer deaths. Among non-Māori, there were 16,870 new registrations per year on average and approximately 7,180 deaths.

For Māori, the age-sex-standardised incidence rate for all cancers combined was 220.4 per 100,000, 19% higher than the non-Māori rate of 185.2 per 100,000. The cancer death rate for this period was 112.0 per 100,000 for Māori, 78% higher than the rate for non-Māori of 63.3 per 100,000 (Figure 2.1).

Figure 2.1: Māori and non-Māori cancer registrations and deaths, age-sex-standardised rates, 2002–2006



Females

Among females, the age-standardised cancer incidence rate for Māori was 228.3 per 100,000, 29% higher than the rate for non-Māori females of 177.7 per 100,000. The cancer death rate for Māori females was 107.3 per 100,000, 90% higher than the non-Māori rate of 56.4 per 100,000.

Males

The age-standardised cancer incidence rate for Māori males was 212.5 per 100,000, 10% higher than the non-Māori rate of 193.3 per 100,000. The cancer death rate was 68% higher for Māori males (116.6 per 100,000) than for non-Māori males (69.6 per 100,000).

By area deprivation

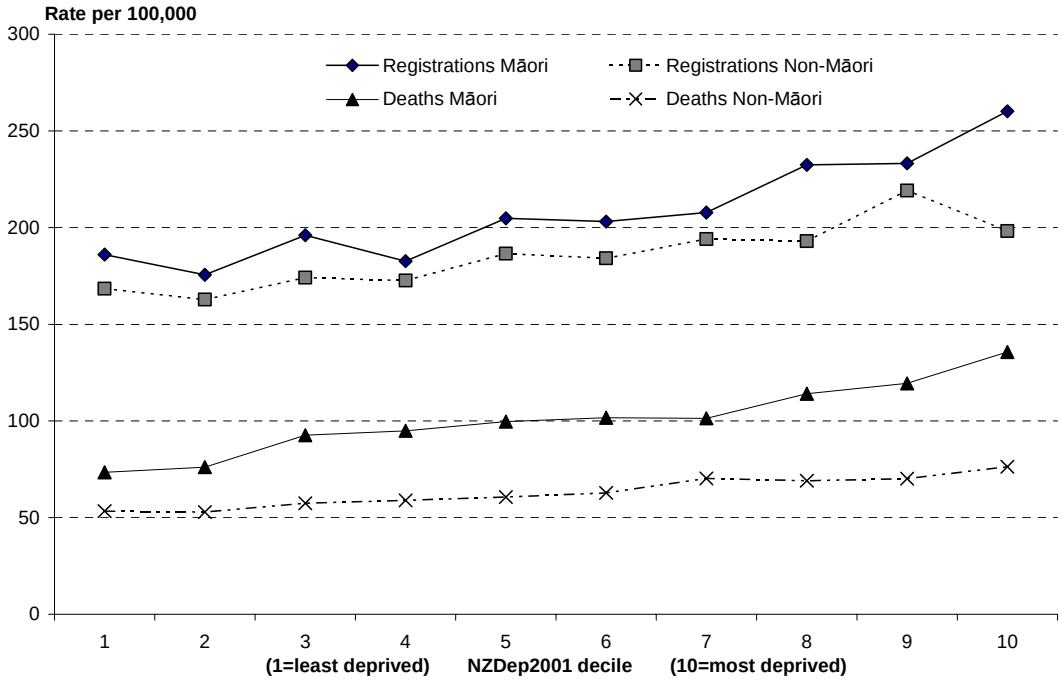
Fifty percent of Māori cancer registrations during the period 2002–2006, and 18% of non-Māori, were among people living in the two most socioeconomically deprived deciles (deciles 9 and 10) at the time of their diagnosis.

Cancer incidence and mortality for all cancers combined was significantly associated with increasing deprivation among both Māori and non-Māori. The association was stronger for mortality than for incidence. The deprivation gradient was steeper for Māori than for non-Māori in cancer mortality.

Within each deprivation decile, Māori cancer incidence was somewhat higher than that of non-Māori, but the mortality gap was considerably wider than the incidence gap. The differences between Māori and non-Māori were greater in the most deprived decile.

The higher levels of deprivation in the Māori population accounted for approximately 27% of the incidence disparity and 15% of the mortality disparity.

Figure 2.2: Cancer registration and death age-standardised rates by deprivation decile, 2002–2006



By rural–urban status

Sixty-two percent of Māori who were diagnosed with cancer during 2002–2006 were living in main urban areas at the time of registration, 20% in independent urban areas (small towns) and 18% in rural areas. Among non-Māori, the proportions were 74%, 15%, and 10% respectively.

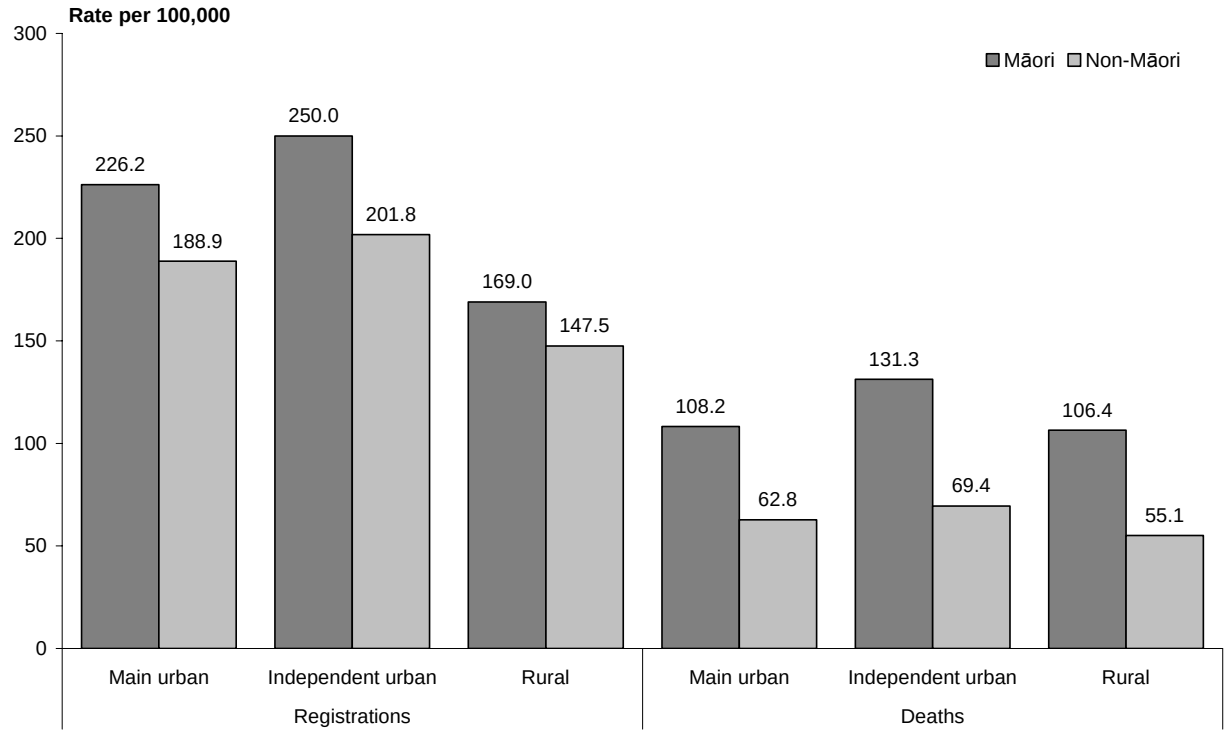
Cancer incidence was significantly lower among Māori living in rural areas compared to Māori living in main urban areas while cancer mortality was similar. Among non-Māori, cancer incidence and mortality were both significantly lower in rural areas than in main urban areas.

Māori living in small towns had higher cancer incidence and mortality than Māori living in main urban areas or rural areas. Among non-Māori, cancer incidence and mortality were also higher in small towns than in main urban or rural areas.

The incidence of cancer was 20% higher among Māori compared to non-Māori in main urban areas, 24% higher in independent urban areas and 15% higher in rural areas. Māori cancer mortality rates were around 72% higher than those of non-Māori in main urban areas, and around 90% higher in independent urban and rural areas.

Adjusting Māori:non-Māori ratios for rural–urban status resulted in a negligible increase (1%).

Figure 2.3: Cancer registrations and deaths by rural–urban status, 2002–2006



MOST COMMON CANCERS 2002–2006

Registrations

Lung cancer was the most commonly occurring cancer for Māori overall, accounting for 20% of all cancers (compared to 9% for non-Māori). Breast, prostate, colorectal, and stomach cancers were the next most frequent. Among non-Māori, the most common types were colorectal, prostate, breast, melanoma of the skin, and lung cancer. These patterns were also consistent across each rural–urban area, except for non-Māori in rural areas where prostate ranked highest and melanoma third.

For Māori females, breast cancer was the most common (31%) followed by lung (19%), colorectal (6%), uterine (6%), stomach and cervical cancer (4% each). For non-Māori females, breast (27%), colorectal (16%), melanoma (11%), lung (8%) and uterine (4%) were the most common cancers.

Among Māori males, lung cancer (20%) and prostate cancer (20%) were the most common, followed by colorectal (9%), stomach (5%) and liver cancer (5%). For non-Māori males, prostate cancer was the most common (28%) followed by colorectal (15%), melanoma of the skin (11%), lung (10%), and bladder cancers (4%).

Table 2.1: Cancer registrations and deaths, five leading sites, 2002–2006

Rank	Māori			Non-Māori		
	Site	Number	% of new cases	Site	Number	% of new cases
Registrations						
1	Lung	1,430	19.5%	Colorectal	13,061	15.5%
2	Female breast	1,244	17.0%	Prostate	12,475	14.8%
3	Prostate	664	9.1%	Female breast	10,868	12.9%
4	Colorectal	548	7.5%	Melanoma of skin	9,493	11.3%
5	Stomach	320	4.4%	Lung	7,273	8.6%
Deaths						
1	Lung	1,158	31.1%	Lung	6,242	17.4%
2	Female breast	362	9.7%	Colorectal	5,567	15.5%
3	Colorectal	269	7.2%	Female breast	2,814	7.8%
4	Stomach	221	5.9%	Prostate	2,685	7.5%
5	Prostate	166	4.5%	Pancreas	1,524	4.2%

Deaths

Lung cancer was the leading cause of cancer death, accounting for 31% of Māori and 17% of non-Māori cancer deaths. Female breast, colorectal, stomach and prostate cancers were the next most common for Māori. Cancers of unknown primary site ranked fifth for Māori males (followed by liver cancer) and ranked fifth for Māori females (followed by pancreatic cancer).

Among non-Māori males, lung, colorectal, prostate, cancers of unknown primary site, and melanoma were the leading causes of cancer death. For non-Māori females, the most common were colorectal, breast, lung, cancers of unknown primary site, and ovarian cancers.

By area deprivation

Among Māori, lung, breast, prostate and colorectal were the four leading cancer sites across all deprivation quintiles, with some variation across quintiles. The fifth most common was stomach cancer in most quintiles, with leukaemia in quintile 4. Prostate, colorectal, breast, melanoma and lung were the five leading sites for non-Māori in all quintiles, with colorectal leading in the three most deprived quintiles.

Lung cancer accounts for an increasing proportion of all cancers with increasing deprivation for both Māori and non-Māori. Among non-Māori, prostate and melanoma decrease as a proportion of all cancers with increasing deprivation.

Table 2.2: Cancer registrations, five leading cancers, by deprivation quintile, 2002–2006

Rank	NZDep2001 quintile 1			NZDep2001 quintile 2			NZDep2001 quintile 3			NZDep2001 quintile 4			NZDep2001 quintile 5		
		No.	% of new cases		No.	% of new cases		No.	% of new cases		No.	% of new cases		No.	% of new cases
Māori															
1	Breast	65	17.5	Lung	114	17.7	Breast	192	18.3	Lung	336	19.6	Lung	722	20.5
2	Lung	60	16.2	Breast	108	16.7	Lung	181	17.2	Breast	302	17.6	Breast	573	16.2
3	Colorectal	37	10.0	Prostate	60	9.3	Prostate	97	9.3	Prostate	163	9.5	Prostate	304	8.6
4	Prostate	32	8.6	Colorectal	54	8.4	Colorectal	94	8.9	Colorectal	134	7.8	Colorectal	224	6.4
5	Stomach	18	4.9	Stomach	24	3.7	Stomach	50	4.7	Leukaemia	63	3.7	Stomach	176	5.0
Non-Māori															
1	Prostate	2,364	16.2	Prostate	2,512	15.6	Colorectal	2,887	15.7	Colorectal	3,235	16.2	Colorectal	2,243	15.0
2	Colorectal	2,192	15.0	Colorectal	2,475	15.3	Prostate	2,680	14.6	Prostate	2,856	14.3	Prostate	2,022	13.5
3	Breast	2,106	14.4	Breast	2,204	13.7	Breast	2,353	12.8	Breast	2,395	12.0	Breast	1,777	11.9
4	Melanoma	1,893	13.0	Melanoma	1,973	12.2	Melanoma	2,125	11.6	Melanoma	2,045	10.2	Lung	1,610	10.8
5	Lung	897	6.1	Lung	1,198	7.4	Lung	1,609	8.8	Lung	1,945	9.7	Melanoma	1,428	9.6

Quintile 1 is least deprived, Quintile 5 is most deprived.

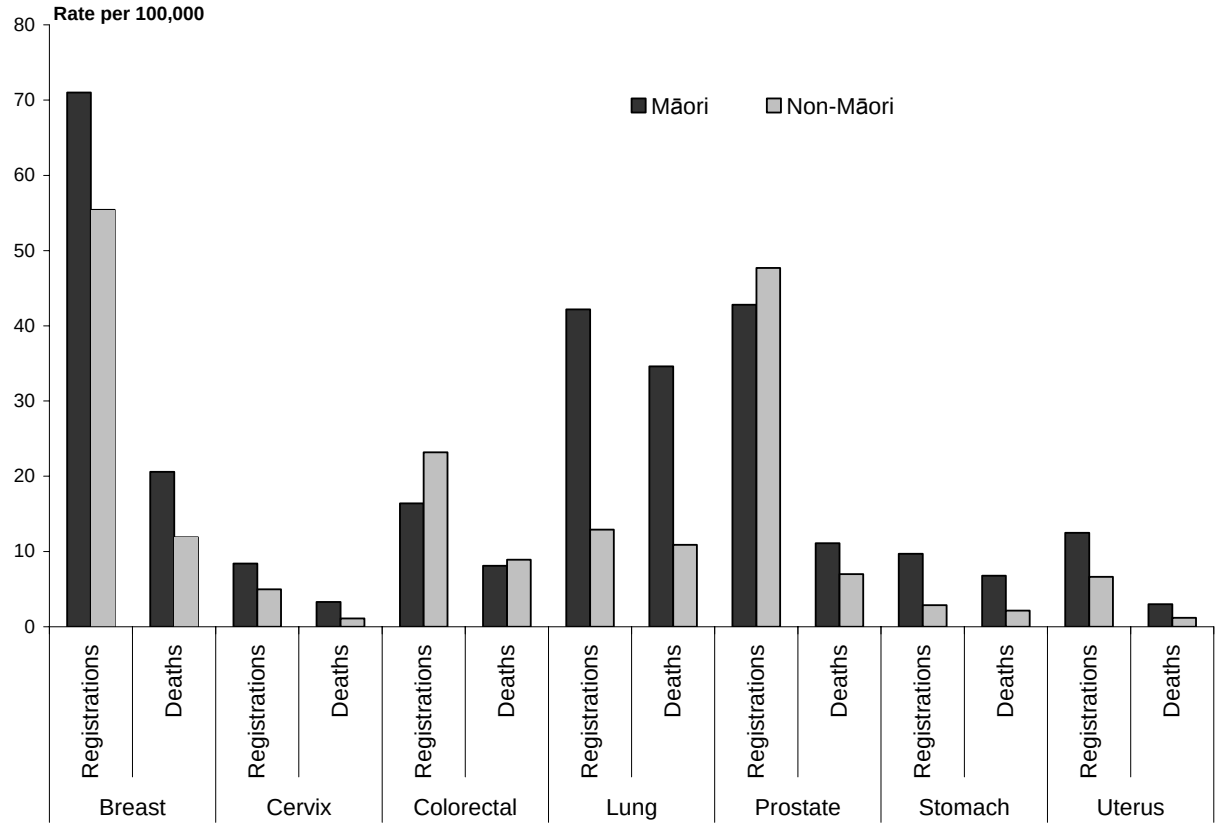
Lung and breast cancers were the leading causes of cancer death for Māori in each deprivation quintile, with colorectal ranking third in four deciles and stomach ranking third in the most deprived quintile. Among non-Māori, lung and colorectal cancer were the leading causes of cancer death in each quintile, with lung cancer ranking highest in the three most deprived quintiles.

SELECTED CANCERS: REGISTRATIONS AND DEATHS 2002-2006

This chapter presents data on Māori and non-Māori incidence and mortality from breast, cervical, colorectal, lung, prostate, stomach and uterine cancers. The first part reports Māori and non-Māori age-standardised rates for the five-year period 2002–2006 and time trends (calculated using Poisson regression) for the period 1996–2006. Information on incidence and mortality patterns by deprivation and by rural–urban status for the period 2002–2006 follows. Detailed tables can be found in sections 3–5.

Māori and non-Māori cancer registrations and deaths

Figure 2.4: Cancer registrations and deaths, selected cancers, age-sex-standardised rates, 2002–2006



During the period 2002–2006, breast, cervical, lung, stomach, and uterine cancers were more common among Māori than non-Māori. Mortality rates were also higher among Māori for these cancers. The mortality gaps for lung and stomach cancers mirrored the incidence gaps but for breast, cervical and uterine cancers the mortality gaps were wider than the incidence gaps.

Colorectal cancer was more common among non-Māori but death rates were similar to those of Māori. Prostate cancer was also more common among non-Māori men but Māori death rates were higher than those of non-Māori men.

Breast cancer

During the period 2002–2006, on average, around 250 Māori women were diagnosed with breast cancer each year and approximately 72 died from breast cancer. Among non-Māori women, there were 2,175 registrations per year on average and 563 deaths. The age-standardised breast cancer incidence rate for Māori was 28% higher than the rate for non-Māori, while the death rate was 73% higher.

During the period 1996–2006, there were no significant changes in breast cancer incidence rates among Māori or non-Māori women. However, there was a significant decrease in mortality rates of 5% per year among non-Māori women, and a non-significant decrease of 2% per year among Māori women.

Cervical cancer

During 2002–2006, 29 Māori women per year on average were diagnosed with cervical cancer and 12 died from this cancer. Among non-Māori women, there were 137 registrations per year on average and 48 deaths. The incidence rate for Māori for the period 2002–2006 was 70% higher than the non-Māori rate and the mortality rate was 2.9 times higher.

During the period 1996–2006, there were significant decreases in cervical cancer incidence and mortality among both Māori and non-Māori women, with significantly steeper declines among Māori. The incidence decreased by 9% per year among Māori women and by 4% per year among non-Māori women. Māori mortality rates decreased by 11% per year and non-Māori rates decreased by 5% per year.

Colorectal cancer

During 2002–2006, around 110 Māori were diagnosed with colorectal cancer per year on average and 54 died from this cancer per year. Among non-Māori there were 2,610 registrations and 1,113 deaths per year on average. The Māori age-sex-standardised colorectal cancer incidence rate was about a third lower than the non-Māori rate, but the mortality rate was similar to the non-Māori rate. Colorectal cancer was more common among males than females among both Māori and non-Māori.

Over the period 1996–2006, there was a significant increase of 4% per year in the incidence of colorectal cancer among Māori women but no change in mortality. There were no changes in incidence or mortality among non-Māori women.

There was no change in colorectal cancer incidence among Māori or non-Māori men. Mortality rates decreased by 2% per among both Māori and non-Māori men, although the trend was only significant for non-Māori.

Lung cancer

During 2002–2006, approximately 285 Māori were diagnosed with lung cancer per year on average and 230 died from the disease per year. Among non-Māori, there were 1,455 registrations per year on average and 1,250 deaths. The age-sex-standardised incidence and mortality rates for Māori were over three times the non-Māori rates. Among Māori, males and females had similar rates of lung cancer, while among non-Māori, rates were higher for males than for females.

Over the period 1996–2006, there was a non-significant decrease of 1% per year in lung cancer incidence among Māori males and a significant decrease of 3% per year among non-Māori males. Incidence rates among females showed a non-significant increase of 1% for Māori females and no change for non-Māori females.

Lung cancer mortality rates decreased significantly among males – Māori rates by 5% per year and non-Māori rates by 3% per year. There was a non-significant decrease in mortality rates of 1% for Māori females and no change for non-Māori females.

Prostate cancer

On average, just over 130 Māori men were diagnosed with prostate cancer each year, and around 33 died from the disease during 2002–2006. Among non-Māori men, on average 2,495 per year were diagnosed with prostate cancer and nearly 540 per year died from the cancer. The Māori age-standardised registration rate was about 10% lower than the non-Māori rate while the death rate was 60% higher.

Over the period 1996–2006, there were no significant changes in incidence or mortality for Māori men. Among non-Māori men there was no change in incidence but there was a significant decrease in mortality of 2% per year.

Stomach cancer

On average, 64 Māori per year were diagnosed with stomach cancer and 44 died from the cancer per year during 2002–2006. Among non-Māori, around 315 were diagnosed with and 245 died from stomach cancer per year on average. The age-sex-standardised incidence and mortality rates for Māori were around three times the non-Māori rates. Stomach cancer was more common among males than females for both Māori and non-Māori.

Over the period 1996–2006, there was a non-significant decrease of 1% per year in stomach cancer incidence among Māori males and females, and a significant decrease of 4% per year among non-Māori males and females. Mortality decreased by a non-significant 3% per year among Māori females and a significant 3% per year among non-Māori females. Among males there was a significant decrease in mortality of 5% per year among Māori males and 3% per year among non-Māori males.

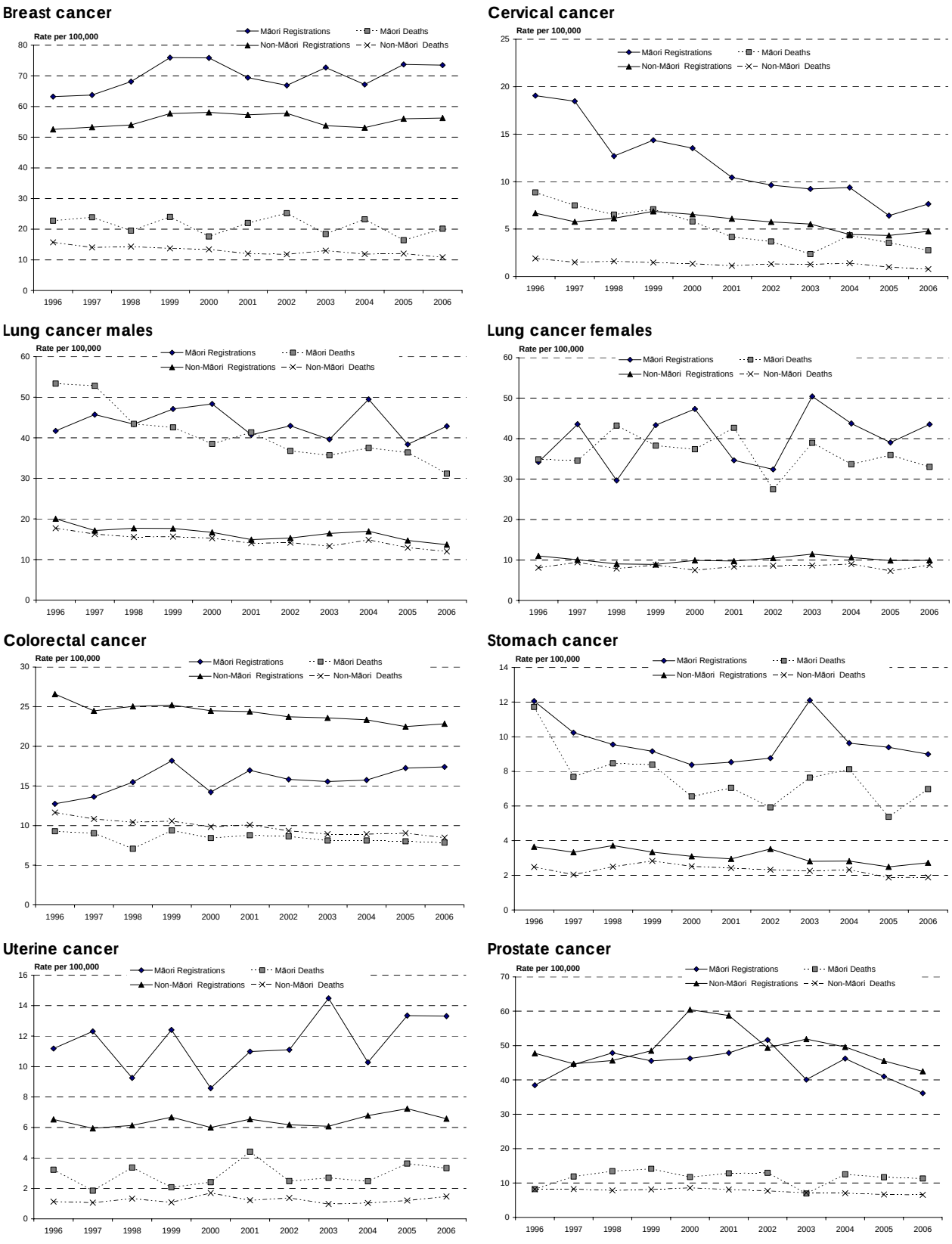
Uterine cancer

During 2002–2006, 45 Māori women per year on average were diagnosed with uterine cancer and 11 died from the disease. Among non-Māori women, there were just over 300 registrations per year on average and 75 deaths. The Māori age-standardised incidence rate was 90% higher than the non-Māori rate and the death rate was 140% higher.

Over the period 1996–2006, there was a significant increase in uterine cancer incidence among Māori women of 2% per year and a non-significant increase in mortality rates of 2% per year. There were no changes in incidence or mortality among non-Māori women.

Figure 2.5 below shows age-standardised cancer incidence and mortality rates by year over the period 1996–2006. The time trends described above were estimated using regression modelling. Due to changes in ethnicity data quality over time, we can be more confident of decreasing trends than of increasing trends, which could be partly explained by improved counting of Māori cancer registrations and deaths over time.

Figure 2.5: Incidence and mortality rates by year for selected cancers, 1996–2006



Selected cancers by area deprivation

The association between increasing deprivation and cancer incidence or mortality varied by cancer and in some cases differed between Māori and non-Māori. Figures 2.6 and 2.7 show Māori and non-Māori age-sex-standardised registration and death rates by deprivation quintile for selected cancers for the period 2002–2006.

Figure 2.6: Cancer registrations, selected cancers, age-sex-standardised rates by deprivation quintile, 2002–2006

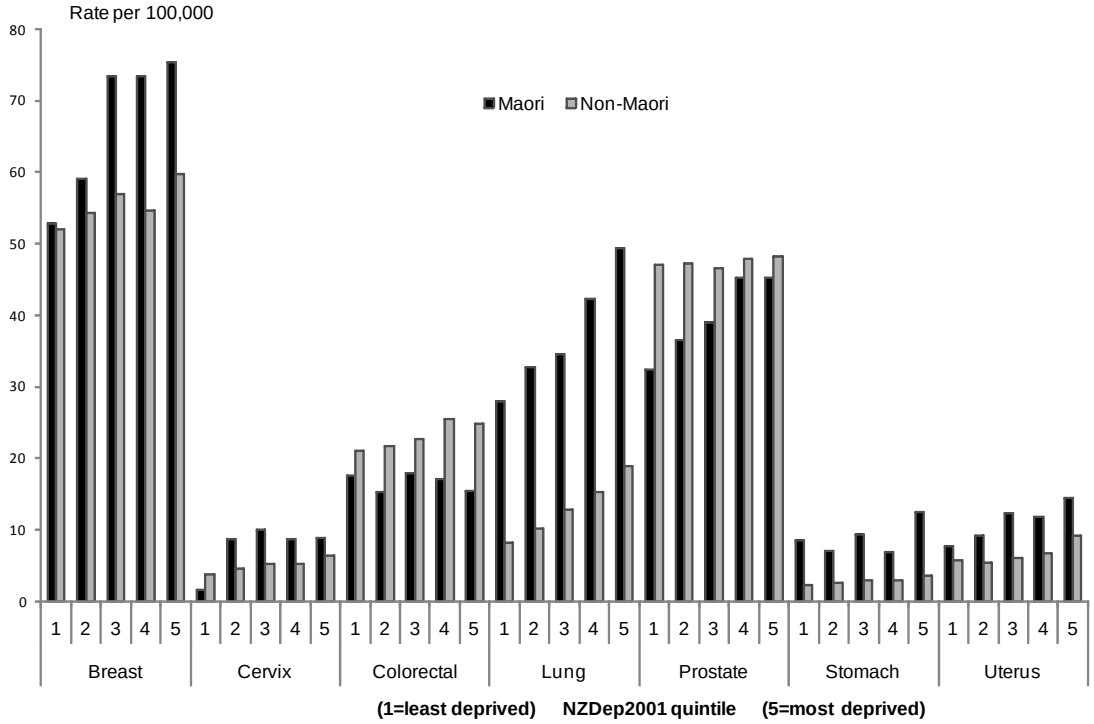
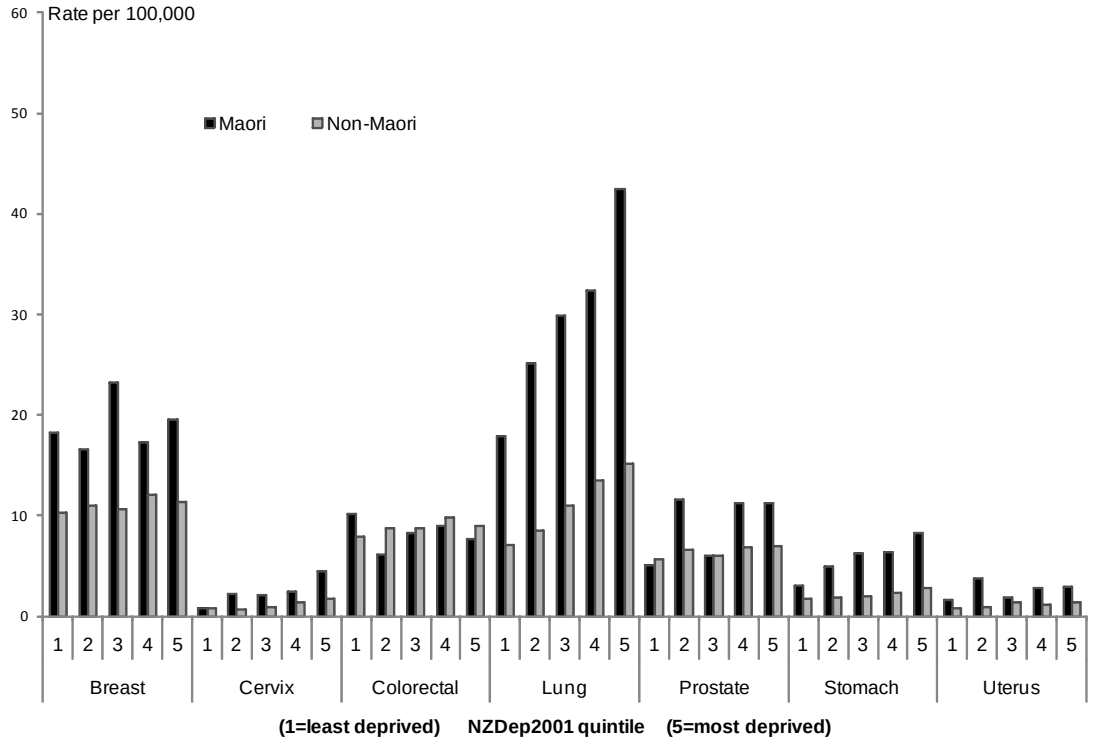


Figure 2.7: Cancer deaths, selected cancers, age-sex-standardised rates by deprivation quintile, 2002–2006



- Breast cancer incidence was significantly associated with increasing deprivation among both Māori and non-Māori women. Deprivation accounted for 11% of the disparity in incidence between Māori and non-Māori women. Breast cancer mortality, however, was not associated with deprivation for Māori or non-Māori women.
- The association between deprivation and cervical cancer incidence was statistically significant for non-Māori women but not for Māori women. The deprivation gradient for cervical cancer mortality was significant for both Māori and non-Māori women. Deprivation accounted for just over a quarter of the incidence and mortality disparities between Māori and non-Māori women.
- Colorectal cancer incidence and mortality were not associated with deprivation for Māori. Among non-Māori, there was a weak but statistically significant association between deprivation and colorectal cancer incidence and mortality.
- Lung cancer incidence and mortality was highly associated with increasing deprivation for both Māori and non-Māori. Deprivation accounted for between 16% and 25% of the incidence and mortality disparities between Māori and non-Māori men and women.
- Prostate cancer incidence was associated with increasing deprivation for Māori men but not for non-Māori. The deprivation gradient for mortality was significant for non-Māori. For Māori men it was steeper than for non-Māori men but not statistically significant.
- Stomach cancer incidence and mortality were significantly associated with deprivation among Māori and non-Māori. The higher proportion of Māori living in deprived areas accounted for 8–14% of the disparities in incidence and mortality between Māori and non-Māori men and women.
- Uterine cancer incidence was strongly associated with increasing deprivation among both Māori and non-Māori. The deprivation gradient for uterine cancer mortality was significant for non-Māori but not for Māori women. Deprivation accounted for 22% of the incidence disparity and 15% of the mortality disparity between Māori and non-Māori women.

Table 2.3: Māori:non-Māori incidence and mortality ratios adjusted for age and deprivation, by sex, 2002–2006

Cancer	Registrations		Deaths	
	Ratio adjusted for age (95% CI)	Ratio adjusted for age and deprivation (95% CI)	Ratio adjusted for age (95% CI)	Ratio adjusted for age and deprivation (95% CI)
Females				
Breast	1.31 (1.22–1.41)	1.27 (1.19–1.36)	1.84 (1.61–2.11)	1.86 (1.67–2.07)
Cervix	1.84 (1.36–2.51)	1.62 (1.31–2.00)	3.64 (2.87–4.62)	2.96 (2.27–3.86)
Colorectal	0.66 (0.57–0.77)	0.64 (0.56–0.73)	0.89 (0.67–1.18)	0.89 (0.74–1.06)
Lung	4.09 (3.77–4.44)	3.48 (3.17–3.82)	4.86 (4.29–5.49)	4.23 (3.84–4.65)
Stomach	4.28 (3.54–5.17)	3.83 (3.13–4.69)	3.93 (2.97–5.21)	3.56 (2.86–4.44)
Uterus	1.92 (1.67–2.22)	1.72 (1.49–2.00)	2.76 (2.11–3.60)	2.49 (1.90–3.26)
Males				
Colorectal	0.76 (0.68–0.86)	0.72 (0.63–0.83)	1.09 (0.97–1.22)	1.07 (0.91–1.26)
Lung	2.82 (2.59–3.06)	2.37 (2.16–2.59)	3.04 (2.61–3.53)	2.60 (2.39–2.83)
Prostate	0.91 (0.84–0.98)	0.90 (0.81–1.00)	1.74 (1.50–2.02)	1.72 (1.48–2.01)
Stomach	2.95 (2.51–3.48)	2.71 (2.26–3.25)	2.97 (2.52–3.50)	2.82 (2.34–3.39)

Selected cancers by rural–urban status

Figure 2.8: Cancer registrations by rural–urban status, selected cancers, age-sex-standardised rates, 2002–2006

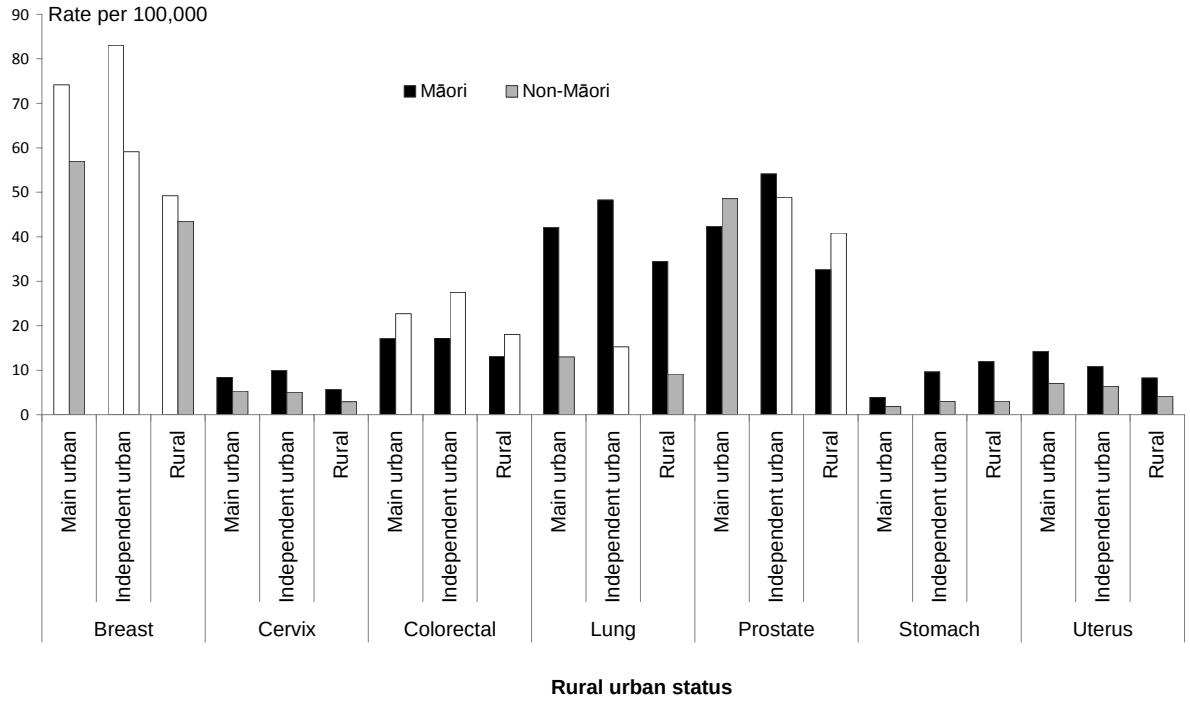
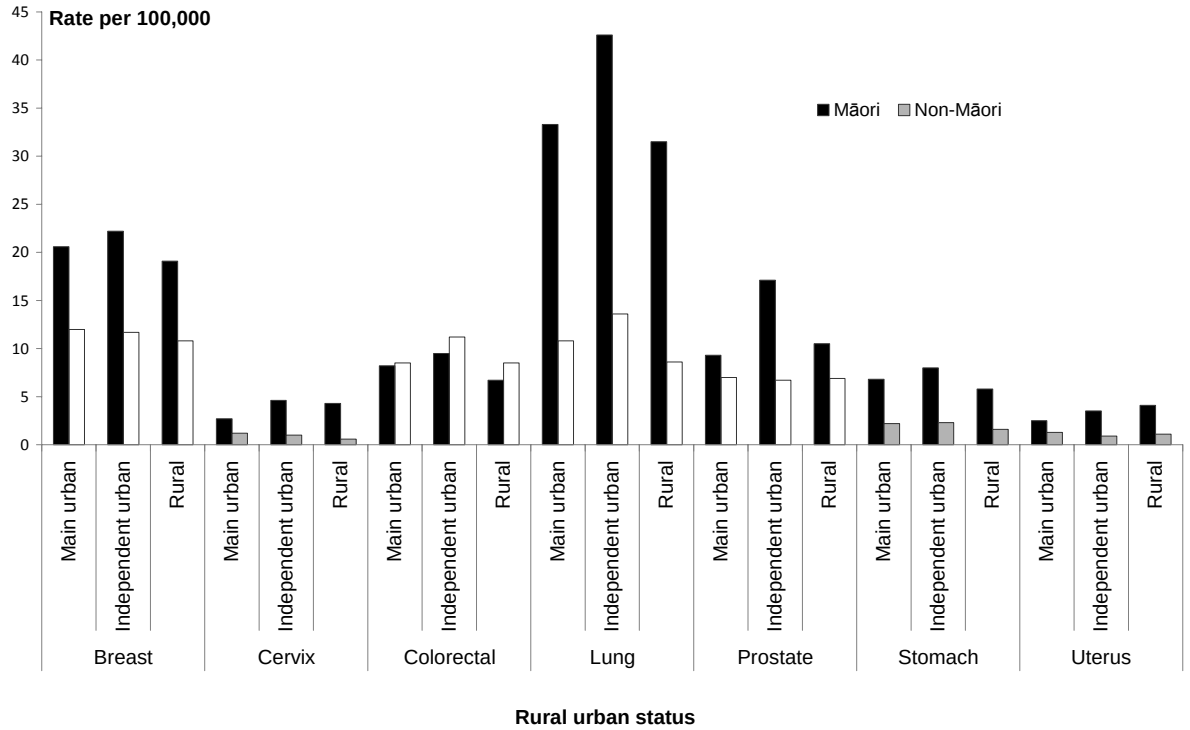


Figure 2.9: Cancer deaths by rural–urban status, selected cancers, age-sex-standardised rates, 2002–2006



The incidence of most of the selected cancers was lower among rural residents compared to main urban residents for both Māori and non-Māori. Mortality rates however were similar to or in some cases even higher than those of main urban residents.

Residents of independent urban areas (small towns) generally had similar or higher incidence and mortality rates than main urban residents.

- Breast cancer incidence was significantly lower in rural areas compared to main urban areas among both Māori and non-Māori women. There was no difference in incidence between main urban and independent urban areas for Māori or non-Māori. There were no significant differences in breast cancer mortality by urban–rural residency.
- Cervical cancer incidence was lower in rural areas compared to main urban areas, but the difference was only significant for non-Māori women. There were no differences in incidence between residents of main urban and independent urban areas. There were no significant differences in Māori mortality rates between area types but among non-Māori, rural residents had significantly lower mortality rates than main urban or independent urban residents.
- Colorectal cancer incidence was significantly lower among rural residents for both Māori and non-Māori. Among Māori, there was no difference in incidence between main urban and independent urban residents, but among non-Māori, small town residents had significantly higher incidence than had rural or main urban residents.
- Lung cancer incidence and mortality was significantly higher in independent urban areas than main urban or rural areas. Rural residents had significantly lower incidence than main urban or independent urban areas among both Māori and non-Māori. Rural mortality rates were also lower, but only significant for non-Māori.
- Prostate cancer incidence was significantly lower among Māori and non-Māori rural residents compared to main urban residents. Māori men living in independent urban areas had higher incidence than main urban areas but there was no difference for non-Māori. Among Māori, prostate cancer death rates were significantly higher in independent urban areas, but rural and main urban areas had similar rates. There was no difference in mortality by area among non-Māori men.
- Stomach cancer incidence and mortality was lower among rural residents than main urban residents, but only significant for non-Māori. There was no significant difference in incidence or mortality rates between independent urban and main urban residents for either group.
- Uterine cancer was significantly less common among rural residents for both Māori and non-Māori women, but mortality rates were similar to those of main urban residents. There was no significant difference in incidence or mortality rates between main urban and independent urban residents.

Adjusting for rural–urban status increased the Māori:non-Māori ratios slightly for most cancers.

STAGE AT DIAGNOSIS 1996–2006

'Stage at diagnosis' refers to the extent of disease spread and is classified as:

- localised
- regional (spread to adjacent tissue or organ and/or involves regional lymph nodes)
- distant (spread to distant organs, tissues or to distant lymph nodes)
- unknown.[2]

The data in this chapter includes cancers registered during the 11-year period 1996–2006. Data for the period 2002–2006 can be found in Appendix 4.

- During the period 1996–2006, stage at diagnosis was unknown for the majority of prostate cancer registrations (over 75%), around half of lung cancer registrations, and nearly 40% of cervical cancer registrations. A quarter of Māori stomach cancer registrations and a third of non-Māori also did not have stage recorded on the registration (Figure 2.10).
- After adjusting for sex and age at diagnosis, Māori had significantly higher odds than non-Māori of having stage at diagnosis not recorded on the registration for most of the selected cancers (female breast, cervix, colorectal, lung, and prostate cancers).
- The majority of breast, cervical, colorectal, and uterine cancers were diagnosed at the localised or regional stage for both Māori and non-Māori. Only a small proportion of lung, prostate cancers and around a third of stomach cancers were diagnosed at the earlier stages of disease spread (Figure 2.10).
- Among those for whom stage information was recorded, Māori had significantly lower odds than non-Māori of being diagnosed at a localised stage, and higher odds of being diagnosed at a distant stage for most of the key cancers (breast, cervical, colorectal, lung, and prostate cancers) (Figure 2.11).

[2] 'Unknown stage at diagnosis' indicates the data was missing from the registration. It could mean the cancer was not staged, or it could mean the cancer was not staged in time to be recorded on the registration.

Figure 2.10: Distribution of stage at diagnosis for key cancers, 1996–2006

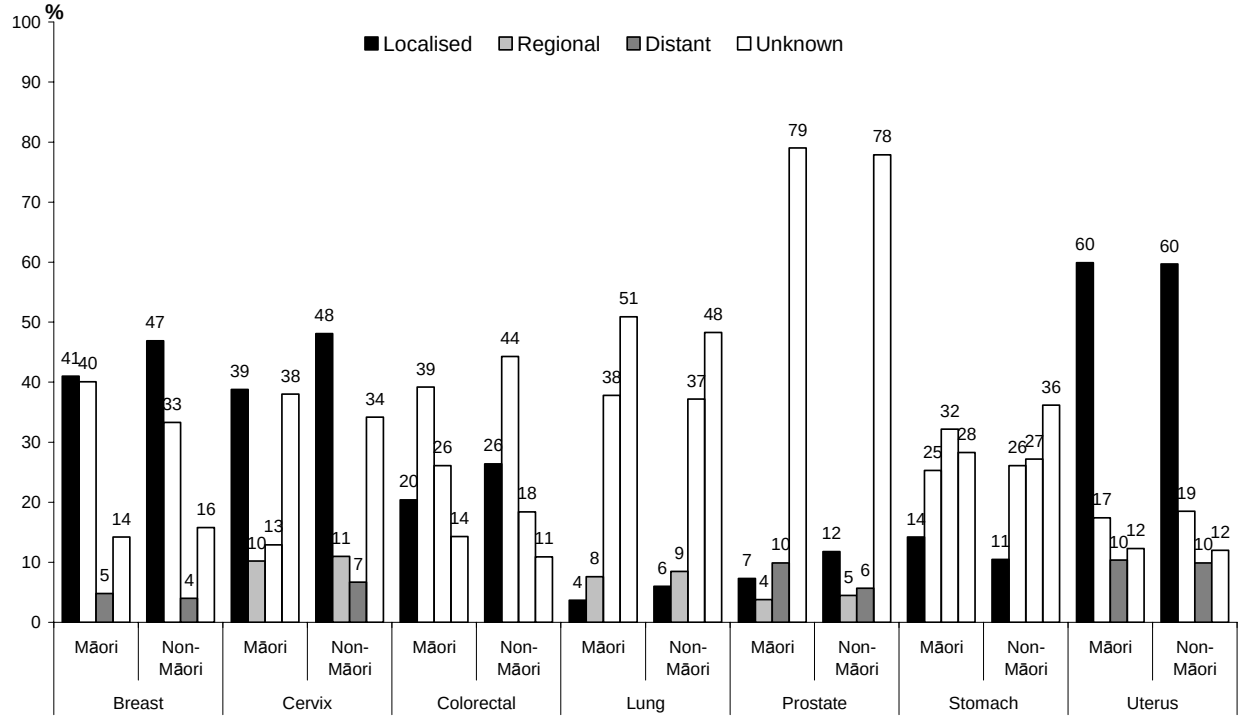
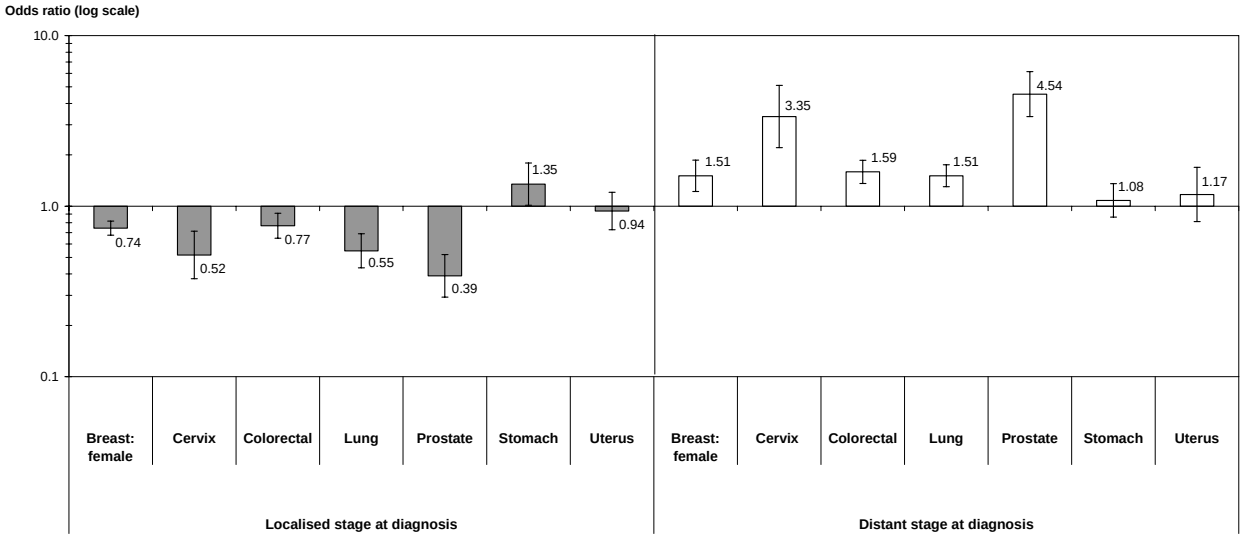


Figure 2.11: Māori:non-Māori odds ratios for localised or distant stage at diagnosis, adjusted for age and sex, 1996–2006



Stage at diagnosis and area deprivation

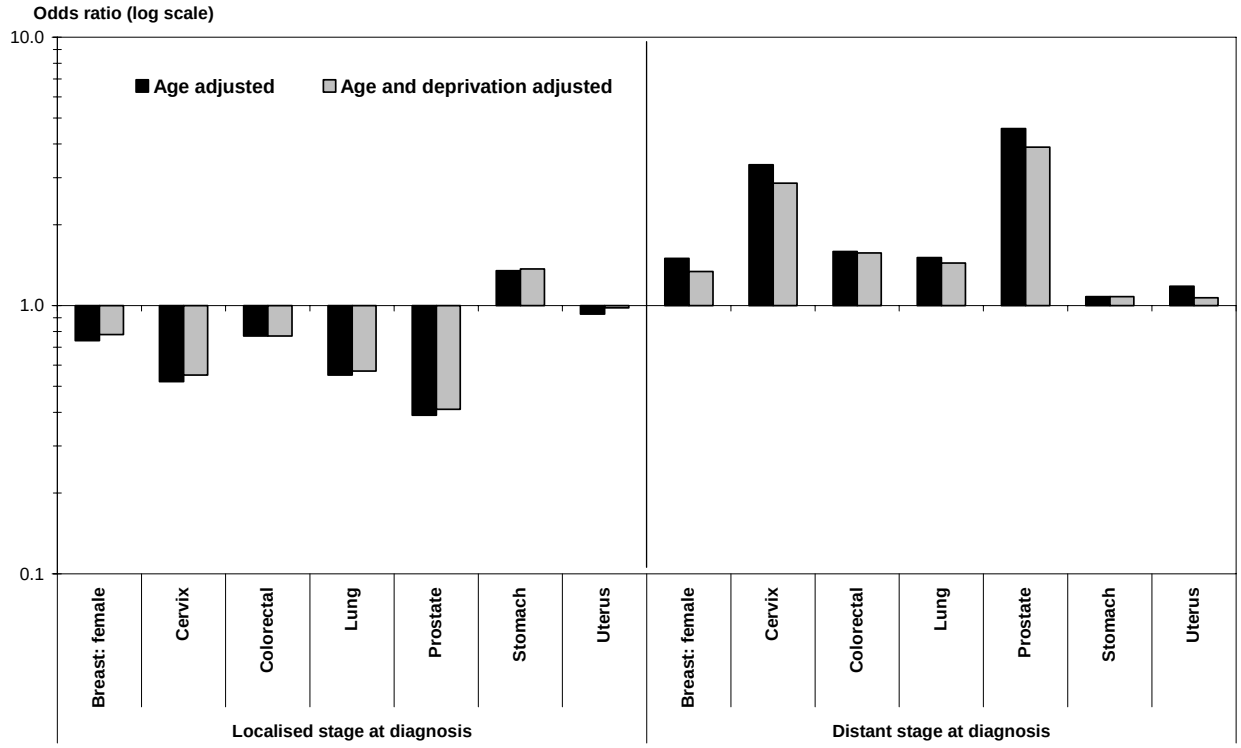
- During the 11-year period 1996–2006, there were no statistically significant associations between unknown stage at diagnosis and deprivation among Māori, although the estimated gradient was steep for cervical cancer registrations. Among non-Māori there was a significant association between unknown stage and increasing deprivation for lung and prostate cancers.
- The association between localised or distant stage at diagnosis and deprivation was not significant for any of the major cancers among Māori, which may be due to small numbers.
- Increasing deprivation was associated with a decreasing chance of being diagnosed at an early stage of disease for non-Māori with breast, lung, and prostate cancers after adjusting for sex and age at diagnosis. Conversely there was an increasing chance of diagnosis at a late stage of disease spread with increasing deprivation for non-Māori with breast, colorectal, lung, prostate, and uterine cancers.

Table 2.4: Stage at diagnosis: deprivation gradients adjusted for age and sex, 1996–2006

Cancer	Deprivation gradient (rate of change per decile)			
	Māori		Non-Māori	
Unknown stage				
Breast: female	0.990	(0.919–1.066)	1.020	(0.998–1.042)
Cervix	1.167	(0.991–1.374)	1.022	(0.962–1.085)
Colorectal	0.979	(0.883–1.085)	1.000	(0.981–1.020)
Lung	1.022	(0.973–1.073)	**1.031**	**(1.013–1.050)**
Prostate	0.978	(0.899–1.064)	**1.019**	**(1.003–1.034)**
Stomach	1.054	(0.942–1.180)	1.025	(0.985–1.066)
Uterus	1.021	(0.821–1.270)	0.997	(0.940–1.058)
Localised stage				
Breast: female	0.984	(0.935–1.036)	**0.974**	**(0.960–0.989)**
Cervix	1.047	(0.852–1.286)	0.966	(0.885–1.053)
Colorectal	0.974	(0.894–1.062)	1.007	(0.993–1.022)
Lung	0.966	(0.858–1.086)	**0.960**	**(0.925–0.997)**
Prostate	1.022	(0.864–1.210)	**0.947**	**(0.920–0.974)**
Stomach	1.072	(0.922–1.246)	0.982	(0.925–1.042)
Uterus	0.981	(0.863–1.116)	0.964	(0.925–1.004)
Distant stage				
Breast: female	1.084	(0.958–1.227)	**1.073**	**(1.034–1.114)**
Cervix	1.175	(0.926–1.492)	1.105	(0.979–1.247)
Colorectal	1.011	(0.932–1.097)	**1.017**	**(1.000–1.034)**
Lung	1.053	(0.975–1.136)	**1.050**	**(1.022–1.079)**
Prostate	0.907	(0.756–1.086)	**1.148**	**(1.101–1.198)**
Stomach	0.906	(0.809–1.013)	1.041	(0.995–1.089)
Uterus	0.976	(0.806–1.181)	**1.100**	**(1.032–1.173)**

Note: A gradient above 1 indicates higher odds of diagnosis at the specific stage with increasing deprivation. Conversely a gradient below 1 indicates lower odds with increasing deprivation.

Figure 2.12: Māori:non-Māori odds ratios for localised and distant stage, adjusted for age, sex and deprivation, 1996–2006



The higher proportion of Māori living in socioeconomically deprived areas accounted for a small proportion of the stage differentials between Māori and non-Māori for cancers of the breast, cervix, lung, prostate, and uterus but not for colorectal or stomach cancers.

Stage at diagnosis by rural–urban status

There were few significant differences in stage at diagnosis between main urban and independent urban or rural residents, with few consistent patterns among Māori.

Among non-Māori, the odds of having unknown stage at diagnosis were generally lower among residents of areas outside main urban areas (with the exception of lung cancer), although few odds ratios (ORs) were significant. There were also few significant differences between main urban and other residents in the odds of being diagnosed at localised or distant stage.

Rural–urban status did not appear to contribute to Māori:non-Māori disparities in stage at diagnosis.

Table 2.5: Stage at diagnosis: rural–urban odds ratios (ORs), adjusted for age and sex, 1996–2006

Cancer	Māori		Non-Māori	
	Independent urban:main urban OR	Rural:main urban OR	Independent urban:main urban OR	Rural:main urban OR
Unknown stage				
Breast	1.00 (0.72–1.37)	1.26 (0.90–1.75)	0.95 (0.85–1.05)	0.97 (0.85–1.11)
Cervix	1.07 (0.61–1.90)	0.81 (0.43–1.55)	0.81 (0.58–1.14)	0.71 (0.46–1.08)
Colorectal	1.19 (0.74–1.92)	0.83 (0.50–1.38)	0.90 (0.81–1.00)	**0.86 (0.75–0.99)**
Lung	1.14 (0.93–1.39)	1.09 (0.88–1.34)	1.08 (0.99–1.18)	1.11 (1.00–1.25)
Prostate	0.82 (0.58–1.17)	0.86 (0.59–1.24)	0.99 (0.91–1.08)	0.97 (0.89–1.07)
Stomach	0.86 (0.53–1.40)	**1.61 (1.00–2.59)**	0.85 (0.69–1.03)	0.86 (0.67–1.11)
Uterus	1.89 (0.87–4.12)	1.58 (0.70–3.58)	**0.71 (0.51–0.99)**	0.71 (0.45–1.13)
Localised stage				
Breast	1.03 (0.83–1.29)	0.88 (0.69–1.13)	1.01 (0.94–1.09)	**1.10 (1.01–1.20)**
Cervix	0.99 (0.53–1.83)	1.07 (0.56–2.06)	0.93 (0.67–1.29)	1.20 (0.81–1.76)
Colorectal	0.96 (0.62–1.49)	1.12 (0.74–1.68)	1.05 (0.98–1.13)	0.99 (0.91–1.09)
Lung	0.79 (0.45–1.39)	1.09 (0.65–1.85)	0.94 (0.78–1.12)	1.02 (0.81–1.27)
Prostate	1.16 (0.65–2.06)	1.16 (0.65–2.09)	0.96 (0.86–1.08)	0.99 (0.88–1.11)
Stomach	0.51 (0.27–1.00)	**0.37 (0.17–0.81)**	1.18 (0.88–1.58)	1.28 (0.91–1.81)
Uterus	0.81 (0.46–1.43)	0.64 (0.36–1.15)	1.20 (0.97–1.48)	1.02 (0.78–1.32)
Distant stage				
Breast	1.20 (0.75–1.93)	**0.43 (0.20–0.95)**	0.88 (0.72–1.08)	1.01 (0.80–1.28)
Cervix	0.76 (0.31–1.85)	**2.21 (1.02–4.82)**	0.95 (0.53–1.71)	0.80 (0.36–1.77)
Colorectal	1.07 (0.73–1.59)	0.92 (0.62–1.36)	**1.13 (1.04–1.22)**	1.07 (0.97–1.18)
Lung	0.92 (0.75–1.14)	0.09 (0.72–1.11)	0.98 (0.90–1.07)	0.93 (0.83–1.04)
Prostate	1.25 (0.78–1.99)	1.08 (0.65–1.79)	1.13 (0.98–1.29)	0.94 (0.79–1.12)
Stomach	1.16 (0.75–1.82)	0.86 (0.53–1.40)	1.16 (0.95–1.43)	1.05 (0.81–1.35)
Uterus	1.17 (0.48–2.86)	1.36 (0.57–3.27)	0.78 (0.54–1.12)	0.94 (0.61–1.45)

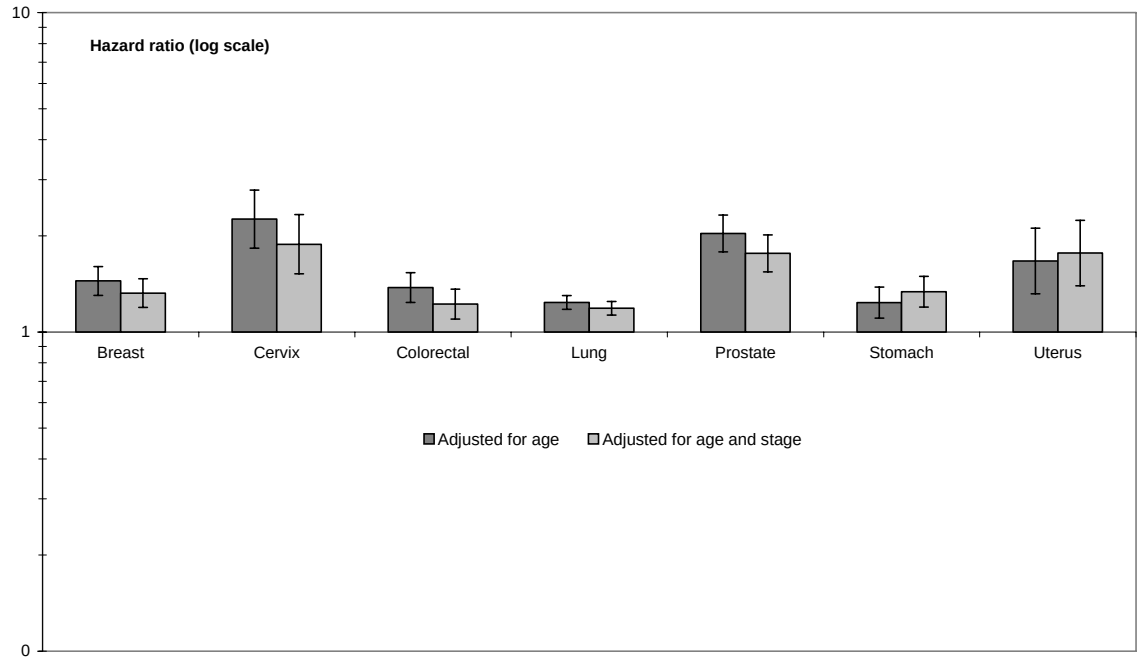
SURVIVAL DISPARITIES 1996–2006

This chapter presents survival disparities over the period 1996–2006, measured using cancer-specific mortality hazard ratios. These are a measure of the relative risk of dying from the cancer after diagnosis, pooled over the whole period.

The hazard ratios in Figure 2.13 estimate the relative risk of dying from the cancer after diagnosis for Māori compared to non-Māori, adjusted firstly for sex and age at diagnosis, and then also for stage at diagnosis. A hazard ratio above 1 indicates that Māori have a higher risk of death than non-Māori (i.e. a survival disadvantage).

Māori:non-Māori survival disparities

Figure 2.13: Māori:non-Māori cancer-specific mortality hazard ratios adjusted for age at diagnosis, and for stage (including unknown stage), 1996–2006



During the period 1996–2006, Māori had a significantly higher age-adjusted risk of dying from their cancer after diagnosis compared to non-Māori for each of the selected cancers. The relative risks ranged from 24% higher for lung and stomach cancers to 103% higher for prostate cancer.

Cervical cancer showed the highest relative risk of death after diagnosis but there was a significant decrease in survival disparities between Māori and non-Māori over the 11 years.

Differential stage at diagnosis accounted for a considerable proportion of the disparities in outcomes for most of the cancers: breast 27%, cervix 30%, colorectal 41%, lung 22%, prostate 26%. However, the relative risks remained significant after adjusting for stage. Stage at diagnosis did not account for any of the disparities in uterine or stomach cancer survival.

Area deprivation survival disparities

Table 2.6 uses hazard ratios (HRs) to estimate the relative risk of dying from cancer after diagnosis for residents of more deprived areas compared to residents of less deprived areas, with the findings presented separately for Māori and non-Māori. These statistics were calculated to find out if there is a cancer survival disadvantage for residents of more deprived areas compared to residents of less deprived areas.

Table 2.6: Deprivation gradients in risk of cancer-specific death after diagnosis, 1996–2006

Cancer	Māori			Non-Māori		
	HR	(95% CI)	p value	HR	(95% CI)	p value
Breast	1.002	(0.963–1.041)	0.93	**1.037**	**(1.025–1.050)**	**<0.0001**
Cervix	1.067	(0.988–1.152)	0.097	1.028	(0.989–1.067)	0.16
Colorectal	1.020	(0.977–1.064)	0.37	**1.018**	**(1.010–1.025)**	**<0.0001**
Lung	1.014	(0.995–1.034)	0.14	**1.018**	**(1.011–1.024)**	**<0.0001**
Prostate	1.043	(0.986–1.104)	0.14	**1.041**	**(1.029–1.054)**	**<0.0001**
Stomach	1.031	(0.988–1.075)	0.16	1.012	(0.997–1.026)	0.11
Uterus	1.002	(0.913–1.100)	0.97	**1.045**	**(1.015–1.077)**	**0.004**

Note: A hazard ratio above 1 indicates increasing risk of death after diagnosis with increasing deprivation. A hazard ratio below 1 indicates a decreasing risk of death with increasing deprivation. The gradients for each cancer were not significantly different for Māori and non-Māori.

Deprivation appears to be associated with poorer cancer-specific mortality outcomes for most of the selected cancers.

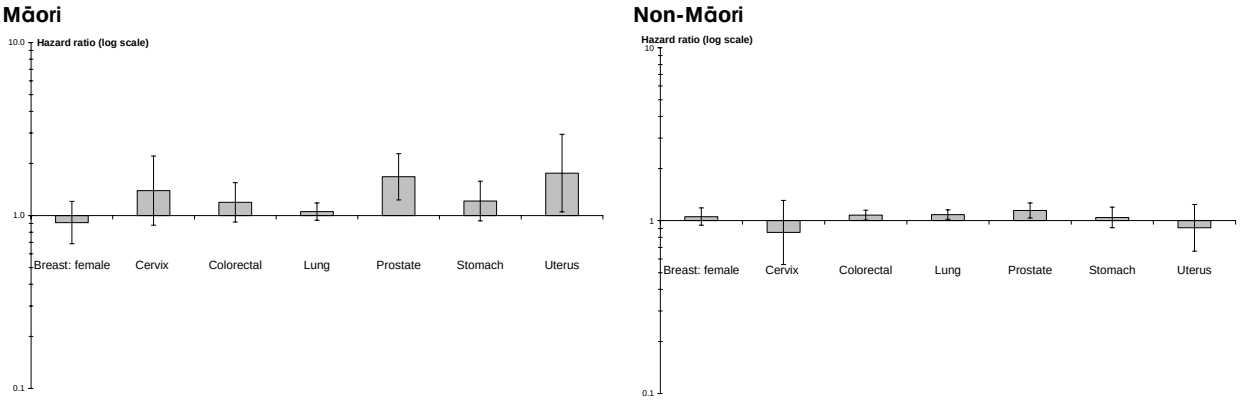
Among Māori, none of the relationships between survival and deprivation were statistically significant but this may be due to small numbers in the less deprived areas. There was a non-significant increasing risk of death (or lower survival) with increasing deprivation for most of the key cancers, with the exception of breast and uterine cancers, which showed no gradient.

Among non-Māori, increasing deprivation was significantly associated with poorer survival chances for breast, colorectal, lung, prostate, and uterine cancers. The hazard ratios for stomach and cervical cancers were not significant but were in the same direction as the other cancers.

Rural–urban survival disparities

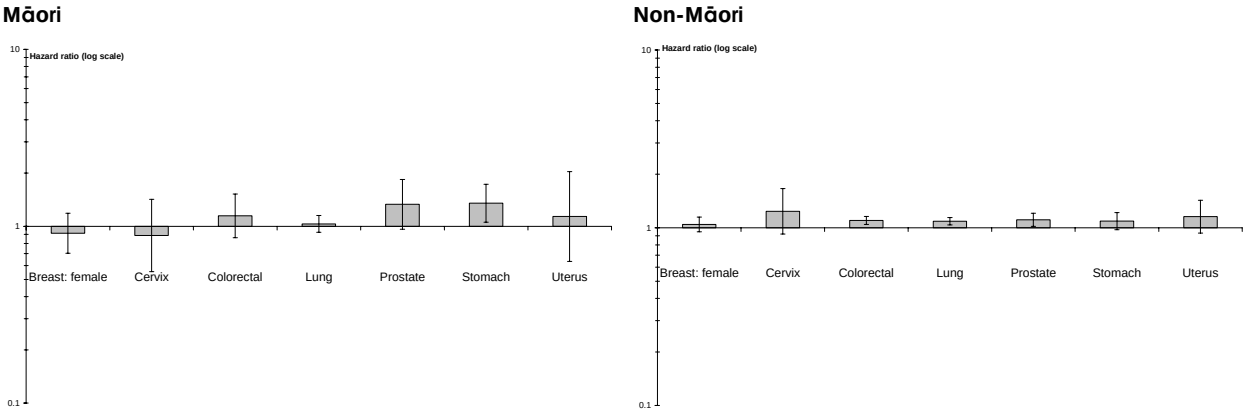
These graphs show the relative risk of dying from the cancer after diagnosis among those living in rural areas at the time of diagnosis compared to those living in main urban areas (Figure 2.14) and among independent urban residents compared to main urban residents (Figure 2.15), during the 11-year period 1996–2006. They aim to show whether there is a rural or urban survival advantage for Māori and non-Māori residents. The hazard ratios are presented separately for Māori and non-Māori and are adjusted for age and sex. They are shown on the log scale.

Figure 2.14: Relative risk of cancer-specific death after diagnosis for rural compared to main urban residents, 1996–2006



Among Māori, rural residents had significantly lower survival (or higher death rates) than their main urban counterparts for prostate and uterine cancers. Among non-Māori, rural residents had significantly lower survival from colorectal, lung, and prostate cancers.

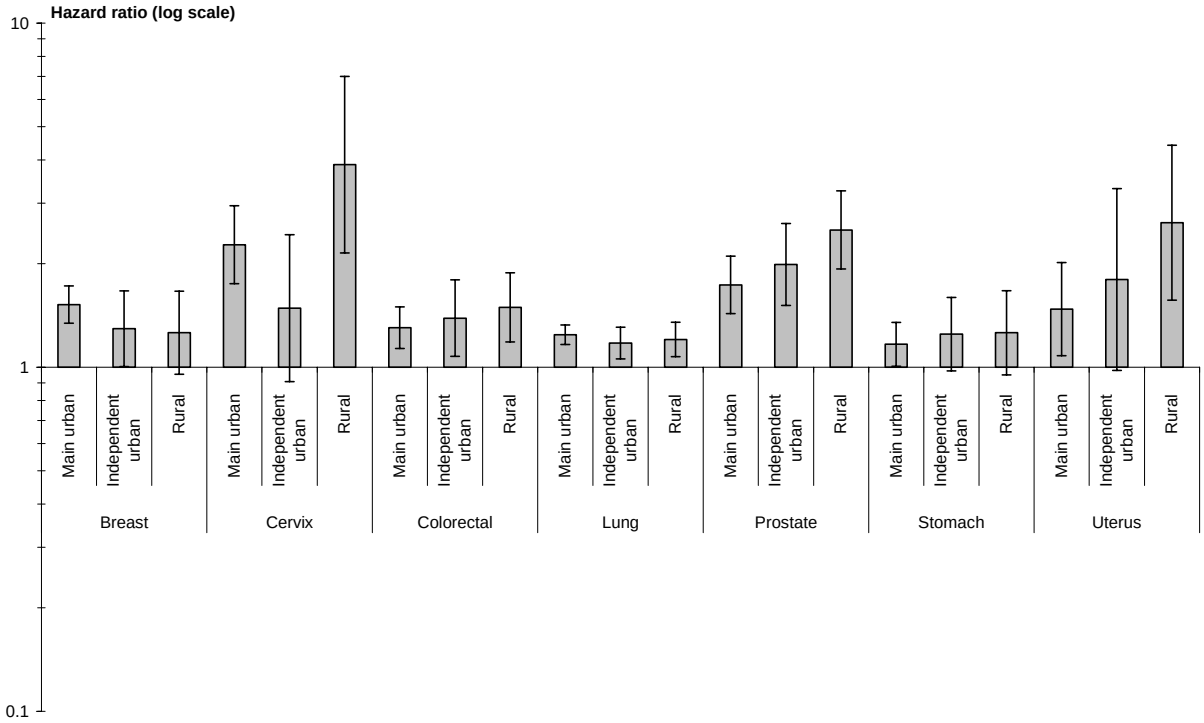
Figure 2.15: Relative risk of cancer-specific death after diagnosis for independent urban compared to main urban residents, 1996–2006



Māori residents of small towns or independent urban areas had significantly lower survival from stomach cancer compared to their main urban counterparts. Among non-Māori, independent urban residents had significantly lower survival from colorectal, lung, and prostate cancers.

Figure 2.16 presents the relative risk of dying from the cancer after diagnosis for Māori compared to non-Māori, by rural–urban residency. These analyses address the question "Are survival disparities between Māori and non-Māori different for residents of main urban, independent urban, or rural areas?"

Figure 2.16: Māori:non-Māori relative risk of cancer-specific death after diagnosis, by rural–urban residency, 1996–2006



Note: Hazard ratio axis on log scale. Hazard ratios above 1 indicate worse survival outcomes for Māori compared to non-Māori.

Disparities in survival outcomes between Māori and non-Māori appear to vary by rural–urban status for some cancers, and in different directions. For example, the Māori:non-Māori hazard ratios were smaller in rural areas compared to main urban areas for breast and lung cancers, but higher in rural areas for cervical, prostate and uterine cancers. However there were no statistically significant differences in hazard ratios between area types. Within each rural–urban area, Māori had higher risk than non-Māori of dying from their cancer after diagnosis.

For breast cancer, the disparity between Māori and non-Māori outcomes is smaller in rural and independent urban areas. This is partly due to worse survival outcomes among non-Māori rural and small town residents compared to main urban residents and partly due to better survival outcomes among Māori in small towns or rural areas compared to main urban areas (see Figures 2.14 and 2.15).

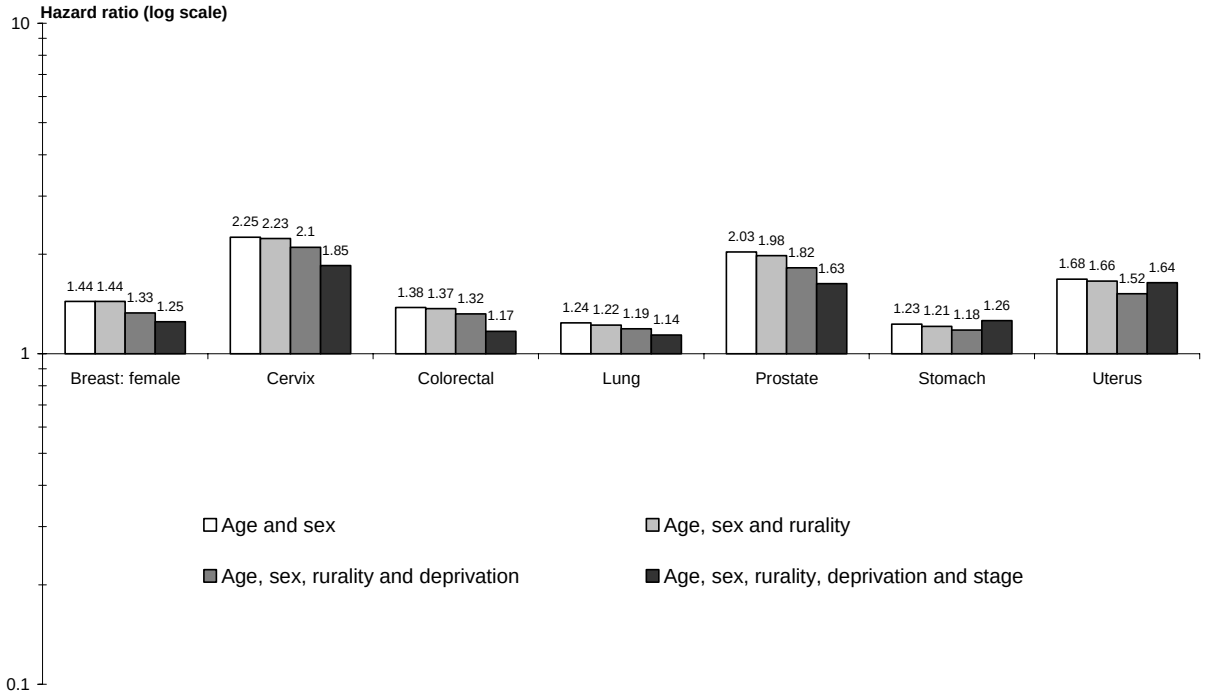
For cervical and uterine cancers, disparities between Māori and non-Māori are greater among those living in rural areas at the time of diagnosis. Māori living in rural areas had worse outcomes than main urban residents for these two cancers while non-Māori in rural areas had better outcomes than main urban residents.

For prostate cancer, gaps between Māori and non-Māori are wider outside main urban centres. Both Māori and non-Māori with prostate cancer have worse survival outcomes outside main urban centres, but the difference is greater for Māori patients.

Māori:non-Māori survival disparities

Figure 2.17 presents the relative risk of death for Māori compared to non-Māori, adjusted for age and sex, and then incrementally adjusted for rural–urban residency at the time of registration, neighbourhood deprivation, and stage at diagnosis. The difference between the height of the bars indicates how much of the survival disparities between Māori and non-Māori can be accounted for by differences in each additional factor.

Figure 2.17: Māori:non-Māori cancer-specific mortality hazard ratios, adjusted for sex and age at diagnosis, rural–urban status, area deprivation, and stage at diagnosis, 1996–2006



Rural–urban status had a negligible impact on disparities in survival outcomes between Māori and non-Māori, however, this may be because the majority of patients were resident in main urban areas, which hence dominate the estimates.

The higher proportion of Māori living in more deprived areas accounted for part of the higher relative risk of death.

Differential stage at diagnosis was important particularly for prostate, cervical, breast, and colorectal cancers, which have better survival chances if detected early. Stage at diagnosis did not contribute to the disparities in outcomes for stomach cancer (for which Māori had higher odds of being diagnosed at localised stage) or uterine cancer (which had a similar stage pattern to non-Māori).

SUMMARY OF SELECTED FINDINGS

Māori: non-Māori cancer outcomes

- The incidence of cancer is 20% higher for Māori than for non-Māori, but cancer mortality is nearly 80% higher. Lung cancer accounts for nearly half the excess deaths and breast cancer accounts for 18%.
- Survival chances are lower for Māori than for non-Māori for several key cancers.
- Māori are more likely than non-Māori to have their cancer detected at a later stage of disease spread. This contributes to the survival disparities, but does not completely account for them.

Socioeconomic deprivation and cancer

- Residents of more socioeconomically deprived neighbourhoods are more likely to develop cancer, less likely to have their cancer detected early, and have poorer survival chances, than residents of less deprived neighbourhoods.
- The deprivation gradient in incidence and mortality is steeper for Māori than for non-Māori.
- The higher exposure of Māori to neighbourhood deprivation contributes to the disparities between Māori and non-Māori in cancer incidence, mortality, stage at diagnosis, and survival.

Rural–urban status and cancer

- Cancer incidence is lowest in rural areas (for both Māori and non-Māori), and higher in small towns than main urban areas (among Māori only).
- Rural residents and small town residents have poorer survival chances than main urban residents.
- There is no clear evidence of disparities in stage at diagnosis between urban and rural residents.
- Rural–urban status makes a small contribution to survival disparities between Māori and non-Māori, but deprivation and later detection account for more of the differences in survival.
- Survival disparities persist after adjusting for age at diagnosis, rural–urban status, deprivation, and stage at diagnosis.

SECTION 3:

Māori and Non-Māori Cancer Statistics

This section presents data on Māori and non-Māori cancer incidence and mortality and stage at diagnosis for the period 2002–2006, and survival disparities for the 11-year period 1996–2006. The first chartbook, *Unequal Impact: Māori and non-Māori cancer statistics 1996–2001,* used slightly different methods of coding ethnicity and a different standard population and comparisons should, therefore, be made with caution.

CANCER REGISTRATIONS AND DEATHS 2002–2006

Key Findings

- During the period 2002–2006, there were around 1,460 new cancer registrations per year on average among Māori and approximately 745 cancer deaths. Among non-Māori there were 16,870 new registrations per year on average and approximately 7,180 deaths per year.
- For Māori, the age-sex-standardised incidence rate for all cancers combined was 220 per 100,000, 19% higher than the non-Māori rate of 185 per 100,000.
- The cancer death rate for this period was 112 per 100,000 for Māori, 78% higher than the rate for non-Māori of 63 per 100,000. Lung cancer accounted for nearly half the excess cancer deaths among Māori and breast cancer accounted for 18%.
- The five most commonly occurring cancers among Māori were lung, female breast, prostate, colorectal, and stomach cancers. Among non-Māori, the most common cancers were colorectal, prostate, female breast, melanoma of the skin, and lung cancers.
- The most common causes of cancer death among Māori were lung, female breast, colorectal, stomach and prostate cancers. For non-Māori, the leading causes of cancer death were lung, colorectal, female breast and prostate cancers. Cancers of unknown primary site were the 4th leading cause of cancer death for Māori and 5th leading cause for non-Māori.
- Cancer incidence was higher for Māori than for non-Māori for many cancers and lower for several others. Māori age-sex-standardised incidence was higher for cancers of the lung, breast, stomach, cervix, testis, liver, uterus, larynx, oesophagus, pancreas, thyroid, and for multiple myeloma. Māori mortality rates were higher for these cancers, and for prostate, kidney, non-Hodgkin's lymphoma, ovarian, oral cancers, and mesothelial and soft tissue cancers. Māori males also had higher incidence of oral and kidney cancers and Māori females had higher incidence of and mortality from gallbladder cancer.
- Non-Māori incidence was higher than that of Māori for melanoma of the skin, prostate, colon, rectum, and brain cancers. Bladder cancer was also more common among non-Māori males than among Māori males. Non-Māori death rates were higher for colon cancer, melanoma of the skin, and brain cancer (males only).
- Māori:non-Māori age-sex-standardised mortality ratios were higher than incidence ratios for many types of cancer.

The following tables outline numbers, age-standardised rates and rate ratios for all sites combined and site-specific cancer registrations and deaths, for both sexes combined and by sex. The numbers are the total number of registrations or deaths, adjusted for undercounting of Māori, during the five-year period 2002–2006. Rates are the number of cancers or cancer deaths per 100,000 person-years and age-sex-standardised to the 2001 Māori population. Rate ratios are the Māori rate divided by the non-Māori rate. A ratio of 1 indicates the rates are the same, a ratio above 1 indicates that Māori have a higher rate than non-Māori, and a ratio below 1 means that Māori have a lower rate than non-Māori.

Table 3.1: Cancer registrations: numbers, age-sex-standardised rates, Māori:non-Māori rate ratios, 2002–2006

Cancer	Number		Rate (95% CI)				Rate ratio(95% CI)	
	Māori	Non-Māori	Māori		Non-Māori			
All sites	7,304	84,350	220.4	(215.0–226.0)	185.2	(183.4–186.9)	**1.19**	**(1.16–1.22)**
Bladder	88	2,345	2.7	(2.1–3.3)	3.8	(3.7–4.1)	**0.69**	**(0.55–0.87)**
Bone	34	166	1.1	(0.8–1.5)	0.9	(0.7–1.1)	1.19	(0.79–1.80)
Brain	91	1,223	2.9	(2.3–3.6)	4.0	(3.7–4.4)	**0.71**	**(0.57–0.90)**
Breast: female*	1,237	10,875	71.0	(67.0–75.3)	55.4	(54.0–56.7)	**1.28**	**(1.20–1.37)**
Cervix*	144	685	8.4	(7.1–10.0)	5.0	(4.5–5.5)	**1.70**	**(1.40–2.08)**
Colorectal	543	13,066	16.4	(15.0–17.9)	23.2	(22.7–23.7)	**0.71**	**(0.64–0.77)**
Colon	*337*	*8,633*	*10.1*	*(9.0–11.3)*	*14.5*	*(14.1–14.9)*	***0.70***	***(0.62–0.78)***
Rectum	*207*	*4,432*	*6.3*	*(5.4–7.2)*	*8.7*	*(8.4–9.0)*	***0.72***	***(0.62–0.84)***
Gallbladder	35	453	1.0	(0.7–1.4)	0.7	(0.6–0.8)	1.34	(0.92–1.94)
Hodgkin's disease	46	377	1.5	(1.1–2.0)	1.7	(1.5–2.0)	0.86	(0.62–1.18)
Ill-defined sites	225	2,245	6.7	(5.9–7.8)	3.5	(3.3–3.7)	**1.92**	**(1.65–2.23)**
Kidney	157	1,713	4.8	(4.1–5.7)	4.0	(3.8–4.3)	**1.20**	**(1.01–1.44)**
Larynx	52	340	1.6	(1.2–2.2)	0.7	(0.6–0.8)	**2.38**	**(1.73–3.27)**
Leukaemias	264	3,003	8.2	(7.3–9.4)	7.7	(7.3–8.2)	1.06	(0.92–1.22)
Lymphoid leukaemia	*151*	*1,805*	*4.7*	*(4.0–5.6)*	*4.9*	*(4.5–5.3)*	*0.97*	*(0.81–1.17)*
Myeloid leukaemia	*85*	*882*	*2.7*	*(2.1–3.3)*	*2.3*	*(2.0–2.5)*	*1.17*	*(0.92–1.50)*
Other leukaemias	*27*	*317*	*0.9*	*(0.6–1.3)*	*0.6*	*(0.5–0.8)*	*1.41*	*(0.89–2.23)*
Liver	195	791	6.0	(5.2–7.0)	1.6	(1.5–1.8)	**3.64**	**(3.03–4.38)**
Lung	1,417	7,286	42.2	(39.9–44.6)	12.9	(12.5–13.4)	**3.27**	**(3.06–3.48)**
Melanoma of skin	117	9,493	3.6	(3.0–4.3)	25.5	(24.9–26.1)	**0.14**	**(0.12–0.17)**
Mesothelial and soft tissue	100	1,044	3.0	(2.5–3.7)	2.8	(2.5–3.0)	1.09	(0.87–1.37)
Multiple myeloma	103	1,345	3.0	(2.5–3.7)	2.4	(2.2–2.5)	**1.27**	**(1.02–1.58)**
Non-Hodgkin's lymphoma	215	3,069	6.6	(5.8–7.7)	7.1	(6.8–7.5)	0.93	(0.80–1.09)
Oesophagus	103	1,127	3.2	(2.6–3.9)	1.9	(1.7–2.0)	**1.68**	**(1.35–2.10)**
Oral cancers	132	1,387	4.1	(3.4–4.9)	3.5	(3.3–3.8)	1.17	(0.97–1.42)
Ovary*	123	1,301	7.0	(5.8–8.4)	5.9	(5.5–6.4)	1.18	(0.97–1.44)
Pancreas	174	1,673	5.1	(4.3–5.9)	2.7	(2.5–2.9)	**1.88**	**(1.58–2.23)**
Prostate*	659	12,480	42.8	(39.4–46.5)	47.7	(46.7–48.6)	**0.90**	**(0.82–0.98)**
Stomach	319	1,564	9.7	(8.7–10.9)	2.9	(2.6–3.1)	**3.41**	**(2.96–3.93)**
Testis*	150	600	10.6	(9.0–12.5)	6.3	(5.6–7.0)	**1.68**	**(1.38–2.05)**
Thyroid	148	775	4.5	(3.8–5.3)	2.8	(2.5–3.1)	**1.61**	**(1.33–1.95)**
Uterus*	222	1,512	12.5	(10.9–14.4)	6.6	(6.1–7.0)	**1.91**	**(1.63–2.23)**

(1) Ratios in **bold** are statistically significant at the 5% level.

(2) Rates reported for cancers marked with an asterisk (*) are sex-specific.

Table 3.2: Cancer deaths: numbers, age-sex-standardised rates, Māori:non-Māori rate ratios, 2002–2006

Cancer	Number		Rate (95% C)		Rate ratio(95% CI)
	Māori	Non-Māori	Māori	Non-Māori	
All sites	3,720	35,894	112.0 (108.4–115.7)	63.0 (62.2–63.8)	**1.78 (1.72–1.84)**
Bladder	42	880	1.3 (0.9–1.7)	1.2 (1.1–1.3)	1.08 (0.79–1.48)
Bone	18	73	0.6 (0.4–1.0)	0.3 (0.3–0.5)	**1.75 (1.02–3.02)**
Brain	81	1,034	2.5 (2.0–3.1)	3.0 (2.7–3.2)	0.85 (0.68–1.07)
Breast: female*	362	2,814	20.6 (18.6–22.8)	11.9 (11.4–12.4)	**1.73 (1.55–1.94)**
Cervix*	58	242	3.3 (2.6–4.3)	1.1 (1.0–1.3)	**2.92 (2.16–3.94)**
Colorectal	269	5,567	8.1 (7.2–9.2)	8.9 (8.7–9.2)	0.91 (0.80–1.03)
Colon	*160*	*3,762*	*4.8 (4.1–5.6)*	*5.8 (5.5–6.0)*	***0.83 (0.71–0.98)***
Rectum	*109*	*1,805*	*3.3 (2.8–4.0)*	*3.2 (3.0–3.3)*	*1.05 (0.86–1.28)*
Gallbladder	25	343	0.7 (0.5–1.0)	0.5 (0.5–0.6)	1.27 (0.84–1.92)
Hodgkin's disease	5	80	0.2 (0.1–0.4)	0.2 (0.2–0.3)	0.68 (0.27–1.72)
Ill-defined sites	206	1,989	6.2 (5.4–7.1)	3.0 (2.8–3.1)	**2.10 (1.81–2.43)**
Kidney	74	729	2.3 (1.8–2.8)	1.4 (1.2–1.5)	**1.66 (1.30–2.12)**
Larynx	11	129	0.3 (0.2–0.6)	0.2 (0.2–0.2)	1.72 (0.93–3.21)
Leukaemias	89	1,312	2.8 (2.2–3.4)	2.6 (2.4–2.8)	1.05 (0.84–1.31)
Lymphoid leukaemia	*35*	*434*	*1.1 (0.8–1.6)*	*1.0 (0.9–1.1)*	*1.13 (0.79–1.63)*
Myeloid leukaemia	*40*	*732*	*1.2 (0.9–1.7)*	*1.4 (1.3–1.5)*	*0.87 (0.63–1.21)*
Other leukaemias	*14*	*146*	*0.4 (0.2–0.7)*	*0.2 (0.2–0.3)*	*1.78 (1.00–3.19)*
Liver	147	677	4.5 (3.8–5.3)	1.3 (1.2–1.4)	**3.40 (2.83–4.09)**
Lung	1,158	6,242	34.6 (32.7–36.7)	10.9 (10.6–11.3)	**3.17 (2.97–3.38)**
Melanoma of skin	27	1,298	0.9 (0.6–1.3)	2.7 (2.6–2.9)	**0.31 (0.21–0.46)**
Mesothelial and soft tissue	54	611	1.7 (1.3–2.2)	1.2 (1.1–1.4)	**1.34 (1.01–1.79)**
Multiple myeloma	54	750	1.5 (1.2–2.0)	1.2 (1.1–1.3)	**1.34 (1.01–1.78)**
Non-Hodgkin's lymphoma	110	1,369	3.4 (2.8–4.1)	2.4 (2.3–2.6)	**1.38 (1.13–1.69)**
Oesophagus	76	923	2.3 (1.8–2.9)	1.5 (1.4–1.6)	**1.54 (1.22–1.96)**
Oral cancers	56	543	1.7 (1.3–2.3)	1.1 (1.0–1.2)	**1.60 (1.21–2.12)**
Ovary*	74	852	4.2 (3.3–5.3)	3.0 (2.8–3.3)	**1.39 (1.09–1.77)**
Pancreas	145	1,524	4.3 (3.6–5.0)	2.4 (2.3–2.6)	**1.74 (1.46–2.07)**
Prostate*	166	2,685	11.1 (9.5–12.9)	7.0 (6.7–7.3)	**1.59 (1.35–1.86)**
Stomach	221	1,225	6.8 (5.9–7.7)	2.1 (2.0–2.3)	**3.20 (2.76–3.71)**
Testis*	15	27	1.1 (0.6–1.8)	0.2 (0.2–0.4)	**4.27 (2.22–8.21)**
Thyroid	20	104	0.6 (0.4–0.9)	0.2 (0.1–0.2)	**3.26 (1.98–5.38)**
Uterus*	53	376	3.0 (2.3–3.9)	1.2 (1.1–1.4)	**2.43 (1.81–3.27)**

(1) Ratios in **bold** are statistically significant at the 5% level.

(2) Rates reported for cancers marked with an asterisk (*) are sex-specific.

Table 3.3: Female cancer registrations: numbers, age-standardised rates, Māori:non-Māori rate ratios, 2002–2006

Cancer	Number		Rate (95% CI)		Rate ratio (95% CI)
	Māori	Non-Māori	Māori	Non-Māori	
All sites	4,014	39,662	228.3 (220.8–236.1)	177.0 (174.5–179.5)	**1.29 (1.24–1.34)**
Bladder	35	588	1.9 (1.3–2.7)	1.6 (1.5–1.8)	1.16 (0.80–1.68)
Bone	13	71	0.8 (0.5–1.4)	0.8 (0.6–1.1)	1.02 (0.53–1.98)
Brain	42	487	2.5 (1.8–3.5)	3.3 (2.9–3.8)	0.77 (0.55–1.08)
Breast: female	1,237	10,875	71.0 (67.0–75.3)	55.4 (54.0–56.7)	**1.28 (1.20–1.37)**
Cervix	144	685	8.4 (7.1–10.0)	5.0 (4.5–5.5)	**1.70 (1.40–2.08)**
Colorectal	247	6,451	13.8 (12.1–15.8)	20.8 (20.1–21.5)	**0.66 (0.58–0.76)**
Colon	*168*	*4,587*	*9.4 (8.0–11.0)*	*14.0 (13.5–14.5)*	***0.67 (0.57–0.79)***
Rectum	*78*	*1,865*	*4.4 (3.5–5.6)*	*6.8 (6.4–7.2)*	***0.65 (0.51–0.82)***
Gallbladder	27	281	1.5 (1.0–2.2)	0.8 (0.7–1.0)	**1.76 (1.14–2.72)**
Hodgkin's disease	21	149	1.3 (0.8–2.0)	1.5 (1.2–1.8)	0.88 (0.54–1.42)
Ill-defined sites	112	1,121	6.1 (5.0–7.4)	3.1 (2.8–3.4)	**1.97 (1.59–2.45)**
Kidney	54	628	3.1 (2.3–4.1)	2.9 (2.6–3.3)	1.07 (0.78–1.45)
Larynx	13	45	0.8 (0.4–1.3)	0.2 (0.1–0.2)	**4.81 (2.33–9.93)**
Leukaemias	121	1,304	7.3 (6.0–8.7)	6.6 (6.0–7.3)	1.10 (0.89–1.36)
Lymphoid leukaemia	*57*	*756*	*3.4 (2.6–4.5)*	*4.1 (3.6–4.7)*	*0.84 (0.62–1.13)*
Myeloid leukaemia	*49*	*421*	*2.9 (2.2–3.9)*	*2.1 (1.8–2.5)*	***1.41 (1.01–1.96)***
Other leukaemias	*14*	*128*	*0.9 (0.5–1.5)*	*0.4 (0.3–0.7)*	*2.04 (0.97–4.27)*
Liver	45	263	2.5 (1.9–3.5)	0.9 (0.8–1.1)	**2.77 (1.92–3.99)**
Lung	751	2,982	41.9 (38.8–45.2)	10.5 (9.9–11.1)	**4.01 (3.64–4.40)**
Melanoma of skin	74	4,524	4.4 (3.5–5.5)	25.3 (24.4–26.2)	**0.17 (0.14–0.22)**
Mesothelial and soft tissue	51	337	3.0 (2.2–3.9)	2.0 (1.7–2.4)	**1.45 (1.04–2.03)**
Multiple myeloma	56	567	3.0 (2.3–4.0)	1.8 (1.6–2.0)	**1.68 (1.25–2.27)**
Non-Hodgkin's lymphoma	102	1,415	5.8 (4.7–7.1)	5.8 (5.4–6.3)	1.00 (0.80–1.24)
Oesophagus	26	401	1.4 (0.9–2.1)	1.0 (0.9–1.2)	1.36 (0.88–2.09)
Oral cancers	33	487	1.9 (1.4–2.8)	2.2 (1.9–2.5)	0.88 (0.60–1.28)
Ovary	123	1,301	7.0 (5.8–8.4)	5.9 (5.5–6.4)	1.18 (0.97–1.44)
Pancreas	93	865	5.0 (4.0–6.2)	2.3 (2.1–2.6)	**2.15 (1.69–2.73)**
Stomach	144	575	8.2 (6.9–9.7)	1.8 (1.6–2.1)	**4.46 (3.54–5.61)**
Thyroid	108	552	6.4 (5.2–7.7)	4.0 (3.6–4.5)	**1.57 (1.26–1.97)**
Uterus	222	1,512	12.5 (10.9–14.4)	6.6 (6.1–7.0)	**1.91 (1.63–2.23)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 3.4: Female cancer deaths: numbers, age-standardised rates, Māori:non-Māori rate ratios, 2002–2006

Cancer	Number		Rate (95% CI)		Rate ratio (95% CI)
	Māori	Non-Māori	Māori	Non-Māori	
All sites	1,910	16,968	107.3 (102.6–112.3)	56.4 (55.3–57.5)	**1.90 (1.81–2.00)**
Bladder	16	267	0.8 (0.5–1.4)	0.5 (0.4–0.6)	1.68 (1.00–2.83)
Bone	6	31	0.4 (0.2–0.9)	0.3 (0.2–0.5)	1.20 (0.48–2.99)
Brain	42	385	2.5 (1.8–3.4)	2.1 (1.8–2.3)	1.21 (0.87–1.69)
Breast: female	362	2,814	20.6 (18.6–22.8)	11.9 (11.4–12.4)	**1.73 (1.55–1.94)**
Cervix	58	242	3.3 (2.6–4.3)	1.1 (1.0–1.3)	**2.92 (2.16–3.94)**
Colorectal	116	2,829	6.4 (5.4–7.7)	8.0 (7.7–8.4)	**0.80 (0.66–0.97)**
Colon	*76*	*2,067*	*4.2 (3.4–5.3)*	*5.6 (5.3–5.9)*	***0.75 (0.60–0.95)***
Rectum	*40*	*762*	*2.2 (1.6–3.0)*	*2.4 (2.2–2.6)*	*0.92 (0.66–1.27)*
Gallbladder	20	207	1.1 (0.7–1.7)	0.6 (0.5–0.7)	**1.79 (1.12–2.87)**
Hodgkin's disease	2	33	0.1 (0.0–0.5)	0.2 (0.1–0.3)	0.61 (0.14–2.62)
Ill-defined sites	86	1,021	4.7 (3.8–5.8)	2.7 (2.5–2.9)	**1.73 (1.38–2.18)**
Kidney	24	272	1.4 (0.9–2.0)	0.9 (0.8–1.1)	1.50 (0.98–2.31)
Larynx	1	23	0.1 (0.0–0.4)	0.1 (0.0–0.1)	0.85 (0.11–6.42)
Leukaemias	42	597	2.4 (1.8–3.3)	2.1 (1.9–2.4)	1.14 (0.82–1.59)
Lymphoid leukaemia	*16*	*189*	*1.0 (0.6–1.6)*	*0.7 (0.6–0.9)*	*1.32 (0.76–2.30)*
Myeloid leukaemia	*20*	*344*	*1.1 (0.7–1.8)*	*1.2 (1.1–1.4)*	*0.92 (0.58–1.46)*
Other leukaemias	*6*	*64*	*0.3 (0.1–0.7)*	*0.2 (0.1–0.2)*	*2.11 (0.83–5.32)*
Liver	34	251	1.9 (1.3–2.6)	0.8 (0.7–0.9)	**2.34 (1.61–3.39)**
Lung	603	2,492	33.9 (31.3–36.7)	8.5 (8.1–8.9)	**4.00 (3.65–4.39)**
Melanoma of skin	7	514	0.4 (0.2–0.8)	2.0 (1.8–2.2)	**0.19 (0.09–0.41)**
Mesothelial and soft tissue	21	175	1.2 (0.8–1.9)	0.7 (0.6–0.9)	**1.73 (1.08–2.77)**
Multiple myeloma	36	331	1.9 (1.4–2.7)	0.9 (0.8–1.0)	**2.23 (1.57–3.18)**
Non-Hodgkin's lymphoma	49	658	2.7 (2.1–3.6)	2.0 (1.8–2.2)	**1.36 (1.01–1.84)**
Oesophagus	22	339	1.2 (0.8–1.8)	0.8 (0.7–0.9)	1.47 (0.94–2.27)
Oral cancers	9	180	0.5 (0.3–1.0)	0.5 (0.4–0.7)	0.94 (0.48–1.88)
Ovary	74	852	4.2 (3.3–5.3)	3.0 (2.8–3.3)	**1.39 (1.09–1.77)**
Pancreas	77	783	4.2 (3.4–5.3)	2.0 (1.9–2.2)	**2.09 (1.64–2.66)**
Stomach	92	469	5.2 (4.3–6.4)	1.4 (1.3–1.6)	**3.72 (2.94–4.71)**
Thyroid	11	71	0.6 (0.3–1.1)	0.2 (0.1–0.3)	**3.06 (1.57–5.93)**
Uterus	53	376	3.0 (2.3–3.9)	1.2 (1.1–1.4)	**2.43 (1.81–3.27)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 3.5: Male cancer registrations: numbers, age-standardised rates, Māori:non-Māori rate ratios, 2002–2006

Cancer	Number		Rate (95% CI)		Rate ratio (95% CI)
	Māori	Non-Māori	Māori	Non-Māori	
All sites	1,810	18,926	116.6 (111.4–122.2)	69.6 (68.5–70.8)	**1.68 (1.59–1.76)**
Bladder	26	613	1.7 (1.2–2.5)	1.9 (1.7–2.0)	0.92 (0.62–1.36)
Bone	12	42	0.8 (0.5–1.4)	0.4 (0.2–0.5)	**2.25 (1.14–4.44)**
Brain	39	649	2.5 (1.9–3.5)	3.8 (3.5–4.2)	**0.66 (0.48–0.92)**
Colorectal	153	2,738	9.8 (8.4–11.5)	9.8 (9.4–10.3)	1.00 (0.85–1.18)
Colon	*84*	*1,695*	*5.4 (4.3–6.6)*	*5.9 (5.6–6.2)*	*0.91 (0.73–1.13)*
Rectum	*69*	*1,043*	*4.5 (3.5–5.7)*	*3.9 (3.7–4.2)*	*1.13 (0.89–1.45)*
Gallbladder	5	136	0.3 (0.1–0.8)	0.5 (0.4–0.6)	0.64 (0.26–1.57)
Hodgkin's disease	3	47	0.2 (0.1–0.6)	0.3 (0.2–0.4)	0.74 (0.23–2.43)
Ill-defined sites	120	968	7.8 (6.5–9.3)	3.2 (3.0–3.5)	**2.40 (1.98–2.91)**
Kidney	50	457	3.2 (2.4–4.2)	1.8 (1.6–2.0)	**1.74 (1.29–2.34)**
Larynx	10	106	0.6 (0.3–1.2)	0.3 (0.3–0.4)	1.89 (0.98–3.64)
Leukaemias	47	715	3.1 (2.3–4.1)	3.1 (2.8–3.4)	0.99 (0.73–1.34)
Lymphoid leukaemia	*19*	*245*	*1.3 (0.8–2.0)*	*1.3 (1.1–1.5)*	*1.02 (0.63–1.66)*
Myeloid leukaemia	*20*	*388*	*1.3 (0.8–2.0)*	*1.6 (1.4–1.8)*	*0.83 (0.53–1.32)*
Other leukaemias	*8*	*82*	*0.5 (0.3–1.0)*	*0.3 (0.2–0.4)*	*1.62 (0.76–3.45)*
Liver	113	426	7.1 (5.9–8.5)	1.8 (1.6–2.0)	**3.87 (3.12–4.79)**
Lung	555	3,750	35.4 (32.6–38.5)	13.4 (13.0–13.9)	**2.64 (2.41–2.89)**
Melanoma of skin	20	784	1.3 (0.9–2.1)	3.5 (3.2–3.8)	**0.38 (0.24–0.60)**
Mesothelial and soft tissue	33	436	2.1 (1.5–3.0)	1.8 (1.6–2.0)	1.19 (0.83–1.70)
Multiple myeloma	18	419	1.1 (0.7–1.8)	1.4 (1.3–1.6)	0.80 (0.50–1.28)
Non-Hodgkin's lymphoma	61	711	4.0 (3.1–5.2)	2.9 (2.7–3.2)	**1.39 (1.07–1.82)**
Oesophagus	54	584	3.4 (2.6–4.5)	2.2 (2.0–2.4)	**1.57 (1.18–2.08)**
Oral cancers	47	363	3.0 (2.2–3.9)	1.6 (1.5–1.8)	**1.82 (1.33–2.47)**
Pancreas	68	741	4.3 (3.4–5.4)	2.9 (2.7–3.1)	**1.49 (1.16–1.91)**
Prostate	166	2,685	11.1 (9.5–12.9)	7.0 (6.7–7.3)	**1.59 (1.35–1.86)**
Stomach	129	756	8.3 (7.0–9.9)	2.8 (2.6–3.1)	**2.94 (2.43–3.56)**
Testis	15	27	1.1 (0.6–1.8)	0.2 (0.2–0.4)	**4.27 (2.22–8.21)**
Thyroid	9	33	0.6 (0.3–1.1)	0.2 (0.1–0.2)	**3.52 (1.64–7.53)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 3.6: Male cancer deaths: numbers, age-standardised rates, Māori:non-Māori rate ratios, 2002–2006

Cancer	Number		Rate (95% CI)		Rate ratio (95% CI)
	Māori	Non-Māori	Māori	Non-Māori	
All sites	1,810	18,926	115.2 (110.0–120.6)	69.8 (68.6–70.9)	**1.65 (1.57–1.73)**
Bladder	26	613	1.7 (1.1–2.4)	1.8 (1.7–2.0)	0.90 (0.61–1.34)
Bone	12	42	0.8 (0.4–1.4)	0.4 (0.2–0.5)	**2.17 (1.10–4.30)**
Brain	39	649	2.5 (1.8–3.4)	3.9 (3.5–4.3)	**0.64 (0.46–0.89)**
Colorectal	153	2,738	9.7 (8.3–11.4)	9.9 (9.4–10.3)	0.99 (0.84–1.16)
Colon	*84*	*1,695*	*5.3 (4.3–6.6)*	*5.9 (5.6–6.2)*	*0.90 (0.72–1.12)*
Rectum	*69*	*1,043*	*4.4 (3.5–5.6)*	*3.9 (3.7–4.2)*	*1.12 (0.87–1.43)*
Gallbladder	5	136	0.3 (0.1–0.8)	0.5 (0.4–0.6)	0.64 (0.26–1.56)
Hodgkin's disease	3	47	0.2 (0.1–0.6)	0.3 (0.2–0.4)	0.73 (0.22–2.40)
Ill-defined sites	120	968	7.7 (6.4–9.2)	3.2 (3.0–3.5)	**2.36 (1.95–2.87)**
Kidney	50	457	3.1 (2.4–4.1)	1.8 (1.6–2.0)	**1.72 (1.28–2.31)**
Larynx	10	106	0.6 (0.3–1.2)	0.3 (0.3–0.4)	1.88 (0.98–3.62)
Leukaemias	47	715	3.0 (2.3–4.0)	3.1 (2.8–3.4)	0.97 (0.71–1.31)
Lymphoid leukaemia	*19*	*245*	*1.2 (0.8–1.9)*	*1.3 (1.1–1.5)*	*0.99 (0.61–1.60)*
Myeloid leukaemia	*20*	*388*	*1.3 (0.8–2.0)*	*1.6 (1.4–1.8)*	*0.82 (0.52–1.29)*
Other leukaemias	*8*	*82*	*0.5 (0.3–1.0)*	*0.3 (0.2–0.4)*	*1.60 (0.75–3.40)*
Liver	113	426	7.1 (5.9–8.5)	1.8 (1.7–2.1)	**3.83 (3.09–4.74)**
Lung	555	3,750	35.1 (32.3–38.2)	13.4 (13.0–13.9)	**2.61 (2.39–2.86)**
Melanoma of skin	20	784	1.3 (0.8–2.0)	3.5 (3.2–3.8)	**0.37 (0.24–0.58)**
Mesothelial and soft tissue	33	436	2.1 (1.5–2.9)	1.8 (1.6–2.0)	1.17 (0.82–1.68)
Multiple myeloma	18	419	1.1 (0.7–1.8)	1.4 (1.3–1.6)	0.80 (0.50–1.28)
Non-Hodgkin's lymphoma	61	711	3.9 (3.1–5.1)	2.9 (2.7–3.2)	**1.35 (1.04–1.76)**
Oesophagus	54	584	3.4 (2.6–4.5)	2.2 (2.0–2.4)	**1.56 (1.18–2.07)**
Oral cancers	47	363	3.0 (2.2–3.9)	1.6 (1.5–1.8)	**1.80 (1.33–2.46)**
Pancreas	68	741	4.3 (3.4–5.4)	2.9 (2.7–3.1)	**1.48 (1.15–1.90)**
Prostate	166	2,685	10.8 (9.3–12.6)	7.0 (6.7–7.3)	**1.55 (1.32–1.81)**
Stomach	129	756	8.2 (6.9–9.8)	2.8 (2.6–3.1)	**2.90 (2.39–3.51)**
Testis	15	27	1.0 (0.6–1.7)	0.3 (0.2–0.4)	**4.07 (2.12–7.83)**
Thyroid	9	33	0.6 (0.3–1.1)	0.2 (0.1–0.2)	**3.48 (1.63–7.46)**

(1) Ratios in **bold** are statistically significant at the 5% level.

STAGE AT DIAGNOSIS 1996–2006

Key Findings

- There were differences in the distribution of stage at diagnosis between Māori and non-Māori, including a reduced likelihood for Māori of being diagnosed at an early stage, and an increased likelihood of being diagnosed at a distant stage for several types of cancer.
- Māori had lower odds than non-Māori of being diagnosed at localised stage for female breast, cervix, colorectal, kidney, lung, melanoma, oral, prostate, and testicular cancers, but higher odds for stomach and thyroid cancers.
- The odds of being diagnosed at a distant stage were higher for Māori with cancers of the bladder, brain, breast, cervix, colon and rectum, lung, pancreas, prostate, and for melanoma of the skin.
- Māori were significantly less likely than non-Māori to have extent of disease spread recorded on the cancer registration for some of the most common cancers, including female breast, cervix, colorectal, melanoma, oral, and stomach cancers; but more likely to have stage recorded for bladder cancer.

'Stage at diagnosis' refers to the extent of spread of disease and is classified as:

- localised
- regional (spread to adjacent tissue or organ and/or involves regional lymph nodes)
- distant (spread to distant organs, tissues or to distant lymph nodes)
- unknown.

The classification is not applicable to leukaemias or lymphomas, and these are therefore excluded from the stage tables.

Table 3.7 presents numbers and the distribution of new cancer registrations by stage, unadjusted for age or sex. Table 3.8 shows Māori: non-Māori odds ratios, adjusted for age and sex, for unknown stage (all cancers), localised stage and distant stage at diagnosis (staged cancers only). The adjustment is made because of the association between age and stage at diagnosis. An odds ratio less than 1 indicates Māori have lower odds than non-Māori of being diagnosed at the specified stage of disease spread. Conversely, a ratio higher than 1 indicates Māori have higher odds.

For this chapter, ethnicity data was based on the cancer registration only, without adjustment. Any registration with Māori coded in any of the three ethnicity fields was classified as a Māori registration. All others were classified as non-Māori.

This chapter includes data for the period 1996–2006 to align with the data on survival disparities, which covers the same period. Data on stage at diagnosis for the period 2002–2006 can be found in Appendix 4.

Table 3.7: Distribution of stage at diagnosis, cancer registrations (unadjusted), 1996–2006

Cancer		Total number	Localised		Regional		Distant		Unknown	
			Number	%	Number	%	Number	%	Number	%
Bladder	Māori	157	11	7.0	14	8.9	21	13.4	111	70.7
	Non-Māori	5,642	268	4.8	340	6.0	240	4.3	4,794	85.0
Bone	Māori	58	9	15.5	9	15.5	17	29.3	23	39.7
	Non-Māori	371	76	20.5	53	14.3	58	15.6	184	49.6
Brain	Māori	169	150	88.8	1	0.6	5	3.0	13	7.7
	Non-Māori	2,665	2,470	92.7	5	0.2	19	0.7	171	6.4
Breast: female	Māori	2,207	905	41.0	884	40.1	105	4.8	313	14.2
	Non-Māori	22,838	10,717	46.9	7,601	33.3	903	4.0	3,617	15.8
Cervix	Māori	363	141	38.8	37	10.2	47	12.9	138	38.0
	Non-Māori	1,695	815	48.1	187	11.0	113	6.7	580	34.2
Colorectal	Māori	916	187	20.4	359	39.2	239	26.1	131	14.3
	Non-Māori	27,696	7,319	26.4	12,263	44.3	5,106	18.4	3,008	10.9
Colon	*Māori*	*549*	*112*	*20.4*	*232*	*42.3*	*169*	*30.8*	*36*	*6.6*
	Non-Māori	*18,371*	*4,583*	*24.9*	*8,703*	*47.4*	*3,663*	*19.9*	*1,422*	*7.7*
Rectum	*Māori*	*367*	*75*	*20.4*	*127*	*34.6*	*70*	*19.1*	*95*	*25.9*
	Non-Māori	*9,325*	*2,736*	*29.3*	*3,560*	*38.2*	*1,443*	*15.5*	*1,586*	*17.0*
Gallbladder	Māori	69	7	10.1	13	18.8	24	34.8	25	36.2
	Non-Māori	867	100	11.5	185	21.3	231	26.6	351	40.5
Kidney	Māori	265	124	46.8	51	19.2	62	23.4	28	10.6
	Non-Māori	3,601	1,693	47.0	540	15.0	819	22.7	549	15.2
Larynx	Māori	80	5	6.3	19	23.8	6	7.5	50	62.5
	Non-Māori	793	87	11.0	140	17.7	52	6.6	514	64.8
Liver	Māori	331	41	12.4	5	1.5	63	19.0	222	67.1
	Non-Māori	1,527	121	7.9	48	3.1	301	19.7	1,057	69.2
Lung	Māori	2,447	90	3.7	186	7.6	925	37.8	1,246	50.9
	Non-Māori	15,648	942	6.0	1,327	8.5	5,817	37.2	7,562	48.3
Melanoma of skin	Māori	199	153	76.9	19	9.5	20	10.1	7	3.5
	Non-Māori	18,985	16,449	86.6	1,077	5.7	891	4.7	568	3.0
Mesothelial and soft tissue	Māori	174	46	26.4	9	5.2	29	16.7	90	51.7
	Non-Māori	2,110	367	17.4	134	6.4	318	15.1	1,285	60.9
Oesophagus	Māori	161	4	2.5	21	13.0	37	23.0	99	61.5
	Non-Māori	2,287	118	5.2	256	11.2	474	20.7	1,439	62.9
Oral cancers	Māori	229	33	14.4	97	42.4	19	8.3	80	34.9
	Non-Māori	2,979	827	27.8	891	29.9	158	5.3	1,103	37.0
Ovary	Māori	268	106	39.6	20	7.5	123	45.9	19	7.1
	Non-Māori	2,902	694	23.9	309	10.6	1,662	57.3	237	8.2
Pancreas	Māori	282	5	1.8	23	8.2	146	51.8	108	38.3
	Non-Māori	3,477	83	2.4	303	8.7	1,541	44.3	1,550	44.6
Prostate	Māori	1,146	84	7.3	43	3.8	114	9.9	905	79.0
	Non-Māori	28,039	3,317	11.8	1,268	4.5	1,611	5.7	21,843	77.9

Table 3.7 (continued)

Cancer		Total number	Localised		Regional		Distant		Unknown	
			Number	%	Number	%	Number	%	Number	%
Stomach	Māori	562	80	14.2	142	25.3	181	32.2	159	28.3
	Non-Māori	3,672	385	10.5	960	26.1	997	27.2	1,330	36.2
Testis	Māori	308	200	64.9	49	15.9	37	12.0	22	7.1
	Non-Māori	1,235	930	75.3	139	11.3	112	9.1	54	4.4
Thyroid	Māori	249	165	66.3	46	18.5	19	7.6	19	7.6
	Non-Māori	1,583	894	56.5	397	25.1	103	6.5	189	11.9
Uterus	Māori	367	220	59.9	64	17.4	38	10.4	45	12.3
	Non-Māori	3,114	1,858	59.7	576	18.5	307	9.9	373	12.0

Table 3.8: Māori:non-Māori odds ratios (ORs) for localised or distant stage at diagnosis, adjusted for age and sex (staged cancers only) and for unknown stage at diagnosis (all cancers), 1996–2006

Cancer	Localised			Distant			Unknown		
	OR	(95% CI)	p value	OR	(95% CI)	p value	OR	(95% CI)	p value
Bladder	0.59	(0.29–1.20)	0.14	**2.75**	**(1.45–5.20)**	**0.002**	**0.49**	**(0.34–0.71)**	**0.0001**
Bone	0.55	(0.24–1.27)	0.16	2.01	(0.94–4.27)	0.071	0.74	(0.41–1.32)	0.31
Brain	0.41	(0.16–1.06)	0.066	**2.90**	**(1.02–8.24)**	**0.046**	1.37	(0.75–2.49)	0.31
Breast: female	**0.74**	**(0.68–0.82)**	**<0.0001**	**1.51**	**(1.22–1.86)**	**0.0002**	**1.30**	**(1.14–1.48)**	**<0.0001**
Cervix	**0.52**	**(0.37–0.71)**	**<0.0001**	**3.35**	**(2.20–5.11)**	**<0.0001**	**1.62**	**(1.25–2.08)**	**0.0002**
Colorectal	**0.77**	**(0.65–0.91)**	**0.002**	**1.59**	**(1.36–1.86)**	**<0.0001**	**1.83**	**(1.51–2.22)**	**<0.0001**
Colon	***0.80***	***(0.64–0.99)***	***0.037***	***1.64***	***(1.36–1.98)***	***<0.0001***	***1.50***	***(1.05–2.13)***	***0.024***
Rectum	***0.72***	***(0.55–0.95)***	***0.019***	***1.47***	***(1.11–1.95)***	***0.007***	***1.97***	***(1.55–2.52)***	***<0.0001***
Gallbladder	0.78	(0.33–1.82)	0.56	1.73	(0.91–3.26)	0.092	1.58	(0.88–2.83)	0.12
Kidney	**0.76**	**(0.58–0.99)**	**0.044**	1.22	(0.89–1.66)	0.22	1.28	(0.84–1.96)	0.25
Larynx	0.45	(0.17–1.23)	0.12	1.02	(0.39–2.66)	0.96	0.96	(0.59–1.56)	0.87
Liver	1.51	(0.96–2.38)	0.071	0.94	(0.60–1.45)	0.77	1.05	(0.81–1.37)	0.71
Lung	**0.55**	**(0.44–0.69)**	**<0.0001**	**1.51**	**(1.30–1.75)**	**<0.0001**	**1.51**	**(1.38–1.65)**	**<0.0001**
Melanoma of skin	**0.35**	**(0.24–0.50)**	**<0.0001**	**2.93**	**(1.83–4.71)**	**<0.0001**	1.31	(0.61–2.80)	0.49
Mesothelial and soft tissue	1.32	(0.83–2.09)	0.25	0.87	(0.54–1.42)	0.59	0.87	(0.63–1.20)	0.4
Oesophagus	0.40	(0.14–1.13)	0.083	1.28	(0.75–2.19)	0.36	**1.49**	**(1.05–2.12)**	**0.026**
Oral cancers	**0.35**	**(0.24–0.53)**	**<0.0001**	1.67	(0.99–2.79)	0.053	1.04	(0.78–1.38)	0.81
Ovary	1.27	(0.95–1.69)	0.1	0.94	(0.71–1.24)	0.66	1.27	(0.77–2.09)	0.35
Pancreas	0.49	(0.19–1.25)	0.14	**1.67**	**(1.08–2.57)**	**0.02**	1.18	(0.91–1.54)	0.22
Prostate	**0.39**	**(0.29–0.52)**	**<0.0001**	**4.54**	**(3.35–6.15)**	**<0.0001**	**1.19**	**(1.02–1.37)**	**0.023**
Stomach	**1.35**	**(1.01–1.79)**	**0.041**	1.08	(0.86–1.35)	0.5	1.22	(0.99–1.52)	0.065
Testis	**0.64**	**(0.48–0.86)**	**0.003**	1.36	(0.91–2.04)	0.14	1.63	(0.97–2.76)	0.067
Thyroid	**1.38**	**(1.01–1.89)**	**0.04**	1.39	(0.82–2.36)	0.22	0.68	(0.42–1.12)	0.13
Uterus	0.94	(0.73–1.21)	0.61	1.17	(0.81–1.69)	0.4	**1.57**	**(1.11–2.22)**	**0.01**

(1) Odds ratios in **bold** are statistically significant at the 5% level.

SURVIVAL DISPARITIES 1996–2006

Key Findings

- Over the 11-year period 1996–2006, Māori had a higher risk of dying from their cancer after diagnosis than non-Māori for many cancers.
- Differences in stage at diagnosis explained some but not all of this survival disparity.
- For most cancers, survival disparities remained significant after taking stage at diagnosis into account.

The following figures and tables present cancer-specific mortality hazard ratios, adjusted for age, for age and sex, and for age, sex and stage. The hazard ratios indicate the relative risk of dying from the cancer after being diagnosed, for Māori compared with non-Māori. A hazard ratio greater than 1 indicates a higher risk for Māori of dying from the cancer after diagnosis.

This chapter presents data for the 11-year period 1996–2006. For this chapter, ethnicity was taken from the cancer registration without adjustment. If any field on the cancer registration was coded as Māori, the registration was classified as Māori. All others were classified as non-Māori.

Table 3.9: Māori:non-Māori cancer-specific mortality hazard ratios (HRs), adjusted for age at diagnosis, by sex, 1996–2006

Cancer	Female			Male		
	HR	(95% CI)	p value	HR	(95% CI)	p value
Bladder	**3.56**	**(2.42–5.24)**	**<0.0001**	**1.63**	**(1.12–2.36)**	**0.010**
Brain	1.18	(0.89–1.57)	0.25	1.27	(0.97–1.67)	0.085
Breast: female	**1.44**	**(1.30–1.60)**	**<0.0001**	n/a		
Cervix	**2.26**	**(1.83–2.78)**	**<0.0001**	n/a		
Colorectal	**1.22**	**(1.03–1.44)**	**0.025**	**1.51**	**(1.31–1.73)**	**<0.0001**
Colon	*1.09*	*(0.88–1.36)*	*0.43*	***1.46***	***(1.21–1.76)***	***<0.0001***
Rectum	***1.57***	***(1.19–2.07)***	***0.002***	***1.62***	***(1.31–2.00)***	***<0.0001***
Gallbladder	**1.52**	**(1.03–2.23)**	**0.033**	0.97	(0.59–1.59)	0.90
Hodgkin's disease	0.90	(0.28–2.94)	0.86	**2.40**	**(1.06–5.45)**	**0.036**
Ill-defined sites	1.16	(0.97–1.38)	0.096	**1.44**	**(1.22–1.69)**	**<0.0001**
Kidney	1.25	(0.85–1.85)	0.25	**1.46**	**(1.13–1.89)**	**0.004**
Larynx	0.92	(0.31–2.70)	0.88	1.43	(0.86–2.38)	0.16
Leukaemias	1.22	(0.95–1.57)	0.12	1.04	(0.82–1.32)	0.74
Liver	1.21	(0.87–1.67)	0.25	**1.24**	**(1.05–1.47)**	**0.010**
Lung	**1.23**	**(1.15–1.32)**	**<0.0001**	**1.24**	**(1.16–1.33)**	**<0.0001**
Melanoma of skin	1.56	(0.86–2.83)	0.15	**3.39**	**(2.12–5.40)**	**<0.0001**
Mesothelial and soft tissue	1.29	(0.91–1.82)	0.15	1.14	(0.81–1.58)	0.45
Multiple myeloma	**1.41**	**(1.04–1.93)**	**0.029**	1.31	(0.96–1.78)	0.086
Non-Hodgkin's lymphoma	**1.59**	**(1.25–2.02)**	**0.0001**	**1.55**	**(1.24–1.93)**	**<0.0001**
Oesophagus	1.41	(0.97–2.04)	0.071	**1.42**	**(1.14–1.76)**	**0.001**
Oral cancers	1.56	(0.96–2.51)	0.071	**1.80**	**(1.39–2.33)**	**<0.0001**
Ovary	1.18	(0.96–1.44)	0.12	n/a		
Pancreas	1.16	(0.96–1.40)	0.13	1.05	(0.86–1.28)	0.64
Prostate	n/a			**2.03**	**(1.78–2.32)**	**<0.0001**
Stomach	1.11	(0.93–1.32)	0.25	**1.32**	**(1.14–1.53)**	**0.0002**
Thyroid	1.47	(0.84–2.59)	0.18	1.69	(0.85–3.35)	0.13
Uterus	**1.67**	**(1.32–2.11)**	**<0.0001**	n/a		

(1) Hazard ratios in **bold** are statistically significant at the 5% level.

(2) Hazard ratios in grey should be interpreted with caution due to small number of deaths. Where hazard ratios are missing, the data was excluded due to insufficient numbers.

Table 3.10: Māori:non-Māori hazard ratios (HRs) adjusted for age at diagnosis and sex, and for stage (including unstaged), both sexes, 1996–2006

Cancer	Adjusted for age and sex		Adjusted for age, sex and stage	
	HR (95% CI)	p value	HR (95% CI)	p value
Bladder	**2.24 (1.71–2.92)**	**<0.0001**	**1.78 (1.36–2.33)**	**<0.0001**
Bone	1.46 (0.93–2.31)	0.10	1.16 (0.73–1.84)	0.52
Brain	**1.25 (1.02–1.52)**	**0.029**	1.22 (1.00–1.49)	0.049
Breast: female	**1.44 (1.30–1.60)**	**<0.0001**	**1.32 (1.19–1.47)**	**<0.0001**
Cervix	**2.26 (1.83–2.78)**	**<0.0001**	**1.88 (1.52–2.33)**	**<0.0001**
Colorectal	**1.38 (1.24–1.53)**	**<0.0001**	**1.22 (1.10–1.36)**	**0.0003**
Colon	***1.27 (1.10–1.47)***	***0.0009***	*1.13 (0.98–1.31)*	*0.087*
Rectum	***1.61 (1.36–1.90)***	***<0.0001***	***1.45 (1.23–1.72)***	***<0.0001***
Gallbladder	1.26 (0.93–1.70)	0.13	1.17 (0.87–1.58)	0.30
Ill-defined sites	1.67 (0.86–3.25)	0.13	**1.28 (1.14–1.44)**	**<0.0001**
Kidney	**1.29 (1.15–1.45)**	**<0.0001**	**1.26 (1.02–1.56)**	**0.030**
Larynx	**1.42 (1.15–1.76)**	**0.001**	1.20 (0.76–1.90)	0.43
Liver	**1.24 (1.07–1.44)**	**0.004**	**1.33 (1.15–1.54)**	**0.0002**
Lung	**1.24 (1.18–1.30)**	**<0.0001**	**1.19 (1.13–1.25)**	**<0.0001**
Melanoma of skin	**2.31 (1.60–3.35)**	**<0.0001**	**1.50 (1.03–2.16)**	**0.032**
Mesothelial and soft tissue	1.26 (0.99–1.60)	0.057	**1.33 (1.05–1.70)**	**0.019**
Oesophagus	**1.43 (1.18–1.72)**	**0.0002**	**1.39 (1.15–1.67)**	**0.0006**
Oral cancers	**1.75 (1.40–2.20)**	**<0.0001**	**1.50 (1.20–1.89)**	**0.0005**
Ovary	1.18 (0.96–1.44)	0.12	**1.44 (1.18–1.77)**	**0.0004**
Pancreas	1.09 (0.95–1.25)	0.22	1.08 (0.95–1.24)	0.25
Prostate	**2.03 (1.78–2.32)**	**<0.0001**	**1.76 (1.54–2.01)**	**<0.0001**
Stomach	**1.24 (1.10–1.38)**	**0.0002**	**1.34 (1.20–1.49)**	**<0.0001**
Thyroid	**1.55 (1.00–2.40)**	**0.048**	1.24 (0.80–1.92)	0.34
Uterus	**1.67 (1.32–2.11)**	**<0.0001**	**1.77 (1.40–2.24)**	**<0.0001**

(1) Hazard ratios in **bold** are statistically significant at the 5% level.

(2) Hazard ratios in grey should be interpreted with caution due to small number of deaths.

Table 3.11: Māori: non-Māori hazard ratios (HRs) adjusted for age at diagnosis and sex, and for stage (staged cancers only), both sexes, 1996–2006

Cancer	Adjusted for age and sex			Adjusted for age, sex and stage		
	HR	(95% CI)	p value	HR	(95% CI)	p value
Bladder	**1.60**	**(1.08–2.38)**	**0.020**	1.39	(0.93–2.09)	0.11
Brain	**1.30**	**(1.06–1.59)**	**0.013**	1.27	(1.03–1.56)	0.022
Breast: female	**1.36**	**(1.21–1.53)**	**<0.0001**	**1.23**	**(1.09–1.38)**	**0.0005**
Cervix	**2.52**	**(1.86–3.43)**	**<0.0001**	2.17	(1.58–2.99)	<0.0001
Colorectal	**1.36**	**(1.21–1.53)**	**<0.0001**	**1.20**	**(1.07–1.35)**	**0.002**
Colon	***1.27***	***(1.09–1.47)***	***0.002***	*1.11*	*(0.96–1.29)*	*0.16*
Rectum	***1.60***	***(1.33–1.94)***	***<0.0001***	***1.46***	***(1.21–1.77)***	***<0.0001***
Gallbladder	1.28	(0.87–1.87)	0.21	1.16	(0.79–1.70)	0.45
Ill-defined sites	**1.27**	**(1.13–1.44)**	**<0.0001**	**1.26**	**(1.12–1.42)**	**0.0001**
Kidney	**1.45**	**(1.16–1.82)**	**0.001**	**1.32**	**(1.06–1.65)**	**0.015**
Larynx	1.57	(0.87–2.85)	0.14			
Liver	1.25	(0.94–1.65)	0.12	**1.56**	**(1.17–2.08)**	**0.002**
Lung	**1.37**	**(1.28–1.46)**	**<0.0001**	**1.22**	**(1.14–1.31)**	**<0.0001**
Melanoma of skin	**2.45**	**(1.69–3.54)**	**<0.0001**	**1.57**	**(1.08–2.27)**	**0.017**
Mesothelial and soft tissue	1.36	(0.96–1.93)	0.083	**1.54**	**(1.07–2.20)**	**0.019**
Oesophagus	**1.54**	**(1.14–2.08)**	**0.005**	**1.40**	**(1.04–1.89)**	**0.026**
Oral cancers	**1.83**	**(1.37–2.42)**	**<0.0001**	**1.44**	**(1.08–1.91)**	**0.012**
Ovary	1.12	(0.91–1.39)	0.28	**1.42**	**(1.15–1.75)**	**0.001**
Pancreas	**1.31**	**(1.10–1.56)**	**0.002**	**1.27**	**(1.07–1.51)**	**0.007**
Prostate	**2.66**	**(2.15–3.30)**	**<0.0001**	**1.51**	**(1.22–1.88)**	**0.0002**
Stomach	**1.22**	**(1.06–1.39)**	**0.004**	**1.41**	**(1.23–1.61)**	**<0.0001**
Thyroid	**1.88**	**(1.20–2.94)**	**0.005**	1.37	(0.88–2.15)	0.17
Uterus	**1.71**	**(1.32–2.22)**	**<0.0001**	**1.88**	**(1.45–2.43)**	**<0.0001**

(1) Hazard ratios in **bold** are statistically significant at the 5% level.

(2) Hazard ratios in grey should be interpreted with caution due to small number of deaths. Where hazard ratios are missing, the data was excluded due to insufficient numbers.

MĀORI AND NON-MĀORI CANCER STATISTICS: SUMMARY OF FINDINGS

- During the period 2002–2006, cancer incidence was around 20% higher among Māori than among non-Māori, but cancer mortality was nearly 80% higher.
- Māori:non-Māori mortality ratios were higher than incidence ratios for many cancers.
- Lung cancer was the most commonly occurring cancer among Māori and non-Māori males. Breast cancer was the most common cancer among Māori and non-Māori females.
- Lung cancer was the most common cause of cancer death among Māori males and females, and among non-Māori males. For non-Māori females, colorectal and breast cancers were the leading causes of cancer death.
- Māori were less likely than non-Māori to be diagnosed at earlier stages of the disease for several types of cancer, and less likely to have extent of disease spread recorded on the cancer registration.
- Over the 11-year period 1996–2006, Māori had a higher risk of dying from their cancer after diagnosis than non-Māori for many cancers. Differences in stage at diagnosis explained some but not all of this survival disparity. For most cancers, survival disparities remained significant after taking stage at diagnosis into account.

SECTION 4:

Area Deprivation and Cancer

CANCER REGISTRATIONS AND DEATHS BY AREA DEPRIVATION: ALL CANCERS COMBINED 2002–2006

Key Findings

- Cancer incidence and mortality for all cancers combined was higher in more deprived areas among both Māori and non-Māori during the period 2002–2006. The association with increasing deprivation was stronger for cancer mortality than for cancer incidence. The deprivation gradient was also steeper for Māori than for non-Māori, for both incidence and mortality.
- Within each deprivation decile, Māori cancer incidence was somewhat higher than that of non-Māori. However, the mortality gap between Māori and non-Māori in each decile was considerably wider than the incidence gap. The differences between Māori and non-Māori were greater in the most deprived decile.
- The unequal exposure to neighbourhood socioeconomic deprivation accounted for 27% of the Māori:non-Māori incidence ratio and 15% of the mortality ratio.

The tables and figures below outline the age-standardised cancer incidence rates and mortality rates by NZDep2001 deprivation decile, for both sexes (Tables 4.1, 4.2 and Figure 4.1), and for females (Tables 4.5, 4.6 and Figure 4.3) and males (Tables 4.10, 4.11 and Figure 4.5). Decile 1 refers to the 10% of neighbourhoods that are the least deprived and decile 10 refers to the 10% of neighbourhoods that are the most deprived. The last column in these tables shows the ratio of Māori rates compared to non-Māori rates. A ratio of 1 means the rates are the same. A ratio higher than 1 indicates Māori rates are higher than those of non-Māori while a ratio lower than 1 indicates the rate for Māori is lower than the non-Māori rate.

The deprivation gradient (or slope) is the increased (or decreased) risk of getting cancer (registrations) or of dying from cancer (deaths) per increasing deprivation decile. Tables 4.3, 4.7, and 4.11 show the rates of change per decile for Māori and non-Māori. A gradient over 1 represents an increasing risk per decile. The ratio of gradients shows whether the slope is steeper (a ratio over 1) or flatter (a ratio under 1) for Māori compared to non-Māori. If the confidence interval does not include 1, the difference is statistically significant at the 5% level.

Māori:non-Māori cancer incidence and mortality ratios adjusted for age, then also for deprivation, are presented in tables 4.4, 4.6, and 4.12. The difference between the age-adjusted and the deprivation-adjusted ratios provides an estimate of how much the differential distribution of area deprivation contributes to the cancer disparities between Māori and non-Māori.

Both Sexes

Table 4.1: All cancer registrations: numbers, age-sex-standardised rates per 100,000, Māori:non-Māori rate ratios, by deprivation decile, 2002–2006

NZDep2001 decile	Māori		Non-Māori		Ratio (95% CI)
	Number	Rate (95% CI)	Number	Rate (95% CI)	
1	175	186.0 (155.3–222.6)	7,383	168.4 (163.7–173.2)	1.10 (0.92–1.32)
2	226	175.6 (151.1–204.1)	7,205	162.8 (158.3–167.4)	1.08 (0.93–1.26)
3	274	196.1 (171.9–223.7)	7,706	174.1 (169.3–179.2)	1.13 (0.98–1.29)
4	381	182.6 (163.6–203.8)	8,419	172.6 (167.9–177.5)	1.06 (0.94–1.18)
5	434	204.8 (185.1–226.6)	8,564	186.5 (181.2–192.0)	1.10 (0.99–1.22)
6	626	203.1 (186.7–220.9)	9,759	184.1 (179.1–189.3)	**1.10 (1.01–1.20)**
7	739	207.8 (192.3–224.5)	10,066	194.1 (188.6–199.8)	1.07 (0.99–1.16)
8	988	232.4 (217.3–248.5)	9,892	193.0 (187.4–198.6)	**1.20 (1.12–1.30)**
9	1,417	233.2 (220.2–246.9)	8,954	219.1 (212.2–226.1)	**1.06 (1.00–1.14)**
10	2,137	260.2 (247.5–273.5)	5,958	198.2 (189.6–207.1)	**1.31 (1.23–1.40)**

Table 4.2: All cancer deaths: numbers, age-sex-standardised rates per 100,000 Māori:non-Māori rate ratios, by deprivation decile, 2002–2006

NZDep2001 decile	Māori		Non-Māori		Ratio (95% CI)
	Number	Rate (95% CI)	Number	Rate (95% CI)	
1	67	73.4 (57.2–94.3)	2,847	53.4 (51.1–55.8)	**1.38 (1.07–1.77)**
2	101	76.1 (62.5–92.7)	2,814	52.9 (50.7–55.2)	**1.44 (1.18–1.76)**
3	128	92.6 (77.7–110.4)	3,135	57.4 (55.0–59.9)	**1.61 (1.35–1.93)**
4	196	94.9 (82.5–109.3)	3,607	58.9 (56.6–61.3)	**1.61 (1.39–1.87)**
5	215	99.7 (87.2–114.1)	3,579	60.6 (58.1–63.2)	**1.65 (1.43–1.89)**
6	316	101.7 (91.0–113.6)	4,286	62.8 (60.5–65.2)	**1.62 (1.44–1.82)**
7	361	101.4 (91.4–112.5)	4,661	70.3 (67.7–73.1)	**1.44 (1.29–1.61)**
8	478	114.1 (104.2–124.9)	4,524	69.1 (66.5–71.7)	**1.65 (1.50–1.82)**
9	728	119.4 (110.9–128.5)	3,663	70.2 (67.4–73.0)	**1.70 (1.56–1.85)**
10	1,120	135.6 (127.8–143.8)	2,644	76.3 (73.0–79.7)	**1.78 (1.65–1.91)**

Table 4.3: All cancers: Māori and non-Māori incidence and mortality deprivation gradients, adjusted for age and sex, 2002–2006

	Dep2001 decile (95% CI)		Ratio of gradients (95% CI)
	Māori	Non-Māori	
Registrations	1.051 (1.025–1.077)	1.026 (1.019–1.033)	1.024 (0.999–1.051)
Deaths	1.064 (1.043–1.086)	1.035 (1.029–1.041)	**1.029 (1.008–1.050)**

Table 4.4: All cancers: incidence and mortality Māori:non-Māori rate ratios adjusted for age, sex and deprivation, 2002–2006

	Adjusted for age and sex	Adjusted for age, sex, and deprivation
	Ratio (95% CI)	Ratio (95% CI)
Registrations	**1.24 (1.00–1.52)**	**1.17 (1.10–1.25)**
Deaths	**1.78 (1.55–2.05)**	**1.66 (1.58–1.75)**

(1) Ratios modelled using Poisson regression (see Appendix 1, for explanation).

Females

Table 4.5: All cancer registrations: numbers, age-standardised rates per 100,000, Māori:non-Māori rate ratios by deprivation decile, females, 2002–2006

NZDep2001 decile	Māori			Non-Māori			Ratio (95% CI)
	Number	Rate	(95% CI)	Number	Rate	(95% CI)	
1	101	191.5	(152.4–240.7)	3,454	160.8	(154.1–167.7)	1.19 (0.94–1.50)
2	116	175.7	(142.8–216.1)	3,378	157.0	(150.6–163.6)	1.12 (0.91–1.38)
3	145	198.2	(166.0–236.7)	3,636	170.5	(163.4–177.9)	1.16 (0.97–1.40)
4	196	180.6	(155.2–210.1)	4,019	168.4	(161.6–175.4)	1.07 (0.92–1.25)
5	227	209.1	(181.9–240.3)	4,035	177.2	(169.7–185.1)	**1.18 (1.02–1.36)**
6	352	224.0	(200.4–250.5)	4,535	176.0	(168.8–183.6)	**1.27 (1.13–1.43)**
7	426	229.3	(207.2–253.7)	4,707	181.3	(173.4–189.5)	**1.26 (1.13–1.41)**
8	555	240.8	(220.3–263.3)	4,705	182.1	(174.3–190.2)	**1.32 (1.20–1.46)**
9	778	235.9	(218.5–254.8)	4,254	210.8	(201.0–221.1)	**1.12 (1.02–1.23)**
10	1,166	263.7	(246.6–282.1)	2,746	188.2	(175.6–201.8)	**1.40 (1.27–1.54)**

Table 4.6: All cancer deaths: numbers, age-standardised rates per 100,000, Māori:non-Māori rate ratios by deprivation decile, females, 2002–2006

NZDep2001 decile	Māori			Non-Māori			Ratio (95% CI)
	Number	Rate	(95% CI)	Number	Rate	(95% CI)	
1	35	70.0	(49.9–98.2)	1,367	49.1	(45.9–52.5)	**1.43 (1.01–2.01)**
2	59	87.9	(67.9–113.7)	1,334	47.8	(44.8–51.0)	**1.84 (1.41–2.40)**
3	57	75.8	(58.3–98.6)	1,432	51.2	(48.0–54.7)	**1.48 (1.13–1.94)**
4	93	85.8	(69.9–105.2)	1,680	52.3	(49.3–55.6)	**1.64 (1.32–2.03)**
5	112	101.1	(83.9–121.8)	1,718	53.9	(50.5–57.5)	**1.87 (1.54–2.28)**
6	169	106.3	(91.3–123.7)	2,025	55.5	(52.4–58.8)	**1.91 (1.63–2.25)**
7	184	98.0	(84.7–113.3)	2,234	62.9	(59.4–66.6)	**1.56 (1.33–1.82)**
8	241	103.9	(91.6–118.0)	2,158	61.3	(57.9–64.9)	**1.70 (1.48–1.95)**
9	376	112.5	(101.6–124.6)	1,752	64.0	(60.2–68.0)	**1.76 (1.56–1.98)**
10	578	128.4	(118.3–139.4)	1,196	66.6	(62.2–71.4)	**1.93 (1.73–2.14)**

Table 4.7: All cancers: incidence and mortality deprivation gradients, females, 2002–2006

	Dep2001 decile (95% CI)		Ratio of gradients (95% CI)
	Māori	Non-Māori	
Registrations	**1.046 (1.030–1.062)**	**1.025 (1.021–1.030)**	**1.020 (1.004–1.037)**
Deaths	**1.057 (1.035–1.080)**	**1.032 (1.025–1.038)**	**1.025 (1.003–1.048)**

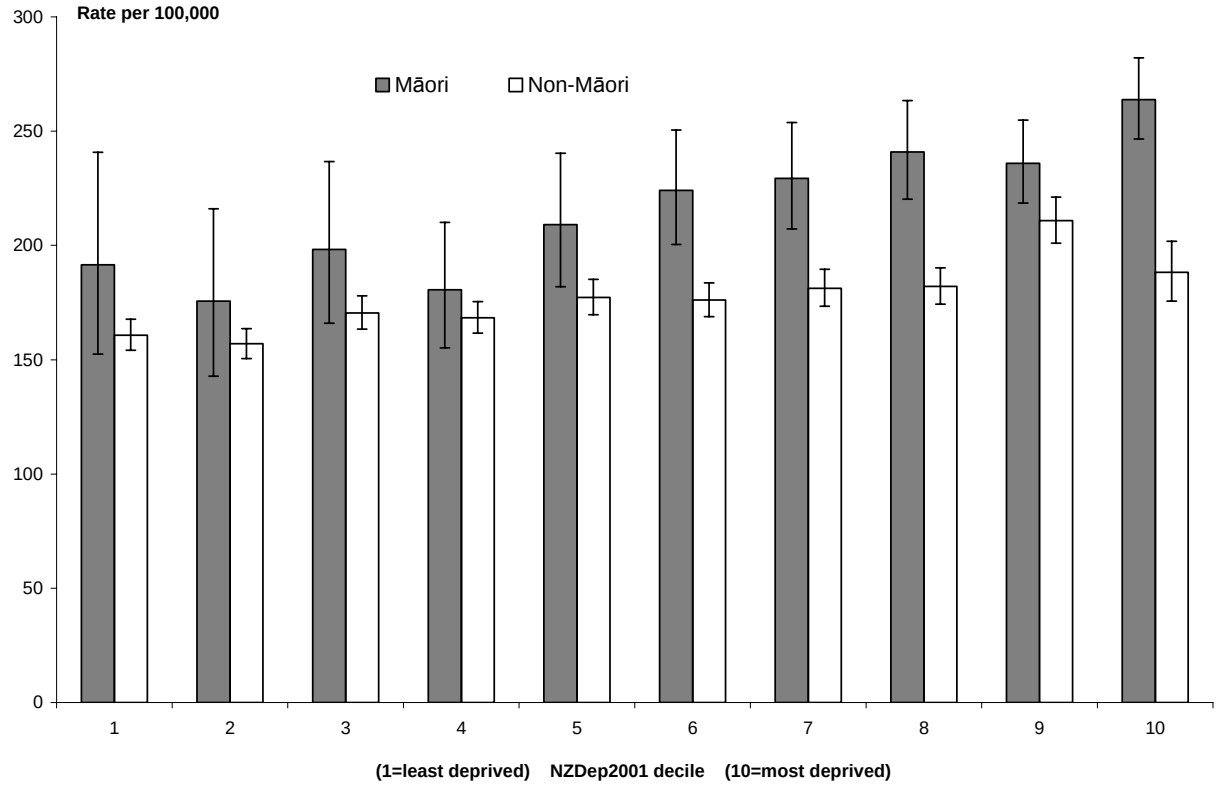
Table 4.8: All cancers: incidence and mortality Māori:non-Māori rate ratios adjusted for age, and deprivation, females, 2002–2006

	Adjusted for age	Adjusted for age, deprivation
	Ratio (95% CI)	Ratio (95% CI)
Registrations	**1.34 (1.23–1.45)**	**1.27 (1.22–1.32)**
Deaths	**1.87 (1.70–2.07)**	**1.76 (1.66–1.86)**

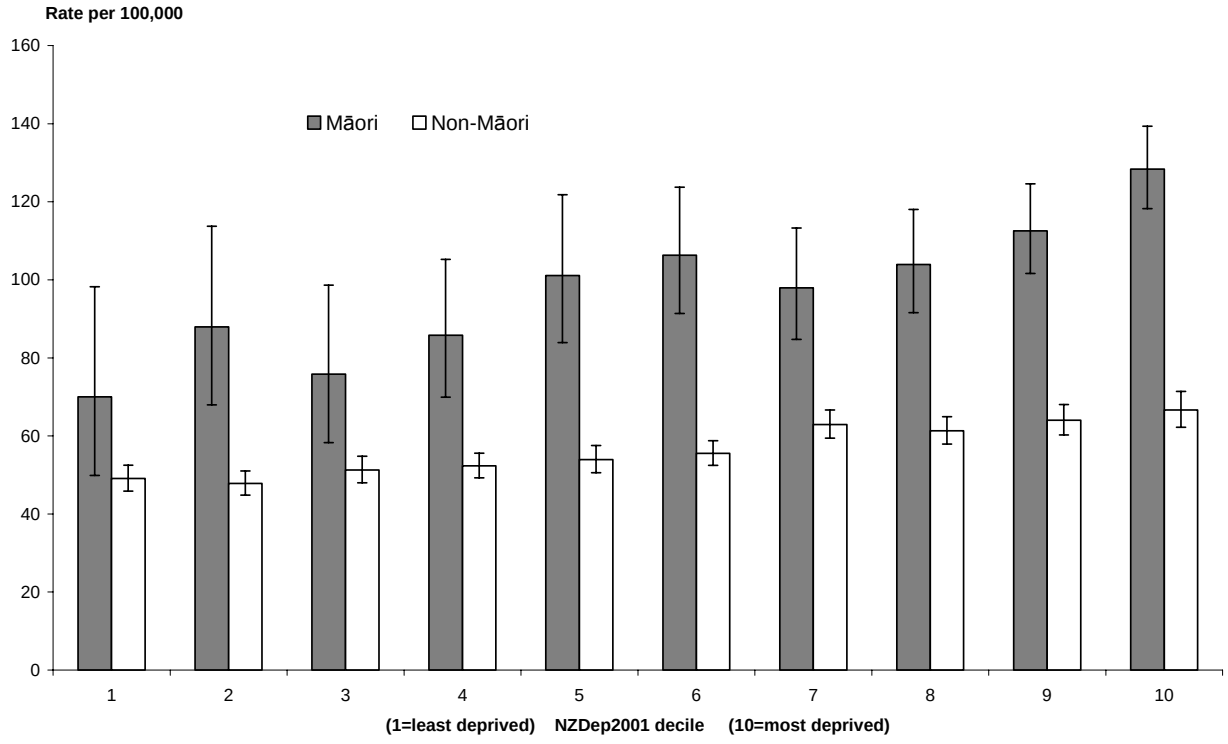
(1) Ratios modelled using Poisson regression (see Appendix 1, for explanation).

Figure 4.1: All cancers: age-standardised incidence and mortality rates by deprivation decile, females, 2002–2006

(a) Registrations



(b) Deaths



Males

Table 4.9: All cancers: numbers, age-standardised registration rates per 100,000, Māori:non-Māori rate ratios, by deprivation decile, males, 2002–2006

NZDep2001 decile	Māori			Non-Māori			Ratio (95% CI)
	Number	Rate	(95% CI)	Number	Rate	(95% CI)	
1	74	180.4	(136.2–238.8)	3,929	176.1	(169.5–182.9)	1.02 (0.77–1.36)
2	109	175.6	(141.1–218.4)	3,828	168.6	(162.4–175.0)	1.04 (0.83–1.30)
3	129	194.0	(159.7–235.7)	4,070	177.8	(171.2–184.7)	1.09 (0.89–1.33)
4	186	184.7	(157.5–216.5)	4,399	176.8	(170.3–183.6)	1.04 (0.89–1.23)
5	207	200.5	(173.0–232.4)	4,529	195.8	(188.4–203.4)	1.02 (0.88–1.19)
6	273	182.1	(160.3–206.9)	5,225	192.2	(185.3–199.4)	0.95 (0.83–1.08)
7	314	186.3	(165.4–209.9)	5,359	207.0	(199.2–215.0)	0.90 (0.79–1.02)
8	433	223.9	(202.3–247.7)	5,187	203.8	(196.1–211.8)	1.10 (0.99–1.22)
9	639	230.4	(211.7–250.7)	4,700	227.4	(218.0–237.2)	1.01 (0.92–1.11)
10	971	256.6	(238.4–276.3)	3,212	208.1	(196.8–220.0)	**1.23 (1.12–1.35)**

Table 4.10: All cancers: numbers, age-standardised death rates per 100,000, Māori:non-Māori rate ratios, by deprivation decile, males, 2002–2006

NZDep2001 decile	Māori			Non-Māori			Ratio (95% CI)
	Number	Rate	(95% CI)	Number	Rate	(95% CI)	
1	32	76.9	(53.5–110.6)	1,480	57.7	(54.4–61.2)	1.33 (0.92–1.93)
2	42	64.4	(47.5–87.3)	1,480	58.0	(54.7–61.4)	1.11 (0.81–1.51)
3	71	109.4	(86.5–138.3)	1,703	63.6	(60.1–67.2)	**1.72 (1.35–2.19)**
4	103	104.1	(85.7–126.5)	1,927	65.5	(62.2–69.0)	**1.59 (1.30–1.94)**
5	103	98.4	(81.1–119.4)	1,861	67.3	(63.7–71.1)	**1.46 (1.19–1.79)**
6	147	97.0	(82.5–114.1)	2,261	70.1	(66.6–73.7)	**1.39 (1.17–1.64)**
7	177	104.8	(90.4–121.5)	2,427	77.8	(73.9–81.8)	**1.35 (1.15–1.58)**
8	237	124.3	(109.4–141.2)	2,366	76.8	(73.1–80.7)	**1.62 (1.41–1.85)**
9	352	126.2	(113.6–140.2)	1,911	76.4	(72.4–80.5)	**1.65 (1.47–1.86)**
10	542	142.8	(131.1–155.4)	1,448	85.9	(81.0–91.1)	**1.66 (1.50–1.84)**

Table 4.11: All cancers: incidence and mortality deprivation gradients, males, 2002–2006

	Dep2001 decile (95% CI)		Ratio of gradients (95% CI)
	Māori	Non-Māori	
Registrations	**1.052 (1.035–1.069)**	**1.027 (1.023–1.031)**	**1.024 (1.007–1.041)**
Deaths	**1.069 (1.046–1.092)**	**1.038 (1.031–1.044)**	**1.030 (1.007–1.054)**

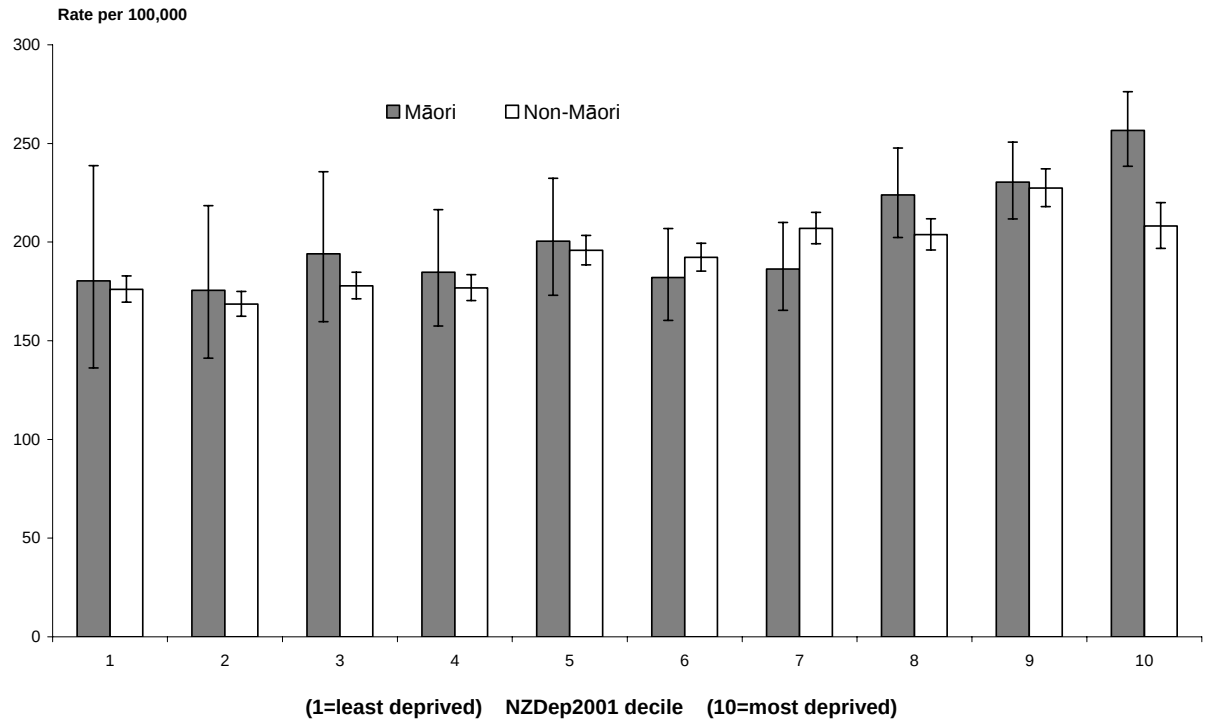
Table 4.12: All cancers: incidence and mortality Māori:non-Māori rate ratios adjusted for age, and deprivation, males, 2002–2006

	Adjusted for age	Adjusted for age, deprivation
	Ratio (95% CI)	Ratio (95% CI)
Registrations	**1.13 (1.07–1.18)**	**1.07 (1.03–1.11)**
Deaths	**1.69 (1.53–1.86)**	**1.57 (1.48–1.66)**

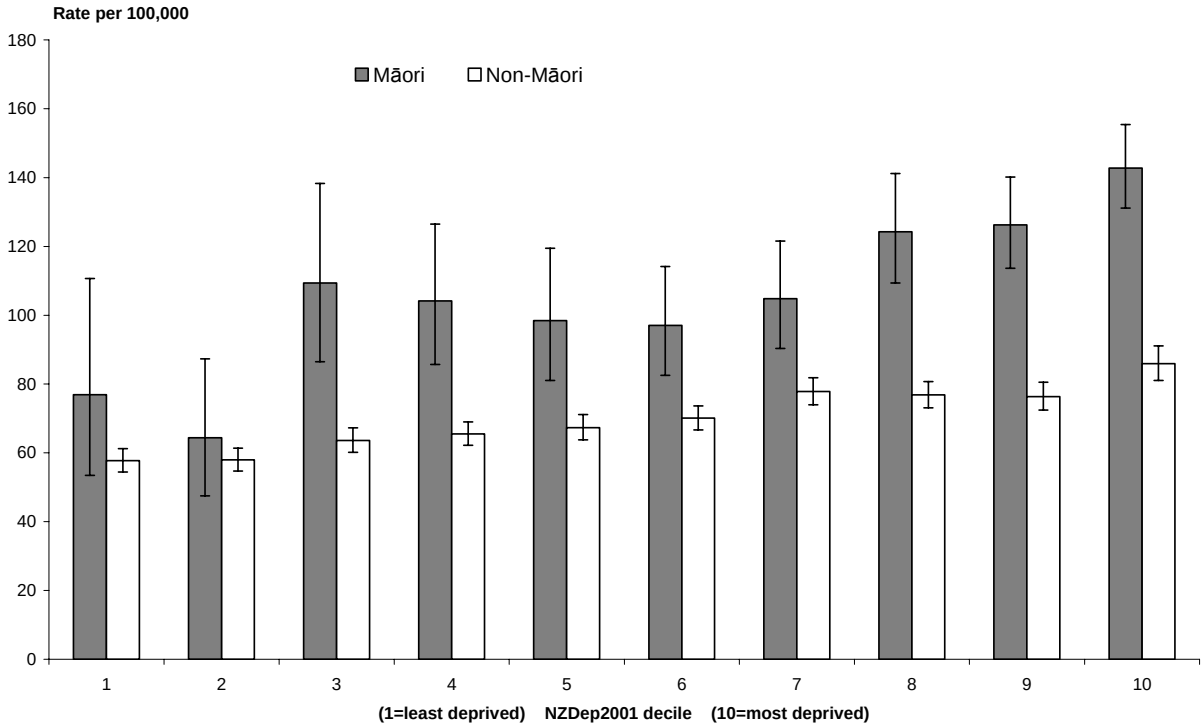
(1) Ratios modelled using Poisson regression (see Appendix 1, for explanation).

Figure 4.2: All cancers: age-standardised registration and death rates by deprivation decile, males, 2002–2006

(a) Registrations



(b) Deaths



CANCER REGISTRATIONS AND DEATHS BY AREA DEPRIVATION AND CANCER TYPE 2002–2006

Key Findings

- While cancer incidence and mortality increases with increasing area deprivation in general, the relationships vary depending on the type of cancer.
- Lung cancer and liver cancer incidence showed the strongest associations with increasing socioeconomic deprivation among Māori. Other cancers with significant deprivation gradients for Māori included cancers of the female breast, stomach, uterus, prostate and testis. Pancreatic cancer and leukaemia also showed a significant association for Māori males.
- Among non-Māori, there was a significant association between increasing incidence and increasing deprivation for most cancers, with the exception of melanoma, prostate, ovarian, bladder, and testicular cancers. Liver cancer displayed the strongest gradient for non-Māori.
- For Māori, increasing deprivation was most strongly associated with increased mortality risk from cancers of the cervix and testis. Lung, liver, stomach, and pancreatic cancer deaths also showed significant gradients among Māori.
- Among non-Māori the deprivation gradients were steepest for deaths from cervical, oral, and lung cancers. Other cancers with a significant deprivation gradient for non-Māori included cancers of the thyroid, liver, stomach, uterus, pancreas, bladder, oesophagus and prostate.
- Adjusting for deprivation reduced the relative disparities between Māori and non-Māori for most of the cancers with a significantly higher incidence or mortality rate among Māori. However, most remained significant after adjusting for deprivation.

The tables and figures below outline the age-standardised cancer incidence rates and mortality rates for selected cancers[3] by NZDep2001 deprivation quintile, for both sexes (Tables 4.13 and 4.14). Quintile 1 refers to the least deprived neighbourhoods and quintile 5 the most deprived neighbourhoods. The ratios are the Māori rates divided by the non-Māori rates. A ratio above 1 indicates the Māori rate is higher than the non-Māori rate. Conversely a ratio below 1 indicates the Māori rate is lower than the non-Māori rate. If the confidence interval is above or below 1.00 the ratio is statistically significant at the 5% level.

The deprivation gradient (or slope) is the increased (or decreased) risk of getting cancer (registrations) or of dying from cancer (deaths) per increasing deprivation decile. Tables 4.15 and 4.16 present the rates of change per decile for Māori and non-Māori. A gradient over 1 represents an increasing risk per decile. The ratio of gradients shows whether the slope is steeper (a ratio over 1) or flatter (a ratio under 1) for Māori compared to non-Māori. If the confidence interval is above or below 1.00 the difference in gradients is statistically significant at the 5% level.

The smaller numbers of Māori registrations and deaths impede the ability to detect significant associations by deprivation. This does not mean the associations do not exist.

Māori:non-Māori cancer incidence and mortality ratios adjusted for age and for deprivation are presented for females and males separately in Tables 4.17 and 4.18. The difference between the age-adjusted and the deprivation-adjusted ratios provides an estimate of how much socioeconomic deprivation contributes to the disparities between Māori and non-Māori for particular cancer types.

[3] The cancer sites include the 10 leading cancer registration and death sites for Māori and non-Māori males and females.

Table 4.13: Cancer registrations, age-sex-standardised rates, by deprivation quintile, 2002–2006

Cancer	NZDep 2001 quintile	Māori			Non-Māori			Ratio	(95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)		
Bladder	1	4	1.5	(0.5–4.7)	405	3.6	(3.2–4.1)	0.41	(0.13–1.30)
	2	10	3.0	(1.6–5.8)	433	3.6	(3.2–4.0)	0.84	(0.43–1.64)
	3	15	2.7	(1.6–4.7)	502	3.7	(3.3–4.1)	0.74	(0.43–1.30)
	4	20	2.6	(1.6–4.1)	598	4.1	(3.7–4.6)	0.62	(0.39–1.01)
	5	40	2.8	(2.0–4.0)	400	4.2	(3.7–4.8)	**0.68**	**(0.47–0.97)**
Brain	1	2	1.0	(0.2–4.1)	236	3.8	(3.2–4.4)	0.27	(0.06–1.12)
	2	5	1.4	(0.5–3.7)	240	3.6	(3.0–4.2)	0.39	(0.14–1.07)
	3	12	2.4	(1.3–4.3)	237	3.6	(3.0–4.3)	0.66	(0.36–1.23)
	4	34	4.5	(3.2–6.4)	296	4.7	(3.9–5.7)	0.95	(0.64–1.42)
	5	39	2.9	(2.1–4.0)	205	4.5	(3.6–5.5)	**0.65**	**(0.44–0.96)**
Breast	1	65	52.8	(40.5–68.8)	2,106	51.9	(49.5–54.5)	1.02	(0.78–1.33)
	2	108	59.0	(48.3–72.2)	2,204	54.2	(51.6–57.0)	1.09	(0.88–1.34)
	3	192	73.4	(63.2–85.2)	2,353	57.0	(54.1–60.0)	**1.29**	**(1.10–1.51)**
	4	302	73.3	(65.1–82.6)	2,395	54.7	(51.8–57.8)	**1.34**	**(1.18–1.53)**
	5	573	75.3	(68.9–82.3)	1,777	59.8	(55.6–64.2)	**1.26**	**(1.12–1.41)**
Cervix	1	2	1.7	(0.4–6.9)	106	3.7	(3.0–4.6)	0.46	(0.11–1.89)
	2	16	8.8	(5.2–14.8)	121	4.5	(3.6–5.7)	**1.93**	**(1.09–3.43)**
	3	27	10.0	(6.7–15.0)	147	5.2	(4.2–6.4)	**1.92**	**(1.22–3.02)**
	4	35	8.7	(6.2–12.3)	157	5.2	(4.2–6.5)	**1.66**	**(1.11–2.50)**
	5	65	8.8	(6.9–11.4)	150	6.5	(5.1–8.3)	1.36	(0.96–1.94)
Colorectal	1	37	17.6	(12.4–25.1)	2,192	21.1	(20.1–22.2)	0.83	(0.58–1.19)
	2	54	15.4	(11.6–20.4)	2,475	21.7	(20.7–22.7)	**0.71**	**(0.53–0.95)**
	3	94	17.9	(14.4–22.2)	2,887	22.7	(21.7–23.7)	**0.79**	**(0.63–0.98)**
	4	134	17.2	(14.3–20.5)	3,235	25.5	(24.4–26.7)	**0.67**	**(0.56–0.81)**
	5	224	15.5	(13.5–17.8)	2,243	24.8	(23.4–26.2)	**0.62**	**(0.54–0.73)**
Kidney	1	10	3.9	(1.9–7.8)	268	3.3	(2.8–3.9)	1.17	(0.57–2.40)
	2	18	5.5	(3.3–9.0)	331	3.5	(3.1–4.0)	1.55	(0.92–2.62)
	3	23	4.4	(2.9–6.8)	376	3.9	(3.4–4.4)	1.14	(0.73–1.79)
	4	31	4.0	(2.8–5.9)	439	4.8	(4.2–5.4)	0.85	(0.57–1.26)
	5	76	5.6	(4.4–7.1)	289	4.6	(3.8–5.5)	1.22	(0.90–1.64)
Leukaemias	1	16	7.1	(4.1–12.4)	515	6.6	(5.9–7.5)	1.07	(0.61–1.89)
	2	17	4.8	(2.9–8.0)	579	7.3	(6.4–8.3)	0.66	(0.39–1.12)
	3	35	7.0	(4.9–9.9)	628	7.9	(6.9–9.0)	0.88	(0.61–1.28)
	4	63	8.2	(6.3–10.6)	734	8.3	(7.3–9.5)	0.99	(0.74–1.32)
	5	133	10.0	(8.3–11.9)	530	8.6	(7.2–10.2)	1.16	(0.91–1.49)

Table 4.13 (continued)

Cancer	NZDep 2001 quintile	Māori			Non-Māori			Ratio (95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)	
Liver	1	7	3.0	(1.4–6.9)	104	1.0	(0.8–1.2)	**3.11 (1.33–7.27)**
	2	23	6.6	(4.2–10.3)	133	1.5	(1.1–1.9)	**4.52 (2.71–7.52)**
	3	18	3.3	(2.0–5.4)	153	1.4	(1.1–1.8)	**2.37 (1.38–4.08)**
	4	52	6.9	(5.2–9.2)	191	1.8	(1.4–2.2)	**3.93 (2.69–5.73)**
	5	96	7.1	(5.7–8.7)	199	2.9	(2.3–3.6)	**2.45 (1.78–3.35)**
Lung	1	60	27.9	(21.1–37.0)	897	8.2	(7.6–8.9)	**3.40 (2.54–4.55)**
	2	114	32.7	(26.7–40.1)	1,198	10.2	(9.5–11.0)	**3.20 (2.58–3.96)**
	3	181	34.6	(29.6–40.4)	1,609	12.9	(12.0–13.7)	**2.69 (2.27–3.19)**
	4	336	42.2	(37.7–47.3)	1,945	15.3	(14.3–16.3)	**2.77 (2.43–3.16)**
	5	722	49.3	(45.5–53.4)	1,610	18.9	(17.4–20.7)	**2.60 (2.32–2.93)**
Melanoma	1	12	5.3	(2.8–9.9)	1,893	25.7	(24.4–27.1)	**0.20 (0.11–0.38)**
	2	13	3.7	(2.1–6.6)	1,973	25.9	(24.6–27.3)	**0.14 (0.08–0.26)**
	3	22	4.2	(2.7–6.5)	2,125	27.1	(25.7–28.5)	**0.16 (0.10–0.24)**
	4	22	2.9	(1.9–4.5)	2,045	24.8	(23.5–26.2)	**0.12 (0.08–0.18)**
	5	50	3.5	(2.6–4.7)	1,428	23.6	(22.1–25.1)	**0.15 (0.11–0.20)**
Non-Hodgkin's lymphoma	1	10	4.6	(2.4–8.9)	538	6.3	(5.7–7.0)	0.72 (0.37–1.41)
	2	19	5.7	(3.4–9.5)	594	6.3	(5.7–7.0)	0.89 (0.53–1.51)
	3	35	6.7	(4.7–9.4)	642	7.1	(6.4–7.9)	0.94 (0.65–1.35)
	4	45	5.8	(4.3–7.9)	716	7.2	(6.5–8.1)	0.80 (0.58–1.11)
	5	106	7.8	(6.4–9.5)	565	8.8	(7.8–10.1)	0.88 (0.69–1.12)
Oesophagus	1	4	1.8	(0.6–5.6)	159	1.4	(1.1–1.6)	1.30 (0.41–4.13)
	2	11	3.3	(1.8–6.2)	207	1.7	(1.4–2.0)	**1.93 (1.01–3.69)**
	3	15	3.0	(1.7–5.2)	240	1.8	(1.5–2.1)	1.68 (0.94–2.99)
	4	24	3.1	(2.0–4.7)	316	2.4	(2.1–2.8)	1.30 (0.83–2.03)
	5	49	3.4	(2.5–4.6)	202	2.2	(1.8–2.8)	**1.53 (1.07–2.21)**
Oral	1	8	3.8	(1.8–8.3)	212	2.6	(2.2–3.1)	1.48 (0.67–3.27)
	2	15	4.2	(2.4–7.3)	253	3.1	(2.7–3.6)	1.35 (0.77–2.39)
	3	19	3.8	(2.4–6.1)	300	3.5	(3.0–4.1)	1.10 (0.67–1.78)
	4	43	5.6	(4.1–7.7)	314	3.8	(3.2–4.5)	**1.49 (1.05–2.11)**
	5	47	3.5	(2.6–4.7)	299	4.9	(4.2–5.8)	0.70 (0.50–0.98)
Ovary	1	7	5.0	(2.1–12.2)	237	5.2	(4.5–6.1)	0.97 (0.39–2.36)
	2	12	6.1	(3.3–11.3)	249	5.6	(4.8–6.5)	1.09 (0.58–2.07)
	3	18	7.1	(4.4–11.4)	261	5.3	(4.4–6.3)	1.34 (0.81–2.23)
	4	29	6.8	(4.6–10.0)	309	6.2	(5.3–7.3)	1.10 (0.72–1.66)
	5	59	7.9	(6.0–10.3)	233	7.3	(6.0–9.0)	1.07 (0.76–1.50)
Pancreas	1	9	4.6	(2.3–9.2)	259	2.2	(1.9–2.6)	2.03 (0.99–4.17)
	2	18	5.3	(3.3–8.7)	303	2.4	(2.1–2.8)	**2.19 (1.31–3.66)**
	3	19	3.7	(2.3–6.0)	388	2.8	(2.4–3.2)	1.33 (0.80–2.19)
	4	33	4.0	(2.8–5.8)	416	2.9	(2.5–3.3)	1.38 (0.94–2.05)
	5	93	6.3	(5.0–7.8)	302	3.3	(2.7–3.9)	**1.91 (1.44–2.54)**

Table 4.13 (continued)

Cancer	NZDep 2001 quintile	Māori			Non-Māori			Ratio	(95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)		
Prostate	1	32	32.4	(22.0–47.7)	2,364	47.1	(45.2–49.2)	0.69	(0.47–1.01)
	2	60	36.6	(27.8–48.2)	2,512	47.2	(45.2–49.3)	0.78	(0.59–1.02)
	3	97	3.09	(31.5–48.5)	2,680	46.5	(44.5–48.6)	0.84	(0.67–1.05)
	4	163	45.3	(38.4–53.4)	2,856	47.9	(45.9–50.1)	0.94	(0.80–1.12)
	5	304	45.2	(40.0–51.2)	2,021	48.2	(45.6–50.9)	0.94	(0.82–1.08)
Stomach	1	18	8.5	(5.1–14.3)	245	2.3	(2.0–2.7)	**3.72**	**(2.18–6.36)**
	2	24	7.0	(4.6–10.8)	287	2.6	(2.2–3.0)	**2.72**	**(1.71–4.30)**
	3	50	9.4	(7.0–12.6)	337	2.9	(2.4–3.4)	**3.25**	**(2.32–4.55)**
	4	52	6.8	(5.1–9.1)	384	3.0	(2.6–3.5)	**2.27**	**(1.64–3.15)**
	5	176	12.6	(10.7–14.7)	298	3.7	(2.9–4.7)	**3.42**	**(2.57–4.54)**
Testis	1	8	7.5	(3.6–15.8)	106	5.3	(4.2–6.7)	1.42	(0.65–3.09)
	2	15	8.7	(5.0–15.0)	112	5.6	(4.5–7.1)	1.54	(0.85–2.77)
	3	23	9.6	(6.3–14.5)	129	6.7	(5.4–8.3)	1.43	(0.89–2.29)
	4	31	9.2	(6.4–13.2)	142	7.3	(5.9–9.0)	1.27	(0.84–1.93)
	5	75	13.5	(10.7–17.1)	107	6.5	(4.8–8.9)	**2.06**	**(1.40–3.05)**
Thyroid	1	11	4.5	(2.3–8.7)	144	2.5	(2.1–3.1)	1.79	(0.90–3.58)
	2	15	4.3	(2.5–7.2)	122	2.2	(1.7–2.7)	**1.96**	**(1.11–3.47)**
	3	17	3.4	(2.0–5.5)	160	2.7	(2.2–3.3)	1.24	(0.73–2.10)
	4	32	4.2	(2.9–6.0)	175	2.7	(2.2–3.4)	**1.51**	**(1.00–2.30)**
	5	74	5.3	(4.2–6.7)	169	4.0	(3.2–5.0)	1.32	(0.95–1.83)
Uterus	1	9	7.7	(3.8–15.5)	263	5.8	(5.1–6.7)	1.32	(0.64–2.70)
	2	17	9.2	(5.5–15.3)	263	5.5	(4.7–6.3)	1.68	(0.99–2.85)
	3	33	12.3	(8.6–17.6)	313	6.1	(5.3–7.2)	**2.00**	**(1.35–2.96)**
	4	49	11.9	(8.9–15.9)	354	6.8	(5.9–7.9)	**1.75**	**(1.26–2.43)**
	5	113	14.5	(11.9–17.6)	313	9.2	(7.7–11.1)	**1.57**	**(1.20–2.05)**

Table 4.14: Cancer deaths, age-sex-standardised rates, by deprivation quintile, 2002–2006

Cancer	NZDep 2001 quintile	Māori			Non-Māori			Ratio (95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)	
Bladder	1	1	0.6	(0.1–4.1)	127	0.9	(0.8–1.1)	0.60 (0.08–4.33)
	2	2	0.7	(0.2–2.7)	171	1.2	(1.0–1.4)	0.58 (0.14–2.35)
	3	8	1.5	(0.7–2.9)	198	1.1	(1.0–1.4)	1.29 (0.63–2.63)
	4	14	1.8	(1.1–3.1)	229	1.3	(1.1–1.5)	1.46 (0.84–2.53)
	5	17	1.2	(0.8–2.0)	153	1.3	(1.1–1.6)	0.92 (0.54–1.55)
Brain	1	8	3.5	(1.7–7.0)	215	2.9	(2.5–3.4)	1.19 (0.58–2.44)
	2	9	2.7	(1.4–5.1)	208	2.9	(2.4–3.4)	0.93 (0.47–1.82)
	3	12	2.4	(1.4–4.2)	218	2.8	(2.4–3.4)	0.85 (0.47–1.54)
	4	17	2.2	(1.4–3.6)	234	3.1	(2.6–3.7)	0.72 (0.43–1.19)
	5	35	2.5	(1.8–3.5)	154	3.0	(2.5–3.6)	0.83 (0.56–1.22)
Breast: female	1	24	18.2	(12.2–27.3)	536	10.3	(9.4–11.4)	**1.76 (1.17–2.67)**
	2	32	16.6	(11.7–23.5)	545	11.0	(10.0–12.2)	**1.50 (1.05–2.16)**
	3	67	23.3	(18.3–29.6)	596	10.7	(9.7–11.8)	**2.18 (1.68–2.82)**
	4	76	17.3	(13.8–21.7)	684	12.1	(11.0–13.3)	**1.43 (1.12–1.82)**
	5	162	19.6	(16.8–22.9)	437	11.4	(10.2–12.7)	**1.72 (1.42–2.08)**
Cervix	1	1	0.8	(0.1–6.0)	39	0.8	(0.6–1.3)	0.99 (0.13–7.35)
	2	4	2.2	(0.8–5.9)	31	0.7	(0.4–1.1)	**3.08 (1.04–9.14)**
	3	6	2.1	(0.9–4.6)	41	0.9	(0.6–1.3)	2.31 (0.95–5.62)
	4	11	2.5	(1.4–4.5)	66	1.4	(1.0–1.9)	1.73 (0.89–3.39)
	5	36	4.5	(3.3–6.3)	62	1.7	(1.3–2.3)	**2.64 (1.69–4.13)**
Colorectal	1	22	10.2	(6.7–15.6)	886	7.9	(7.3–8.5)	1.29 (0.84–1.98)
	2	21	6.2	(4.0–9.5)	1,111	8.8	(8.2–9.4)	0.71 (0.46–1.09)
	3	43	8.3	(6.1–11.1)	1,224	8.8	(8.2–9.4)	0.94 (0.69–1.27)
	4	70	9.0	(7.1–11.4)	1,445	9.8	(9.2–10.5)	0.92 (0.72–1.17)
	5	111	7.7	(6.4–9.3)	888	9.0	(8.3–9.8)	0.86 (0.70–1.05)
Kidney	1	5	1.9	(0.8–4.5)	104	1.0	(0.8–1.3)	1.80 (0.73–4.47)
	2	9	2.8	(1.4–5.4)	135	1.2	(1.0–1.4)	**2.36 (1.18–4.68)**
	3	8	1.5	(0.7–3.0)	186	1.6	(1.3–1.9)	0.93 (0.46–1.91)
	4	18	2.3	(1.5–3.7)	184	1.6	(1.3–2.0)	1.45 (0.88–2.40)
	5	34	2.4	(1.7–3.4)	116	1.3	(1.1–1.6)	**1.82 (1.22–2.70)**
Leukaemias	1	6	2.9	(1.3–6.4)	241	2.7	(2.2–3.2)	1.08 (0.47–2.46)
	2	9	2.7	(1.4–5.2)	268	2.8	(2.4–3.3)	0.95 (0.48–1.87)
	3	17	3.4	(2.1–5.4)	257	2.3	(2.0–2.8)	1.44 (0.86–2.39)
	4	17	2.2	(1.4–3.5)	325	2.6	(2.2–3.1)	0.84 (0.51–1.39)
	5	39	2.8	(2.1–3.9)	218	2.7	(2.3–3.2)	1.05 (0.73–1.50)
Liver	1	6	2.7	(1.2–6.1)	115	1.1	(0.9–1.3)	**2.51 (1.08–5.81)**
	2	15	4.2	(2.5–6.9)	116	1.1	(0.9–1.4)	**3.68 (2.11–6.42)**
	3	11	2.1	(1.1–3.7)	125	1.1	(0.9–1.3)	**1.94 (1.04–3.65)**
	4	42	5.6	(4.1–7.6)	160	1.3	(1.1–1.6)	**4.18 (2.92–5.98)**
	5	73	5.3	(4.2–6.7)	158	2.2	(1.9–2.6)	**2.40 (1.80–3.21)**

Table 4.14 (continued)

Cancer	NZDep 2001 quintile	Māori			Non-Māori			Ratio	(95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)		
Lung	1	42	17.9	(13.2–24.3)	791	7.1	(6.6–7.7)	**2.52**	**(1.84–3.46)**
	2	88	25.2	(20.4–31.1)	1,009	8.5	(8.0–9.2)	**2.95**	**(2.36–3.68)**
	3	155	29.8	(25.5–34.9)	1,397	11.0	(10.4–11.7)	**2.71**	**(2.29–3.21)**
	4	251	32.4	(28.6–36.7)	1,720	13.5	(12.7–14.2)	**2.41**	**(2.10–2.76)**
	5	621	42.5	(39.2–46.0)	1,301	15.1	(14.2–16.1)	**2.81**	**(2.54–3.10)**
Melanoma	1	1	0.5	(0.1–3.6)	258	2.9	(2.5–3.3)	0.17	(0.02–1.25)
	2	1	0.3	(0.0–1.9)	269	2.8	(2.4–3.2)	**0.10**	**(0.01–0.69)**
	3	4	0.7	(0.3–1.9)	259	2.5	(2.1–2.8)	**0.30**	**(0.11–0.80)**
	4	5	0.7	(0.3–1.7)	301	2.9	(2.5–3.3)	**0.24**	**(0.10–0.60)**
	5	16	1.3	(0.8–2.1)	205	2.7	(2.3–3.2)	**0.47**	**(0.28–0.79)**
Non-Hodgkin's lymphoma	1	3	1.2	(0.4–3.9)	230	2.1	(1.8–2.5)	0.59	(0.18–1.87)
	2	16	4.7	(2.9–7.7)	276	2.3	(2.0–2.7)	**2.00**	**(1.20–3.35)**
	3	23	4.4	(2.9–6.6)	295	2.4	(2.1–2.8)	**1.82**	**(1.18–2.81)**
	4	16	2.1	(1.3–3.5)	343	2.7	(2.3–3.1)	0.79	(0.47–1.33)
	5	52	3.8	(2.9–5.0)	219	2.7	(2.3–3.1)	**1.43**	**(1.04–1.96)**
Oesophagus	1	2	1.1	(0.3–4.4)	142	1.2	(1.0–1.5)	0.88	(0.22–3.60)
	2	10	3.0	(1.6–5.7)	171	1.4	(1.1–1.6)	**2.23**	**(1.17–4.24)**
	3	9	1.7	(0.9–3.4)	216	1.5	(1.3–1.8)	1.14	(0.58–2.25)
	4	17	2.2	(1.4–3.5)	246	1.8	(1.6–2.1)	1.21	(0.73–2.00)
	5	38	2.6	(1.9–3.6)	146	1.6	(1.3–1.9)	**1.67**	**(1.15–2.42)**
Oral	1	2	0.8	(0.2–3.1)	69	0.7	(0.5–0.9)	1.12	(0.27–4.61)
	2	5	1.5	(0.6–3.7)	93	0.9	(0.7–1.1)	1.79	(0.72–4.44)
	3	10	2.0	(1.1–3.6)	115	1.1	(0.9–1.4)	1.78	(0.92–3.44)
	4	21	2.8	(1.8–4.3)	138	1.2	(1.0–1.5)	**2.34**	**(1.46–3.77)**
	5	18	1.3	(0.8–2.1)	126	1.7	(1.4–2.1)	0.75	(0.45–1.24)
Ovary	1	4	3.1	(1.2–8.4)	157	2.9	(2.4–3.4)	1.09	(0.40–2.98)
	2	7	3.5	(1.6–7.4)	159	2.5	(2.1–3.0)	1.38	(0.64–3.00)
	3	11	4.1	(2.2–7.3)	166	2.3	(1.9–2.8)	1.76	(0.95–3.28)
	4	15	3.1	(1.9–5.2)	217	3.1	(2.6–3.7)	1.00	(0.59–1.71)
	5	37	4.5	(3.2–6.2)	149	3.3	(2.7–4.0)	1.37	(0.94–2.00)
Pancreas	1	7	3.1	(1.5–6.6)	226	2.0	(1.7–2.3)	1.59	(0.74–3.41)
	2	10	3.0	(1.6–5.6)	279	2.3	(2.0–2.6)	1.33	(0.70–2.52)
	3	20	3.8	(2.4–5.9)	342	2.4	(2.1–2.7)	**1.59**	**(1.01–2.51)**
	4	33	4.1	(2.9–5.8)	392	2.7	(2.4–3.0)	**1.55**	**(1.07–2.23)**
	5	73	5.0	(3.9–6.3)	279	3.1	(2.7–3.5)	**1.61**	**(1.23–2.11)**
Prostate	1	5	5.1	(2.1–12.2)	403	5.6	(5.1–6.3)	0.90	(0.37–2.18)
	2	19	11.6	(7.4–18.2)	559	6.7	(6.1–7.3)	**1.75**	**(1.10–2.77)**
	3	16	6.0	(3.7–9.8)	572	6.1	(5.5–6.6)	0.99	(0.60–1.63)
	4	42	11.2	(8.3–15.3)	684	6.8	(6.3–7.5)	**1.64**	**(1.20–2.26)**
	5	83	11.2	(9.0–13.9)	462	7.0	(6.3–7.7)	**1.61**	**(1.27–2.05)**

Table 4.14 (continued)

Cancer	NZDep 2001 quintile	Māori			Non-Māori			Ratio	(95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)		
Stomach	1	7	3.1	(1.5–6.4)	184	1.7	(1.4–2.0)	1.80	(0.84–3.86)
	2	17	4.9	(3.1–8.0)	234	1.9	(1.6–2.2)	**2.59**	**(1.56–4.28)**
	3	33	6.2	(4.4–8.7)	256	2.0	(1.7–2.3)	**3.09**	**(2.13–4.50)**
	4	49	6.3	(4.8–8.4)	297	2.3	(2.0–2.6)	**2.77**	**(2.02–3.81)**
	5	114	8.3	(6.9–10.0)	247	2.8	(2.4–3.3)	**2.92**	**(2.31–3.71)**
Testis	1	0			3	0.1	(0.0–0.6)		
	2	0			5	0.3	(0.1–0.7)		
	3	3	1.3	(0.4–4.1)	7	0.4	(0.2–0.9)	3.30	(0.83–13.05)
	4	3	0.9	(0.3–2.8)	10	0.3	(0.2–0.7)	2.70	(0.73–10.05)
	5	9	1.7	(0.9–3.2)	1	0.1	(0.0–0.8)	**15.53**	**(1.97–122.62)**
Thyroid	1	1	0.5	(0.1–3.8)	13	0.1	(0.0–0.2)	6.04	(0.77–47.41)
	2	2	0.6	(0.1–2.3)	17	0.2	(0.1–0.3)	3.64	(0.82–16.15)
	3	2	0.4	(0.1–1.6)	20	0.2	(0.1–0.3)	2.50	(0.54–11.54)
	4	2	0.3	(0.1–1.0)	34	0.3	(0.2–0.4)	0.90	(0.21–3.83)
	5	13	0.9	(0.5–1.5)	18	0.2	(0.1–0.4)	**3.82**	**(1.75–8.32)**
Uterus	1	2	1.6	(0.4–6.5)	54	0.8	(0.6–1.1)	1.96	(0.47–8.22)
	2	7	3.7	(1.8–7.9)	64	0.9	(0.6–1.2)	**4.20**	**(1.86–9.46)**
	3	6	1.8	(0.8–4.1)	90	1.3	(1.1–1.7)	1.36	(0.58–3.15)
	4	13	2.8	(1.6–4.9)	97	1.1	(0.9–1.5)	**2.50**	**(1.37–4.56)**
	5	25	3.0	(2.0–4.4)	67	1.4	(1.1–1.9)	**2.06**	**(1.26–3.36)**

Table 4.15: Cancer registrations: deprivation gradients adjusted for age and sex, 2002–2006

Cancer	Rate of change per NZDep2001 decile (95% CI)		Ratio of deprivation gradients (95% CI)
	Māori	Non-Māori	
All sites	**1.051 (1.025–1.077)**	**1.026 (1.019–1.033)**	1.02 (1.00–1.05)
Bladder	1.021 (0.924–1.127)	**1.022 (1.004–1.041)**	1.00 (0.90–1.10)
Brain	1.021 (0.924–1.127)	**1.022 (1.004–1.041)**	1.00 (0.90–1.10)
Breast	**1.034 (1.009–1.059)**	**1.011 (1.004–1.019)**	1.02 (1.00–1.05)
Cervix	1.052 (0.977–1.133)	**1.074 (1.041–1.108)**	0.98 (0.90–1.06)
Colorectal	0.990 (0.957–1.025)	**1.023 (1.016–1.030)**	0.97 (0.93–1.00)
Kidney	1.029 (0.956–1.108)	**1.042 (1.020–1.064)**	0.99 (0.92–1.07)
Leukaemias	1.055 (0.999–1.115)	**1.022 (1.008–1.038)**	1.03 (0.98–1.09)
Liver	**1.074 (1.005–1.147)**	**1.112 (1.079–1.146)**	0.97 (0.90–1.04)
Lung	**1.079 (1.048–1.110)**	**1.095 (1.083–1.107)**	0.99 (0.96–1.02)
Melanoma	0.945 (0.867–1.029)	0.992 (0.983–1.002)	0.95 (0.87–1.04)
Non-Hodgkin's lymphoma	1.048 (0.990–1.110)	**1.027 (1.012–1.041)**	1.02 (0.96–1.08)
Oesophagus	1.038 (0.960–1.123)	**1.053 (1.030–1.077)**	0.99 (0.91–1.07)
Ovary	1.042 (0.939–1.156)	1.021 (0.992–1.052)	1.02 (0.92–1.14)
Oral	0.982 (0.919–1.051)	**1.070 (1.049–1.093)**	**0.92 (0.86–0.99)**
Pancreas	1.061 (0.998–1.128)	**1.038 (1.019–1.056)**	1.02 (0.96–1.09)
Prostate	**1.041 (1.000–1.084)**	1.004 (0.995–1.012)	1.04 (1.00–1.08)
Stomach	**1.069 (1.017–1.124)**	**1.047 (1.026–1.069)**	1.02 (0.97–1.08)
Thyroid	1.046 (0.967–1.131)	**1.058 (1.026–1.092)**	0.99 (0.91–1.08)
Uterus	**1.061 (1.005–1.121)**	**1.055 (1.036–1.075)**	1.01 (0.95–1.07)

(1) Gradients and ratios in **bold** are statistically significant at the 5% level.

Table 4.16: Cancer deaths: deprivation gradients adjusted for age and sex, 2002–2006

Cancer	Rate of change per NZDep2001 decile (95% CI)		Ratio of deprivation gradients (95% CI)
	Māori	Non-Māori	
All sites	**1.064 (1.043–1.086)**	**1.035 (1.029–1.041)**	**1.03 (1.01–1.05)**
Bladder	1.082 (0.941–1.243)	**1.034 (1.007–1.062)**	1.04 (0.91–1.21)
Brain	0.990 (0.913–1.074)	0.992 (0.971–1.014)	1.00 (0.92–1.09)
Breast	1.003 (0.962–1.046)	1.010 (0.996–1.025)	0.99 (0.95–1.04)
Cervix	**1.176 (1.037–1.333)**	**1.118 (1.064–1.174)**	1.05 (0.92–1.20)
Colorectal	0.993 (0.944–1.044)	**1.018 (1.008–1.029)**	0.98 (0.93–1.03)
Kidney	1.019 (0.930–1.117)	**1.041 (1.013–1.070)**	0.98 (0.89–1.08)
Leukaemias	0.993 (0.915–1.078)	1.002 (0.982–1.023)	0.99 (0.91–1.08)
Liver	**1.098 (1.019–1.183)**	**1.074 (1.042–1.107)**	1.02 (0.94–1.11)
Lung	**1.101 (1.066–1.136)**	**1.090 (1.077–1.103)**	1.01 (0.98–1.04)
Melanoma	1.130 (0.949–1.347)	0.997 (0.977–1.018)	1.13 (0.95–1.35)
Non-Hodgkin's lymphoma	1.014 (0.941–1.093)	1.012 (0.992–1.032)	1.00 (0.93–1.08)
Oesophagus	1.078 (0.988–1.175)	**1.027 (1.005–1.050)**	1.05 (0.96–1.15)
Oral	1.010 (0.906–1.126)	**1.097 (1.061–1.135)**	0.92 (0.82–1.03)
Ovary	1.048 (0.949–1.157)	1.019 (0.993–1.046)	1.03 (0.93–1.14)
Pancreas	**1.084 (1.010–1.164)**	**1.044 (1.024–1.064)**	1.04 (0.97–1.12)
Prostate	1.063 (0.993–1.138)	**1.020 (1.004–1.035)**	1.04 (0.97–1.12)
Stomach	**1.089 (1.026–1.156)**	**1.052 (1.029–1.076)**	1.04 (0.97–1.10)
Thyroid	1.127 (0.916–1.387)	**1.084 (1.003–1.171)**	1.04 (0.83–1.30)
Uterus	1.023 (0.921–1.137)	**1.053 (1.015–1.094)**	0.97 (0.87–1.09)

(1) Gradients and ratios in **bold** are statistically significant at the 5% level.

Table 4.17: Māori:non-Māori ratios for cancer incidence (registrations) and mortality (deaths), adjusted for age and for deprivation, females, 2002–2006

	Cancer	Ratio adjusted for age (95% CI)	Ratio adjusted for age and deprivation (95% CI)
Registrations	All sites	**1.34 (1.23–1.45)**	**1.27 (1.22–1.32)**
	Bladder	1.16 (0.82–1.62)	1.12 (0.80–1.56)
	Brain	0.81 (0.54–1.22)	0.76 (0.55–1.05)
	Breast	**1.31 (1.22–1.41)**	**1.27 (1.19–1.36)**
	Cervix uteri	**1.84 (1.36–2.51)**	**1.62 (1.31–2.00)**
	Colorectal	**0.66 (0.57–0.77)**	**0.64 (0.56–0.73)**
	Kidney	1.14 (0.78–1.66)	1.08 (0.74–1.56)
	Leukaemias	1.12 (0.89–1.42)	1.06 (0.85–1.32)
	Liver	**2.78 (1.97–3.90)**	**2.29 (1.56–3.37)**
	Lung	**4.09 (3.77–4.44)**	**3.48 (3.17–3.82)**
	Melanoma	**0.18 (0.14–0.22)**	**0.18 (0.14–0.23)**
	Non-Hodgkin's lymphoma	1.02 (0.79–1.32)	0.98 (0.79–1.20)
	Oesophagus	**1.38 (0.87–2.17)**	**1.33 (0.92–1.94)**
	Oral	0.88 (0.62–1.24)	0.81 (0.57–1.16)
	Ovary	1.23 (0.94–1.62)	1.18 (0.90–1.54)
	Pancreas	**2.16 (1.71–2.72)**	**2.03 (1.62–2.54)**
	Stomach	**4.28 (3.54–5.17)**	**3.83 (3.13–4.69)**
	Thyroid	**1.69 (1.37–2.08)**	**1.49 (1.19–1.88)**
	Uterus	**1.92 (1.67–2.22)**	**1.72 (1.49–2.00)**
Deaths	All sites	**1.87 (1.70–2.07)**	**1.76 (1.66–1.86)**
	Bladder	1.58 (0.93–2.69)	1.42 (0.82–2.45)
	Brain	1.25 (0.85–1.81)	1.22 (0.89–1.67)
	Breast	**1.73 (1.48–2.02)**	**1.70 (1.50–1.91)**
	Cervix uteri	**2.99 (2.25–3.97)**	**2.38 (1.75–3.24)**
	Colorectal	**0.78 (0.61–0.99)**	**0.75 (0.61–0.91)**
	Kidney	**1.48 (1.01–2.16)**	**1.52 (1.02–2.27)**
	Leukaemias	1.10 (0.84–1.43)	1.08 (0.77–1.53)
	Liver	**2.31 (1.79–2.98)**	**2.28 (1.57–3.32)**
	Lung	**3.91 (3.36–4.55)**	**3.32 (3.00–3.68)**
	Melanoma	**0.20 (0.10–0.41)**	**0.20 (0.09–0.44)**
	Non-Hodgkin's lymphoma	1.35 (0.94–1.94)	1.33 (0.95–1.86)
	Oesophagus	1.41 (0.89–2.22)	1.36 (0.92–2.02)
	Oral	0.91 (0.49–1.70)	0.85 (0.45–1.63)
	Ovary	**1.37 (1.05–1.79)**	**1.32 (1.02–1.70)**
	Pancreas	**1.98 (1.42–2.76)**	**1.85 (1.43–2.38)**
	Stomach	**3.41 (2.57–4.52)**	**3.00 (2.38–3.80)**
	Thyroid	**3.01 (1.88–4.82)**	**2.41 (1.36–4.29)**
	Uterus	**2.39 (1.79–3.20)**	**2.17 (1.61–2.93)**

(1) Ratios modelled using Poisson regression.

(2) Ratios in **bold** are statistically significant at the 5% level.

Table 4.18: Māori:non-Māori ratios for cancer incidence (registrations) and mortality (deaths), adjusted for age and for deprivation, males, 2002–2006

	Cancer	Ratio adjusted for age (95% CI)	Ratio adjusted for age and deprivation (95% CI)
Registrations	All sites	**1.13 (1.07–1.18)**	**1.07 (1.03–1.11)**
	Bladder	**0.58 (0.44–0.76)**	**0.56 (0.41–0.76)**
	Brain	**0.68 (0.51–0.91)**	**0.67 (0.52–0.87)**
	Colorectal	**0.76 (0.68–0.86)**	**0.72 (0.63–0.83)**
	Kidney	**1.33 (1.09–1.63)**	1.21 (0.97–1.51)
	Leukaemias	1.09 (0.92–1.30)	1.05 (0.88–1.25)
	Liver	**4.21 (3.50–5.07)**	**3.48 (2.81–4.30)**
	Lung	**2.82 (2.59–3.06)**	**2.37 (2.16–2.59)**
	Melanoma	**0.11 (0.08–0.15)**	**0.11 (0.08–0.16)**
	Non-Hodgkin's lymphoma	0.88 (0.73–1.07)	0.83 (0.67–1.03)
	Oesophagus	**1.88 (1.49–2.38)**	**1.65 (1.27–2.14)**
	Oral	**1.36 (1.10–1.67)**	**1.19 (0.93–1.51)**
	Pancreas	**1.73 (1.37–2.17)**	**1.58 (1.26–1.97)**
	Prostate	**0.91 (0.84–0.98)**	**0.90 (0.81–1.00)**
	Stomach	**2.95 (2.51–3.48)**	**2.71 (2.26–3.25)**
	Thyroid	**1.81 (1.29–2.53)**	**1.68 (1.12–2.52)**
Deaths	All sites	**1.69 (1.53–1.86)**	**1.57 (1.48–1.66)**
	Bladder	0.93 (0.62–1.39)	0.88 (0.61–1.28)
	Brain	**0.66 (0.49–0.90)**	**0.68 (0.50–0.94)**
	Colorectal	1.00 (0.83–1.20)	0.97 (0.81–1.16)
	Kidney	**1.77 (1.23–2.55)**	**1.55 (1.13–2.13)**
	Leukaemias	1.00 (0.74–1.35)	1.00 (0.75–1.34)
	Liver	**3.89 (2.77–5.45)**	**3.15 (2.50–3.98)**
	Lung	**2.64 (2.20–3.16)**	**2.23 (2.02–2.46)**
	Melanoma	**0.38 (0.22–0.64)**	**0.38 (0.24–0.59)**
	Non-Hodgkin's lymphoma	**1.36 (1.02–1.80)**	**1.32 (1.01–1.72)**
	Oesophagus	**1.61 (1.18–2.19)**	**1.50 (1.15–1.96)**
	Oral	**1.85 (1.36–2.52)**	**1.51 (1.08–2.11)**
	Pancreas	**1.49 (1.13–1.98)**	**1.35 (1.06–1.70)**
	Prostate	**1.60 (1.33–1.93)**	**1.54 (1.30–1.82)**
	Stomach	**2.90 (2.40–3.50)**	**2.64 (2.18–3.21)**
	Thyroid	**3.66 (1.99–6.75)**	**3.45 (1.66–7.19)**

(1) Ratios modelled using Poisson regression.

(2) Ratios in **bold** are statistically significant at the 5% level.

STAGE AT DIAGNOSIS BY AREA DEPRIVATION 1996–2006

Key Findings

- There was little evidence of an association between stage at diagnosis and deprivation among Māori with cancer, although the small numbers may affect our ability to detect any associations. The exception was melanoma of the skin, for which the odds of being at an earlier stage of disease spread decreased with increasing deprivation.
- Among non-Māori the likelihood of being diagnosed at localised stage decreased with increasing deprivation for cancers of the breast, lung, and prostate, and for melanoma of the skin. Conversely, the chance of being diagnosed at a distant stage of disease spread increased with increasing deprivation for breast, colorectal, lung, melanoma, oral, pancreatic, prostate, testicular, thyroid, and uterine cancers. In addition, the odds of unknown stage at diagnosis increased with increasing deprivation for cancers of the liver, lung, prostate, and pancreas.
- Where Māori had higher odds than non-Māori of being diagnosed at a later stage of disease spread, adjusting for deprivation had little effect on the odds ratios for localised stage, but did reduce the odds ratios for distant stage. Adjusting for deprivation reduced the odds ratios for distant stage for breast, cervical, lung, oral, pancreatic, and prostate cancers. However, most remained significant after adjusting for deprivation.
- Adjusting for deprivation reduced the Māori:non-Māori odds ratio for unknown stage at diagnosis for cancers of the breast, cervix, lung, pancreas, and prostate, but, apart from pancreatic cancer, each remained significant after adjusting for deprivation.

'Stage at diagnosis' refers to the extent of spread of disease and is classified as:

- localised
- regional (spread to adjacent tissue or organ and/or involves regional lymph nodes)
- distant (spread to distant organs, tissues or to distant lymph nodes)
- unknown.

The classification is not applicable to leukaemias or lymphomas, which are excluded from the stage tables.

The data in this chapter relates to new cancers registered during the 11-year period 1996–2006 to align with the survival analysis. Data on stage at diagnosis for the period 2002–2006 is presented in Appendix 4.

Table 4.19 presents numbers and distribution of new cancer registrations by stage and NZDep 2001 quintile, unadjusted for age or sex. Table 4.20 presents deprivation gradients (odds ratios per increasing deprivation decile adjusted for age and sex) for unknown stage at diagnosis separately for Māori and non-Māori.

Table 4.21 presents Māori:non-Māori odds ratios for unknown stage adjusted for age and sex, and then for deprivation. The difference between the odds ratios shows the extent to which differential exposure to deprivation contributes to disparities in stage at diagnosis between Māori and non-Māori.

Tables 4.22 and 4.23 present similar odds ratios for localised stage at diagnosis, and Tables 4.24 and 4.25 for distant stage at diagnosis.

Odds ratios in grey should be interpreted with caution due to the small number of registrations. Where data is missing in the tables, the odds ratios have been excluded due to insufficient numbers.

Table 4.19: Distribution of stage at diagnosis on cancer registration, numbers, % (unadjusted for age) by NZDep2001 quintile, 1996–2006

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Bladder	1	7	884	1	14.3	37	4.2	0	0.0	61	6.9	1	14.3	30	3.4	5	71.4	756	85.5
	2	17	1,101	1	5.9	57	5.2	2	11.8	67	6.1	5	29.4	46	4.2	9	52.9	931	84.6
	3	24	1,263	2	8.3	55	4.4	7	29.2	72	5.7	3	12.5	47	3.7	12	50.0	1,089	86.2
	4	40	1,402	5	12.5	67	4.8	1	2.5	80	5.7	7	17.5	69	4.9	27	67.5	1,186	84.6
	5	67	956	2	3.0	50	5.2	4	6.0	59	6.2	5	7.5	47	4.9	56	83.6	800	83.7
Brain	1	5	459	5	100.0	427	93.0	0	0.0	2	0.4	0	0.0	4	0.9	0	0.0	26	5.7
	2	16	528	15	93.8	491	93.0	1	6.3	1	0.2	0	0.0	2	0.4	0	0.0	34	6.4
	3	23	539	20	87.0	502	93.1	0	0.0	0	0.0	2	8.7	2	0.4	1	4.3	35	6.5
	4	51	626	46	90.2	585	93.5	0	0.0	1	0.2	1	2.0	6	1.0	4	7.8	34	5.4
	5	73	480	63	86.3	438	91.3	0	0.0	1	0.2	2	2.7	5	1.0	8	11.0	36	7.5
Breast: female	1	109	4,271	53	48.6	2,119	49.6	41	37.6	1,409	33.0	6	5.5	128	3.0	9	8.3	615	14.4
	2	203	4,576	87	42.9	2,205	48.2	75	36.9	1,516	33.1	10	4.9	149	3.3	31	15.3	706	15.4
	3	317	4,856	121	38.2	2,280	47.0	137	43.2	1,631	33.6	18	5.7	208	4.3	41	12.9	737	15.2
	4	518	5,252	212	40.9	2,378	45.3	215	41.5	1,734	33.0	28	5.4	232	4.4	63	12.2	908	17.3
	5	1,054	3,795	431	40.9	1,700	44.8	413	39.2	1,284	33.8	42	4.0	179	4.7	168	15.9	632	16.7
Cervix uteri	1	14	266	8	57.1	139	52.3	2	14.3	35	13.2	1	7.1	12	4.5	3	21.4	80	30.1
	2	37	288	18	48.6	161	55.9	5	13.5	22	7.6	4	10.8	14	4.9	10	27.0	91	31.6
	3	50	355	21	42.0	166	46.8	6	12.0	46	13.0	6	12.0	25	7.0	17	34.0	118	33.2
	4	79	402	27	34.2	179	44.5	10	12.7	46	11.4	9	11.4	28	7.0	33	41.8	149	37.1
	5	183	380	67	36.6	169	44.5	14	7.7	38	10.0	27	14.8	34	8.9	75	41.0	139	36.6
Colorectal	1	53	4,501	13	24.5	1,180	26.2	17	32.1	1,984	44.1	11	20.8	811	18.0	12	22.6	526	11.7
	2	90	5,339	19	21.1	1,412	26.4	37	41.1	2,392	44.8	22	24.4	985	18.4	12	13.3	550	10.3
	3	147	6,128	30	20.4	1,631	26.6	52	35.4	2,748	44.8	42	28.6	1,118	18.2	23	15.6	631	10.3
	4	236	6,812	43	18.2	1,812	26.6	89	37.7	2,989	43.9	66	28.0	1,267	18.6	38	16.1	744	10.9
	5	385	4,736	81	21.0	1,232	26.0	161	41.8	2,073	43.8	97	25.2	896	18.9	46	11.9	535	11.3

Table 4.19 (continued)

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Kidney	1	15	574	6	40.0	283	49.3	0	0.0	94	16.4	8	53.3	123	21.4	1	6.7	74	12.9
	2	32	698	21	65.6	314	45.0	3	9.4	120	17.2	6	18.8	152	21.8	2	6.3	112	16.0
	3	38	782	12	31.6	372	47.6	11	28.9	124	15.9	10	26.3	172	22.0	5	13.2	114	14.6
	4	51	881	20	39.2	408	46.3	14	27.5	113	12.8	10	19.6	215	24.4	7	13.7	145	16.5
	5	129	638	65	50.4	302	47.3	23	17.8	87	13.6	28	21.7	147	23.0	13	10.1	102	16.0
Liver	1	11	189	2	18.2	17	9.0	0	0.0	7	3.7	3	27.3	42	22.2	6	54.5	123	65.1
	2	29	253	2	6.9	21	8.3	1	3.4	10	4.0	7	24.1	51	20.2	19	65.5	171	67.6
	3	31	306	7	22.6	22	7.2	1	3.2	6	2.0	4	12.9	61	19.9	19	61.3	217	70.9
	4	81	369	6	7.4	26	7.0	1	1.2	9	2.4	16	19.8	69	18.7	58	71.6	265	71.8
	5	177	386	24	13.6	33	8.5	2	1.1	15	3.9	33	18.6	71	18.4	118	66.7	267	69.2
Lung	1	94	1,877	3	3.2	147	7.8	10	10.6	177	9.4	38	40.4	685	36.5	43	45.7	868	46.2
	2	201	2,572	6	3.0	158	6.1	15	7.5	228	8.9	72	35.8	989	38.5	108	53.7	1,197	46.5
	3	304	3,361	18	5.9	201	6.0	29	9.5	296	8.8	107	35.2	1,284	38.2	150	49.3	1,580	47.0
	4	564	4,202	23	4.1	230	5.5	43	7.6	360	8.6	219	38.8	1,551	36.9	279	49.5	2,061	49.0
	5	1,274	3,551	40	3.1	202	5.7	88	6.9	259	7.3	486	38.1	1,264	35.6	660	51.8	1,826	51.4
Melanoma	1	17	3,689	14	82.4	3,257	88.3	2	11.8	163	4.4	1	5.9	166	4.5	0	0.0	103	2.8
	2	31	3,918	24	77.4	3,417	87.2	3	9.7	211	5.4	1	3.2	176	4.5	3	9.7	114	2.9
	3	36	4,227	27	75.0	3,680	87.1	5	13.9	228	5.4	2	5.6	197	4.7	2	5.6	122	2.9
	4	39	4,171	35	89.7	3,551	85.1	1	2.6	297	7.1	3	7.7	184	4.4	0	0.0	139	3.3
	5	76	2,930	53	69.7	2,500	85.3	8	10.5	176	6.0	13	17.1	166	5.7	2	2.6	88	3.0
Oesophagus	1	4	310	1	25.0	11	3.5	0	0.0	31	10.0	0	0.0	65	21.0	3	75.0	203	65.5
	2	20	405	1	5.0	18	4.4	4	20.0	44	10.9	6	30.0	95	23.5	9	45.0	248	61.2
	3	27	479	0	0.0	28	5.8	2	7.4	56	11.7	3	11.1	111	23.2	22	81.5	284	59.3
	4	32	622	0	0.0	34	5.5	4	12.5	77	12.4	11	34.4	106	17.0	17	53.1	405	65.1
	5	77	451	2	2.6	27	6.0	11	14.3	44	9.8	17	22.1	92	20.4	47	61.0	288	63.9

Table 4.19 (continued)

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Oral	1	11	427	2	18.2	124	29.0	6	54.5	123	28.8	0	0.0	20	4.7	3	27.3	160	37.5
	2	25	534	2	8.0	151	28.3	7	28.0	177	33.1	1	4.0	21	3.9	15	60.0	185	34.6
	3	36	662	8	22.2	182	27.5	14	38.9	210	31.7	1	2.8	37	5.6	13	36.1	233	35.2
	4	58	702	8	13.8	189	26.9	29	50.0	191	27.2	6	10.3	44	6.3	15	25.9	278	39.6
	5	98	627	12	12.2	175	27.9	41	41.8	183	29.2	11	11.2	35	5.6	34	34.7	234	37.3
Ovary	1	15	496	5	33.3	114	23.0	2	13.3	68	13.7	7	46.7	279	56.3	1	6.7	35	7.1
	2	32	561	15	46.9	127	22.6	2	6.3	56	10.0	13	40.6	330	58.8	2	6.3	48	8.6
	3	39	590	13	33.3	135	22.9	2	5.1	58	9.8	20	51.3	340	57.6	4	10.3	57	9.7
	4	50	673	20	40.0	159	23.6	4	8.0	67	10.0	20	40.0	396	58.8	6	12.0	51	7.6
	5	131	561	52	39.7	156	27.8	10	7.6	56	10.0	63	48.1	305	54.4	6	4.6	44	7.8
Pancreas	1	14	520	0	0.0	23	4.4	0	0.0	51	9.8	7	50.0	233	44.8	7	50.0	213	41.0
	2	24	637	1	4.2	11	1.7	1	4.2	63	9.9	15	62.5	291	45.7	7	29.2	272	42.7
	3	37	772	1	2.7	15	1.9	5	13.5	73	9.5	14	37.8	339	43.9	17	45.9	345	44.7
	4	51	847	1	2.0	21	2.5	4	7.8	66	7.8	27	52.9	371	43.8	19	37.3	389	45.9
	5	152	677	2	1.3	13	1.9	13	8.6	49	7.2	82	53.9	294	43.4	55	36.2	321	47.4
Prostate	1	55	5,158	5	9.1	695	13.5	1	1.8	236	4.6	4	7.3	224	4.3	45	81.8	4,003	77.6
	2	103	5,614	8	7.8	709	12.6	3	2.9	283	5.0	13	12.6	281	5.0	79	76.7	4,341	77.3
	3	160	6,030	12	7.5	687	11.4	4	2.5	301	5.0	12	7.5	334	5.5	132	82.5	4,708	78.1
	4	263	6,336	17	6.5	704	11.1	16	6.1	278	4.4	33	12.5	398	6.3	197	74.9	4,956	78.2
	5	555	4,696	41	7.4	501	10.7	19	3.4	160	3.4	50	9.0	356	7.6	445	80.2	3,679	78.3
Stomach	1	22	537	2	9.1	58	10.8	7	31.8	131	24.4	7	31.8	153	28.5	6	27.3	195	36.3
	2	55	677	10	18.2	75	11.1	11	20.0	183	27.0	21	38.2	179	26.4	13	23.6	240	35.5
	3	74	772	12	16.2	85	11.0	16	21.6	207	26.8	26	35.1	205	26.6	20	27.0	275	35.6
	4	111	890	15	13.5	83	9.3	29	26.1	244	27.4	42	37.8	239	26.9	25	22.5	324	36.4
	5	298	760	41	13.8	81	10.7	78	26.2	186	24.5	85	28.5	216	28.4	94	31.5	277	36.4

Table 4.19 (continued)

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Testis	1	14	222	10	71.4	175	78.8	1	7.1	21	9.5	2	14.3	14	6.3	1	7.1	12	5.4
	2	30	228	22	73.3	171	75.0	3	10.0	27	11.8	3	10.0	18	7.9	2	6.7	12	5.3
	3	44	259	26	59.1	194	74.9	11	25.0	32	12.4	5	11.4	22	8.5	2	4.5	11	4.2
	4	75	297	49	65.3	224	75.4	13	17.3	30	10.1	6	8.0	30	10.1	7	9.3	13	4.4
	5	144	220	92	63.9	159	72.3	21	14.6	29	13.2	21	14.6	27	12.3	10	6.9	5	2.3
Thyroid	1	13	288	6	46.2	178	61.8	5	38.5	73	25.3	1	7.7	13	4.5	1	7.7	24	8.3
	2	28	248	20	71.4	149	60.1	4	14.3	68	27.4	2	7.1	9	3.6	2	7.1	22	8.9
	3	24	330	17	70.8	188	57.0	4	16.7	82	24.8	1	4.2	14	4.2	2	8.3	46	13.9
	4	55	351	36	65.5	184	52.4	11	20.0	91	25.9	2	3.6	32	9.1	6	10.9	44	12.5
	5	129	348	86	66.7	189	54.3	22	17.1	80	23.0	13	10.1	32	9.2	8	6.2	47	13.5
Uterus	1	14	500	10	71.4	311	62.2	0	0.0	91	18.2	3	21.4	41	8.2	1	7.1	57	11.4
	2	27	536	15	55.6	325	60.6	7	25.9	106	19.8	3	11.1	45	8.4	2	7.4	60	11.2
	3	48	655	24	50.0	394	60.2	10	20.8	120	18.3	8	16.7	60	9.2	6	12.5	81	12.4
	4	74	732	50	67.6	439	60.0	11	14.9	132	18.0	2	2.7	78	10.7	11	14.9	83	11.3
	5	203	669	120	59.1	376	56.2	36	17.7	124	18.5	22	10.8	81	12.1	25	12.3	88	13.2

Table 4.20: Unknown stage at diagnosis: deprivation gradients adjusted for age and sex, 1996–2006

Cancer	Rate of change in odds of having unknown stage at diagnosis per increasing NZDep2001 decile (95% CI)	
	Māori	Non-Māori
Bladder	1.174 (0.962–1.434)	0.989 (0.952–1.027)
Brain		1.081 (0.925–1.263)
Breast: female	0.990 (0.919–1.066)	1.020 (0.998–1.042)
Cervix	1.167 (0.991–1.374)	1.022 (0.962–1.085)
Colorectal	0.979 (0.883–1.085)	1.000 (0.981–1.020)
Kidney	1.008 (0.785–1.294)	1.010 (0.957–1.066)
Liver	1.089 (0.956–1.240)	**1.068 (1.011–1.128)**
Lung	1.022 (0.973–1.073)	**1.031 (1.013–1.050)**
Melanoma		0.965 (0.922–1.010)
Oesophagus	1.065 (0.886–1.280)	0.999 (0.952–1.049)
Oral	1.021 (0.871–1.198)	1.016 (0.976–1.059)
Ovary	0.942 (0.731–1.213)	1.056 (0.979–1.139)
Pancreas	0.993 (0.863–1.142)	**1.044 (1.004–1.085)**
Prostate	0.978 (0.899–1.064)	**1.019 (1.003–1.034)**
Stomach	1.054 (0.942–1.180)	1.025 (0.985–1.066)
Testis	0.992 (0.710–1.387)	0.957 (0.815–1.123)
Thyroid	0.877 (0.692–1.113)	1.051 (0.972–1.137)
Uterus	1.021 (0.821–1.270)	0.997 (0.940–1.058)

(1) Gradients in **bold** are statistically significant at the 5% level.

Table 4.21: Māori:non-Māori odds ratios (ORs) for unknown stage at diagnosis, cancer registrations, adjusted for age and sex, and area deprivation, 1996–2006

Cancer	Adjusted for age and sex	Adjusted for age, sex, and NZDep2001 decile
	OR (95% CI)	OR (95% CI)
Bladder	**2.78 (1.47–5.27)**	**2.71 (1.43–5.14)**
Brain	**2.86 (1.01–8.15)**	2.55 (0.87–7.48)
Breast: female	**1.50 (1.22–1.86)**	**1.34 (1.08–1.67)**
Cervix	**3.35 (2.20–5.10)**	**2.86 (1.85–4.42)**
Colorectal	**1.59 (1.36–1.86)**	**1.57 (1.34–1.83)**
Kidney	1.22 (0.90–1.67)	1.19 (0.87–1.63)
Liver	0.94 (0.61–1.46)	0.98 (0.62–1.54)
Lung	**1.51 (1.31–1.75)**	**1.44 (1.24–1.67)**
Melanoma	**2.93 (1.82–4.70)**	**2.83 (1.76–4.55)**
Oesophagus	1.29 (0.75–2.19)	1.36 (0.79–2.33)
Oral	1.67 (1.00–2.81)	1.52 (0.90–2.56)
Ovary	0.95 (0.72–1.25)	0.95 (0.72–1.27)
Pancreas	**1.67 (1.08–2.57)**	1.53 (0.98–2.38)
Prostate	**4.57 (3.36–6.22)**	**3.89 (2.85–5.32)**
Stomach	1.08 (0.86–1.35)	1.08 (0.86–1.36)
Testis	1.36 (0.91–2.04)	1.18 (0.78–1.80)
Thyroid	1.41 (0.83–2.40)	1.10 (0.64–1.90)
Uterus	1.18 (0.82–1.70)	1.07 (0.73–1.56)

(1) Odds ratios in **bold** are statistically significant at the 5% level.

Table 4.22: Localised stage at diagnosis: deprivation gradients adjusted for age and sex, 1996–2006

Cancer	Rate of change in odds of having localised stage at diagnosis per increasing NZDep2001 decile (95% CI)	
	Māori	Non-Māori
Bladder		1.040 (0.967–1.119)
Brain		0.886 (0.681–1.151)
Breast: female	0.984 (0.935–1.036)	**0.974 (0.960–0.989)**
Cervix	1.047 (0.852–1.286)	0.966 (0.885–1.053)
Colorectal	0.974 (0.894–1.062)	1.007 (0.993–1.022)
Kidney	0.920 (0.802–1.055)	1.008 (0.970–1.048)
Liver	1.074 (0.870–1.326)	1.000 (0.906–1.104)
Lung	0.966 (0.858–1.086)	**0.960 (0.925–0.997)**
Melanoma	**0.812 (0.661–0.997)**	**0.952 (0.930–0.975)**
Oesophagus		1.072 (0.965–1.192)
Oral	0.811 (0.631–1.043)	1.008 (0.960–1.059)
Ovary	0.968 (0.808–1.160)	0.999 (0.948–1.054)
Pancreas		0.885 (0.766–1.022)
Prostate	1.022 (0.864–1.210)	**0.947 (0.920–0.974)**
Stomach	1.072 (0.922–1.246)	0.982 (0.925–1.042)
Testis	1.036 (0.894–1.199)	0.929 (0.862–1.001)
Thyroid	1.039 (0.886–1.219)	0.948 (0.896–1.002)
Uterus	0.981 (0.863–1.116)	0.964 (0.925–1.004)

(1) Gradients in **bold** are statistically significant at the 5% level.

Table 4.23: Māori:non-Māori odds ratios (ORs) for localised stage at diagnosis, cancer registrations, adjusted for age and sex, and area deprivation, 1996–2006

Cancer	Adjusted for age and sex	Adjusted for age, sex, and NZDep2001 decile
	OR (95% CI)	OR (95% CI)
Bladder	0.58 (0.29–1.19)	0.58 (0.28–1.18)
Brain	0.41 (0.16–1.07)	0.42 (0.16–1.12)
Breast: female	**0.74 (0.68–0.82)**	**0.78 (0.71–0.86)**
Cervix	**0.52 (0.38–0.71)**	**0.55 (0.40–0.77)**
Colorectal	**0.77 (0.65–0.91)**	**0.77 (0.65–0.91)**
Kidney	**0.75 (0.58–0.99)**	**0.75 (0.57–0.98)**
Liver	1.51 (0.96–2.37)	1.45 (0.91–2.31)
Lung	**0.55 (0.44–0.69)**	**0.57 (0.45–0.72)**
Melanoma	**0.35 (0.24–0.50)**	**0.37 (0.25–0.53)**
Oesophagus	0.40 (0.14–1.12)	0.36 (0.13–1.03)
Oral	**0.34 (0.23–0.51)**	**0.35 (0.23–0.53)**
Ovary	1.25 (0.94–1.66)	1.19 (0.89–1.60)
Pancreas	0.49 (0.19–1.25)	0.56 (0.22–1.45)
Prostate	**0.39 (0.29–0.52)**	**0.41 (0.31–0.55)**
Stomach	**1.35 (1.02–1.80)**	**1.37 (1.02–1.84)**
Testis	**0.64 (0.48–0.86)**	**0.71 (0.52–0.96)**
Thyroid	**1.38 (1.01–1.88)**	**1.47 (1.07–2.03)**
Uterus	0.93 (0.72–1.20)	0.98 (0.75–1.27)

(1) Odds ratios in **bold** are statistically significant at the 5% level.

Table 4.24: Distant stage at diagnosis: deprivation gradients adjusted for age and sex, 1996–2006

Cancer	Rate of change in odds of having distant stage at diagnosis per increasing NZDep2001 decile (95% CI)	
	Māori	Non-Māori
Bladder	1.188 (0.844–1.671)	1.030 (0.954–1.112)
Brain		1.129 (0.868–1.468)
Breast: female	1.084 (0.958–1.227)	**1.073 (1.034–1.114)**
Cervix	1.175 (0.926–1.492)	1.105 (0.979–1.247)
Colorectal	1.011 (0.932–1.097)	**1.017 (1.000–1.034)**
Kidney	1.000 (0.853–1.172)	1.023 (0.978–1.070)
Liver	0.930 (0.754–1.147)	0.980 (0.893–1.075)
Lung	1.053 (0.975–1.136)	**1.050 (1.022–1.079)**
Melanoma	1.502 (1.032–2.187)	**1.039 (1.006–1.074)**
Oesophagus	1.081 (0.810–1.441)	0.954 (0.885–1.027)
Oral	1.278 (0.936–1.744)	**1.101 (1.006–1.205)**
Ovary	0.937 (0.790–1.111)	1.018 (0.974–1.063)
Pancreas	0.997 (0.749–1.328)	**1.094 (1.026–1.167)**
Prostate	0.907 (0.756–1.086)	**1.148 (1.101–1.198)**
Stomach	0.906 (0.809–1.013)	1.041 (0.995–1.089)
Testis	1.026 (0.846–1.245)	**1.139 (1.029–1.261)**
Thyroid	1.130 (0.841–1.518)	**1.147 (1.024–1.284)**
Uterus	0.976 (0.806–1.181)	**1.100 (1.032–1.173)**

(1) Gradients in **bold** are statistically significant at the 5% level.

Table 4.25: Māori:non-Māori odds ratios (ORs) for distant stage at diagnosis, cancer registrations, adjusted for age and sex, and area deprivation, 1996–2006

Cancer	Adjusted for age and sex	Adjusted for age, sex, and NZDep2001 decile
	OR (95% CI)	OR (95% CI)
Bladder	**2.78 (1.47–5.27)**	**2.71 (1.43–5.14)**
Brain	2.86 (1.01–8.15)	2.55 (0.87–7.48)
Breast: female	**1.50 (1.22–1.86)**	**1.34 (1.08–1.67)**
Cervix	**3.35 (2.20–5.10)**	**2.86 (1.85–4.42)**
Colorectal	**1.59 (1.36–1.86)**	**1.57 (1.34–1.83)**
Kidney	1.22 (0.90–1.67)	1.19 (0.87–1.63)
Liver	0.94 (0.61–1.46)	0.98 (0.62–1.54)
Lung	**1.51 (1.31–1.75)**	**1.44 (1.24–1.67)**
Melanoma	**2.93 (1.82–4.70)**	**2.83 (1.76–4.55)**
Oesophagus	1.29 (0.75–2.19)	1.36 (0.79–2.33)
Oral	1.67 (1.00–2.81)	1.52 (0.90–2.56)
Ovary	0.95 (0.72–1.25)	0.95 (0.72–1.27)
Pancreas	**1.67 (1.08–2.57)**	1.53 (0.98–2.38)
Prostate	**4.57 (3.36–6.22)**	**3.89 (2.85–5.32)**
Stomach	1.08 (0.86–1.35)	1.08 (0.86–1.36)
Testis	1.36 (0.91–2.04)	1.18 (0.78–1.80)
Thyroid	1.41 (0.83–2.40)	1.10 (0.64–1.90)
Uterus	1.18 (0.82–1.70)	1.07 (0.73–1.56)

(1) Odds ratios in **bold** are statistically significant at the 5% level.

SURVIVAL DISPARITIES BY AREA DEPRIVATION 1996–2006

Key Findings

- The relatively small numbers of Māori limit our ability to show significant deprivation gradients for Māori and the larger number of non-Māori with cancer means that trends are more likely to show as significant for non-Māori. This does not mean that the trends do not exist for Māori. There was no evidence of significant differences between the Māori and non-Māori deprivation gradients in risk of death after diagnosis, apart from melanoma of the skin, which shows a significantly stronger association with deprivation for Māori than for non-Māori.
- For Māori, there was a significant association between socioeconomic deprivation and an increased risk of cancer-specific death after diagnosis for melanoma of the skin. The small numbers may have affected our ability to detect deprivation gradients in survival among Māori for many cancers.
- Among non-Māori, the risk of death was significantly raised with increasing deprivation for cancers of the bladder, breast, colorectal, kidney, lung, melanoma, oral, pancreas, prostate and uterus.
- Adjusting for deprivation reduced the Māori:non-Māori survival disparities (cancer-specific mortality hazard ratios) to some extent for many cancers. However, the reduction from further adjusting for stage at diagnosis was considerably larger. Nevertheless, even after adjusting for deprivation and stage at diagnosis, the hazard ratios remained significant for most cancers.

This chapter analyses area deprivation inequalities in survival disparities for Māori and non-Māori registered with cancer between January 1996 and December 2006. It also examines the role of differential exposure to area deprivation to survival disparities between Māori and non-Māori. The measure is a hazard ratio, which estimates the relative risk of dying from the cancer after diagnosis.

Table 4.26 presents area deprivation gradients in the risk of death after diagnosis separately for Māori and non-Māori. The socioeconomic gradient is estimated using proportional hazards modelling, which models the increasing (or decreasing) risk of death per increasing deprivation decile, adjusted for sex and age at diagnosis. A hazard ratio of 1.038 indicates that a person living in a decile 2 area would have a 3.8% higher risk than someone would in a decile 1 area. It is a multiplicative measure, not an additive measure. A hazard ratio or gradient greater than 1 shows an increasing risk of death after diagnosis with increasing deprivation, while a hazard ratio less than 1 indicates a decreasing risk of death with increasing deprivation.

Table 4.27 presents the relative risk of death after diagnosis for Māori compared to non-Māori adjusted for age and sex. The hazard ratios are then adjusted for deprivation, and finally also for stage at diagnosis. The difference between a hazard ratio adjusted for age and the hazard ratio adjusted for age and deprivation provides an estimate of the contribution of deprivation to the survival differences between Māori and non-Māori cancer patients. Similarly, the difference when stage is added to the model indicates the contribution of differences in stage at diagnosis to the disparity between Māori and non-Māori in cancer-specific mortality after diagnosis.

The deprivation score from the NZDep2001 Index of Area Deprivation was assigned from the area of residence at the time the cancer was registered.

Table 4.26: Deprivation gradients for cancer-specific death after diagnosis, Māori and non-Māori, 1996–2006

Cancer	Cancer-specific mortality hazard ratio per NZDep2001 decile (95% CI)		Ratio of Māori/non-Māori deprivation gradients (95% CI)
	Māori	Non-Māori	
Bladder	1.041 (0.933–1.161)	**1.037 (1.016–1.058)**	1.00 (0.90–1.12)
Brain	0.957 (0.887–1.033)	1.003 (0.987–1.020)	0.95 (0.88–1.03)
Breast: female	1.002 (0.963–1.041)	**1.037 (1.025–1.050)**	0.97 (0.93–1.01)
Cervix	1.067 (0.988–1.152)	1.028 (0.989–1.067)	1.04 (0.95–1.13)
Colorectal	1.020 (0.977–1.064)	**1.018 (1.010–1.025)**	1.00 (0.96–1.05)
Kidney	0.983 (0.910–1.061)	**1.031 (1.010–1.053)**	0.95 (0.88–1.03)
Leukaemias	1.072 (0.996–1.154)	1.005 (0.989–1.021)	1.07 (0.99–1.15)
Liver	0.979 (0.926–1.035)	1.002 (0.980–1.024)	0.98 (0.92–1.04)
Lung	1.014 (0.995–1.034)	**1.018 (1.011–1.024)**	1.00 (0.98–1.02)
Melanoma of skin	**1.291 (1.086–1.536)**	**1.040 (1.022–1.059)**	**1.24 (1.04–1.48)**
Non-Hodgkin's lymphoma	1.015 (0.954–1.080)	1.010 (0.995–1.026)	1.01 (0.94–1.07)
Oesophagus	1.013 (0.943–1.088)	1.007 (0.989–1.026)	1.01 (0.93–1.08)
Oral cancers	0.998 (0.921–1.082)	**1.050 (1.023–1.077)**	0.95 (0.87–1.04)
Ovary	1.038 (0.964–1.119)	1.006 (0.988–1.026)	1.03 (0.96–1.12)
Pancreas	1.037 (0.983–1.094)	**1.018 (1.004–1.032)**	1.02 (0.96–1.08)
Prostate	1.043 (0.986–1.104)	**1.041 (1.029–1.054)**	1.00 (0.95–1.06)
Stomach	1.031 (0.988–1.075)	1.012 (0.997–1.026)	1.02 (0.97–1.07)
Thyroid	0.945 (0.805–1.108)	1.026 (0.969–1.086)	0.92 (0.78–1.09)
Uterus	1.002 (0.913–1.100)	**1.045 (1.015–1.077)**	0.96 (0.87–1.06)

(1) Gradient is the cancer-specific mortality hazard ratio per increasing deprivation decile. A hazard ratio over 1 indicates a higher risk of death from the cancer after diagnosis per increasing deprivation decile. A hazard ratio under 1 indicates a declining risk of death from the cancer after diagnosis per increasing deprivation decile.

(2) Hazard ratios in **bold** are significant at the 5% level.

Table 4.27: Māori:non-Māori cancer-specific mortality hazard ratios (HRs), adjusted for sex and age at diagnosis, deprivation, and stage at diagnosis (including unstaged), 1996–2006

Cancer	Adjusted for age and sex			Adjusted for age, sex, deprivation decile			Adjusted for age, sex, deprivation, stage at diagnosis		
	HR	(95% CI)	p value	HR	(95% CI)	p value	HR	(95% CI)	p value
Bladder	**2.25**	**(1.73–2.94)**	**<0.0001**	**2.11**	**(1.61–2.75)**	**<0.0001**	**1.69**	**(1.29–2.21)**	**0.0001**
Brain	**1.24**	**(1.02–1.51)**	**0.033**	**1.24**	**(1.01–1.51)**	**0.038**	1.21	(0.99–1.48)	0.063
Breast: female	**1.44**	**(1.30–1.60)**	**<0.0001**	**1.34**	**(1.20–1.49)**	**<0.0001**	**1.25**	**(1.13–1.39)**	**<0.0001**
Cervix	**2.25**	**(1.82–2.77)**	**<0.0001**	**2.12**	**(1.71–2.63)**	**<0.0001**	**1.86**	**(1.50–2.32)**	**<0.0001**
Colorectal	**1.38**	**(1.23–1.53)**	**<0.0001**	**1.33**	**(1.20–1.49)**	**<0.0001**	**1.18**	**(1.06–1.31)**	**0.003**
Colon	**1.28**	**(1.11–1.47)**	**0.0008**	**1.25**	**(1.08–1.44)**	**0.002**	1.10	(0.95–1.27)	0.19
Rectum	**1.59**	**(1.35–1.88)**	**<0.0001**	**1.51**	**(1.27–1.79)**	**<0.0001**	**1.37**	**(1.16–1.62)**	**0.0003**
Kidney	**1.42**	**(1.15–1.76)**	**0.001**	**1.35**	**(1.08–1.68)**	**0.007**	1.20	(0.97–1.49)	0.094
Leukaemias	1.11	(0.93–1.32)	0.23	1.09	(0.92–1.31)	0.32		n/a	
Liver	**1.22**	**(1.05–1.42)**	**0.008**	**1.22**	**(1.05–1.43)**	**0.009**	**1.31**	**(1.12–1.52)**	**0.0006**
Lung	**1.24**	**(1.18–1.30)**	**<0.0001**	**1.20**	**(1.14–1.27)**	**<0.0001**	**1.15**	**(1.10–1.21)**	**<0.0001**
Melanoma	**2.32**	**(1.60–3.35)**	**<0.0001**	**2.20**	**(1.52–3.18)**	**<0.0001**	1.41	(0.97–2.04)	0.069
Non-Hodgkin's lymphoma	**1.60**	**(1.36–1.88)**	**<0.0001**	**1.56**	**(1.32–1.84)**	**<0.0001**		n/a	
Oesophagus	**1.43**	**(1.19–1.73)**	**0.0002**	**1.42**	**(1.17–1.71)**	**0.0003**	**1.36**	**(1.12–1.65)**	**0.002**
Oral cancers	**1.75**	**(1.40–2.20)**	**<0.0001**	**1.65**	**(1.31–2.07)**	**<0.0001**	**1.41**	**(1.12–1.78)**	**0.003**
Ovary	1.18	(0.96–1.45)	0.11	1.16	(0.95–1.43)	0.15	**1.40**	**(1.14–1.71)**	**0.001**
Pancreas	1.09	(0.95–1.26)	0.20	1.05	(0.92–1.21)	0.46	1.05	(0.91–1.21)	0.49
Prostate	**2.03**	**(1.78–2.32)**	**<0.0001**	**1.86**	**(1.62–2.13)**	**<0.0001**	**1.67**	**(1.45–1.91)**	**<0.0001**
Stomach	**1.23**	**(1.09–1.37)**	**0.0004**	**1.20**	**(1.07–1.34)**	**0.002**	**1.29**	**(1.15–1.45)**	**<0.0001**
Testis	2.80	(1.63–4.84)	0.0002	2.46	(1.39–4.36)	0.002	2.37	(1.33–4.25)	0.004
Thyroid	**1.55**	**(1.01–2.40)**	**0.047**	1.50	(0.96–2.35)	0.078	1.38	(0.87–2.17)	0.17
Uterus	**1.68**	**(1.32–2.13)**	**<0.0001**	**1.54**	**(1.20–1.96)**	**0.0005**	**1.65**	**(1.30–2.10)**	**<0.0001**

(1) Hazard ratios in **bold** are significant at the 5% level.

(2) Hazard ratios in grey should be interpreted with caution due to small number of deaths. Where hazard ratios are missing, the data was excluded due to insufficient numbers.

AREA DEPRIVATION AND CANCER: SUMMARY OF FINDINGS

- Almost 50% of Māori registered with cancer during the period 2002–2006 were living in the most socioeconomically deprived areas at the time of their diagnosis (quintile 5), compared to 17% of non-Māori.
- Compared to residents of less deprived areas, residents of more socioeconomically deprived neighbourhoods:
  - are more likely to develop cancer
  - are more likely to have their cancer detected later
  - have lower chances of survival after diagnosis.
- The association with increasing deprivation is stronger for cancer mortality than for cancer incidence.
- The deprivation gradients are steeper for Māori than for non-Māori, for both incidence and mortality.
- The unequal exposure of Māori to higher levels of socioeconomic deprivation contributes to disparities between Māori and non-Māori in cancer incidence, mortality, stage at diagnosis, and survival.

SECTION 5:

Rural–Urban Status and Cancer

CANCER REGISTRATIONS AND DEATHS BY RURAL–URBAN STATUS, ALL CANCERS COMBINED, 2002–2006

Key Findings

- The incidence of all cancers combined was significantly lower in rural areas compared to main urban areas, among both Māori and non-Māori. Among Māori, however, mortality rates were similar for rural and main urban residents. For non-Māori, both incidence and mortality rates were significantly lower in rural areas.
- Residents of independent urban communities had a higher risk of being diagnosed with cancer than those in main urban areas among both Māori and non-Māori. Mortality rates were also higher for these residents compared to their main urban counterparts.
- The difference in mortality rates between main urban residents and independent urban or rural residents was greater for Māori than for non-Māori.
- Within each area category, Māori cancer incidence and mortality rates were higher than those of non-Māori, but the mortality ratios were higher than the incidence ratios.
- Adjusting for rural–urban status resulted in a very small increase in Māori:non-Māori incidence and mortality ratios.

This chapter provides information on registrations and deaths for all cancers combined for Māori and non-Māori living in main urban, independent urban, and rural areas.

Table 5.1 presents the total number of cancer registrations among Māori and non-Māori during the period 2002–2006, along with age-sex-standardised rates and Māori/non-Māori rate ratios, within main urban, independent urban, and rural areas. Rates were standardised to the 2001 Māori population. Similar data is also presented for cancer deaths. Table 5.4 presents this data for males and females separately.

In Table 5.2 the ratios in the column headed 'Māori' compare registration (or death) rates for Māori living in independent urban communities with registration (or death) rates for Māori living in main urban areas (see Independent vs. main urban). A ratio above 1 indicates Māori living in independent urban communities have higher cancer registration rates than Māori living in main urban areas. Likewise registration (and death) rate ratios are presented for Māori living in rural areas compared to Māori living in main urban areas (see Rural vs. main urban). The 'Non-Māori' column presents the same comparisons for non-Māori residents. Table 5.5 presents similar data for males and females.

Table 5.3 shows Māori:non-Māori ratios of cancer incidence and cancer mortality adjusted for age and sex, and for rural–urban status. The difference between the two ratios indicates the contribution of rural–urban status to the disparities between Māori and non-Māori. These ratios were calculated using Poisson regression modelling. Table 5.6 presents similar data for males and females separately.

Table 5.7 shows the proportion of Māori and non-Māori who moved into a different type of area between the time of registration and the time of death.

Table 5.1: All cancers, age-sex-standardised registration rates per 100,000 by rural–urban category, both sexes, 2002–2006

Rural–urban category	Māori			Non-Māori			Māori: non-Māori rate ratio (95% CI)
	Number	Rate	(95% CI)	Number	Rate	(95% CI)	
Registrations							
Main urban	4,662	226.2	(219.1–233.4)	62,388	188.9	(186.9–190.9)	**1.20 (1.16–1.24)**
Independent urban	1,453	250.0	(236.7–264.0)	12,994	201.8	(195.9–207.9)	**1.24 (1.16–1.32)**
Rural	1,145	169.0	(159.1–179.6)	8,688	147.5	(143.4–151.8)	**1.15 (1.07–1.23)**
Deaths							
Main urban	2,204	108.2	(103.8–112.9)	26,357	62.8	(61.9–63.7)	**1.72 (1.65–1.80)**
Independent urban	769	131.3	(122.1–141.0)	5,824	69.4	(66.9–71.9)	**1.89 (1.75–2.05)**
Rural	739	106.4	(98.9–114.5)	3,586	55.1	(53.1–57.2)	**1.93 (1.78–2.10)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 5.2: All cancers, independent urban:main urban and rural:main urban incidence and mortality age-sex-standardised rate ratios for Māori and non-Māori, 2002–2006

	Comparison	Māori		Non-Māori	
		Ratio	(95% CI)	Ratio	(95% CI)
Registrations	Independent vs. main urban	**1.11**	**(1.04–1.18)**	**1.07**	**(1.04–1.10)**
	Rural vs. main urban	**0.75**	**(0.70–0.80)**	**0.78**	**(0.76–0.81)**
Deaths	Independent vs. main urban	**1.21**	**(1.12–1.32)**	**1.10**	**(1.06–1.15)**
	Rural vs. main urban	0.98	(0.90–1.07)	**0.88**	**(0.84–0.91)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 5.3: All cancers, incidence and mortality Māori:non-Māori rate ratios adjusted for age, sex and rural–urban category, 2002–2006

	Adjusted for age and sex		Adjusted for age, sex, rural–urban category	
	Ratio	(95% CI)	Ratio	(95% CI)
Registrations	1.21	(0.98–1.49)	**1.22**	**(1.09–1.37)**
Deaths	**1.78**	**(1.55–2.04)**	**1.79**	**(1.66–1.94)**

(1) Ratios were modelled using Poisson regression.

(2) Ratios in **bold** are statistically significant at the 5% level.

By sex

Table 5.4: All cancers, age-standardised registration and death rates per 100,000 by rural–urban category and sex, 2002–2006

Sex	Rural–urban category	Māori			Non-Māori			Ratio (95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)	
Females	**Registrations**							
	Main urban	2,607	233.8	(224.2–243.8)	30,013	180.6	(177.8–183.5)	**1.29 (1.24–1.35)**
	Independent urban	804	261.5	(243.1–281.3)	5,922	189.9	(181.3–199.0)	**1.38 (1.26–1.50)**
	Rural	586	172.0	(158.1–187.3)	3,610	141.5	(135.4–147.9)	**1.22 (1.10–1.34)**
	Deaths							
	Main urban	1,148	103.4	(97.6–109.6)	12,788	56.0	(54.8–57.3)	**1.85 (1.74–1.96)**
	Independent urban	389	122.8	(111.0–135.8)	2,683	62.1	(58.6–65.7)	**1.98 (1.76–2.22)**
	Rural	368	104.1	(93.8–115.6)	1,428	49.7	(46.8–52.8)	**2.09 (1.86–2.36)**
Males	**Registrations**							
	Main urban	2,054	218.6	(208.4–229.2)	32,376	197.2	(194.4–200.0)	**1.11 (1.05–1.16)**
	Independent urban	649	238.4	(219.7–258.7)	7,072	213.7	(205.6–222.0)	**1.12 (1.02–1.22)**
	Rural	560	166.1	(152.2–181.1)	5,077	153.6	(148.0–159.4)	1.08 (0.98–1.19)
	Deaths							
	Main urban	1,056	113.1	(106.4–120.2)	13,569	69.6	(68.2–71.0)	**1.63 (1.52–1.73)**
	Independent urban	380	139.7	(126.2–154.7)	3,141	76.7	(73.2–80.3)	**1.82 (1.63–2.04)**
	Rural	371	108.7	(98.0–120.5)	2,158	60.5	(57.7–63.4)	**1.80 (1.60–2.01)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 5.5: All cancers, independent urban:main urban and rural:main urban incidence and mortality age-standardised rate ratios, by sex, 2002–2006

Sex		Comparison	Māori	Non-Māori
			Ratio (95% CI)	Ratio (95% CI)
Females	Registrations	Independent vs. main urban	**1.12 (1.03–1.22)**	**1.05 (1.00–1.10)**
		Rural vs. main urban	**0.74 (0.67–0.81)**	**0.78 (0.75–0.82)**
	Deaths	Independent vs. main urban	**1.19 (1.06–1.33)**	**1.11 (1.04–1.18)**
		Rural vs. main urban	1.01 (0.89–1.13)	**0.89 (0.83–0.95)**
Males	Registrations	Independent vs. main urban	1.09 (0.99–1.20)	**1.08 (1.04–1.13)**
		Rural vs. main urban	**0.76 (0.69–0.84)**	**0.78 (0.75–0.81)**
	Deaths	Independent vs. main urban	**1.24 (1.10–1.39)**	**1.10 (1.05–1.16)**
		Rural vs. main urban	0.96 (0.85–1.08)	**0.87 (0.83–0.91)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 5.6: All cancers, incidence and mortality Māori:non-Māori rate ratios adjusted for age and rural–urban category, by sex, 2002–2006

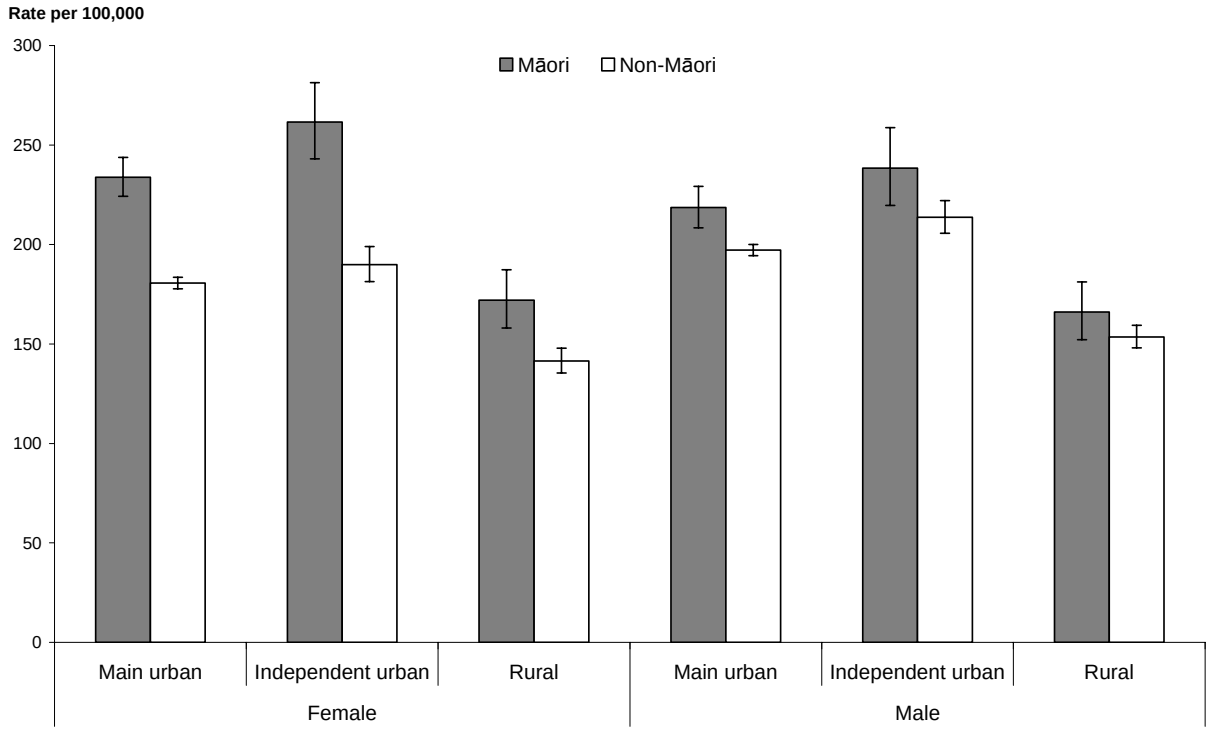
Sex		ed for age	Adjusted for age and rural–urban status
		Ratio (95% CI)	Ratio (95% CI)
Females	Registrations	**1.31 (1.21–1.42)**	**1.32 (1.26–1.39)**
	Deaths	**1.87 (1.69–2.07)**	**1.89 (1.77–2.01)**
Males	Registrations	**1.10 (1.05–1.15)**	**1.11 (1.06–1.16)**
	Deaths	**1.69 (1.53–1.86)**	**1.70 (1.60–1.80)**

(1) Ratios modelled using Poisson regression.

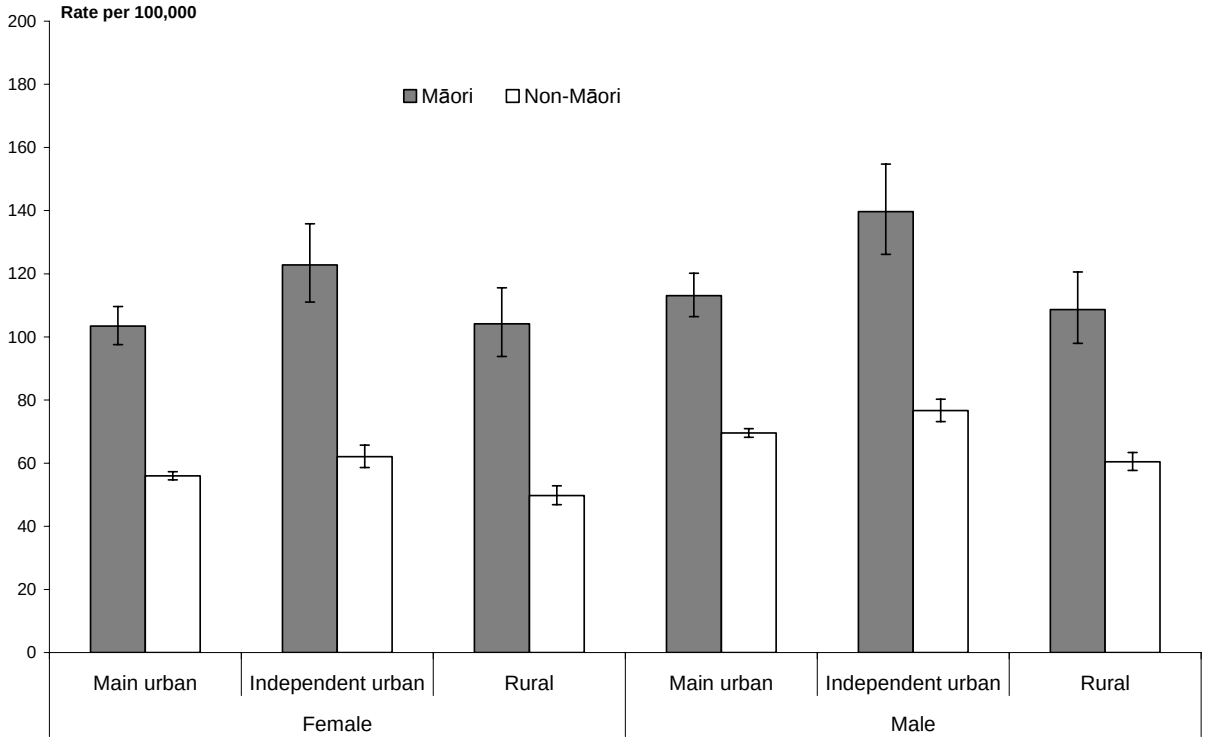
(2) Ratios in **bold** are statistically significant at the 5% level.

Figure 5.1: Cancer incidence and mortality, age-standardised rates by rural–urban category and sex, 2002–2006

(a) Registrations



(b) Deaths



Movement between rural–urban areas after cancer registration

Among those who died from cancer during the period 2002–2006, the majority were living in the same rural–urban category as when their cancer was registered. However, there was some movement between area types between the time of registration and the time of death. The patterns were somewhat different for Māori and non-Māori with less movement to urban areas among Māori and more movement to rural areas. The differences were all statistically significant.

- Among those living in rural areas at the time of diagnosis, Māori were more likely than non-Māori to also be living in rural areas at the time of death (80% vs. 74%), and less likely to be in an independent urban area (11% vs. 13%) or main urban area (9% vs. 14%).
- Among residents of independent urban communities at registration, Māori were more likely to live in a rural area at the time of death (14% vs. 7%). The proportion that shifted to main urban areas was similar for Māori and non-Māori (4%). Therefore, Māori were more likely than non-Māori to move to rural areas and very few move to main urban areas.
- Over 90% of both Māori and non-Māori who were main urban residents at the time of diagnosis were also living in main urban areas at the time of death. However, Māori were more likely than non-Māori to be living in an independent urban community (2% vs. 1%) or a rural area (5% vs. 2%) at the time of death.

Table 5.7: Movement between area types between time of diagnosis and time of death, cancers registered during 2002–2006, (number, %)

Rural–urban status at time of registration		Rural–urban status at time of death					
		Rural		Independent urban		Main urban	
		Number	%	Number	%	Number	%
Māori	Rural	434	80	59	11	50	9
	Independent urban	89	14	502	81	27	4
	Main urban	92	5	42	2	1,561	92
Non-Māori	Rural	1,957	74	332	13	360	14
	Independent urban	352	7	4,335	88	216	4
	Main urban	506	2	189	1	20,985	97

MOST COMMON CANCERS BY RURAL–URBAN STATUS 2002–2006

Registrations

Table 5.8: Cancer registrations: 10 most common cancers by rural–urban category, 2002–2006

Rank	Main urban			Independent urban			Rural		
	Cancer	Number	%	Cancer	Number	%	Cancer	Number	%
	Māori								
1	Lung	857	18.4	Lung	296	20.4	Lung	249	21.8
2	Breast	827	17.7	Breast	247	17.0	Breast	160	13.9
3	Prostate	383	8.2	Prostate	151	10.4	Prostate	117	10.2
4	Colorectal	347	7.4	Colorectal	100	6.9	Colorectal	93	8.1
5	Stomach	197	4.2	Stomach	69	4.8	Stomach	52	4.6
6	Leukaemia	177	3.8	NHL	54	3.7	Leukaemia	39	3.4
7	Uterus	159	3.4	Leukaemia	47	3.2	Liver	37	3.2
8	NHL	137	2.9	Pancreas	34	2.3	Pancreas	30	2.7
9	Liver	124	2.7	Liver	33	2.3	Uterus	29	2.6
10	Thyroid	113	2.4	Uterus	33	2.3	Thyroid	26	2.3
	Non-Māori								
1	Colorectal	9,412	15.1	Colorectal	2,279	17.5	Prostate	1,539	17.7
2	Prostate	8,931	14.3	Prostate	1,972	15.2	Colorectal	1,345	15.5
3	Breast	8,224	13.2	Breast	1,529	11.8	Melanoma	1,110	12.8
4	Melanoma	7,006	11.2	Melanoma	1,350	10.4	Breast	1,092	12.6
5	Lung	5,362	8.6	Lung	1,258	9.7	Lung	651	7.5
6	NHL	2,311	3.7	Leukaemia	485	3.7	Leukaemia	301	3.5
7	Leukaemia	2,202	3.5	NHL	450	3.5	NHL	296	3.4
8	Bladder	1,756	2.8	Bladder	365	2.8	Bladder	220	2.5
9	Pancreas	1,248	2.0	Kidney	289	2.2	Kidney	178	2.0
10	Kidney	1,236	2.0	Pancreas	259	2.0	Pancreas	164	1.9

NHL=Non-Hodgkin's lymphoma; Breast = female only; Lung= Lung, trachea, bronchus; Liver=liver and intrahepatic bile ducts; Melanoma = melanoma of the skin.

Deaths

Table 5.9: Cancer deaths: 10 most frequent cancers by rural–urban category, 2002–2006

Rank	Main urban			Independent urban			Rural		
	Cancer	Number	%	Cancer	Number	%	Cancer	Number	%
	Māori								
1	Lung	672	30.5	Lung	257	33.4	Lung	228	30.9
2	Breast	230	10.4	Breast	66	8.6	Breast	65	8.8
3	Colorectal	165	7.5	Colorectal	55	7.2	Colorectal	47	6.4
4	Stomach	137	6.2	Prostate	48	6.2	Prostate	39	5.3
5	Liver	96	4.4	Stomach	44	5.7	Stomach	39	5.3
6	Pancreas	90	4.1	NHL	23	3.0	Pancreas	31	4.2
7	Prostate	79	3.6	Pancreas	23	3.0	Liver	30	4.1
8	NHL	67	3.0	Liver	21	2.7	Leukaemia	23	3.1
9	Leukaemia	49	2.2	Brain	18	2.3	NHL	20	2.7
10	Kidney	48	2.2	Leukaemia	16	2.1	Ovary	20	2.7
	Non-Māori								
1	Lung	4488	17.0	Lung	1120	19.2	Lung	613	17.1
2	Colorectal	3934	14.9	Colorectal	1021	17.5	Colorectal	598	16.7
3	Breast	2148	8.1	Prostate	445	7.6	Prostate	296	8.3
4	Prostate	1943	7.4	Breast	374	6.4	Breast	277	7.7
5	Pancreas	1122	4.3	Pancreas	256	4.4	Melanoma	161	4.5
6	NHL	1038	3.9	Leukaemia	213	3.7	Pancreas	140	3.9
7	Leukaemia	974	3.7	NHL	193	3.3	NHL	130	3.6
8	Melanoma	958	3.6	Stomach	180	3.1	Brain	128	3.6
9	Stomach	920	3.5	Melanoma	173	3.0	Leukaemia	122	3.4
10	Brain	759	2.9	Bladder	164	2.8	Stomach	119	3.3

NHL=Non-Hodgkin's lymphoma; Breast = female only; Lung= Lung, trachea, bronchus; Liver=liver and intrahepatic bile ducts; Melanoma = melanoma of the skin.

CANCER REGISTRATIONS AND DEATHS BY RURAL–URBAN STATUS AND CANCER TYPE 2002–2006

Key Findings

- Among Māori, the incidence of most cancers was highest among independent urban residents and lowest among rural residents although the differences were not all statistically significant.
- Among non-Māori, the pattern differed slightly, with main urban areas showing the highest incidence rates for most cancers (apart from lung and colorectal, which were highest in independent urban areas.) All cancers were significantly less common among rural residents.
- Although the incidence of each cancer was lower in rural areas compared to main urban areas, mortality rates in rural areas were closer to those of main urban residents among both Māori and non-Māori.
- Adjusting for rural–urban status had negligible effect on Māori:non-Māori incidence and mortality rate ratios.

This chapter presents information on cancer incidence (based on registration rates) and mortality (based on death rates) for certain cancers selected because they were among the 10 most frequent cancers or cancer deaths for Māori or non-Māori males and females during the period 2002–2006.

Table 5.10 presents age-sex-standardised registration rates for selected cancers by rural–urban category. The tables include the total numbers of cancers registered during the period 2002–2006, rates per 100,000 age-sex-standardised to the 2001 Māori population, and rate ratios (Māori rates divided by non-Māori rates).

Table 5.11 compares cancer incidence in independent urban areas and in rural areas with that in main urban areas, using age-sex-standardised rate ratios (independent urban rate/main urban rate). The comparisons were made separately for Māori and non-Māori. A ratio over 1 indicates the incidence of a particular cancer was higher in independent urban areas (or rural areas) than the incidence in main urban areas. Conversely, a ratio under 1 indicates a lower rate was found in independent urban or rural areas. Ratios highlighted by bolded text were statistically significant at the 5% level. Sex-specific data is presented in Table 5.12.

Table 5.13 presents registration rate ratios for Māori compared to non-Māori, first adjusted for age and sex and then for rural–urban category. The difference between the two ratios provides an estimate of the contribution of rural–urban status to the overall Māori:non-Māori disparity in cancer incidence. Poisson regression modelling was used to calculate these ratios.

Tables 5.14 to 5.18 present similar data for cancer deaths.

Table 5.10: Cancer registrations: numbers, age-sex-standardised rates per 100,000, rate ratios by rural–urban category, 2002–2006

Cancer	Rural–urban area	Māori			Non-Māori			Ratio	(95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)		
Bladder	Main urban	53	2.7	(2.0–3.6)	1,495	3.7	(3.5–3.9)	**0.72**	**(0.53–0.97)**
	Independent urban	16	2.7	(1.6–4.5)	146	1.2	(0.9–1.6)	**2.26**	**(1.27–4.02)**
	Rural	18	2.5	(1.6–4.1)	122	1.6	(1.3–2.0)	1.57	(0.93–2.65)
Brain	Main urban	58	2.8	(2.1–3.7)	624	3.0	(2.7–3.4)	0.92	(0.69–1.22)
	Independent urban	17	2.9	(1.8–4.8)	74	1.4	(1.0–2.2)	**2.03**	**(1.07–3.86)**
	Rural	16	2.6	(1.5–4.4)	71	1.4	(0.9–2.1)	1.85	(0.96–3.57)
Breast	Main urban	827	74.2	(69.0–79.8)	8,224	57.0	(55.4–58.5)	**1.30**	**(1.21–1.41)**
	Independent urban	247	83.1	(72.9–94.6)	1,529	59.1	(54.7–64.0)	**1.40**	**(1.21–1.64)**
	Rural	160	49.2	(41.9–57.9)	1,092	43.5	(40.3–46.9)	1.13	(0.95–1.35)
Cervix	Main urban	94	8.5	(6.9–10.4)	558	5.3	(4.7–5.9)	**1.60**	**(1.26–2.03)**
	Independent urban	30	10.0	(6.9–14.5)	74	5.1	(3.6–7.2)	**1.97**	**(1.18–3.30)**
	Rural	19	5.8	(3.6–9.2)	52	2.9	(2.1–4.2)	**1.95**	**(1.08–3.53)**
Colorectal	Main urban	347	17.2	(15.3–19.2)	9,388	22.7	(22.2–23.3)	**0.75**	**(0.67–0.85)**
	Independent urban	100	17.2	(14.0–21.2)	2,181	27.5	(25.9–29.2)	**0.63**	**(0.51–0.78)**
	Rural	93	13.1	(10.6–16.2)	1,300	18.0	(17.0–19.2)	**0.73**	**(0.58–0.91)**
Kidney	Main urban	113	5.5	(4.5–6.7)	1,221	3.8	(3.6–4.2)	**1.44**	**(1.16–1.78)**
	Independent urban	22	3.8	(2.5–6.0)	170	3.3	(2.5–4.3)	1.16	(0.69–1.94)
	Rural	23	3.5	(2.3–5.3)	124	1.9	(1.6–2.4)	**1.79**	**(1.11–2.88)**
Leukaemias	Main urban	177	8.7	(7.4–10.2)	2,173	7.6	(7.1–8.2)	1.14	(0.96–1.35)
	Independent urban	47	8.5	(6.3–11.4)	283	5.9	(4.5–7.8)	1.43	(0.96–2.15)
	Rural	39	6.4	(4.6–9.0)	214	4.5	(3.6–5.7)	1.42	(0.95–2.12)
Liver	Main urban	124	6.2	(5.2–7.5)	596	1.7	(1.5–1.9)	**3.74**	**(2.99–4.66)**
	Independent urban	33	6.1	(4.3–8.7)	55	0.8	(0.5–1.4)	**7.60**	**(3.96–14.57)**
	Rural	37	5.4	(3.9–7.6)	32	0.4	(0.2–0.9)	**12.05**	**(5.46–26.60)**
Lung	Main urban	857	42.1	(39.2–45.3)	5,350	13.0	(12.5–13.5)	**3.24**	**(2.98–3.51)**
	Independent urban	296	48.3	(42.8–54.5)	1,258	15.3	(13.9–16.7)	**3.16**	**(2.72–3.68)**
	Rural	249	34.5	(30.4–39.3)	650	9.2	(8.2–10.2)	**3.77**	**(3.18–4.47)**
Melanoma	Main urban	80	3.8	(3.0–4.8)	5,743	22.9	(22.3–23.6)	**0.17**	**(0.13–0.21)**
	Independent urban	25	4.4	(2.9–6.7)	601	13.1	(11.6–14.8)	**0.34**	**(0.22–0.52)**
	Rural	13	2.1	(1.2–3.7)	428	8.7	(7.9–9.7)	**0.24**	**(0.14–0.43)**
Non-Hodgkin's lymphoma	Main urban	137	6.9	(5.7–8.2)	2,306	7.3	(6.9–7.8)	0.94	(0.77–1.13)
	Independent urban	54	9.7	(7.3–12.8)	363	6.6	(5.5–7.8)	**1.48**	**(1.06–2.06)**
	Rural	23	3.6	(2.4–5.6)	153	2.6	(2.1–3.2)	1.41	(0.87–2.29)
Oesophagus	Main urban	63	3.3	(2.5–4.3)	792	1.7	(1.5–1.8)	**1.96**	**(1.47–2.60)**
	Independent urban	22	3.7	(2.4–5.7)	76	1.1	(0.8–1.5)	**3.43**	**(1.98–5.94)**
	Rural	19	2.7	(1.7–4.4)	61	0.9	(0.6–1.2)	**3.17**	**(1.80–5.58)**
Oral	Main urban	82	4.1	(3.3–5.1)	837	3.3	(3.0–3.6)	1.24	(0.97–1.58)
	Independent urban	28	5.0	(3.4–7.4)	152	2.9	(2.3–3.7)	**1.73**	**(1.09–2.74)**
	Rural	22	3.3	(2.1–5.0)	95	1.5	(1.2–1.9)	**2.17**	**(1.32–3.58)**

Tabb 5.10 (continued)

Cancer	Rural–urban area	Māori		Non-Māori		Ratio (95% CI)
		Number	Rate (95% CI)	Number	Rate (95% CI)	
Ovary	Main urban	77	6.8 (5.4–8.6)	1,004	6.2 (5.7–6.7)	1.09 (0.85–1.40)
	Independent urban	26	8.4 (5.6–12.5)	178	5.6 (4.3–7.3)	1.49 (0.92–2.42)
	Rural	20	5.9 (3.7–9.3)	109	4.3 (3.3–5.6)	1.37 (0.81–2.33)
Pancreas	Main urban	107	5.2 (4.3–6.4)	1,171	2.6 (2.4–2.8)	**2.0 (1.62–2.52)**
	Independent urban	34	5.4 (3.8–7.7)	245	2.7 (2.2–3.3)	**1.9 (1.33–3.00)**
	Rural	30	4.0 (2.7–5.7)	137	1.8 (1.5–2.3)	**2.1 (1.41–3.28)**
Prostate	Main urban	383	42.4 (38.0–47.3)	8,930	48.6 (47.5–49.8)	**0.8 (0.78–0.98)**
	Independent urban	151	54.1 (45.6–64.3)	1,972	48.9 (46.3–51.7)	1.1 (0.92–1.33)
	Rural	117	32.6 (27.1–39.3)	1,539	40.9 (38.7–43.2)	**0.8 (0.66–0.97)**
Stomach	Main urban	197	9.7 (8.3–11.2)	1,177	3.0 (2.7–3.2)	**3.2 (2.74–3.88)**
	Independent urban	69	12.0 (9.3–15.3)	211	3.0 (2.3–3.9)	**3.9 (2.74–5.63)**
	Rural	52	7.8 (5.9–10.4)	113	1.6 (1.2–2.2)	**4.7 (3.21–7.07)**
Testis	Main urban	112	11.2 (9.2–13.5)	466	6.5 (5.8–7.3)	**1.7 (1.37–2.15)**
	Independent urban	20	9.5 (6.0–14.9)	61	6.0 (3.9–9.0)	1.5 (0.86–2.92)
	Rural	19	9.0 (5.7–14.4)	69	5.1 (3.5–7.4)	1.7 (0.98–3.25)
Thyroid	Main urban	103	4.8 (4.0–5.9)	611	3.0 (2.7–3.3)	**1.6 (1.28–2.00)**
	Independent urban	18	3.3 (2.0–5.3)	37	1.0 (0.6–1.7)	**3.2 (1.62–6.54)**
	Rural	26	4.3 (2.9–6.4)	25	0.5 (0.2–1.1)	**8.4 (3.50–20.30)**
Uterus	Main urban	159	14.2 (12.1–16.8)	1,176	7.1 (6.5–7.6)	**2.0 (1.68–2.42)**
	Independent urban	33	10.8 (7.6–15.4)	210	6.4 (5.1–8.0)	**1.7 (1.12–2.57)**
	Rural	29	8.3 (5.7–12.1)	124	4.1 (3.3–5.2)	**2.0 (1.29–3.12)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 5.11: Cancer incidence: independent urban:main urban and rural:main urban comparisons, age-sex-standardised rate ratios, for Māori and non-Māori, by cancer type, 2002–2006

Cancer	Independent urban vs. main urban				Rural vs. main urban			
	Māori		Non-Māori		Māori		Non-Māori	
	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)
Bladder	1.02	(0.57–1.84)	**0.32**	**(0.25–0.42)**	0.95	(0.54–1.66)	**0.43**	**(0.35–0.54)**
Brain	1.04	(0.59–1.83)	**0.47**	**(0.31–0.72)**	0.93	(0.52–1.67)	**0.46**	**(0.30–0.69)**
Breast: female	1.12	(0.96–1.30)	1.04	(0.96–1.13)	**0.66**	**(0.56–0.79)**	**0.76**	**(0.70–0.83)**
Cervix	1.18	(0.77–1.81)	0.96	(0.66–1.38)	0.68	(0.41–1.14)	**0.56**	**(0.38–0.81)**
Colorectal	1.00	(0.79–1.27)	**1.21**	**(1.13–1.29)**	**0.77**	**(0.60–0.97)**	**0.79**	**(0.74–0.85)**
Kidney	0.69	(0.43–1.12)	0.86	(0.65–1.13)	0.63	(0.40–1.00)	**0.51**	**(0.40–0.64)**
Leukaemias	0.98	(0.70–1.37)	0.78	(0.58–1.03)	0.74	(0.51–1.07)	**0.59**	**(0.47–0.75)**
Liver	0.98	(0.66–1.47)	**0.48**	**(0.28–0.85)**	0.87	(0.59–1.28)	**0.27**	**(0.13–0.56)**
Lung	**1.15**	**(1.00–1.32)**	**1.18**	**(1.06–1.30)**	**0.82**	**(0.71–0.95)**	**0.70**	**(0.63–0.79)**
Melanoma	1.16	(0.72–1.86)	**0.57**	**(0.50–0.65)**	0.55	(0.30–1.02)	**0.38**	**(0.34–0.42)**
Non-Hodgkin's lymphoma	**1.41**	**(1.01–1.97)**	0.89	(0.74–1.08)	**0.53**	**(0.33–0.85)**	**0.35**	**(0.28–0.44)**
Oesophagus	1.11	(0.66–1.86)	**0.63**	**(0.45–0.89)**	0.83	(0.48–1.43)	**0.51**	**(0.37–0.71)**
Oral	1.22	(0.78–1.91)	0.87	(0.68–1.13)	0.80	(0.49–1.31)	**0.46**	**(0.35–0.60)**
Ovary	1.23	(0.77–1.97)	0.91	(0.68–1.20)	0.87	(0.52–1.46)	**0.69**	**(0.53–0.91)**
Pancreas	1.03	(0.68–1.55)	1.04	(0.84–1.29)	0.76	(0.50–1.16)	**0.71**	**(0.57–0.89)**
Prostate	**1.28**	**(1.04–1.57)**	1.01	(0.95–1.07)	**0.77**	**(0.62–0.96)**	**0.84**	**(0.79–0.89)**
Stomach	1.24	(0.92–1.65)	1.02	(0.78–1.35)	0.81	(0.59–1.12)	**0.55**	**(0.41–0.74)**
Testis	0.85	(0.52–1.38)	0.92	(0.60–1.40)	0.81	(0.49–1.34)	0.78	(0.52–1.15)
Thyroid	0.68	(0.40–1.14)	**0.33**	**(0.20–0.56)**	0.89	(0.57–1.39)	**0.17**	**(0.08–0.37)**
Uterus	0.76	(0.52–1.13)	0.91	(0.72–1.14)	**0.58**	**(0.39–0.88)**	**0.59**	**(0.46–0.75)**

(1) Ratios of registration rates age-sex-standardised to the 2001 Māori population.

(2) Ratios in **bold** are statistically significant at the 5% level.

Table 5.12: Cancer incidence: independent urban:main urban and rural:main urban comparisons, age-standardised rate ratios, for Māori and non-Māori, by cancer type, by sex, 2002–2006

Cancer	Independent urban vs. main urban				Rural vs. main urban			
	Māori		Non-Māori		Māori		Non-Māori	
	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)
Females								
Bladder	1.50	(0.64–3.47)	0.99	(0.55–1.78)	0.83	(0.31–2.27)	0.73	(0.50–1.07)
Brain	1.11	(0.49–2.52)	0.65	(0.40–1.07)	1.12	(0.47–2.63)	0.85	(0.54–1.35)
Breast: female	1.12	(0.96–1.30)	1.04	(0.96–1.13)	**0.66**	**(0.56–0.79)**	**0.76**	**(0.70–0.83)**
Cervix uteri	1.18	(0.77–1.81)	0.96	(0.66–1.38)	0.68	(0.41–1.14)	**0.56**	**(0.38–0.81)**
Colorectal	1.17	(0.85–1.63)	**1.23**	**(1.11–1.35)**	**0.57**	**(0.39–0.85)**	**0.84**	**(0.76–0.93)**
Kidney	1.12	(0.55–2.28)	1.23	(0.76–1.98)	0.47	(0.18–1.21)	0.96	(0.68–1.34)
Leukaemias	1.14	(0.70–1.84)	0.99	(0.67–1.46)	0.70	(0.40–1.23)	0.83	(0.61–1.12)
Liver	0.94	(0.38–2.30)	0.53	(0.10–2.74)	1.26	(0.60–2.63)	0.31	(0.08–1.21)
Lung	1.06	(0.87–1.29)	**1.19**	**(1.01–1.41)**	0.84	(0.69–1.03)	**0.71**	**(0.57–0.87)**
Melanoma	1.55	(0.87–2.75)	**1.13**	**(1.00–1.28)**	0.89	(0.44–1.78)	0.95	(0.85–1.06)
Non-Hodgkin's lymphoma	1.56	(0.96–2.53)	0.90	(0.67–1.20)	0.81	(0.44–1.48)	**0.75**	**(0.56–0.99)**
Oesophagus	1.75	(0.70–4.33)	0.97	(0.61–1.55)	0.41	(0.09–1.83)	0.85	(0.54–1.32)
Oral	**2.46**	**(1.10–5.52)**	0.83	(0.48–1.43)	1.36	(0.52–3.53)	**0.60**	**(0.38–0.96)**
Ovary	1.23	(0.77–1.97)	0.91	(0.68–1.20)	0.87	(0.52–1.46)	**0.69**	**(0.53–0.91)**
Pancreas	1.03	(0.58–1.83)	1.01	(0.74–1.37)	0.97	(0.56–1.69)	0.93	(0.66–1.32)
Stomach	**1.79**	**(1.21–2.65)**	1.08	(0.58–2.03)	0.70	(0.41–1.20)	0.58	(0.31–1.08)
Thyroid	0.65	(0.35–1.21)	0.68	(0.42–1.09)	0.98	(0.59–1.64)	**0.32**	**(0.18–0.58)**
Uterus	0.76	(0.52–1.13)	0.91	(0.72–1.14)	**0.58**	**(0.39–0.88)**	**0.59**	**(0.46–0.75)**
Males								
Bladder	0.78	(0.34–1.79)	0.87	(0.73–1.04)	1.01	(0.51–1.99)	**0.73**	**(0.61–0.87)**
Brain	0.99	(0.45–2.16)	1.11	(0.80–1.55)	0.79	(0.36–1.76)	0.77	(0.55–1.07)
Colorectal	0.88	(0.63–1.23)	**1.22**	**(1.12–1.33)**	0.90	(0.67–1.23)	**0.84**	**(0.77–0.92)**
Kidney	**0.51**	**(0.26–0.99)**	1.22	(0.98–1.52)	0.70	(0.41–1.20)	**0.66**	**(0.50–0.87)**
Leukaemias	0.86	(0.54–1.38)	1.18	(0.92–1.51)	0.77	(0.47–1.25)	0.79	(0.61–1.03)
Liver	1.00	(0.64–1.56)	0.62	(0.34–1.11)	0.77	(0.50–1.21)	**0.41**	**(0.23–0.71)**
Lung	**1.23**	**(1.01–1.51)**	**1.15**	**(1.01–1.30)**	**0.80**	**(0.65–0.99)**	**0.70**	**(0.61–0.80)**
Melanoma	0.71	(0.29–1.73)	**1.13**	**(1.01–1.25)**	**0.17**	**(0.04–0.72)**	**0.83**	**(0.75–0.92)**
Non-Hodgkin's lymphoma	1.31	(0.83–2.07)	1.04	(0.81–1.33)	**0.34**	**(0.16–0.74)**	**0.69**	**(0.55–0.86)**
Oesophagus	0.93	(0.50–1.75)	1.08	(0.81–1.45)	0.94	(0.52–1.70)	0.73	(0.52–1.01)
Oral	0.95	(0.54–1.65)	1.28	(0.99–1.66)	0.68	(0.38–1.20)	**0.71**	**(0.55–0.93)**
Pancreas	1.03	(0.57–1.84)	1.12	(0.84–1.49)	0.57	(0.29–1.11)	0.90	(0.69–1.17)
Prostate	**1.28**	**(1.04–1.57)**	1.01	(0.95–1.07)	**0.77**	**(0.62–0.96)**	**0.84**	**(0.79–0.89)**
Stomach	0.89	(0.57–1.37)	1.06	(0.77–1.46)	0.88	(0.59–1.31)	**0.69**	**(0.49–0.98)**
Testis	0.85	(0.52–1.38)	0.92	(0.60–1.40)	0.81	(0.49–1.34)	0.78	(0.52–1.15)
Thyroid	0.73	(0.28–1.92)	1.10	(0.62–1.96)	0.66	(0.27–1.62)	0.81	(0.46–1.42)

(1) Ratios of registration rates age-sex-standardised to the 2001 Māori population.

(2) Ratios in **bold** are statistically significant at the 5% level.

Table 5.13: Cancer incidence: Māori:non-Māori ratios adjusted for age and for rural–urban category, by sex, 2002–2006

Sex	Cancer	Ratio adjusted for age (95% CI)	Ratio adjusted for age and rurality (95% CI)
Females	Bladder	1.13 (0.81–1.60)	1.15 (0.81–1.62)
	Brain	0.80 (0.53–1.20)	0.81 (0.56–1.17)
	Breast: female	**1.29 (1.20–1.39)**	**1.30 (1.22–1.39)**
	Cervix uteri	**1.80 (1.35–2.41)**	**1.84 (1.44–2.34)**
	Colorectal	**0.65 (0.56–0.76)**	**0.66 (0.56–0.77)**
	Kidney	1.10 (0.76–1.59)	1.11 (0.83–1.48)
	Leukaemias	1.10 (0.87–1.39)	1.10 (0.90–1.33)
	Liver	**2.70 (1.92–3.80)**	**2.88 (1.97–4.20)**
	Lung	**3.98 (3.66–4.32)**	**4.04 (3.69–4.42)**
	Melanoma	**0.17 (0.14–0.22)**	**0.17 (0.13–0.23)**
	Non-Hodgkin's lymphoma	1.00 (0.78–1.28)	1.01 (0.79–1.30)
	Oesophagus	1.38 (0.88–2.15)	1.41 (0.86–2.33)
	Oral	0.86 (0.61–1.22)	0.87 (0.61–1.22)
	Ovary	1.19 (0.94–1.50)	**1.21 (1.02–1.44)**
	Pancreas	**2.10 (1.66–2.65)**	**2.12 (1.68–2.68)**
	Stomach	**4.16 (3.44–5.03)**	**4.29 (3.44–5.34)**
	Thyroid	**1.66 (1.35–2.05)**	**1.72 (1.29–2.31)**
	Uterus	**1.90 (1.65–2.19)**	**1.95 (1.68–2.27)**
Males	Bladder	**0.57 (0.43–0.74)**	**0.58 (0.43–0.78)**
	Brain	**0.67 (0.50–0.90)**	**0.67 (0.51–0.90)**
	Colorectal	**0.74 (0.66–0.83)**	**0.74 (0.64–0.87)**
	Kidney	**1.30 (1.06–1.60)**	**1.31 (1.08–1.60)**
	Leukaemias	1.07 (0.90–1.28)	1.08 (0.90–1.29)
	Liver	**4.10 (3.40–4.94)**	**4.29 (3.50–5.26)**
	Lung	**2.73 (2.52–2.97)**	**2.78 (2.54–3.06)**
	Melanoma	**0.11 (0.08–0.15)**	**0.11 (0.08–0.15)**
	Non-Hodgkin's lymphoma	0.87 (0.72–1.05)	0.88 (0.71–1.10)
	Oesophagus	**1.83 (1.44–2.32)**	**1.86 (1.40–2.48)**
	Oral	**1.32 (1.07–1.63)**	**1.33 (1.13–1.56)**
	Pancreas	**1.68 (1.33–2.12)**	**1.70 (1.33–2.18)**
	Prostate	**0.88 (0.81–0.95)**	0.89 (0.76–1.04)
	Stomach	**2.87 (2.43–3.38)**	**2.91 (2.47–3.43)**
	Testis	**1.62 (1.36–1.94)**	**1.63 (1.32–2.01)**
	Thyroid	**1.75 (1.24–2.46)**	**1.77 (1.21–2.59)**

(1) Registration rate ratios modelled using Poisson regression.

(2) Ratios in **bold** are statistically significant at the 5% level.

Table 5.14: Cancer deaths: numbers, age-sex-standardised rates per 100,000, rate ratios, by rural–urban category, 2002–2006

Cancer	Rural–urban category	Māori			Non-Māori			Ratio	(95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)		
Bladder	Main urban	24	1.2	(0.8–1.8)	632	1.2	(1.0–1.3)	1.04	(0.69–1.58)
	Independent urban	10	1.7	(0.9–3.2)	164	1.4	(1.1–1.7)	1.22	(0.62–2.39)
	Rural	8	1.1	(0.5–2.1)	82	1.0	(0.8–1.3)	1.02	(0.49–2.13)
Brain	Main urban	44	2.2	(1.6–2.9)	759	2.9	(2.6–3.1)	0.75	(0.55–1.02)
	Independent urban	18	3.0	(1.9–4.9)	142	3.2	(2.5–4.1)	0.94	(0.55–1.60)
	Rural	19	3.2	(2.0–5.0)	128	3.1	(2.4–3.8)	1.03	(0.62–1.73)
Breast: female	Main urban	230	20.6	(18.1–23.4)	2,148	12.0	(11.4–12.7)	**1.71**	**(1.49–1.96)**
	Independent urban	66	22.2	(17.4–28.4)	374	11.7	(10.2–13.4)	**1.90**	**(1.43–2.51)**
	Rural	65	19.1	(14.9–24.5)	277	10.8	(9.5–12.2)	**1.78**	**(1.35–2.35)**
Cervix	Main urban	30	2.7	(1.9–3.9)	196	1.2	(1.0–1.5)	**2.20**	**(1.48–3.28)**
	Independent urban	14	4.6	(2.7–7.8)	27	1.0	(0.6–1.7)	**4.56**	**(2.17–9.60)**
	Rural	14	4.3	(2.5–7.3)	16	0.6	(0.4–1.1)	**6.90**	**(3.25–14.64)**
Colorectal	Main urban	165	8.2	(7.0–9.5)	3,934	8.5	(8.2–8.8)	0.96	(0.82–1.12)
	Independent urban	55	9.5	(7.3–12.4)	1,021	11.2	(10.3–12.1)	0.85	(0.64–1.12)
	Rural	47	6.7	(5.0–9.0)	598	8.5	(7.8–9.2)	0.79	(0.58–1.07)
Kidney	Main urban	48	2.4	(1.8–3.2)	510	1.3	(1.1–1.4)	**1.91**	**(1.41–2.59)**
	Independent urban	13	2.2	(1.3–3.8)	136	1.8	(1.4–2.3)	1.22	(0.67–2.22)
	Rural	13	2.0	(1.1–3.4)	79	1.3	(1.0–1.6)	1.53	(0.84–2.79)
Leukaemias	Main urban	49	2.4	(1.8–3.2)	974	2.7	(2.4–2.9)	0.91	(0.67–1.22)
	Independent urban	16	2.8	(1.7–4.5)	213	2.6	(2.1–3.3)	1.05	(0.61–1.82)
	Rural	23	4.0	(2.6–6.0)	122	2.3	(1.8–2.9)	**1.74**	**(1.07–2.82)**
Liver	Main urban	96	4.7	(3.8–5.7)	555	1.5	(1.4–1.7)	**3.12**	**(2.49–3.90)**
	Independent urban	21	4.0	(2.6–6.1)	71	0.9	(0.6–1.1)	**4.61**	**(2.75–7.74)**
	Rural	30	4.3	(3.0–6.2)	48	0.8	(0.6–1.1)	**5.58**	**(3.41–9.14)**
Lung	Main urban	672	33.3	(30.8–35.9)	4,488	10.8	(10.4–11.1)	**3.09**	**(2.84–3.35)**
	Independent urban	257	42.6	(37.6–48.2)	1,120	13.6	(12.7–14.7)	**3.12**	**(2.70–3.60)**
	Rural	228	31.5	(27.6–35.9)	613	8.6	(7.9–9.4)	**3.66**	**(3.13–4.27)**
Melanoma	Main urban	14	0.7	(0.4–1.3)	958	2.7	(2.5–2.9)	**0.27**	**(0.16–0.47)**
	Independent urban	5	0.8	(0.3–2.1)	173	2.7	(2.2–3.4)	**0.31**	**(0.12–0.81)**
	Rural	8	1.3	(0.7–2.8)	161	2.8	(2.4–3.4)	**0.47**	**(0.22–0.99)**
Non-Hodgkin's lymphoma	Main urban	67	3.4	(2.6–4.3)	1,038	2.5	(2.3–2.7)	**1.33**	**(1.03–1.72)**
	Independent urban	23	4.0	(2.6–6.1)	193	2.4	(1.9–2.9)	**1.69**	**(1.06–2.69)**
	Rural	20	3.2	(2.0–5.1)	130	2.0	(1.7–2.5)	1.55	(0.93–2.58)
Oesophagus	Main urban	44	2.2	(1.7–3.0)	702	1.6	(1.4–1.7)	**1.43**	**(1.05–1.95)**
	Independent urban	16	2.7	(1.7–4.5)	143	1.7	(1.4–2.1)	1.59	(0.93–2.72)
	Rural	16	2.2	(1.3–3.6)	76	1.0	(0.8–1.3)	**2.18**	**(1.27–3.75)**
Oral	Main urban	38	2.0	(1.4–2.7)	397	1.1	(1.0–1.3)	**1.75**	**(1.24–2.45)**
	Independent urban	11	1.8	(1.0–3.3)	96	1.4	(1.1–1.8)	1.29	(0.67–2.50)
	Rural	7	1.0	(0.5–2.1)	48	0.6	(0.5–0.9)	1.55	(0.70–3.44)

Table 5.14 (continued)

Cancer	Rural–urban category	Māori			Non-Māori			Ratio	(95% CI)
		Number	Rate	(95% CI)	Number	Rate	(95% CI)		
Ovary	Main urban	43	3.9	(2.9–5.3)	644	3.0	(2.7–3.3)	1.29	(0.94–1.77)
	Independent urban	11	3.3	(1.8–6.1)	115	2.4	(1.9–3.0)	1.38	(0.73–2.62)
	Rural	20	5.6	(3.6–8.8)	89	3.2	(2.5–4.1)	**1.76**	**(1.06–2.91)**
Pancreas	Main urban	90	4.3	(3.5–5.3)	1,122	2.4	(2.2–2.6)	**1.80**	**(1.44–2.24)**
	Independent urban	23	3.7	(2.5–5.7)	256	3.0	(2.6–3.5)	1.24	(0.80–1.94)
	Rural	31	4.2	(2.9–6.0)	140	2.1	(1.7–2.5)	**2.02**	**(1.36–3.02)**
Prostate	Main urban	79	9.3	(7.5–11.6)	1,941	7.0	(6.7–7.4)	**1.33**	**(1.06–1.67)**
	Independent urban	48	17.1	(12.8–22.8)	445	6.7	(6.0–7.5)	**2.54**	**(1.87–3.46)**
	Rural	39	10.5	(7.6–14.3)	296	6.9	(6.1–7.7)	**1.53**	**(1.09–2.13)**
Stomach	Main urban	137	6.8	(5.7–8.1)	920	2.2	(2.0–2.4)	**3.12**	**(2.59–3.76)**
	Independent urban	44	8.0	(5.9–10.7)	180	2.3	(1.9–2.8)	**3.52**	**(2.46–5.04)**
	Rural	39	5.8	(4.2–7.9)	119	1.6	(1.4–2.0)	**3.50**	**(2.41–5.09)**
Testis	Main urban	12	1.2	(0.7–2.1)	18	0.2	(0.1–0.4)	**5.24**	**(2.47–11.12)**
	Independent urban	2	1.0	(0.3–4.1)	4	0.4	(0.1–1.3)	2.60	(0.42–15.98)
	Rural	1	0.4	(0.1–3.2)	4	0.2	(0.1–0.6)	2.20	(0.24–20.33)
Thyroid	Main urban	11	0.5	(0.3–1.0)	81	0.2	(0.2–0.3)	**2.81**	**(1.46–5.39)**
	Independent urban	4	0.7	(0.3–1.9)	12	0.1	(0.0–0.2)	**6.94**	**(1.94–24.85)**
	Rural	5	0.8	(0.3–2.1)	9	0.2	(0.1–0.5)	**4.32**	**(1.20–15.47)**
Uterus	Main urban	28	2.5	(1.7–3.6)	281	1.3	(1.1–1.5)	**1.97**	**(1.32–2.93)**
	Independent urban	11	3.5	(1.9–6.3)	54	0.9	(0.6–1.3)	**4.04**	**(1.95–8.36)**
	Rural	14	4.1	(2.4–7.0)	37	1.1	(0.8–1.6)	**3.62**	**(1.93–6.79)**

(1) Ratios in **bold** are statistically significant at the 5% level.

Table 5.15: Cancer deaths: independent urban vs. main urban and rural vs. main urban comparisons, age-sex-standardised rate ratios, Māori and non-Māori, 2002–2006

Cancer	Independent urban vs. main urban				Rural vs. main urban			
	Māori		Non-Māori		Māori		Non-Māori	
	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)
All sites	**1.21**	**(1.12–1.32)**	**1.10**	**(1.06–1.15)**	0.98	(0.90–1.07)	**0.88**	**(0.84–0.91)**
Bladder	1.39	(0.65–2.98)	1.19	(0.95–1.50)	0.89	(0.40–1.99)	0.90	(0.71–1.16)
Brain	1.41	(0.81–2.46)	1.12	(0.86–1.46)	1.47	(0.85–2.56)	1.06	(0.84–1.35)
Breast: female	1.08	(0.82–1.42)	0.97	(0.84–1.13)	0.93	(0.70–1.23)	0.89	(0.78–1.03)
Cervix	1.69	(0.89–3.19)	0.81	(0.47–1.41)	1.58	(0.83–3.00)	**0.51**	**(0.29–0.88)**
Colorectal	1.16	(0.85–1.59)	**1.31**	**(1.20–1.43)**	0.82	(0.59–1.14)	1.00	(0.91–1.09)
Kidney	0.91	(0.49–1.70)	**1.43**	**(1.10–1.87)**	0.81	(0.44–1.51)	1.01	(0.78–1.32)
Leukaemias	1.15	(0.65–2.03)	0.99	(0.78–1.26)	1.65	(0.99–2.74)	0.86	(0.67–1.10)
Liver	0.85	(0.53–1.37)	**0.57**	**(0.42–0.78)**	0.92	(0.61–1.39)	**0.51**	**(0.36–0.73)**
Lung	**1.28**	**(1.11–1.48)**	**1.27**	**(1.17–1.37)**	0.95	(0.81–1.10)	**0.80**	**(0.73–0.87)**
Melanoma	1.14	(0.40–3.27)	1.00	(0.79–1.26)	1.80	(0.74–4.40)	1.05	(0.87–1.27)
Non-Hodgkin's lymphoma	1.18	(0.73–1.92)	0.93	(0.76–1.15)	0.94	(0.56–1.59)	0.81	(0.65–1.01)
Oesophagus	1.23	(0.69–2.18)	1.10	(0.87–1.40)	0.98	(0.55–1.75)	**0.64**	**(0.50–0.82)**
Oral	0.93	(0.47–1.83)	1.25	(0.93–1.68)	0.51	(0.23–1.15)	**0.58**	**(0.42–0.79)**
Ovary	0.85	(0.44–1.66)	0.80	(0.62–1.02)	1.45	(0.85–2.48)	1.06	(0.83–1.37)
Pancreas	0.86	(0.54–1.37)	**1.24**	**(1.04–1.48)**	0.96	(0.64–1.45)	0.85	(0.70–1.04)
Prostate	**1.83**	**(1.27–2.64)**	0.96	(0.85–1.08)	1.12	(0.76–1.65)	0.98	(0.86–1.11)
Stomach	1.17	(0.83–1.65)	1.04	(0.84–1.28)	0.85	(0.59–1.22)	**0.75**	**(0.62–0.93)**
Testis	0.87	(0.20–3.90)	1.76	(0.49–6.31)	0.38	(0.05–2.94)	0.91	(0.29–2.91)
Thyroid	1.29	(0.41–4.07)	0.52	(0.22–1.23)	1.51	(0.50–4.56)	0.98	(0.39–2.45)
Uterus	1.40	(0.69–2.82)	0.68	(0.44–1.06)	1.65	(0.86–3.16)	0.90	(0.62–1.29)

(1) Ratios of death rates age-sex-standardised to the 2001 Māori population.

(2) Ratios in **bold** are statistically significant at the 5% level.

Table 5.16: Cancer deaths: independent urban vs. main urban and rural vs. main urban comparisons, age-standardised rate ratios, Māori and non-Māori, by sex, 2002–2006

Cancer	Independent urban vs. main urban				Rural vs. main urban			
	Māori		Non-Māori		Māori		Non-Māori	
	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)	Ratio	(95% CI)
Females								
Bladder	1.25	(0.39–3.99)	1.17	(0.76–1.79)	0.56	(0.12–2.58)	0.64	(0.34–1.21)
Brain	**2.00**	**(1.01–3.99)**	1.40	(0.91–2.16)	0.90	(0.36–2.24)	1.34	(0.88–2.02)
Breast: female	1.08	(0.82–1.42)	0.97	(0.84–1.13)	0.93	(0.70–1.23)	0.89	(0.78–1.03)
Cervix uteri	1.69	(0.89–3.19)	0.81	(0.47–1.41)	1.58	(0.83–3.00)	**0.51**	**(0.29–0.88)**
Colorectal	1.08	(0.67–1.73)	**1.28**	**(1.12–1.46)**	0.64	(0.37–1.11)	0.97	(0.84–1.13)
Kidney	1.38	(0.53–3.58)	1.44	(0.80–2.59)	0.61	(0.18–2.14)	1.27	(0.82–1.95)
Leukaemias	1.29	(0.59–2.79)	1.00	(0.64–1.54)	1.29	(0.57–2.91)	0.85	(0.57–1.28)
Liver	0.19	(0.03–1.44)	0.60	(0.35–1.01)	1.00	(0.45–2.22)	0.65	(0.33–1.30)
Lung	**1.30**	**(1.06–1.59)**	**1.32**	**(1.16–1.49)**	1.05	(0.85–1.29)	**0.74**	**(0.63–0.86)**
Melanoma	5.42	(0.48–61.44)	1.18	(0.81–1.72)	**12.00**	**(1.33–108.12)**	1.07	(0.77–1.50)
Non-Hodgkin's lymphoma	1.32	(0.65–2.70)	1.09	(0.78–1.51)	1.18	(0.55–2.54)	0.86	(0.62–1.19)
Oesophagus	1.63	(0.62–4.24)	0.89	(0.58–1.35)	0.52	(0.12–2.28)	**0.58**	**(0.35–0.95)**
Oral	**5.26**	**(1.24–22.22)**	**0.50**	**(0.28–0.90)**	0.94	(0.10–9.04)	0.63	(0.35–1.14)
Ovary	0.85	(0.44–1.66)	0.80	(0.62–1.02)	1.45	(0.85–2.48)	1.06	(0.83–1.37)
Pancreas	0.86	(0.46–1.59)	1.07	(0.82–1.40)	0.95	(0.54–1.69)	1.01	(0.74–1.37)
Stomach	1.07	(0.62–1.83)	1.23	(0.85–1.77)	0.70	(0.38–1.30)	0.70	(0.47–1.04)
Thyroid	1.59	(0.41–6.17)	0.62	(0.22–1.73)	0.49	(0.06–4.02)	0.48	(0.17–1.38)
Uterus	1.40	(0.69–2.82)	0.68	(0.44–1.06)	1.65	(0.86–3.16)	0.90	(0.62–1.29)
Males								
Bladder	1.48	(0.56–3.93)	1.20	(0.92–1.57)	1.07	(0.41–2.80)	0.98	(0.75–1.28)
Brain	0.83	(0.31–2.23)	0.98	(0.71–1.36)	**2.03**	**(1.00–4.13)**	0.93	(0.70–1.23)
Colorectal	1.22	(0.81–1.84)	**1.34**	**(1.19–1.50)**	0.95	(0.63–1.43)	1.01	(0.90–1.14)
Kidney	0.73	(0.32–1.66)	**1.43**	**(1.09–1.89)**	0.89	(0.44–1.83)	0.89	(0.64–1.24)
Leukaemias	1.03	(0.44–2.41)	0.98	(0.74–1.30)	**1.94**	**(1.01–3.74)**	0.86	(0.63–1.18)
Liver	1.05	(0.64–1.74)	**0.57**	**(0.39–0.82)**	0.90	(0.55–1.45)	**0.46**	**(0.31–0.67)**
Lung	**1.26**	**(1.02–1.56)**	**1.23**	**(1.12–1.36)**	0.85	(0.69–1.06)	**0.84**	**(0.75–0.93)**
Melanoma	0.83	(0.23–3.00)	0.89	(0.66–1.20)	1.06	(0.33–3.39)	1.04	(0.82–1.31)
Non-Hodgkin's lymphoma	1.10	(0.57–2.12)	0.83	(0.64–1.09)	0.80	(0.39–1.64)	0.78	(0.58–1.04)
Oesophagus	1.08	(0.52–2.21)	1.19	(0.90–1.57)	1.16	(0.61–2.18)	**0.67**	**(0.50–0.89)**
Oral	0.59	(0.25–1.41)	**1.53**	**(1.11–2.12)**	0.48	(0.20–1.14)	**0.56**	**(0.39–0.80)**
Pancreas	0.86	(0.43–1.73)	**1.36**	**(1.08–1.72)**	0.97	(0.54–1.75)	**0.75**	**(0.58–0.96)**
Prostate	**1.83**	**(1.27–2.64)**	0.96	(0.85–1.08)	1.12	(0.76–1.65)	0.98	(0.86–1.11)
Stomach	1.24	(0.80–1.94)	0.95	(0.74–1.23)	0.94	(0.60–1.48)	**0.78**	**(0.61–0.99)**
Testis	0.87	(0.20–3.90)	1.76	(0.49–6.31)	0.38	(0.05–2.94)	0.91	(0.29–2.91)
Thyroid	0.87	(0.10–7.79)	0.40	(0.09–1.83)	2.93	(0.70–12.34)	1.65	(0.48–5.60)

(1) Ratios of death rates age-sex-standardised to the 2001 Māori population.

(2) Ratios in **bold** are statistically significant at the 5% level.

Table 5.17: Cancer mortality: Māori:non-Māori rate ratios, by sex, adjusted for age and for rural–urban category, 2002–2006

Sex	Cancer	Ratio adjusted for age (95% CI)	Ratio adjusted for age and rural–urban category (95% CI)
Females	Bladder	1.57 (0.92–2.69)	**1.62 (1.03–2.53)**
	Brain	1.24 (0.85–1.81)	1.23 (0.88–1.72)
	Breast	**1.73 (1.48–2.01)**	**1.74 (1.55–1.97)**
	Cervix	**2.99 (2.25–3.97)**	**3.04 (2.25–4.11)**
	Colorectal	**0.78 (0.61–0.99)**	**0.78 (0.64–0.94)**
	Kidney	**1.48 (1.01–2.15)**	1.46 (0.95–2.24)
	Leukaemias	1.10 (0.84–1.43)	1.10 (0.82–1.49)
	Liver	**2.30 (1.78–2.98)**	**2.45 (1.52–3.96)**
	Lung	**3.90 (3.36–4.54)**	**3.92 (3.53–4.36)**
	Melanoma	**0.20 (0.10–0.41)**	**0.20 (0.07–0.54)**
	Non-Hodgkin's lymphoma	1.35 (0.94–1.94)	1.38 (0.90–2.10)
	Oesophagus	1.40 (0.89–2.22)	1.47 (0.88–2.45)
	Oral	0.91 (0.49–1.70)	0.93 (0.49–1.75)
	Ovary	**1.37 (1.05–1.79)**	**1.38 (1.06–1.79)**
	Pancreas	**2.01 (1.44–2.79)**	**2.03 (1.56–2.65)**
	Stomach	**3.40 (2.56–4.51)**	**3.52 (2.78–4.45)**
	Thyroid	**3.00 (1.87–4.81)**	**3.13 (1.74–5.63)**
	Uterus	**2.39 (1.79–3.20)**	**2.38 (1.77–3.20)**
Males	Bladder	0.93 (0.62–1.38)	0.92 (0.64–1.32)
	Brain	**0.66 (0.49–0.90)**	**0.66 (0.49–0.91)**
	Colorectal	1.00 (0.83–1.20)	0.98 (0.83–1.16)
	Kidney	**1.77 (1.23–2.55)**	**1.77 (1.31–2.40)**
	Leukaemias	1.00 (0.74–1.34)	1.00 (0.70–1.42)
	Liver	**3.88 (2.77–5.45)**	**4.05 (3.17–5.19)**
	Lung, trachea, bronchus	**2.64 (2.20–3.16)**	**2.65 (2.38–2.96)**
	Melanoma	**0.38 (0.22–0.64)**	**0.38 (0.23–0.62)**
	Non-Hodgkin's lymphoma	**1.36 (1.03–1.80)**	**1.38 (1.06–1.81)**
	Oesophagus	**1.61 (1.18–2.19)**	**1.64 (1.24–2.16)**
	Oral	**1.85 (1.36–2.52)**	**1.86 (1.40–2.48)**
	Pancreas	**1.49 (1.13–1.98)**	**1.50 (1.17–1.94)**
	Prostate	**1.61 (1.33–1.95)**	**1.60 (1.36–1.89)**
	Stomach	**2.89 (2.40–3.49)**	**2.92 (2.39–3.58)**
	Testis	**3.94 (1.96–7.91)**	**3.90 (2.11–7.19)**
	Thyroid	**3.66 (1.98–6.74)**	**3.68 (1.59–8.49)**

(1) Death rate ratios modelled using Poisson regression.

(2) Ratios in **bold** are statistically significant at the 5% level.

Table 5.18: Mortality: incidence ratios by rural–urban category, 2002–2006

Cancer	Rural–urban area	Māori			Non-Māori		
		Registration rate	Death rate	Mortality: incidence ratio	Registration rate	Death rate	Mortality: incidence ratio
Bladder	Main urban	2.7	1.2	44%	3.7	1.2	32%
	Independent urban	2.7	1.7	63%	1.2	1.4	117%
	Rural	2.5	1.1	44%	1.6	1.0	63%
Brain	Main urban	2.8	2.2	79%	3.0	2.9	97%
	Independent urban	2.9	3.0	103%	1.4	3.2	229%
	Rural	2.6	3.2	123%	1.4	3.1	221%
Breast: female	Main urban	74.2	20.6	28%	57.0	12.0	21%
	Independent urban	83.1	22.2	27%	59.1	11.7	20%
	Rural	49.2	19.1	39%	43.5	10.8	25%
Cervix	Main urban	8.5	2.7	32%	5.3	1.2	23%
	Independent urban	10.0	4.6	46%	5.1	1.0	20%
	Rural	5.8	4.3	74%	2.9	0.6	21%
Colorectal	Main urban	17.2	8.2	48%	22.7	8.5	37%
	Independent urban	17.2	9.5	55%	27.5	11.2	41%
	Rural	13.1	6.7	51%	18.0	8.5	47%
Kidney	Main urban	5.5	2.4	44%	3.8	1.3	34%
	Independent urban	3.8	2.2	58%	3.3	1.8	55%
	Rural	3.5	2.0	57%	1.9	1.3	68%
Leukaemias	Main urban	8.7	2.4	28%	7.6	2.7	36%
	Independent urban	8.5	2.8	33%	5.9	2.6	44%
	Rural	6.4	4.0	63%	4.5	2.3	51%
Liver	Main urban	6.2	4.7	76%	1.7	1.5	88%
	Independent urban	6.1	4.0	66%	0.8	0.9	113%
	Rural	5.4	4.3	80%	0.4	0.8	200%
Lung	Main urban	42.1	33.3	79%	13.0	10.8	83%
	Independent urban	48.3	42.6	88%	15.3	13.6	89%
	Rural	34.5	31.5	91%	9.2	8.6	93%
Melanoma	Main urban	3.8	0.7	18%	22.9	2.7	12%
	Independent urban	4.4	0.8	18%	13.1	2.7	21%
	Rural	2.1	1.3	62%	8.7	2.8	32%
Non-Hodgkin's lymphoma	Main urban	6.9	3.4	49%	7.3	2.5	34%
	Independent urban	9.7	4.0	41%	6.6	2.4	36%
	Rural	3.6	3.2	89%	2.6	2.0	77%
Oesophagus	Main urban	3.3	2.2	67%	1.7	1.6	94%
	Independent urban	3.7	2.7	73%	1.1	1.7	155%
	Rural	2.7	2.2	81%	0.9	1.0	111%
Oral	Main urban	4.1	2.0	49%	3.3	1.1	33%
	Independent urban	5.0	1.8	36%	2.9	1.4	48%
	Rural	3.3	1.0	30%	1.5	0.6	40%

Table 5.18 (continued)

Cancer	Rural–urban area	Māori			Non-Māori		
		Registration rate	Death rate	Mortality: incidence ratio	Registration rate	Death rate	Mortality: incidence ratio
Ovary	Main urban	6.8	3.9	57%	6.2	3.0	48%
	Independent urban	8.4	3.3	39%	5.6	2.4	43%
	Rural	5.9	5.6	95%	4.3	3.2	74%
Pancreas	Main urban	5.2	4.3	83%	2.6	2.4	92%
	Independent urban	5.4	3.7	69%	2.7	3.0	111%
	Rural	4.0	4.2	105%	1.8	2.1	117%
Prostate	Main urban	42.4	9.3	22%	48.6	7.0	14%
	Independent urban	54.1	17.1	32%	48.9	6.7	14%
	Rural	32.6	10.5	32%	40.9	6.9	17%
Stomach	Main urban	9.7	6.8	70%	3.0	2.2	73%
	Independent urban	12.0	8.0	67%	3.0	2.3	77%
	Rural	7.8	5.8	74%	1.6	1.6	100%
Testis	Main urban	11.2	1.2	11%	6.5	0.2	3%
	Independent urban	9.5	1.0	11%	6.0	0.4	7%
	Rural	9.0	0.4	4%	5.1	0.2	4%
Thyroid	Main urban	4.8	0.5	10%	3.0	0.2	7%
	Independent urban	3.3	0.7	21%	1.0	0.1	10%
	Rural	4.3	0.8	19%	0.5	0.2	40%
Uterus	Main urban	14.2	2.5	18%	7.1	1.3	18%
	Independent urban	10.8	3.5	32%	6.4	0.9	14%
	Rural	8.3	4.1	49%	4.1	1.1	27%

STAGE AT DIAGNOSIS BY RURAL–URBAN STATUS 1996–2006

Key Findings

- There was no consistent evidence of rural or urban disadvantage in stage at diagnosis, for Māori or non-Māori, although there were significant differences for a few cancers.
- Adjusting for rural–urban status had negligible impact on the disparities in stage at diagnosis between Māori and non-Māori.

This chapter presents data on stage at diagnosis from cancers registered during the 11-year period 1996–2006. The period of analysis is longer than that for incidence and mortality in order to provide more power to analyse differences between rural and urban areas, and to align with the survival analyses in the next chapter. Ethnicity for this data and for the survival data was that recorded on the cancer registration only.

'Stage at diagnosis' refers to the extent of spread of disease and is classified as:

- localised (confined to the part of the body where the cancer started)
- regional (spread to adjacent tissue or organ and/or involves regional lymph nodes)
- distant (spread to distant organs, tissues or to distant lymph nodes)
- unknown.

The classification is not applicable to leukaemias or lymphomas.

Table 5.19 presents the numbers and distribution of new cancer registrations for each stage at diagnosis, by rural–urban category, unadjusted for age and sex.

In Table 5.20, the odds of having unknown stage at diagnosis among those living in independent urban areas (or rural areas) are compared to the odds of those living in main urban areas (odds ratios). An odds ratio over 1 means the odds are higher for residents of independent urban areas (or rural areas) compared to residents of main urban areas. The odds ratios are calculated separately for Māori and non-Māori. Tables 5.21 and 5.22 present similar data for the odds of being diagnosed at localised and distant stage respectively among those with extent of disease recorded on the registration.

In Table 5.23 the odds of Māori having unknown stage at diagnosis are compared to the odds for non-Māori (odds ratios). The odds ratios are first adjusted for age and sex, because of the association between age and stage at diagnosis (older people are more likely to have unknown stage at diagnosis and to be diagnosed at a later stage of disease spread). They are then also adjusted for rural–urban category. The difference between the two odds ratios provides an estimate of the contribution of rural–urban status to the differentials in stage at diagnosis between Māori and non-Māori. Similar data is presented for localised stage at diagnosis and distant stage at diagnosis in Tables 5.24 and 5.25.

Table 5.19: Distribution of stage at diagnosis on cancer registrations, by rural–urban category, 1996–2006

Cancer	Area type	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Bladder	Main urban	92	4,196	7	7.6	195	4.6	12	13.0	258	6.1	14	15.2	177	4.2	59	64.1	3,566	85.0
	Independent urban	30	889	2	6.7	42	4.7	2	6.7	47	5.3	3	10.0	39	4.4	23	76.7	761	85.6
	Rural		523	2	5.9	29	5.5	0	0.0	35	6.7	4	11.8	23	4.4	28	82.4	436	83.4
Brain	Main urban	105	2,003	94	89.5	1,860	92.9	0	0.0	4	0.2	1	1.0	13	0.6	10	9.5	126	6.3
	Independent urban	34	369	28	82.4	346	93.8	1	2.9	0	0.0	2	5.9	1	0.3	3	8.8	22	6.0
	Rural		260	27	93.1	237	91.2	0	0.0	1	0.4	2	6.9	5	1.9	0	0.0	17	6.5
Breast: female	Main urban	1,461	17,449	605	41.4	8,150	46.7	590	40.4	5,820	33.4	73	5.0	698	4.0	193	13.2	2,781	15.9
	Independent urban	416	3,116	175	42.1	1,439	46.2	157	37.7	1,042	33.4	24	5.8	116	3.7	60	14.4	519	16.7
	Rural		2,197	125	38.3	1,097	49.9	135	41.4	719	32.7	7	2.1	83	3.8	59	18.1	298	13.6
Cervix	Main urban	243	1,344	99	40.7	646	48.1	27	11.1	133	9.9	27	11.1	92	6.8	90	37.0	473	35.2
	Independent urban	68	207	22	32.4	91	44.0	8	11.8	34	16.4	8	11.8	14	6.8	30	44.1	68	32.9
	Rural		141	20	38.5	78	55.3	2	3.8	20	14.2	12	23.1	7	5.0	18	34.6	36	25.5
Colorectal	Main urban	570	19,906	115	20.2	5,221	26.2	225	39.5	8,858	44.5	149	26.1	3,584	18.0	81	14.2	2,243	11.3
	Independent urban	163	4,768	32	19.6	1,298	27.2	59	36.2	2,039	42.8	45	27.6	941	19.7	27	16.6	490	10.3
	Rural		2,853	40	22.2	749	26.3	73	40.6	1,294	45.4	44	24.4	554	19.4	23	12.8	256	9.0
Kidney	Main urban	183	2,573	88	48.1	1,210	47.0	36	19.7	387	15.0	41	22.4	576	22.4	18	9.8	400	15.5
	Independent urban	39	615	15	38.5	288	46.8	6	15.4	88	14.3	12	30.8	142	23.1	6	15.4	97	15.8
	Rural		386	21	48.8	181	46.9	9	20.9	63	16.3	9	20.9	92	23.8	4	9.3	50	13.0
Liver	Main urban	210	1,221	24	11.4	99	8.1	3	1.4	42	3.4	41	19.5	229	18.8	142	67.6	851	69.7
	Independent urban	53	185	8	15.1	10	5.4	1	1.9	2	1.1	10	18.9	42	22.7	34	64.2	131	70.8
	Rural		100	9	13.6	10	10.0	1	1.5	3	3.0	12	18.2	24	24.0	44	66.7	63	63.0
Lung	Main urban	1,419	11,444	54	3.8	694	6.1	112	7.9	991	8.7	555	39.1	4,265	37.3	698	49.2	5,494	48.0
	Independent urban	533	2,677	16	3.0	149	5.6	37	6.9	205	7.7	194	36.4	982	36.7	286	53.7	1,341	50.1
	Rural		1,446	20	4.1	95	6.6	36	7.4	124	8.6	173	35.6	529	36.6	257	52.9	698	48.3
Melanoma	Main urban	137	14,147	106	77.4	12,248	86.6	10	7.3	818	5.8	17	12.4	662	4.7	4	2.9	419	3.0
	Independent urban	34	2,641	25	73.5	2,280	86.3	6	17.6	148	5.6	1	2.9	131	5.0	2	5.9	82	3.1
	Rural		2,155	22	78.6	1,885	87.5	3	10.7	108	5.0	2	7.1	96	4.5	1	3.6	66	3.1

Table 5.19 (continued)

Cancer	Area type	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Oesophagus	Main urban	93	1,705	2	2.2	86	5.0	9	9.7	190	11.1	25	26.9	350	20.5	57	61.3	1,079	63.3
	Independent urban	32	360	0	0.0	21	5.8	6	18.8	34	9.4	7	21.9	75	20.8	19	59.4	230	63.9
	Rural		203	2	5.7	11	5.4	6	17.1	28	13.8	5	14.3	44	21.7	22	62.9	120	59.1
Oral	Main urban	148	2,185	22	14.9	557	25.5	61	41.2	676	30.9	11	7.4	128	5.9	54	36.5	824	37.7
	Independent urban	46	477	6	13.0	176	36.9	23	50.0	119	24.9	4	8.7	19	4.0	13	28.3	163	34.2
	Rural		292	4	11.8	87	29.8	13	38.2	91	31.2	4	11.8	10	3.4	13	38.2	104	35.6
Ovary	Main urban	170	2,220	70	41.2	526	23.7	15	8.8	243	10.9	73	42.9	1,261	56.8	12	7.1	190	8.6
	Independent urban	48	397	20	41.7	96	24.2	2	4.2	40	10.1	20	41.7	237	59.7	6	12.5	24	6.0
	Rural		264	15	30.6	69	26.1	3	6.1	22	8.3	30	61.2	152	57.6	1	2.0	21	8.0
Pancreas	Main urban	164	2,558	2	1.2	63	2.5	17	10.4	227	8.9	85	51.8	1,131	44.2	60	36.6	1,137	44.4
	Independent urban	55	570	1	1.8	9	1.6	2	3.6	53	9.3	28	50.9	236	41.4	24	43.6	272	47.7
	Rural		327	2	3.3	11	3.4	4	6.7	22	6.7	32	53.3	162	49.5	22	36.7	132	40.4
Prostate	Main urban	657	20,390	48	7.3	2,456	12.0	24	3.7	900	4.4	61	9.3	1,150	5.6	524	79.8	15,884	77.9
	Independent urban	255	4,309	18	7.1	435	10.1	9	3.5	175	4.1	30	11.8	291	6.8	198	77.6	3,408	79.1
	Rural		3,149	17	7.5	407	12.9	10	4.4	184	5.8	23	10.2	152	4.8	176	77.9	2,406	76.4
Stomach	Main urban	331	2,752	60	18.1	276	10.0	76	23.0	721	26.2	108	32.6	737	26.8	87	26.3	1,018	37.0
	Independent urban	122	546	12	9.8	63	11.5	37	30.3	138	25.3	42	34.4	160	29.3	31	25.4	185	33.9
	Rural		339	8	7.5	43	12.7	28	26.2	92	27.1	31	29.0	96	28.3	40	37.4	108	31.9
Testis	Main urban	215	956	147	68.4	709	74.2	26	12.1	114	11.9	26	12.1	91	9.5	16	7.4	42	4.4
	Independent urban	49	138	26	53.1	102	73.9	13	26.5	17	12.3	6	12.2	13	9.4	4	8.2	6	4.3
	Rural		132	26	60.5	112	84.8	10	23.3	8	6.1	5	11.6	7	5.3	2	4.7	5	3.8
Thyroid	Main urban	179	1,283	121	67.6	729	56.8	33	18.4	324	25.3	10	5.6	81	6.3	15	8.4	149	11.6
	Independent urban	35	163	22	62.9	93	57.1	7	20.0	34	20.9	6	17.1	13	8.0	0	0.0	23	14.1
	Rural		120	22	62.9	66	55.0	6	17.1	36	30.0	3	8.6	6	5.0	4	11.4	12	10.0
Uterus	Main urban	242	2,385	152	62.8	1,413	59.2	43	17.8	430	18.0	23	9.5	243	10.2	24	9.9	299	12.5
	Independent urban	65	451	38	58.5	279	61.9	9	13.8	87	19.3	7	10.8	37	8.2	11	16.9	48	10.6
	Rural		261	30	50.0	158	60.5	12	20.0	56	21.5	8	13.3	25	9.6	10	16.7	22	8.4

Table 5.20: Independent urban:main urban and rural:main urban odds ratios (ORs) for unknown stage at diagnosis, adjusted for age and sex, among Māori and non-Māori, 1996–2006

Cancer	Independent urban:main urban			Rural:main urban		
	OR	(95% CI)	p value	OR	(95% CI)	p value
Māori						
Bladder	1.90	(0.73–4.99)	0.19	2.40	(0.89–6.50)	0.084
Brain						
Breast: female	1.00	(0.72–1.37)	0.98	1.26	(0.90–1.75)	0.17
Cervix	1.07	(0.61–1.90)	0.81	0.81	(0.43–1.55)	0.53
Colorectal	1.19	(0.74–1.92)	0.47	0.83	(0.50–1.38)	0.48
Kidney	1.59	(0.58–4.38)	0.37	1.00	(0.32–3.16)	1.00
Liver	0.88	(0.46–1.67)	0.70	0.93	(0.51–1.69)	0.81
Lung	1.14	(0.93–1.39)	0.22	1.09	(0.88–1.34)	0.45
Melanoma	2.20	(0.38–12.77)	0.38	1.23	(0.13–11.56)	0.86
Oesophagus	1.14	(0.48–2.70)	0.77	1.36	(0.58–3.16)	0.48
Oral	0.68	(0.33–1.42)	0.30	1.12	(0.52–2.44)	0.77
Ovary	1.72	(0.60–4.90)	0.31	0.25	(0.03–1.96)	0.19
Pancreas	1.19	(0.63–2.25)	0.59	0.85	(0.45–1.60)	0.62
Prostate	0.82	(0.58–1.17)	0.28	0.86	(0.59–1.24)	0.41
Stomach	0.86	(0.53–1.40)	0.53	**1.61**	**(1.00–2.59)**	**0.048**
Thyroid						
Uterus	1.89	(0.87–4.12)	0.11	1.58	(0.70–3.58)	0.28
Non-Māori						
Bladder	1.03	(0.84–1.27)	0.77	0.91	(0.71–1.16)	0.45
Brain	0.91	(0.57–1.46)	0.70	1.09	(0.65–1.85)	0.74
Breast: female	0.95	(0.85–1.05)	0.31	0.97	(0.85–1.11)	0.64
Cervix	0.81	(0.58–1.14)	0.22	0.71	(0.46–1.08)	0.11
Colorectal	0.90	(0.81–1.00)	0.050	**0.86**	**(0.75–0.99)**	**0.038**
Kidney	0.96	(0.75–1.24)	0.78	0.97	(0.70–1.35)	0.86
Liver	0.95	(0.68–1.35)	0.79	0.66	(0.43–1.02)	0.062
Lung	1.08	(0.99–1.18)	0.082	1.11	(1.00–1.25)	0.058
Melanoma	1.02	(0.80–1.30)	0.88	1.08	(0.83–1.40)	0.58
Oesophagus	1.00	(0.77–1.28)	0.97	0.96	(0.70–1.32)	0.80
Oral	0.83	(0.67–1.03)	0.085	0.92	(0.72–1.19)	0.54
Ovary	0.66	(0.42–1.02)	0.061	1.05	(0.65–1.69)	0.83
Pancreas	1.16	(0.96–1.41)	0.12	1.03	(0.80–1.31)	0.84
Prostate	0.99	(0.91–1.08)	0.83	0.97	(0.89–1.07)	0.57
Stomach	0.85	(0.69–1.03)	0.10	0.86	(0.67–1.11)	0.25
Thyroid	1.05	(0.65–1.70)	0.85	0.80	(0.43–1.49)	0.48
Uterus	**0.71**	**(0.51–0.99)**	**0.045**	0.71	(0.45–1.13)	0.15

(1) Odds ratios in **bold** are statistically significant at the 5% level.

(2) Odds ratios in grey should be interpreted with caution due to the small number of registrations. Where odds ratios are missing, the data was excluded due to insufficient numbers.

Table 5.21: Independent urban:main urban and rural:main urban odds ratios (ORs) for localised stage at diagnosis, adjusted for age and sex, among Māori and non-Māori, 1996–2006

Cancer	Independent urban:main urban			Rural:main urban		
	OR	(95% CI)	p value	OR	(95% CI)	p value
Māori						
Bladder						
Brain						
Breast: female	1.03	(0.83–1.29)	0.79	0.88	(0.69–1.13)	0.33
Cervix	0.99	(0.53–1.83)	0.97	1.07	(0.56–2.06)	0.83
Colorectal	0.96	(0.62–1.49)	0.87	1.12	(0.74–1.68)	0.60
Kidney	0.68	(0.33–1.39)	0.29	1.01	(0.52–1.97)	0.98
Liver	1.29	(0.53–3.12)	0.57	1.25	(0.55–2.88)	0.60
Lung	0.79	(0.45–1.39)	0.41	1.09	(0.65–1.85)	0.74
Melanoma	0.89	(0.35–2.29)	0.82	0.99	(0.35–2.81)	0.98
Oesophagus						
Oral	0.72	(0.26–1.98)	0.53	0.70	(0.21–2.31)	0.56
Ovary	1.23	(0.62–2.43)	0.55	0.71	(0.35–1.44)	0.34
Pancreas						
Prostate	1.16	(0.65–2.06)	0.62	1.16	(0.65–2.09)	0.62
Stomach	0.51	(0.27–1.00)	0.050	**0.37**	**(0.17–0.81)**	**0.012**
Testis	**0.49**	**(0.26–0.93)**	**0.030**	0.71	(0.36–1.39)	0.31
Thyroid	0.99	(0.44–2.21)	0.98	0.98	(0.44–2.17)	0.96
Uterus	0.81	(0.46–1.43)	0.47	0.64	(0.36–1.15)	0.14
Non-Māori						
Bladder	1.06	(0.75–1.50)	0.73	1.14	(0.77–1.71)	0.51
Brain	1.18	(0.75–1.86)	0.48	0.77	(0.49–1.23)	0.27
Breast: female	1.01	(0.94–1.09)	0.80	**1.10**	**(1.01–1.20)**	**0.034**
Cervix	0.93	(0.67–1.29)	0.65	1.20	(0.81–1.76)	0.36
Colorectal	1.05	(0.98–1.13)	0.17	0.99	(0.91–1.09)	0.91
Kidney	1.04	(0.87–1.25)	0.64	0.92	(0.74–1.14)	0.44
Liver	0.75	(0.38–1.47)	0.40	1.42	(0.71–2.84)	0.32
Lung	0.94	(0.78–1.12)	0.48	1.02	(0.81–1.27)	0.87
Melanoma	1.03	(0.91–1.17)	0.61	1.02	(0.89–1.17)	0.77
Oesophagus	1.21	(0.73–1.98)	0.46	0.99	(0.52–1.90)	0.98
Oral	**1.76**	**(1.43–2.17)**	**<0.0001**	1.26	(0.96–1.65)	0.094
Ovary	1.16	(0.89–1.50)	0.28	1.01	(0.75–1.37)	0.94
Pancreas	0.65	(0.32–1.31)	0.23	1.22	(0.63–2.35)	0.56
Prostate	0.96	(0.86–1.08)	0.51	0.99	(0.88–1.11)	0.84
Stomach	1.18	(0.88–1.58)	0.26	1.28	(0.91–1.81)	0.15
Testis	0.99	(0.66–1.49)	0.96	**1.95**	**(1.19–3.22)**	**0.008**
Thyroid	1.13	(0.81–1.58)	0.48	1.02	(0.69–1.49)	0.94
Uterus	1.20	(0.97–1.48)	0.093	1.02	(0.78–1.32)	0.90

(1) Odds ratios in **bold** are statistically significant at the 5% level.

(2) Odds ratios in grey should be interpreted with caution due to the small number of registrations. Where odds ratios are missing, the data was excluded due to insufficient numbers.

Table 5.22: Independent urban:main urban and rural:main urban odds ratios (ORs) for distant stage at diagnosis, adjusted for age and sex, among Māori and non-Māori, 1996–2006

Cancer	Independent urban:main urban			Rural:main urban		
	OR	(95% CI)	p value	OR	(95% CI)	p value
Māori						
Bladder	0.60	(0.16–2.28)	0.45	0.83	(0.25–2.76)	0.76
Brain						
Breast: female	1.20	(0.75–1.93)	0.45	**0.43**	**(0.20–0.95)**	**0.038**
Cervix	0.76	(0.31–1.85)	0.55	**2.21**	**(1.02–4.82)**	**0.045**
Colorectal	1.07	(0.73–1.59)	0.72	0.92	(0.62–1.36)	0.67
Kidney	1.58	(0.73–3.40)	0.25	0.92	(0.41–2.09)	0.84
Liver	0.94	(0.44–2.04)	0.88	0.94	(0.46–1.92)	0.86
Lung	0.92	(0.75–1.14)	0.45	0.90	(0.72–1.11)	0.32
Melanoma	0.17	(0.02–1.45)	0.11	0.62	(0.13–3.06)	0.56
Oesophagus	0.65	(0.24–1.75)	0.40	0.39	(0.13–1.14)	0.086
Oral						
Ovary	0.83	(0.42–1.62)	0.58	1.95	(1.00–3.82)	0.051
Pancreas	0.99	(0.54–1.83)	0.98	1.11	(0.61–2.02)	0.74
Prostate	1.25	(0.78–1.99)	0.35	1.08	(0.65–1.79)	0.77
Stomach	1.16	(0.75–1.82)	0.50	0.86	(0.53–1.40)	0.55
Testis	1.07	(0.41–2.78)	0.89	0.97	(0.35–2.69)	0.95
Thyroid						
Uterus	1.17	(0.48–2.86)	0.74	1.36	(0.57–3.27)	0.49
Non-Māori						
Bladder	1.04	(0.73–1.48)	0.83	1.09	(0.70–1.70)	0.70
Brain						
Breast: female	0.88	(0.72–1.08)	0.21	1.01	(0.80–1.28)	0.92
Cervix	0.95	(0.53–1.71)	0.87	0.80	(0.36–1.77)	0.58
Colorectal	**1.13**	**(1.04–1.22)**	**0.004**	1.07	(0.97–1.18)	0.20
Kidney	1.03	(0.83–1.27)	0.80	1.12	(0.87–1.45)	0.37
Liver	1.34	(0.92–1.95)	0.13	1.50	(0.92–2.43)	0.10
Lung	0.98	(0.90–1.07)	0.69	0.93	(0.83–1.04)	0.19
Melanoma	1.02	(0.84–1.24)	0.84	0.99	(0.79–1.23)	0.90
Oesophagus	1.04	(0.78–1.39)	0.79	0.98	(0.68–1.41)	0.92
Oral	0.66	(0.40–1.08)	0.096	0.56	(0.29–1.07)	0.079
Ovary	1.07	(0.86–1.34)	0.55	1.13	(0.87–1.48)	0.35
Pancreas	0.89	(0.74–1.07)	0.21	1.12	(0.89–1.42)	0.33
Prostate	1.13	(0.98–1.29)	0.085	0.94	(0.79–1.12)	0.50
Stomach	1.16	(0.95–1.43)	0.15	1.05	(0.81–1.35)	0.73
Testis	1.00	(0.54–1.84)	0.99	0.54	(0.24–1.18)	0.12
Thyroid	1.00	(0.53–1.86)	0.99	0.69	(0.29–1.63)	0.40
Uterus	0.78	(0.54–1.12)	0.18	0.94	(0.61–1.45)	0.78

(1) Odds ratios in **bold** are statistically significant at the 5% level.

(2) Odds ratios in grey should be interpreted with caution due to the small number of registrations. Where odds ratios are missing, the data was excluded due to insufficient numbers.

Table 5.23: Māori: non-Māori odds ratios (ORs) for unknown stage at diagnosis, cancer registrations, adjusted for age, sex and rural–urban status, 1996–2006

Cancer	Adjusted for age and sex			Adjusted for age, sex, and rurality		
	OR	(95% CI)	p value	OR	(95% CI)	p value
Bladder	**0.49**	**(0.34–0.70)**	**<0.0001**	**0.49**	**(0.34–0.70)**	**0.0001**
Brain	1.43	(0.78–2.61)	0.24	1.45	(0.79–2.66)	0.23
Breast: female	**1.30**	**(1.15–1.49)**	**<0.0001**	**1.31**	**(1.15–1.49)**	**<0.0001**
Cervix	**1.62**	**(1.26–2.09)**	**0.0002**	**1.68**	**(1.30–2.16)**	**<0.0001**
Colorectal	**1.85**	**(1.52–2.24)**	**<0.0001**	**1.87**	**(1.54–2.27)**	**<0.0001**
Kidney	1.27	(0.83–1.95)	0.26	1.28	(0.84–1.95)	0.26
Liver	1.03	(0.79–1.35)	0.81	1.08	(0.82–1.41)	0.59
Lung	**1.51**	**(1.38–1.65)**	**<0.0001**	**1.49**	**(1.36–1.63)**	**<0.0001**
Melanoma	1.31	(0.61–2.80)	0.49	1.30	(0.61–2.79)	0.49
Oesophagus	**1.48**	**(1.04–2.11)**	**0.030**	**1.48**	**(1.04–2.11)**	**0.031**
Oral	1.05	(0.79–1.40)	0.75	1.06	(0.80–1.42)	0.68
Ovary	1.27	(0.77–2.11)	0.34	1.30	(0.79–2.16)	0.30
Pancreas	1.17	(0.90–1.53)	0.25	1.17	(0.89–1.53)	0.26
Prostate	**1.18**	**(1.02–1.37)**	**0.026**	**1.19**	**(1.02–1.38)**	**0.023**
Stomach	**1.25**	**(1.00–1.55)**	**0.046**	**1.27**	**(1.02–1.58)**	**0.032**
Testis	1.65	(0.97–2.79)	0.063	1.66	(0.98–2.81)	0.061
Thyroid	0.70	(0.42–1.15)	0.16	0.71	(0.43–1.17)	0.17
Uterus	**1.59**	**(1.13–2.25)**	**0.009**	**1.64**	**(1.16–2.32)**	**0.006**

(1) Odds ratios in **bold** are statistically significant at the 5% level.

Table 5.24: Māori: non-Māori odds ratios (ORs) for localised stage at diagnosis, cancer registrations, adjusted for age, sex and rural–urban status, 1996–2006

Cancer	Adjusted for age and sex			Adjusted for age, sex, and rurality		
	OR	(95% CI)	p value	OR	(95% CI)	p value
Bladder	0.58	(0.29–1.19)	0.14	0.58	(0.29–1.19)	0.14
Brain	0.41	(0.16–1.07)	0.070	0.46	(0.17–1.19)	0.11
Breast: female	**0.74**	**(0.68–0.82)**	**<0.0001**	**0.74**	**(0.67–0.82)**	**<0.0001**
Cervix uteri	**0.52**	**(0.37–0.71)**	**<0.0001**	**0.53**	**(0.38–0.73)**	**0.0001**
Colorectal	**0.77**	**(0.65–0.91)**	**0.003**	**0.77**	**(0.65–0.91)**	**0.003**
Kidney	**0.76**	**(0.58–0.99)**	**0.042**	**0.76**	**(0.58–0.99)**	**0.046**
Liver	1.51	(0.96–2.37)	0.073	1.52	(0.96–2.40)	0.076
Lung	**0.55**	**(0.44–0.69)**	**<0.0001**	**0.54**	**(0.43–0.69)**	**<0.0001**
Melanoma	**0.35**	**(0.24–0.50)**	**<0.0001**	**0.35**	**(0.24–0.50)**	**<0.0001**
Oesophagus	0.40	(0.14–1.12)	0.080	0.39	(0.14–1.10)	0.076
Oral	**0.34**	**(0.23–0.52)**	**<0.0001**	**0.32**	**(0.21–0.49)**	**<0.0001**
Ovary	1.25	(0.94–1.66)	0.13	1.25	(0.93–1.66)	0.13
Pancreas	0.49	(0.19–1.25)	0.14	0.48	(0.19–1.22)	0.12
Prostate	**0.38**	**(0.29–0.51)**	**<0.0001**	**0.39**	**(0.29–0.52)**	**<0.0001**
Stomach	**1.35**	**(1.02–1.80)**	**0.038**	**1.36**	**(1.02–1.82)**	**0.035**
Testis	**0.64**	**(0.48–0.86)**	**0.003**	**0.64**	**(0.47–0.86)**	**0.003**
Thyroid	**1.38**	**(1.01–1.88)**	**0.044**	**1.37**	**(1.01–1.88)**	**0.046**

(1) Odds ratios in **bold** are statistically significant at the 5% level.

(2) Ratios in grey should be interpreted with caution due to the small number of registrations.

Table 5.25: Māori/non-Māori odds ratios (ORs) for distant stage at diagnosis, cancer registrations, adjusted for age, sex and rural–urban status, 1996–2006

Cancer	Adjusted for age and sex			Adjusted for age, sex, and rurality		
	OR	(95% CI)	p value	OR	(95% CI)	p value
Bladder	**2.79**	**(1.47–5.28)**	**0.002**	**2.78**	**(1.47–5.28)**	**0.002**
Brain	2.86	(1.01–8.15)	0.049			
Breast: female	**1.50**	**(1.21–1.86)**	**0.0002**	**1.52**	**(1.23–1.88)**	**0.0001**
Cervix	**3.35**	**(2.20–5.11)**	**<0.0001**	**3.36**	**(2.20–5.13)**	**<0.0001**
Colorectal	**1.59**	**(1.36–1.86)**	**<0.0001**	**1.58**	**(1.35–1.85)**	**<0.0001**
Kidney	1.22	(0.90–1.66)	0.20	1.22	(0.89–1.66)	0.21
Liver	0.94	(0.60–1.45)	0.77	0.90	(0.58–1.41)	0.66
Lung	**1.51**	**(1.30–1.75)**	**<0.0001**	**1.51**	**(1.30–1.75)**	**<0.0001**
Melanoma	**2.93**	**(1.83–4.70)**	**<0.0001**	**2.93**	**(1.83–4.71)**	**<0.0001**
Oesophagus	1.29	(0.75–2.19)	0.36	1.31	(0.77–2.24)	0.32
Oral	**1.68**	**(1.00–2.81)**	**0.050**	**1.74**	**(1.04–2.93)**	**0.036**
Ovary	0.95	(0.72–1.25)	0.71	0.93	(0.71–1.23)	0.63
Pancreas	**1.67**	**(1.08–2.57)**	**0.020**	**1.63**	**(1.06–2.52)**	**0.027**
Prostate	**4.64**	**(3.42–6.30)**	**<0.0001**	**4.63**	**(3.40–6.29)**	**<0.0001**
Stomach	1.08	(0.86–1.35)	0.50	1.07	(0.85–1.35)	0.54
Testis	1.36	(0.91–2.04)	0.13	1.39	(0.92–2.08)	0.12
Thyroid	1.41	(0.83–2.40)	0.20	1.41	(0.83–2.40)	0.21
Uterus	1.18	(0.82–1.70)	0.38	1.19	(0.82–1.71)	0.36

(1) Ratios in **bold** are statistically significant at the 5% level.

(2) Ratios in grey should be interpreted with caution due to the small number of registrations. Where odds ratios are missing, the data was excluded due to insufficient numbers.

SURVIVAL DISPARITIES BY RURAL–URBAN STATUS 1996–2006

Key Findings

- Few significant differences in survival between rural and main urban Māori residents were found, although rural Māori had poorer survival from prostate and uterine cancers (i.e. a higher risk of dying from the cancer after diagnosis).
- Rural non-Māori had significantly lower survival from colorectal, liver, lung and prostate cancers and better survival from leukaemia than their main urban counterparts.
- Similarly, few significant differences in survival were found between Māori living in independent urban communities and main urban residents. Māori residents of independent urban communities had better survival from non-Hodgkin's lymphoma and poorer survival from stomach cancer than Māori in main urban areas.
- Among non-Māori, independent urban residents had poorer survival than main urban residents from bladder, colorectal, liver, lung and prostate cancers.
- Māori:non-Māori disparities in survival from the leading cancers (lung, breast, colorectal, prostate) were generally significant in each area type – possibly wider in rural areas for colorectal and prostate cancers.
- Rural–urban status accounted for a very small proportion of the survival differences between Māori and non-Māori for some cancers. However, the higher proportion of Māori living in more deprived areas was a more important factor. Later stage at diagnosis was the strongest determinant of survival differences between Māori and non-Māori.
- Survival disparities between Māori and non-Māori remained significant for most cancers, after adjusting for age, sex, rural–urban status, deprivation, and stage at diagnosis.

This chapter analyses survival disparities over an 11-year period, from January 1996 to December 2006. The following tables include cancer-specific mortality hazard ratios adjusted for age and sex. Some tables also adjust for rural–urban category, deprivation, and stage at diagnosis. The hazard ratios indicate the relative risk of dying from the cancer after diagnosis, with a hazard ratio greater than 1 indicating a higher risk of death from the cancer, and below 1 indicating a lower risk of death.

Table 5.26 compares the risk of death among cancer patients living in independent urban areas with the risk of those living in main urban areas. Hazard ratios are also presented for rural areas compared to main urban areas. Māori and non-Māori hazard ratios were calculated separately.

The hazard ratios in Table 5.27 estimate the relative risk of death among Māori compared to non-Māori patients within each rural–urban category. Table 5.28 shows Māori:non-Māori hazard ratios also adjusted for rural–urban status and for stage at diagnosis. Table 5.29 examines the contribution of deprivation in addition to rural–urban status and then adds stage at diagnosis. The differences between the hazard ratios provide an estimate of the contribution of the additional factor (rural–urban status, stage at diagnosis, or deprivation) to the survival differences between Māori and non-Māori.

Table 5.26: Independent urban:main urban and rural:main urban cancer-specific mortality hazard ratios (HRs) for Māori and non-Māori, adjusted for age and sex, 1996–2006

Cancer	Independent urban:main urban			Rural:main urban		
	HR	(95% CI)	p value	HR	(95% CI)	p value
Māori						
Bladder	1.17	(0.60–2.27)	0.65	0.89	(0.45–1.77)	0.74
Brain	1.15	(0.71–1.85)	0.58	1.06	(0.64–1.76)	0.82
Breast: female	0.91	(0.70–1.18)	0.49	0.91	(0.69–1.21)	0.51
Cervix	0.89	(0.55–1.42)	0.62	1.39	(0.88–2.21)	0.16
Colorectal	1.15	(0.86–1.52)	0.35	1.19	(0.92–1.55)	0.19
Kidney	1.32	(0.76–2.31)	0.32	0.94	(0.54–1.66)	0.84
Leukaemias	0.89	(0.57–1.38)	0.60	1.05	(0.68–1.63)	0.81
Liver	1.20	(0.84–1.70)	0.31	1.24	(0.88–1.74)	0.22
Lung	1.03	(0.92–1.15)	0.59	1.05	(0.94–1.18)	0.37
Melanoma						
Non-Hodgkin's lymphoma	**0.62**	**(0.40–0.94)**	**0.026**	0.79	(0.51–1.21)	0.27
Oesophagus	1.08	(0.66–1.76)	0.76	0.85	(0.54–1.35)	0.50
Oral	1.27	(0.75–2.17)	0.37	0.98	(0.52–1.85)	0.95
Ovary	0.95	(0.56–1.61)	0.84	1.15	(0.72–1.83)	0.56
Pancreas	1.06	(0.75–1.49)	0.76	0.92	(0.66–1.30)	0.64
Prostate	1.33	(0.96–1.84)	0.085	**1.68**	**(1.23–2.28)**	**0.001**
Stomach	**1.35**	**(1.05–1.73)**	**0.017**	1.21	(0.93–1.58)	0.15
Thyroid						
Uterus	1.14	(0.63–2.04)	0.67	**1.76**	**(1.05–2.95)**	**0.032**
Non-Māori						
Bladder	**1.18**	**(1.03–1.36)**	**0.017**	1.02	(0.84–1.23)	0.87
Brain	0.95	(0.84–1.08)	0.42	1.04	(0.89–1.21)	0.61
Breast	1.04	(0.95–1.15)	0.40	1.05	(0.94–1.18)	0.37
Cervix	1.24	(0.92–1.66)	0.16	0.85	(0.56–1.31)	0.47
Colorectal	**1.10**	**(1.04–1.16)**	**0.0004**	**1.08**	**(1.01–1.15)**	**0.027**
Kidney	1.02	(0.88–1.18)	0.84	1.19	(0.99–1.42)	0.058
Leukaemias	0.93	(0.83–1.04)	0.22	**0.83**	**(0.71–0.96)**	**0.015**
Liver	**1.20**	**(1.01–1.43)**	**0.043**	**1.35**	**(1.07–1.70)**	**0.011**
Lung	**1.09**	**(1.04–1.14)**	**0.0005**	**1.08**	**(1.02–1.15)**	**0.010**
Melanoma	1.07	(0.94–1.23)	0.32	1.02	(0.88–1.19)	0.79
Non-Hodgkin's lymphoma	0.93	(0.83–1.05)	0.25	0.97	(0.84–1.12)	0.70
Oesophagus	1.11	(0.98–1.27)	0.11	0.99	(0.83–1.18)	0.94
Oral	0.92	(0.76–1.10)	0.35	0.83	(0.66–1.06)	0.14
Ovary	0.94	(0.81–1.10)	0.45	1.02	(0.84–1.22)	0.87
Pancreas	1.08	(0.98–1.19)	0.10	0.99	(0.88–1.13)	0.93
Prostate	**1.11**	**(1.02–1.20)**	**0.018**	**1.14**	**(1.04–1.26)**	**0.008**
Stomach	1.09	(0.98–1.22)	0.13	1.04	(0.91–1.20)	0.54
Thyroid	1.32	(0.84–2.06)	0.22	0.86	(0.45–1.65)	0.65
Uterus	1.15	(0.93–1.43)	0.19	0.91	(0.67–1.24)	0.54

(1) Hazard ratios in **bold** are statistically significant at the 5% level (see Appendix 1 for further explanation).

(2) Hazard ratios in grey should be interpreted with caution due to the small number of deaths. Where hazard ratios are missing, the data was excluded due to insufficient numbers.

Table 5.27: Māori:non-Māori hazard ratios (HRs) by rural–urban area, adjusted for age and sex, 1996–2006

Cancer	Main urban			Independent urban			Rural		
	HR	(95% CI)	p value	HR	(95% CI)	p value	HR	(95% CI)	p value
Bladder	**2.32**	**(1.65–3.27)**	**<0.0001**	**2.34**	**(1.30–4.22)**	**0.005**	**2.00**	**(1.07–3.76)**	**0.031**
Brain	1.18	(0.90–1.54)	0.22	1.43	(0.94–2.16)	0.094	1.30	(0.83–2.05)	0.25
Breast	**1.52**	**(1.34–1.72)**	**<0.0001**	**1.29**	**(1.00–1.67)**	**0.046**	1.26	(0.95–1.66)	0.10
Cervix	**2.27**	**(1.75–2.95)**	**<0.0001**	1.49	(0.91–2.43)	0.11	3.88	(2.15–7.00)	<0.0001
Colorectal	**1.30**	**(1.13–1.50)**	**0.0002**	**1.39**	**(1.07–1.79)**	**0.012**	**1.49**	**(1.18–1.88)**	**0.0007**
Kidney	**1.44**	**(1.11–1.87)**	**0.006**	1.54	(0.92–2.60)	0.10	1.04	(0.60–1.78)	0.90
Leukaemias	1.10	(0.88–1.37)	0.39	1.07	(0.71–1.63)	0.74	1.32	(0.87–2.00)	0.19
Liver	**1.24**	**(1.03–1.49)**	**0.025**	1.06	(0.73–1.55)	0.75	0.85	(0.58–1.26)	0.43
Lung	**1.24**	**(1.17–1.33)**	**<0.0001**	**1.18**	**(1.06–1.31)**	**0.003**	**1.20**	**(1.07–1.35)**	**0.002**
Melanoma	**2.21**	**(1.41–3.49)**	**0.0006**	2.21	(0.90–5.38)	0.082	**2.84**	**(1.16–6.96)**	**0.023**
Non-Hodgkin's lymphoma	**1.75**	**(1.44–2.14)**	**<0.0001**	1.27	(0.85–1.90)	0.24	1.50	(0.99–2.25)	0.054
Oesophagus	**1.51**	**(1.19–1.92)**	**0.0008**	1.33	(0.84–2.08)	0.22	1.44	(0.93–2.22)	0.10
Oral	**1.64**	**(1.24–2.18)**	**0.0006**	**2.30**	**(1.40–3.78)**	**0.001**	1.74	(0.93–3.24)	0.082
Ovary	1.12	(0.87–1.46)	0.37	1.20	(0.72–1.99)	0.48	1.36	(0.87–2.11)	0.17
Pancreas	1.10	(0.92–1.31)	0.30	1.08	(0.79–1.47)	0.65	1.02	(0.75–1.39)	0.91
Prostate	**1.74**	**(1.43–2.10)**	**<0.0001**	**1.99**	**(1.51–2.62)**	**<0.0001**	**2.51**	**(1.93–3.25)**	**<0.0001**
Stomach	**1.17**	**(1.01–1.35)**	**0.039**	1.25	(0.98–1.60)	0.078	1.26	(0.95–1.67)	0.11
Thyroid	1.70	(1.00–2.88)	0.051						
Uterus	**1.48**	**(1.08–2.02)**	**0.014**	1.80	(0.98–3.30)	0.059	**2.63**	**(1.57–4.42)**	**0.0003**

(1) Hazard ratios in **bold** are statistically significant at the 5% level (see Appendix 1 for further explanation).

(2) Hazard ratios in grey should be interpreted with caution due to the small number of deaths. Where hazard ratios are missing, the data was excluded due to insufficient numbers.

Table 5.28: Māori:non-Māori cancer-specific mortality hazard ratios (HRs), adjusted for sex and age at diagnosis, rurality, and stage at diagnosis (including unknown), 1996–2006

Cancer	Adjusted for age and sex		Adjusted for age, sex, and rurality		Adjusted for age, sex, rurality, and stage at diagnosis	
	HR (95% CI)	p value	HR (95% CI)	p value	HR (95% CI)	p value
Bladder	**2.25 (1.72–2.93)**	**<0.0001**	**2.24 (1.71–2.92)**	**<0.0001**	**1.78 (1.36–2.32)**	**<0.0001**
Brain	**1.24 (1.02–1.51)**	**0.033**	**1.24 (1.02–1.51)**	**0.033**	1.22 (1.00–1.49)	0.053
Breast	**1.44 (1.30–1.60)**	**<0.0001**	**1.44 (1.29–1.59)**	**<0.0001**	**1.31 (1.18–1.46)**	**<0.0001**
Cervix	**2.25 (1.83–2.77)**	**<0.0001**	**2.23 (1.80–2.75)**	**<0.0001**	**1.86 (1.50–2.31)**	**<0.0001**
Colorectal	**1.37 (1.23–1.53)**	**<0.0001**	**1.36 (1.22–1.52)**	**<0.0001**	**1.21 (1.09–1.35)**	**0.0005**
Kidney	**1.42 (1.15–1.76)**	**0.001**	**1.41 (1.14–1.74)**	**0.002**	**1.25 (1.01–1.54)**	**0.043**
Leukaemias	1.11 (0.93–1.32)	0.23	1.13 (0.95–1.34)	0.17	n/a	
Liver	**1.23 (1.06–1.42)**	**0.006**	1.16 (1.00–1.35)	0.050	**1.25 (1.07–1.46)**	**0.004**
Lung	**1.24 (1.18–1.30)**	**<0.0001**	**1.22 (1.16–1.28)**	**<0.0001**	**1.17 (1.11–1.23)**	**<0.0001**
Melanoma	**2.32 (1.60–3.35)**	**<0.0001**	**2.31 (1.60–3.34)**	**<0.0001**	**1.49 (1.03–2.16)**	**0.033**
Non-Hodgkin's lymphoma	**1.60 (1.36–1.88)**	**<0.0001**	**1.62 (1.37–1.90)**	**<0.0001**	n/a	
Oesophagus	**1.44 (1.19–1.73)**	**0.0002**	**1.44 (1.19–1.73)**	**0.0002**	**1.39 (1.15–1.68)**	**0.0006**
Oral	**1.75 (1.40–2.20)**	**<0.0001**	**1.77 (1.41–2.23)**	**<0.0001**	**1.52 (1.21–1.91)**	**0.0004**
Ovary	1.18 (0.96–1.45)	0.11	1.18 (0.96–1.45)	0.11	**1.44 (1.18–1.77)**	**0.0004**
Pancreas	1.09 (0.95–1.25)	0.22	1.09 (0.95–1.25)	0.23	1.09 (0.95–1.25)	0.24
Prostate	**2.04 (1.78–2.33)**	**<0.0001**	**1.99 (1.74–2.27)**	**<0.0001**	**1.72 (1.50–1.96)**	**<0.0001**
Stomach	**1.23 (1.09–1.37)**	**0.0004**	**1.21 (1.08–1.35)**	**0.001**	**1.29 (1.15–1.45)**	**<0.0001**
Thyroid	**1.56 (1.01–2.41)**	**0.047**	1.54 (0.99–2.39)	0.055	1.20 (0.76–1.88)	0.43
Uterus	**1.68 (1.32–2.12)**	**<0.0001**	**1.66 (1.31–2.11)**	**<0.0001**	**1.75 (1.38–2.22)**	**<0.0001**

(1) Hazard ratios in **bold** are significant at the 5% level (see Appendix 1 for further explanation).

(2) Note that cervical cancer hazard ratios decreased over the period of this analysis and are currently lower than the 11-year hazard ratio shown.

(3) Hazard ratios in grey should be interpreted with caution due to the small number of deaths.

Table 5.29: Māori:non-Māori cancer-specific mortality hazard ratios (HRs), adjusted for sex and age at diagnosis, rurality, area deprivation, and stage at diagnosis (including unknown), 1996–2006

Cancer	Adjusted for age, sex, rurality			Adjusted for age, sex, rurality and area deprivation			Adjusted for age, sex, rurality, deprivation and stage at diagnosis		
	HR	(95% CI)	p value	HR	(95% CI)	p value	HR	(95% CI)	p value
Bladder	**2.24**	**(1.71–2.92)**	**<0.0001**	**2.10**	**(1.61–2.76)**	**<0.0001**	**1.69**	**(1.29–2.21)**	**0.0002**
Brain	**1.44**	**(1.29–1.59)**	**<0.0001**	**1.23**	**(1.01–1.51)**	**0.042**	1.21	(0.99–1.48)	0.065
Breast: female	**2.23**	**(1.80–2.75)**	**<0.0001**	**1.33**	**(1.20–1.48)**	**<0.0001**	**1.25**	**(1.12–1.39)**	**<0.0001**
Cervix	**1.36**	**(1.22–1.52)**	**<0.0001**	**2.10**	**(1.69–2.62)**	**<0.0001**	**1.85**	**(1.48–2.32)**	**<0.0001**
Colorectal	**1.41**	**(1.14–1.74)**	**0.002**	**1.32**	**(1.19–1.48)**	**<0.0001**	**1.17**	**(1.05–1.31)**	**0.004**
Kidney	1.13	(0.95–1.34)	0.17	**1.32**	**(1.06–1.65)**	**0.012**	1.19	(0.96–1.47)	0.12
Leukaemias	**1.16**	**(1.00–1.35)**	**0.050**	1.11	(0.93–1.33)	0.24		n/a	
Liver	**1.22**	**(1.16–1.28)**	**<0.0001**	1.16	(0.99–1.36)	0.068	**1.24**	**(1.06–1.45)**	**0.008**
Lung	**2.31**	**(1.60–3.34)**	**<0.0001**	**1.19**	**(1.13–1.25)**	**<0.0001**	**1.14**	**(1.08–1.19)**	**<0.0001**
Melanoma	**1.62**	**(1.37–1.90)**	**<0.0001**	**2.19**	**(1.52–3.17)**	**<0.0001**	1.41	(0.97–2.04)	0.069
Non-Hodgkin's lymphoma	**1.44**	**(1.19–1.73)**	**0.0002**	**1.58**	**(1.33–1.86)**	**<0.0001**		n/a	
Oesophagus	**1.77**	**(1.41–2.23)**	**<0.0001**	**1.42**	**(1.17–1.72)**	**0.0003**	**1.36**	**(1.12–1.65)**	**0.002**
Oral	1.18	(0.96–1.45)	0.11	**1.67**	**(1.32–2.10)**	**<0.0001**	**1.43**	**(1.14–1.81)**	**0.002**
Ovary	1.09	(0.95–1.25)	0.23	1.16	(0.94–1.42)	0.16	**1.40**	**(1.14–1.72)**	**0.002**
Pancreas	**1.99**	**(1.74–2.27)**	**<0.0001**	1.05	(0.91–1.21)	0.48	1.06	(0.92–1.22)	0.42
Prostate	**1.21**	**(1.08–1.35)**	**0.001**	**1.82**	**(1.58–2.08)**	**<0.0001**	**1.63**	**(1.42–1.87)**	**<0.0001**
Stomach	**2.74**	**(1.58–4.76)**	**0.0003**	**1.18**	**(1.05–1.33)**	**0.005**	**1.26**	**(1.12–1.42)**	**<0.0001**
Testis	1.54	(0.99–2.39)	0.055	2.45	(1.37–4.37)	0.002	2.40	(1.32–4.36)	0.004
Thyroid	**1.66**	**(1.31–2.11)**	**<0.0001**	1.50	(0.95–2.37)	0.079	1.33	(0.84–2.13)	0.23
Uterus	**2.24**	**(1.71–2.92)**	**<0.0001**	**1.52**	**(1.19–1.95)**	**0.0009**	**1.64**	**(1.28–2.09)**	**<0.0001**

(1) Hazard ratios in **bold** are significant at the 5% level (see Appendix 1 for further explanation).

(2) Hazard ratios in grey should be interpreted with caution due to small number of deaths.

RURAL–URBAN STATUS AND CANCER: SUMMARY OF FINDINGS

- Among people registered with cancer between 2002 and 2006, the majority of both Māori and non-Māori were living in main urban areas at the time of registration. Māori were more likely than non-Māori to be living in small towns (20% compared to 15%), and in rural areas (16% compared to 10%).
- Rural residents are less likely to develop cancer than those living in main urban areas, but have poorer survival chances once diagnosed.
- Among Māori, small town residents have the highest risk of being diagnosed with cancer and the highest mortality rates. Among non-Māori, small town residents had lower survival chances than main urban residents.
- There is no clear evidence of systematic differences in stage at diagnosis between main urban and other residents.
- The contribution of rural–urban status to Māori:non-Māori disparities in cancer outcomes is unclear, although it does account for a small proportion of survival disparities.
- Survival disparities between Māori and non-Māori persist after taking into account age at diagnosis, stage at diagnosis, deprivation, and rural–urban status.

APPENDICES

APPENDIX 1: METHODS

Data sources

Numerators

Deaths and cancer registrations registered between 1 January 1996 and 31 December 2006 were obtained from the Ministry of Health. Cancer site was classified according to the Tenth Revision of the International Classifications of Diseases, Australian Modification (ICD-10-AM).[4] For the years 1996–1999, cause of death was coded according to the International Classifications of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) classification. Beginning with deaths in 2000, ICD-10-AM was used. We recoded all deaths into the ICD-10-AM classification groupings. ICD codes used are listed in Table A1.1.

Table A1.1: ICD codes

Cancer	ICD-10-AM	ICD-9-CM
Malignant neoplasms	C00–C97	140–208, 238.6, 273.3
Oesophagus[5]	C15	150 excluding 150.8
Cancer of stomach	C16	151
Colorectal	C18–C21	153–154
Liver and intrahepatic bile ducts	C22	155
Pancreas	C25	157
Trachea, bronchus and lung	C33–C34	162
Breast: female	C50 and female	174
Cervix uteri	C53	180
Uterus	C54–C55	179, 182
Ovary	C56	183.0
Prostate	C61	185
Testis	C62	186
Kidney, except renal pelvis	C64	189.0
Breast	C71	191
Thyroid gland	C73	193
Ill-defined, secondary and unspecified sites	C76–C80	195–199
Non-Hodgkin's lymphoma	C82–C85	200, 202.0–202.2, 202.8
Leukaemias	C91–C95	202.4, 204–208

[4] The ICD-10-AM and the ICD-9-CM are international schemes for classifying morbidity and mortality in a standardised way.

[5] 150.8 = C26.8.

Table A1.2: Guide to abridged labels

Abbreviation	ICD-10-AM	Abbreviation
Liver	C22	Liver and intrahepatic bile ducts
Gallbladder	C23–C24	Gallbladder, other and unspecified parts of biliary tract
Lung	C33–C34	Trachea, bronchus and lung
Cervix	C53	Cervix uteri
Kidney	C64	Kidney, except renal pelvis
Non-Hodgkin's lymphoma	C82-85	Non-Hodgkin's lymphoma

Denominators

Age-sex-ethnicity-specific population estimates for each year from 1996 to 2006 inclusive served as denominators for computing cancer incidence and mortality rates. They were obtained from Statistics New Zealand's revised estimates of the mid-year resident Māori ethnic group population for 1991–2009 and estimates of the total New Zealand population. Denominators for the non-Māori rates were constructed by subtracting the Māori population estimates from the total New Zealand population estimates for each year.

Age-sex-ethnicity-specific mid-year resident population estimates per NZDep2001 decile or quintile were constructed to calculate cancer incidence and mortality by area deprivation for the period 2002–2006 (see Appendix 2 for further details).

For the rural–urban analyses of cancer incidence and mortality, age-sex-ethnicity-specific mid-year resident population estimates were developed for each category of the Urban/Rural Profile Classification from the 2001 Census and used as denominators for incidence and mortality rates for the period 2002–2006 (see Appendix 2 for further details).

For the survival and stage at diagnosis analyses, the cancer registrations within each deprivation or urban–rural category served as denominators.

Data inclusions and exclusions

Data on cancer registrations were restricted to invasive or malignant neoplasms (*in situ* tumours are not included). Cancer registrations flagged as 'multiple' were excluded. Multiple registrations are defined as a second cancer record for the same person where the site (place in the body) and morphological type are the same.

For the analysis of cancer survival disparities, where there was more than one registration for a person within a site or site group, the first was included and subsequent registrations were excluded.

Cancer incidence, and mortality was calculated for the period 2002–2006. Trends over time in cancer incidence, mortality, and survival were calculated for the period 1996–2006. Data on stage at diagnosis was calculated for the period 1996–2006 and 2002–2006. Cancer-specific mortality hazard ratios were calculated for the period 1996–2006.

Ethnicity classification

Population rates for deaths registered during 2002–2006 were calculated using ethnicity as recorded on death registrations, which has been shown to provide reasonably accurate estimates of the number of Māori deaths for this period (Fawcett et al 2008). Anyone recorded as Māori (either alone or in combination with another ethnic group or groups) was classified as Māori. Everyone else was classified as non-Māori. The same methods were used to classify Māori deaths in the time trend analysis for mortality rates over the period 1996–2006, but readers should be aware that Māori deaths during the period 1996-1999 are likely to be undercounted by around 6% (Ajwani et al 2003). Downward trends for Māori deaths may therefore be slightly underestimated, while upward trends may be overestimated. The effect on non-Māori time trends is likely to be minimal.

Cancer registrations continue to undercount Māori. The undercount for new cancers registered during 2002–2006 was estimated by linkage to mortality and New Zealand Housing Corporation datasets. From these estimates, new Māori adjusters were created and applied to cancer registration data to 'adjust' for the undercount of Māori in these datasets (see Appendix 3 for further detail).

The adjusters were applied to the number of Māori cancer registrations. Non-Māori numbers were estimated as the difference between the total number of cancer registrations and the adjusted Māori numbers. These data were used as numerators in the calculation of population rates and ratios. In addition, confidence intervals on the rates and ratios incorporated the standard error on the adjusters.

Where modelling was used to analyse data (e.g. trends over time, cancer survival, stage at diagnosis, deprivation modelling, rurality modelling) ethnicity data was not adjusted.

Area deprivation

The NZDep2001 index was used to measure socioeconomic deprivation. NZDep2001 is an area-based index of socioeconomic deprivation, which ranks small areas from the least deprived 10% (decile 1) to the most deprived 10% of areas (decile 10). The index combines nine variables from the 2001 Census (see Table A1.3), reflecting eight domains of deprivation (Salmond & Crampton 2002). Each variable was calculated as the proportion of people with the specified deprivation characteristic in each meshblock in New Zealand. Meshblocks are geographical units defined by Statistics New Zealand containing a median of 90 people (approximately 60 households). Each proportion is age standardised and where necessary adjusted for household composition.

The NZDep2001 deprivation score for census area units was used to measure area-based socioeconomic deprivation. The score is derived for each census area unit from the distribution of the population weighted average NZDep2001 meshblock first principal component scores. Where the cancer registration domicile code corresponds to a census area unit that was not in use in the 2001 census, the area was assigned a score from the above distribution, using the population weighted average NZDep2001 meshblock first principal component scores for meshblocks in the areas that were in use in the 2001 census.

Table A1.3: Variables included in NZDep2001 index (Salmond & Crampton 2002)

Variable	Proportions in small areas in order of decreasing weight in the index
Income	People aged 18–59 receiving a means-tested benefit
Employment	People aged 18–59 unemployed
Income	People living in households with equivalised* income below an income threshold
Communication	People with no access to a telephone
Transport	People with no access to a car
Support	People aged <60 living in a single-parent family
Qualifications	People aged 18–59 without any qualifications
Living space	People living in households below equivalised* bedroom occupancy threshold
Owned home	People not living in own home

* Equivalisation: method used to control for household composition.

Urban/Rural status

The 2001 Urban/Rural Profile Classification was used to determine rural–urban status. This classification was developed by Statistics New Zealand (2004) "to explore the diversity of the social and economic characteristics of people living in all areas of the urban–rural spectrum." The standard urban area classification, particularly the rural categorisation, was judged to be inadequate for this purpose because it is based purely on population size.

Employment location is the defining variable. Data from the Census of Populations and Dwellings, 2001 was used to compare a person's usual residence address with their workplace address. Table A1.4 lists the criteria for the area categories.

Table A1.4: The Urban/Rural Profile Classification category definitions

Main urban area	Main urban areas have a minimum population of 30,000. Includes: Whangarei, Auckland, Hamilton, Tauranga, Rotorua, Gisborne, Napier-Hastings, New Plymouth, Wanganui, Palmerston North, Kapiti, Wellington, Nelson, Christchurch, Dunedin and Invercargill.
Satellite urban community (towns and settlements with strong links to main urban centres)	Where 20 percent or more of the usually resident employed population's workplace address is in a main urban area.
Independent urban community (towns and settlements without significant dependence on main urban centres)	Where less than 20 percent of the usually resident employed population's workplace address is in a main urban area.
Rural area with high urban influence (a transition between the main urban areas and rural areas)	A significant proportion of the resident employed population works in a main urban area.
Rural area with moderate urban influence (areas with a significant, but not exclusively, main urban area influence)	If (1) a large percentage of the resident employed population works in a minor or secondary urban area, or (2) a significant percentage work in a main urban area.
Rural area with low urban influence (areas with a strong rural focus)	The majority of the population in these areas works in a rural area (unlikely to have many employed in main urban area, though some may work in a minor urban area).
Highly rural/remote area	Minimal dependence on urban areas in terms of employment, or a very small employed population.

Categories from the Urban–Rural Profile Classification were aggregated to avoid problems with low numbers. The categories were grouped as follows:

- **Urban** includes main urban areas and satellite urban communities.
- **Independent urban** includes independent urban communities only.
- **Rural** includes rural areas with high, moderate, and low urban influence, and highly rural/remote areas.

Stage of disease at diagnosis

Cancer stage describes the extent of cancer spread from the site of origin at the time of initial diagnosis (Ries et al 2003). The extent of disease information on the cancer registration was used to determine the stage at diagnosis.

The summary staging classification

The localised-regional-distant summary staging scheme is used in descriptive and statistical analyses of cancer registry data, and is defined as follows.

- **Localised cancer** is cancer that is limited to the organ in which it began, without evidence of spread.
- **Regional cancer** is cancer that has spread beyond the original (primary) site to nearby lymph nodes or organs and tissues.
- **Distant cancer** is cancer that has spread from the primary site to distant organs or distant lymph nodes.
- **Unstaged cancer** is cancer for which there is not enough information to indicate a stage (SEER 2005).

Table A1.5 presents the staging classification used by the New Zealand Cancer Registry (from 1999 on) and how we have classified stage at diagnosis. Data are presented on invasive neoplasms only. *In situ* tumours are not included. The staging classification is not applicable to lymphomas, myeloma or leukaemias.

Table A1.5: Stage classification (extent of disease)

NZ Cancer Registry prior to 1999	NZ Cancer Registry 1999 onwards	Unequal impact
in situ	*in situ*	
Localised	Localised to organ of origin	Localised
Regional or node involvement	Invasion of adjacent tissue or organ Regional lymph nodes involvement	Regional
Remote or diffuse metastases	Distant	Distant
Not stated	Not known	Unknown
Not applicable	Not applicable	Not applicable

Analysis of stage of disease at diagnosis

The stage distribution of new cases (percentage of cases diagnosed at localised, regional, distant and stage unknown) was calculated for Māori and non-Māori. Logistic regression analysis was used to compare the odds of being registered with unknown, localised or distant stage at diagnosis for Māori compared with non-Māori, adjusted for age at diagnosis as a continuous variable. Adjustments were also made for deprivation (NZDep2001 decile) and rural–urban categories (main urban, independent urban, rural). Odds ratios were calculated using the logistic procedure of SAS version 9.1 (SAS Institute Inc, Cary, NC).

Because logistic regression models the log of the odds, the association between stage and area deprivation or rural–urban status was modelled multiplicatively, not linearly, and hence we report the ratio of the odds ratios to express the interaction between ethnicity and deprivation or rural–urban status.

To estimate the deprivation gradients for Māori and non-Māori and to test if these gradients were significantly different, an interaction term (ethnicity by NZDep2001) was added to the models. Note that the gradient is the multiplier, which applies when going from one deprivation level to another. For example, if the gradient was 1.05 that would mean that the odds of deprivation level 10 was 1.05 that for level 9 and similarly for any adjacent pair of levels.

Age-standardised rates

Differences in the age structure of the Māori population (relatively young) and the non-Māori population (relatively old) make it necessary to adjust for age when comparing health outcomes. Rates were age-standardised using direct standardisation in which age-specific rates are applied to a standard population structure. The age-standardised rate is the rate that would be expected for the group if it had the same age distribution as the standard population. It is a weighted average of the age-specific incidence or mortality rates, where the weights are the proportions of people in the corresponding age groups of a standard population. The results are affected by the age distribution of events (e.g. deaths) in each population and the relative differences across age groups (the age-specific rate ratios). If these vary between the populations being compared, the selection of standard population can affect the magnitude of rates and ratios, relative ranking of causes, and trends in rates and ratios.

In this chartbook, rates were standardised to the 2001 Māori population (males and females combined) using five-year age groups up to 84, then 85+. Using this standard, sex-specific comparisons between Māori and non-Māori are age-standardised and combined sex comparisons between Māori and non-Māori are age-sex-standardised. The use of a Māori standard creates rates that are a close approximation of the crude overall rates for Māori and thus better reflect the experience of the Māori population (Robson et al 2007). Rates standardised to Segi's world population or the World Health Organization (WHO) population are generally higher for cancer (because these standard populations are older and place greater weight on events at older ages when most cancers occur).

The age distribution of the 2001 Māori population used as the population standard in this book is presented in Table A1.6.

Table A1.6: Percentage of 2001 Māori population in each age group

Age group (years)	Percentage
0–4	12.84
5–9	12.56
10–14	11.93
15–19	9.41
20–24	8.00
25–29	7.63
30–34	7.46
35–39	7.28
40–44	6.24
45–49	4.77
50–54	3.70
55–59	2.63
60–64	2.19
65–69	1.51
70–74	0.96
75–79	0.51
80–84	0.23
85 +	0.14
Total	100.00*

Note: Percentages are rounded.

Confidence intervals and p values

Estimates of rates and ratios have a degree of uncertainty. Confidence intervals can be calculated to give an indication of this. A 95% confidence interval around an estimate is the range of values that have a 95% probability of including the true population value (Beaglehole et al 1993).

When comparing rates of two groups, such as Māori and non-Māori, the 95% confidence intervals can indicate whether the difference is statistically significant. If the 95% confidence intervals do not overlap, the difference between the estimates is considered statistically significant at the 5% level. This means that the probability that the difference is due to chance is less than 5% or 1 in 20. However, differences between estimates can be statistically significant when there is some overlap of their confidence intervals, which is why tests of significance are also carried out.

An alternative to looking at differences in rates is to calculate rate ratios. A 95% confidence interval around a rate ratio that does not include 1 indicates that the ratio is statistically significant from 1 at the 5% level. This means that the two rates are significantly different.

In this chartbook, 95% confidence intervals for crude and age-standardised rates and rate ratios were calculated using the log-transformation method (Clayton and Hills 1993). Where adjusters were used to estimate Māori and non-Māori hospitalisation and cancer registration numbers, standard errors on the adjusters were incorporated into the standard error of the adjusted numbers using formulas for linear function and product of variables to calculate confidence intervals on rates and ratios (Armitage et al 2002).

P values can also be used to test for statistical significance or the role of chance. In most epidemiological research, a p value less than 0.05 is considered statistically significant (a 1 in 20 probability that the result is due to chance). In this chartbook, p values are used to test for significant differences between groups as well as significant trends in data.

Deprivation and Urban–Rural analyses

Poisson regression (Dobson 1990) was used to model the association between cancer incidence or mortality and area deprivation, using the GENMOD procedure of SAS version 9. Males and females were modelled separately. The log of the incidence or mortality rate was modelled as a function of ethnicity (Māori or non-Māori); age (five-year age groups and age 85 years and above); and area deprivation (NZDep2001 decile as a continuous variable). For each model, the range of age groups was restricted to those between the minimum and maximum age. Where there were five-year age groups within a range with no registrations or deaths, the age groups were grouped with adjacent age groups.

Two estimates of the ratio of Māori to non-Māori rates were used to assess the effect of the differential deprivation distribution of Māori and non-Māori on incidence and mortality rate ratios: the first adjusts for age alone and the second adjusts for age and deprivation combined. The difference between the two estimates indicates the proportion of the incidence or mortality disparity that could be attributed to the higher proportion of Māori living in more deprived areas.

To estimate the deprivation gradients for Māori and non-Māori and to test if these gradients were significantly different, an interaction term (ethnicity by NZDep2001) was added to the models. Note that the gradient is the multiplier, which applies when going from one deprivation level to another. For example if it was 1.05 that would mean that, the rate of deprivation level 10 was 1.05 times that for level 9 and similarly for any adjacent pair of levels. Because Poisson regression models the log of the rate, the association between cancer incidence or mortality and area deprivation was modelled multiplicatively, not linearly, and hence we report the ratio of the gradients to express the interaction.

Similar methods were used to adjust for rural–urban categories, and to model the ratio of rates in rural and independent urban areas compared to main urban areas, separately for Māori and non-Māori.

Survival analyses

There are several techniques for conducting survival analyses. Each can produce different results, and each has its own strengths and limitations (Platel and Semmens 2004). Survival analyses were undertaken using cancer-specific survival methods. Cox proportional hazards regressions was used to estimate the relative risk of cancer-specific death after diagnosis, for Māori compared to non-Māori, adjusted for age and sex. This method was chosen to allow for multivariable modelling to examine the contribution of deprivation, rural–urban status, and stage at diagnosis to Māori:non-Māori differences in cancer survival.

Relative survival is an alternative approach, which has the advantage that it does not rely on accurate causes of death data. However, it does not control for difference in background morbidity or mortality between populations.

Hill (2009) notes that the misclassification of the cause of death can bias the hazard ratio estimate towards the null. In a hospital notes study of colon cancer patients, Hill (2009) found 20% of deaths due to non-cancer causes were misclassified on the NZHIS mortality data as due to colon cancer. The greater risk of colon cancer mortality in Māori patients means that a higher proportion of non-Māori deaths were due to non-cancer causes resulting in a greater number of misclassified deaths in non-Māori compared with Māori. This differential increases the non-Māori cancer hazard more than the Māori hazard, resulting in a reduction in the relative difference. The Māori:non-Māori hazard ratios presented in this chartbook may therefore be underestimated.

Hazard ratios

The hazards function estimates the risk of death per unit time, following cancer diagnosis (Lee 1980). Proportional hazards regression was used to estimate hazard ratios – the *relative* risk of dying from the cancer once diagnosed, for Māori compared with non-Māori, adjusted for sex and age at diagnosis. Further adjustments were made for area of residence at the time of registration (deprivation, rural–urban category) and for stage at diagnosis. To examine survival differences between rural and urban areas, hazard ratios were calculated separately for Māori and non-Māori, comparing the relative risk of death for rural residents compared to main urban residents, and for independent urban residents compared to main urban residents. Similarly deprivation gradients in survival were estimated for Māori and non-Māori separately by calculating the relative risk of death after diagnosis per increasing deprivation decile.

Mortality data from 1996–2006 were searched for matching encrypted Health Care User Identifiers from the National Health Index (NHI) of patients registered with cancer during the same period, and treated as a cancer-specific death if the death was coded to the same ICD grouping as the cancer registration.

Cause-specific analysis relies on accurate recording of the underlying cause of death, to differentiate cancer deaths from non-cancer deaths. This data analysis relied on the 'underlying cause of death' recorded on death registrations and was unable to be verified from other sources and should therefore be treated with caution. Active follow-up was not conducted, and so we cannot account for any cancer patients who may have died outside Aotearoa/New Zealand. However, we expect any impact of differential migration to be minor.

Survival times were measured in days. Cancers where the date of diagnosis was the date of death did not contribute to the hazard ratio. Those who died of causes other than the diagnosed cancer were considered censored (removed from the analysis at that point) at the date of death. This was under the assumption that there was no differential misclassification of non-cancer-specific causes of death between Māori and non-Māori. Those with no death record were assumed alive and were censored at 31 December 2006. This allowed us to compare Māori and non-Māori survival without regard to competing causes of death.

Cancer-specific mortality hazard ratios and confidence intervals were calculated using the proportional hazards procedure (PHREG) of SAS version 9.1. The proportional hazards model assumes the relative risk of death between Māori and non-Māori, or between rural and urban areas, or deprivation deciles remains constant over time. The assumption of proportionality and linear relationship with age were checked using the graphical and numerical methods of Lin, Wei et al (1993).

Māori to non-Māori hazard ratios were calculated for selected sites, adjusted for sex and age at diagnosis (as a categorical variable). Because the assumption of linearity did not hold when age was treated as a continuous variable, age categories were used. The age groups were constructed separately for each cancer by dividing the total number of registrations for that cancer site into quintiles with equal numbers of registrations. However, the method of age adjustment made very little difference to the resulting hazard ratios.

Model reporting

For some models, there were few events for the number of variables in the model. This can result in poor estimates for logistic regression and proportional hazards models (Peduzzi et al 1995, 1996). Where there were fewer than 10 events per term in the model, the estimates have been identified in this chartbook, but we recommend that they be interpreted with caution. The results are not presented where there were fewer than five events per term in the model. Similar criteria were used for the number of observations for each value of categorical variables in the models; i.e. caution on less than 10 observations for each value, and where there were fewer than five observations for each value, the estimates are not presented.

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APPENDIX 2: DENOMINATORS BY DEPRIVATION AND RURAL–URBAN STATUS

Key Findings

- The New Zealand Population Census differentially undercounts Māori, males, and young adults compared to other groups. Māori living in the most deprived deciles are also more likely to be undercounted than Māori living in less deprived areas. Non-Māori, on the other hand, are more likely to be undercounted in less deprived areas.
- The use of census data as denominators in analyses of Māori and non-Māori data by deprivation therefore results in overestimated Māori incidence and mortality rates within each deprivation decile and overestimated Māori:non-Māori ratios. It also overestimates the relationship between cancer and deprivation for Māori.
- Population estimates take into account: non-response to the census ethnicity question; net census undercount; residents temporarily overseas on census night; births, deaths and net migration between census night and 30 June; and thus serve as more accurate denominators for the construction of population-based rates.
- New deprivation and rural–urban denominators were therefore constructed for the cancer incidence and mortality analyses by deprivation and rurality for aggregated census area units for the period 2002–2006 based on Māori and non-Māori population estimates obtained from Statistics New Zealand.

Background

Population-based rates of cancer incidence are constructed by dividing the number of cancer registrations (numerator) by the number of people (or person-years) in the population group during the period of study (denominator). NZDep2001 Census population data by deprivation decile and 2001 Urban–Rural Profile Index Census population data were originally obtained to construct cancer incidence and mortality rates for this chartbook. However, inconsistencies between the results in led us to examine the denominators.

The New Zealand Census of Population and Dwellings undercounts Māori more than non-Māori, males more than females, and young adults more than older adults (personal communication, Alan Ambury, Population Statistics, Statistics New Zealand). This means that the use of census population data to construct rates would result in an overestimate of Māori rates and Māori:non-Māori rates in each deprivation decile, and an overestimate of the relationship between cancer and deprivation among Māori.

Population estimates are estimates of the resident population at 30 June in the census year. They are based on the census usually resident population counts but updated for "non-response to the census ethnicity question; net census undercount; residents temporarily overseas on census night; births, deaths and net migration between census night; and 30 June reconciliation with demographic estimates at the youngest ages" (Statistics New Zealand 2009, notes to population estimates). Because they take account of the undercount in the census, we decided to construct new denominators from Māori and non-Māori population estimates for the calculation of population-based incidence and mortality rates by deprivation and rural–urban status. This appendix outlines the methods and results.

Methods

Māori and non-Māori population estimates by sex and five-year age group (with the oldest category being 85 years and over) were obtained from Statistics New Zealand for aggregated census area units in each NZDep2001 decile and each category of the 2001 Urban–Rural Profile Index for the years 2001 and 2006. The aggregation was necessary to avoid errors due to rounding problems.

The population estimates were provided using both 2001 and 2006 area unit boundaries. However, because the domicile codes of the cancer registry and deaths register were coded by the Ministry of Health to 2001 area unit boundaries for the period of study, we chose to use the estimates calculated using the 2001 boundaries for both 2001 and 2006.

Yearly estimates were then constructed for Māori and non-Māori by age, sex, deprivation and rural–urban status by smoothing the data between 2001 and 2006. These were summed for the period 2002–2006 to provide five-year denominators for the incidence and mortality data by deprivation or rural–urban status in this chartbook.

To test the assumptions that Māori, males, young adults, and residents of deprived areas are more likely to be undercounted, the NZDep2001 population data from the 2001 Census was compared with the population estimates. The difference between the population estimate and the census count for each Māori and non-Māori sex-age-deprivation decile specific group was calculated and expressed as a percentage of the census count for that group. The results are shown for Māori and non-Māori females in Figure A2.1 and for Māori and non-Māori males in Figure A2.2.

Results

The proportional differences[6] between the census counts and the population estimates in each age-sex-deprivation decile group are shown in Figures A2.1 and A2.1. The percentage differences between the census counts and population estimates were larger for Māori than for non-Māori in each age-sex-deprivation group. As expected, for both Māori and non-Māori, there was generally a larger difference for males than for females and a greater difference in the young adult age groups than in the older age groups (more so for males).

Māori in more deprived areas show a larger undercount than Māori in less deprived areas across each age group. However, the reverse was the case for non-Māori, with a greater proportional difference between the census counts and population estimates in the less deprived areas than in the more deprived areas.

Tables A2.1 and A2.2 present the denominators constructed for the analysis of Māori and non-Māori cancer incidence and mortality rates by area deprivation for the period 2002–2006.

Tables A2.3 and A2.4 show the denominators constructed for the rural–urban analyses. The main urban category includes main urban and satellite urban areas. The rural areas include all rural categories.

[6] Percentage difference calculated as the 100x (population estimate minus census count)/(census count) for each Māori and non-Māori age-sex-deprivation decile group.

Figure A2.1: Percentage difference between population estimates and census counts by NZDep2001 decile and age group, Māori and non-Māori females, 2001

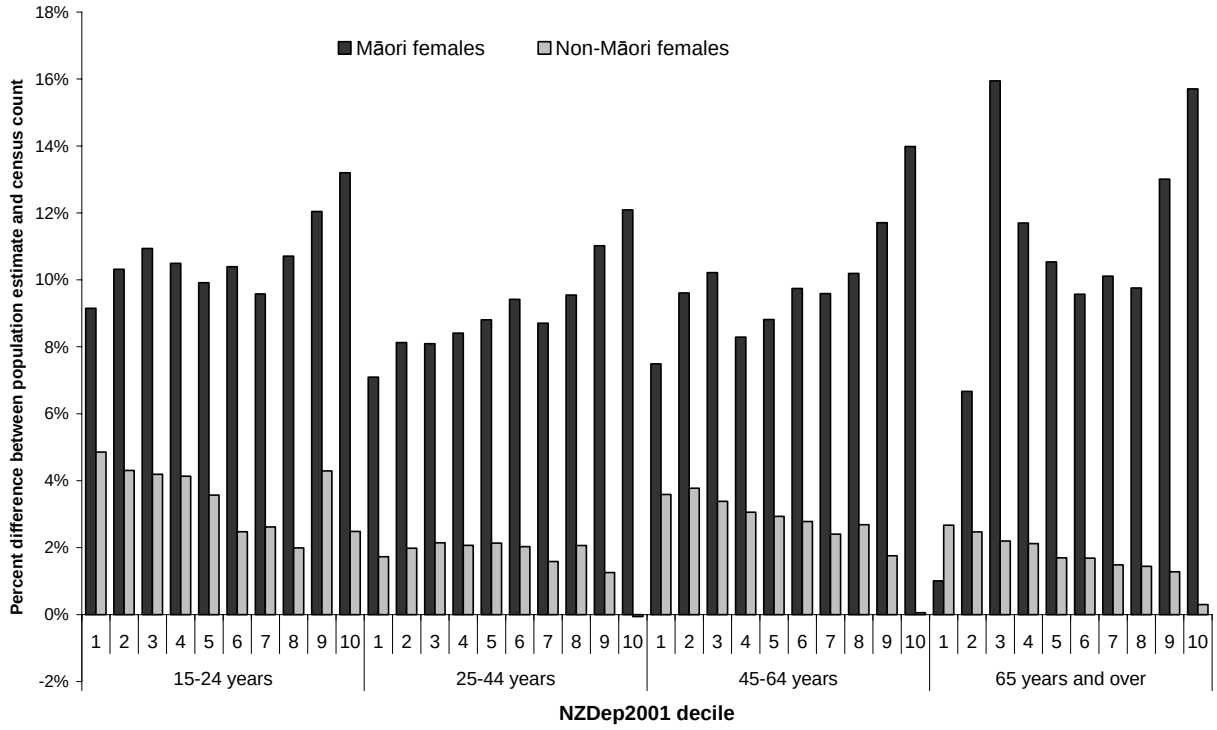


Figure A2.2: Percentage difference between population estimates and census counts by NZDep2001 decile and age group, Māori and non-Māori males, 2001

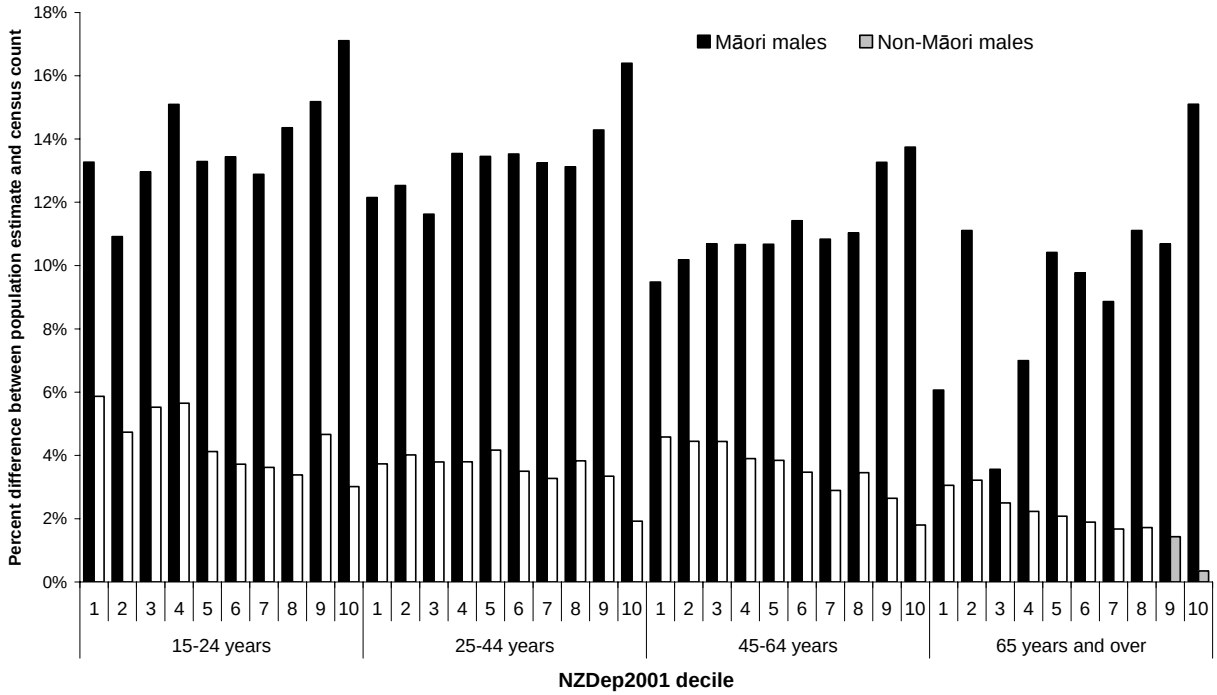


Table A2.1: Māori population estimates for 2002–2006 by sex, age group, and NZDep2001 decile

Sex	Age group	NZDep2001 decile									
		1	2	3	4	5	6	7	8	9	10
Female	0–4 years	5,440	6,740	7,320	11,130	11,170	16,550	19,140	25,170	32,900	43,480
	5–9 years	5,420	6,550	7,530	10,930	10,690	15,950	18,830	23,870	31,450	43,340
	10–14 years	5,160	6,570	7,710	10,680	10,410	15,990	18,850	22,670	30,420	42,200
	15–19 years	4,790	5,960	6,680	9,340	9,620	13,730	16,950	21,430	28,840	36,850
	20–24 years	3,510	4,550	5,270	7,540	8,380	11,800	13,760	17,710	25,850	28,530
	25–29 years	3,150	4,220	5,100	7,230	7,690	10,960	12,490	16,840	21,930	26,710
	30–34 years	3,710	4,650	5,070	7,340	7,750	10,960	12,200	15,690	21,150	27,080
	35–39 years	3,930	4,630	5,250	7,180	7,240	10,180	11,910	14,900	20,180	26,700
	40–44 years	3,640	4,390	4,850	6,530	6,340	9,360	10,630	13,510	18,890	24,040
	45–49 years	2,990	3,580	3,900	5,560	5,330	7,580	8,730	11,200	15,690	20,160
	50–54 years	2,060	2,830	2,870	3,940	4,110	5,750	6,580	8,240	11,590	15,880
	55–59 years	1,520	1,980	2,080	3,020	3,240	4,180	5,040	6,070	8,800	12,270
	60–64 years	920	1,280	1,390	2,100	2,260	3,040	3,710	4,610	6,460	9,360
	65–69 years	630	800	1,020	1,700	1,540	2,410	2,950	3,520	5,210	7,150
	70–74 years	370	570	650	1,020	1,030	1,510	1,860	2,390	3,400	4,580
	75–79 years	240	360	390	630	690	1,040	1,080	1,460	2,140	2,700
	80–84 years	160	190	210	250	360	500	570	660	1,120	1,400
	85 years and over	80	130	180	210	180	310	330	340	590	770
Male	0–4 years	5,590	7,000	7,950	11,530	11,580	17,750	20,380	26,300	34,490	46,140
	5–9 years	5,360	6,990	7,960	11,450	11,900	16,950	19,850	24,820	33,360	45,890
	10–14 years	5,530	7,220	8,100	11,720	11,400	16,440	19,140	23,680	31,910	44,140
	15–19 years	4,960	6,240	6,930	10,330	9,940	14,450	16,780	20,550	27,810	35,850
	20–24 years	3,660	4,840	5,160	8,350	8,040	11,780	13,370	16,410	22,860	25,220
	25–29 years	3,310	4,590	4,860	7,320	7,680	10,670	11,540	14,300	19,010	21,620
	30–34 years	3,610	4,530	4,930	7,350	7,450	10,380	11,220	13,740	17,910	21,280
	35–39 years	3,790	4,610	4,850	7,130	7,170	10,030	10,710	13,390	17,180	21,120
	40–44 years	3,510	4,410	4,600	6,470	6,340	9,200	10,090	11,850	15,540	20,050
	45–49 years	2,960	3,600	4,090	5,440	5,340	7,890	8,140	9,690	13,520	16,740
	50–54 years	2,100	2,730	3,060	4,190	4,140	5,740	6,500	7,450	10,480	13,570
	55–59 years	1,540	1,990	2,110	3,030	3,160	4,380	4,680	5,530	7,760	10,720
	60–64 years	950	1,350	1,450	2,150	2,210	3,130	3,470	4,030	5,670	8,140
	65–69 years	610	890	950	1,640	1,550	2,360	2,790	3,070	4,340	6,430
	70–74 years	330	510	550	880	880	1,360	1,750	1,760	2,900	4,120
	75–79 years	160	320	280	460	510	830	800	980	1,560	2,090
	80–84 years	80	110	160	210	240	390	380	400	640	810
	85 years and over	30	80	80	100	130	150	150	200	280	340

Table A2.2: Non-Māori population estimates 2002–2006 by sex, age group, and NZDep2001 decile

Sex	Age group	NZDep2001 decile									
		1	2	3	4	5	6	7	8	9	10
Female	0–4 years	52,090	53,060	49,950	53,460	48,260	53,660	48,230	56,440	48,340	50,590
	5–9 years	60,430	59,810	55,100	58,260	49,930	54,980	49,760	54,420	46,280	49,680
	10–14 years	66,310	65,100	60,770	64,470	54,060	57,860	53,170	56,100	47,710	50,140
	15–19 years	60,760	60,580	57,090	60,870	51,680	56,310	55,100	60,330	65,900	51,680
	20–24 years	42,760	49,420	46,710	50,580	51,410	58,140	56,940	68,500	87,280	52,260
	25–29 years	40,610	49,940	50,170	53,970	57,130	61,430	54,980	68,290	65,260	47,680
	30–34 years	58,170	64,820	62,390	68,010	65,590	70,220	62,260	73,880	64,200	47,630
	35–39 years	76,290	76,920	73,160	77,080	69,360	75,650	64,460	73,020	61,200	46,730
	40–44 years	83,560	82,140	76,170	79,200	68,790	74,750	63,900	69,860	57,500	44,820
	45–49 years	78,970	76,950	70,340	72,670	62,320	68,700	60,930	63,620	53,580	40,270
	50–54 years	69,830	68,840	62,590	64,880	55,490	63,310	56,390	57,120	48,870	35,610
	55–59 years	58,620	58,010	53,130	56,070	50,300	56,190	51,500	51,910	43,160	31,750
	60–64 years	42,610	42,470	41,710	44,530	41,760	47,220	44,230	44,100	36,560	27,050
	65–69 years	31,850	31,940	33,520	36,970	36,100	40,920	40,880	39,660	31,970	22,970
	70–74 years	24,470	24,410	27,120	31,380	31,210	35,980	37,840	36,410	29,070	19,520
	75–79 years	20,770	20,830	24,320	27,230	28,540	32,410	34,960	34,130	26,870	16,610
	80–84 years	15,590	15,610	17,860	21,010	22,270	25,280	27,330	27,000	20,680	12,080
	85 years and over	15,220	14,670	16,570	19,110	20,200	23,960	23,660	24,920	18,090	10,120
Male	0–4 years	54,880	55,140	52,310	55,570	50,090	55,630	50,690	59,220	51,170	52,680
	5–9 years	63,160	63,110	59,460	61,460	52,690	58,090	52,020	56,980	48,670	52,400
	10–14 years	69,930	69,570	64,230	67,030	56,830	61,190	55,940	58,580	50,310	52,780
	15–19 years	64,530	66,320	61,360	65,690	55,650	61,230	57,520	61,440	61,570	51,570
	20–24 years	46,310	54,020	49,610	54,050	52,620	61,170	57,640	66,710	81,500	49,880
	25–29 years	38,230	48,260	47,670	51,820	53,830	58,260	52,430	64,770	64,160	44,720
	30–34 years	48,980	57,220	56,540	60,860	60,790	65,280	57,380	70,060	62,200	45,670
	35–39 years	66,280	69,010	67,080	70,260	64,810	69,870	60,980	70,370	59,670	45,630
	40–44 years	76,690	76,330	70,740	74,980	65,870	71,280	60,640	67,440	56,920	44,220
	45–49 years	75,320	74,260	67,970	70,960	59,870	67,070	57,760	61,200	52,230	40,410
	50–54 years	70,290	68,820	61,850	63,720	54,410	61,370	53,570	54,850	47,570	36,660
	55–59 years	60,320	59,560	53,510	55,840	47,790	54,650	48,730	48,500	41,770	31,930
	60–64 years	44,190	44,070	41,690	43,760	39,330	44,880	40,730	40,200	35,110	27,060
	65–69 years	32,360	33,090	32,400	35,440	33,030	38,470	36,380	35,510	30,190	22,610
	70–74 years	23,700	24,370	25,880	29,110	28,280	32,540	32,870	31,430	25,540	18,120
	75–79 years	18,090	18,060	20,760	22,630	22,590	26,370	27,890	26,430	21,360	14,050
	80–84 years	10,730	10,760	12,660	13,750	14,210	16,340	17,350	16,790	13,110	8,150
	85 years and over	6,530	6,560	7,850	8,560	8,700	10,590	10,430	10,660	8,040	4,840

Table A2.3: Māori population estimates 2002–2006 by sex, age group and rural–urban category

Sex	Age group	Main urban	Independent urban	Rural
Female	0–4 years	125,650	28,600	24,990
	5–9 years	117,990	28,940	27,750
	10–14 years	113,490	28,850	28,480
	15–19 years	109,030	24,390	20,900
	20–24 years	96,370	17,500	13,050
	25–29 years	85,850	16,810	13,770
	30–34 years	82,260	17,230	16,170
	35–39 years	76,930	17,590	17,600
	40–44 years	68,560	16,490	17,200
	45–49 years	56,040	13,930	14,860
	50–54 years	41,610	10,620	11,690
	55–59 years	30,910	7,990	9,380
	60–64 years	21,710	6,330	7,150
	65–69 years	16,190	5,060	5,720
	70–74 years	10,270	3,350	3,750
	75–79 years	6,130	2,220	2,350
	80–84 years	3,170	1,150	1,110
	85 years and over	1,970	510	690
Male	0–4 years	132,610	29,950	26,330
	5–9 years	124,690	30,010	29,870
	10–14 years	118,760	29,940	30,640
	15–19 years	105,260	24,770	23,860
	20–24 years	88,650	16,900	14,240
	25–29 years	76,750	14,940	13,230
	30–34 years	72,900	14,570	15,050
	35–39 years	68,770	15,050	16,220
	40–44 years	61,430	14,220	16,580
	45–49 years	50,500	11,970	14,950
	50–54 years	38,480	9,640	11,940
	55–59 years	28,500	7,440	9,090
	60–64 years	19,650	5,810	7,140
	65–69 years	14,100	4,760	5,800
	70–74 years	8,320	3,020	3,740
	75–79 years	4,460	1,530	2,050
	80–84 years	1,880	630	860
	85 years and over	920	240	400

Table A2.4: Non-Māori population 2002–2006 by sex, age group and rural–urban category

Sex	Age group	Main urban	Independent urban	Rural
Female	0–4 years	395,890	45,870	72,310
	5–9 years	403,340	51,760	83,600
	10–14 years	426,990	56,560	92,150
	15–19 years	462,040	49,730	68,550
	20–24 years	488,420	37,400	38,280
	25–29 years	453,330	45,070	51,060
	30–34 years	506,350	55,190	75,770
	35–39 years	534,270	62,420	97,370
	40–44 years	527,640	66,300	106,920
	45–49 years	482,800	64,970	100,700
	50–54 years	428,510	62,220	92,370
	55–59 years	368,310	60,560	82,020
	60–64 years	294,120	55,940	62,250
	65–69 years	249,050	52,860	45,010
	70–74 years	218,850	48,830	29,810
	75–79 years	201,230	44,720	20,790
	80–84 years	157,710	34,310	12,750
	85 years and over	146,450	30,620	9,450
Male	0–4 years	414,820	47,410	75,160
	5–9 years	425,590	52,870	89,770
	10–14 years	449,760	58,550	98,280
	15–19 years	471,840	55,250	79,950
	20–24 years	482,110	41,520	49,900
	25–29 years	428,820	43,000	52,400
	30–34 years	461,940	51,690	71,490
	35–39 years	494,430	58,110	91,570
	40–44 years	495,770	62,890	106,560
	45–49 years	456,800	63,220	107,340
	50–54 years	411,340	61,200	100,770
	55–59 years	354,820	58,160	89,770
	60–64 years	278,380	51,320	71,580
	65–69 years	225,530	48,970	55,080
	70–74 years	188,870	44,680	38,330
	75–79 years	156,320	37,050	24,870
	80–84 years	99,000	22,540	12,450
	85 years and over	62,680	13,850	6,210

APPENDIX 3: ESTIMATING MĀORI CANCER REGISTRATIONS 2002–2006

Key Findings

- Cancer registrations have been shown to undercount Māori.
- Since early 2009, the Cancer Registry has assigned Māori ethnicity to cancer registrations from 1989 on if 20% or more of the health events in all national health databases associated with that individual are coded as Māori. For the period 2002–2005, the new method of assigning ethnicity data increased the number of Māori cancer registrations by 3%, with variations by age group.
- However, when the cancer registrations were linked to death registrations and Housing New Zealand Corporation tenant data, there still appeared to be an undercount of Māori cancer registrations. The undercount also varied by deprivation, and rural–urban status (with less undercount in more deprived and in rural areas).
- Two-dimensional adjusters were created for cancers registered between 2002 and 2006 (by age, by age and deprivation, and by age and rural–urban status) to adjust for the residual undercount of Māori registrations.
- The adjusters increased the total number of Māori cancer registrations by around 10%.
- The ethnicity data on cancer registrations is dynamic due to the method of assigning ethnicity. Therefore the adjusters used in this chartbook may not be applicable to other cancer registry data extractions, even for cancers registered during the same time period.

Introduction

Official health data have been shown to undercount Māori cancer registrations (Shaw et al 2009; Robson et al 2006; Harris et al 2007; Curtis et al 2005). A study that matched cancer registrations to census data found Māori registrations were 30% undercounted in the early 1980s but there was a gradual improvement over time with a 15% undercount evident during the period 2001 to 2004 (Shaw et al 2009).

The 'ever Māori' method of ethnicity classification was used in the previous cancer chartbook *Unequal Impact: Māori and non-Māori cancer statistics 1996–2001* to adjust for the undercount of Māori registrations (Robson et al 2006). This method counts as Māori anyone ever recorded as Māori in any cancer registration, hospital admission, death registrations, or on the National Health Index (usually over a specified period). This appeared to produce reasonable estimates for the period 1996–2001. However, when undertaking analyses of cancer registrations for the *Hauora: Māori Standards of Health IV* edition, the 'ever Māori' method appeared to overcount Māori registrations for the period 2000–2004. New adjusters were therefore created from linked cancer, deaths, and Housing New Zealand data (Harris et al 2007).

Since the publication of the study by Shaw et al (2009) and the publication of *Hauora IV,* the Ministry of Health has changed its method of assigning ethnicity to cancer registrations. This means the previous estimates of the undercount, and the adjusters used in Hauora IV cannot be applied to the current dataset. New adjusters have therefore been created for this chartbook for Māori cancers registered during the period 2002–2006. This appendix first examines the effect of the new Ministry of Health approach to ethnicity on Māori cancer registrations and then describes the development of the adjusters used on the new cancer registration data.

Māori cancer registrations before and after Cancer Registry ethnicity Algorithm implementation

Prior to 2009, the ethnicity on cancer registrations was recorded from the source of the cancer registrations (hospitalisation or death) or from the NHI. The Ministry of Health has recently developed an algorithm that looks at all ethnicities recorded for a person across the different data sets (hospitalisations, mortality, NHI) and assigns up to three of these ethnicities to the cancer registrations. If 20% or more of the person's health events are coded as Māori, the cancer registration includes Māori as one of the ethnicity codes. This is an automated process previously performed by cancer coders for registrations with no ethnicity recorded. It has been applied to all cancer registrations from 1989 onwards (Chris Lewis, personal communication 2009).

This section compares the number of cancer registrations coded as Māori during the period 2002–2005 prior to the application of the ethnicity algorithm, with the number coded as Māori after the change in method. This was possible because we had cancer registrations extracted from the cancer registry in 2008 and another extraction in 2009 after the new approach was implemented.

During the period 2002–2005, there were 6,191 registrations classified as Māori in both datasets (i.e. in the earlier and in the new dataset). Although 632 registrations classified as non-Māori on the previous dataset were classified as Māori in the new dataset, 436 registrations classified as Māori in the earlier dataset were classified as non-Māori in the new dataset. This resulted in a net increase of 196 registrations classified as Māori in the new dataset, giving an overall increase of 3% (Table A3.1).

Table A3.1: Number of Māori and non-Māori cancer registrations in 2002–2005 using previous and new methods of assigning ethnicity

		New method of assignment		
		Non-Māori	Māori	Total
Previous method of assignment	Non-Māori	85,424	632	86,056
	Māori	436	6,191	6,627
	Total	85,860	6,823	92,683

There was a decreasing trend with age in the net increase in Māori registrations between the two datasets, ranging from a 44% increase in the 0–14 year age group to a 0.4% increase among those aged 65 years and over (Table A3.2).

Table A3.2: Number of Māori and non-Māori cancer registrations in 2002-2005 using previous and new methods of assigning ethnicity, by age group

Age group	Non-Māori in both	Non-Māori in previous Māori in new	Māori in previous non-Māori in new	Māori in both	Total Māori in previous	Total Māori in new	Net % increase in Māori
0–14 years	376	4	3	78	57	82	43.9
15–24 years	1,803	48	24	336	360	384	6.7
25–44 years	10,520	169	92	1,484	1,576	1,653	4.9
45–64 years	25,748	253	167	2,349	2,516	2,602	3.4
65 years and over	46,977	158	150	1,944	2,094	2,102	0.4

When examined by deprivation decile, the net increase in Māori registrations was generally greater in the less deprived areas, ranging from 6% to 15% in deciles 1–4 compared to -1% to nearly 5% in deciles 7–10 (Table A3.3).

Table A3.3: Number of Māori and non-Māori cancer registrations in 2002–2005 using previous and new methods of assigning ethnicity, by deprivation decile

Deprivation decile	Non-Māori in both	Non-Māori in previous Māori in new	Māori in previous non-Māori in new	Māori in both	Total Māori in previous	Total Māori in new	Net % increase in Māori registrations
1	7,482	28	20	111	131	139	6.1
2	7,376	43	17	157	174	200	14.9
3	7,957	46	18	204	222	250	12.6
4	8,759	48	29	293	322	341	5.9
5	8,758	55	25	376	401	431	7.5
6	9,838	57	51	534	585	591	1.0
7	10,129	83	53	590	643	673	4.7
8	10,050	90	52	845	897	935	4.2
9	8,998	99	69	1,221	1,290	1,320	2.3
10	5,789	82	101	1,846	1,947	1,928	-1.0
Total	85,136	631	435	6,177	6,612	6,808	3.0

The net increase in Māori registrations was slightly higher among main urban residents (3.4%) than other residents (2.1%) (Table A3.4).

Table A3.4: Number of Māori and non-Māori cancer registrations in 2002–2005 using previous and new methods of assigning ethnicity, by rural–urban status

Rural–urban area	Non-Māori in both	Non-Māori in previous Māori in new	Māori in previous non-Māori in new	Māori in both	Total Māori in previous	Total Māori in new	Net % increase in Māori registrations
Main urban	63,492	447	300	3,982	4,282	4,429	3.4
Independent urban	12,748	109	82	1,199	1,281	1,308	2.1
Rural	8,914	75	53	1,001	1,054	1,076	2.1
Total	85,154	631	435	6,182	6,617	6,813	3.0

Summary

The new method of assigning ethnicity on cancer registrations appears to be an improvement on the previous data. However, the increase in the number of Māori registrations was relatively small (around 3%) compared to the estimates of the undercount reported by Shaw et al (2009) and the adjusters developed for *Hauora IV* (Harris et al 2007). These results indicate a residual undercount of Māori registrations in the New Zealand Cancer Registry.

The undercount of Māori cancer registrations leads to a numerator/denominator mismatch that creates a bias when rates are calculated using population data for denominators. To minimise this bias, it was necessary to develop new adjusters for estimating Māori cancer registrations for the period 2002–2006.

Māori cancer registration adjusters 2002–2006 by age, deprivation and rural–urban status

This section describes the methods used to create the Māori cancer registration adjusters by age, deprivation and rural–urban status for the period 2002–2006. It then describes the adjusters, and shows the percentage increase in the number of Māori cancer registrations after the application of the adjusters.

Methods

The adjusters for Māori cancer registrations were developed using similar methods to those used in *Hauora IV* (Harris et al 2007). Using encrypted NHI numbers, links were made to two data sources assumed to have reliable ethnicity data: death registrations from 2002–2006 and Housing New Zealand Corporation (HNZC) tenant data from 2003–2006. The cancer registrations were linked to death registrations from 2002–2006 and the HNZC tenant data from 2003–2006 was linked to the NHI (which we found to be 99.99% concordant with the ethnicity on the cancer registrations). The HNZC data was sourced from the Social Housing Outcomes Worth (SHOW) study, which aims to investigate the relationship between housing conditions and hospitalisation rates in cohorts of HNZC applicants and tenants (Baker et al 2006). Both datasets included information on the domicile code (equivalent to a census area unit), which was mapped to the 2001 indices of Area Deprivation and Urban–Rural Profile.

A weighted average of the HNZC linkage and mortality linkage ratios in five-year age groups was calculated. The ratios were smoothed to create adjusters and standard errors that were estimated using local regression with the Loess procedure in SAS (version 9.1, SAS Institute Inc, Cary NC). The smoothing was conducted in three different ways: firstly over age; secondly over age and deprivation (at decile and at quintile levels), and thirdly smoothed over age within each of the three aggregated urban–rural categories (main urban, independent urban, and rural).

Results

Tables A3.5 and A3.6 show the adjusters used in this chartbook for analysis of Māori cancer registrations for the period 2002–2006 by age, deprivation quintile, and rural–urban residency. Adjusters were also calculated by deprivation decile (not shown). The figures following the tables provide a graphical representation of the adjusters.

Figure A3.1 shows the adjusters increase with age, following a slight 'j' shape. Figure A3.2 shows the adjusters decrease with increasing deprivation but generally increase with age within each deprivation quintile. Figure A3.3 shows the adjusters are higher for main urban residents than for independent urban or rural residents in the older age groups only (ages 45 and over) and there is very little gradient by age in the rural residents.

Table A3.5: Smoothed weighted Māori cancer adjusters developed from linked cancer register, death register, and HNZC tenant data, by age, and NZDep2001 quintile

Age group (years)	Total Māori		Dep quintile 1		Dep quintile 2		Dep quintile 3		Dep quintile 4		Dep quintile 5	
	Ratio	Standard error	Ratio	Standard error	Ratio	Standard error	Ratio	Standard error	Ratio	Standard error	Ratio	Standard error
0–4	1.029	0.03545	1.239	0.05997	1.165	0.04340	1.092	0.04045	1.066	0.04340	1.040	0.05997
5–9	1.020	0.02706	1.212	0.04347	1.138	0.02789	1.065	0.02588	1.044	0.02834	1.037	0.04580
10–14	1.011	0.02083	1.185	0.04150	1.111	0.02628	1.037	0.03168	1.038	0.02628	1.038	0.04150
15–19	1.009	0.01810	1.148	0.04150	1.077	0.03181	1.064	0.02466	1.051	0.02906	1.038	0.04150
20–24	1.008	0.01796	1.146	0.04150	1.076	0.03181	1.063	0.02466	1.050	0.02906	1.037	0.04150
25–29	1.013	0.01812	1.147	0.04150	1.103	0.02628	1.059	0.03168	1.048	0.02628	1.037	0.04150
30–34	1.019	0.01935	1.175	0.04150	1.117	0.02628	1.059	0.03168	1.048	0.02628	1.036	0.04150
35–39	1.032	0.01923	1.213	0.03616	1.109	0.02507	1.058	0.02497	1.043	0.02628	1.038	0.04150
40–44	1.046	0.02034	1.250	0.04150	1.120	0.03181	1.056	0.03168	1.051	0.02628	1.046	0.04150
45–49	1.062	0.01870	1.190	0.03616	1.127	0.02218	1.064	0.02497	1.058	0.02628	1.059	0.04150
50–54	1.078	0.01835	1.129	0.04150	1.101	0.02628	1.073	0.03168	1.071	0.02218	1.064	0.03616
55–59	1.094	0.01935	1.086	0.04150	1.093	0.02628	1.101	0.03168	1.085	0.02628	1.069	0.04150
60–64	1.112	0.01812	1.092	0.04150	1.109	0.02628	1.125	0.03168	1.102	0.02628	1.078	0.04150
65–69	1.130	0.01796	1.147	0.04150	1.130	0.02628	1.113	0.03168	1.104	0.02628	1.096	0.04150
70–74	1.151	0.01810	1.192	0.04150	1.156	0.02628	1.121	0.03168	1.114	0.02507	1.126	0.03616
75–79	1.173	0.02083	1.287	0.04150	1.220	0.02628	1.153	0.03168	1.130	0.03181	1.156	0.04150
80–84	1.197	0.02706	1.466	0.04580	1.357	0.02834	1.247	0.03181	1.227	0.02834	1.211	0.04347
85+	1.221	0.03545	1.706	0.05997	1.578	0.04340	1.451	0.04045	1.324	0.04580	1.266	0.05997

Table A3.6: Smoothed weighted Māori cancer adjusters developed from linked cancer register, death register, and HNZC tenant data, by age and rural–urban status

Age group (years)	Main urban		Independent urban		Rural	
	Ratio	Standard error	Ratio	Standard error	Ratio	Standard error
0–4	1.036	0.03397	1.044	0.02721	1.045	0.02058
5–9	1.036	0.02533	1.046	0.02160	1.044	0.01822
10–14	1.036	0.01998	1.048	0.01733	1.044	0.01605
15–19	1.035	0.01964	1.050	0.01504	1.044	0.01418
20–24	1.037	0.01964	1.053	0.01541	1.044	0.01262
25–29	1.038	0.01964	1.053	0.01456	1.044	0.01148
30–34	1.040	0.01964	1.052	0.01541	1.043	0.01086
35–39	1.045	0.01964	1.055	0.01456	1.042	0.01076
40–44	1.052	0.01964	1.057	0.01541	1.041	0.01125
45–49	1.062	0.01964	1.058	0.01456	1.042	0.01066
50–54	1.075	0.01964	1.058	0.01541	1.042	0.01053
55–59	1.089	0.01964	1.062	0.01541	1.043	0.01086
60–64	1.105	0.01964	1.069	0.01456	1.045	0.01148
65–69	1.126	0.01964	1.076	0.01541	1.047	0.01262
70–74	1.162	0.01964	1.103	0.01504	1.049	0.01418
75–79	1.234	0.01998	1.129	0.01733	1.051	0.01605
80–84	1.309	0.02533	1.159	0.02165	1.052	0.01822
85+	1.387	0.03397	1.189	0.02721	1.054	0.02058

Figure A3.1: Smoothed Māori cancer registration adjusters by age group (percentage increase)

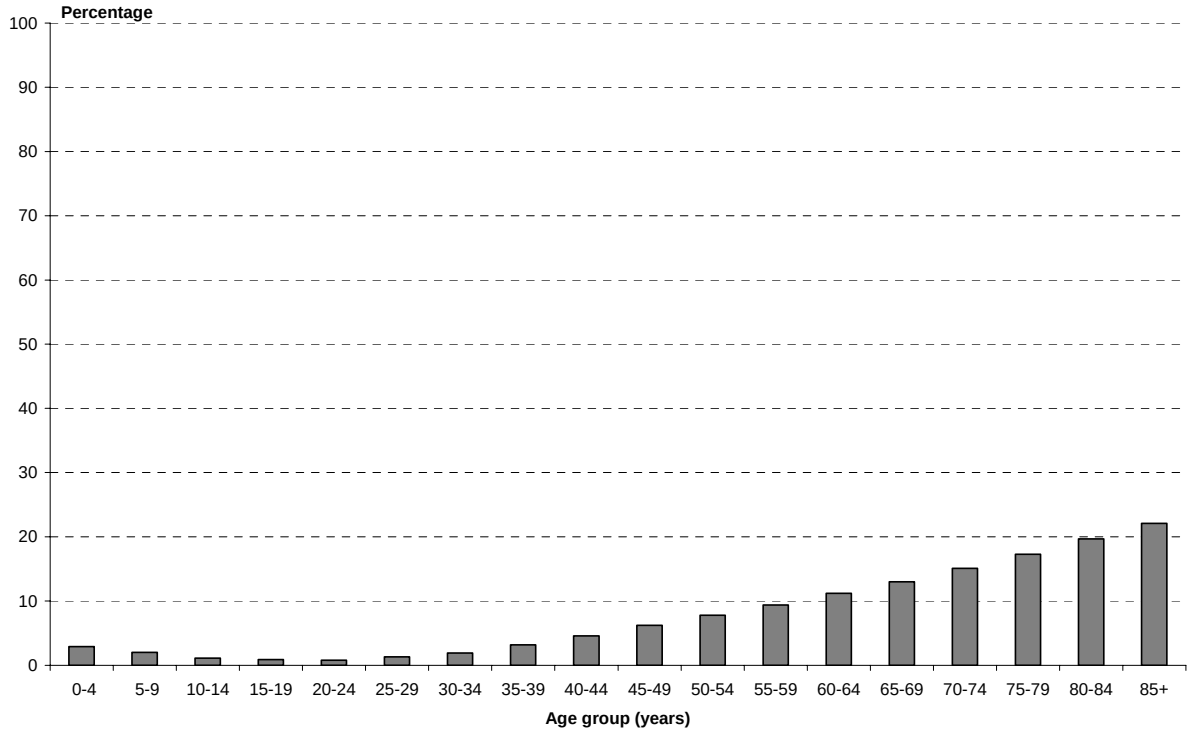


Figure A3.2: Smoothed Māori cancer registration adjusters by age group and NZDep2001 quintile (percentage increase)

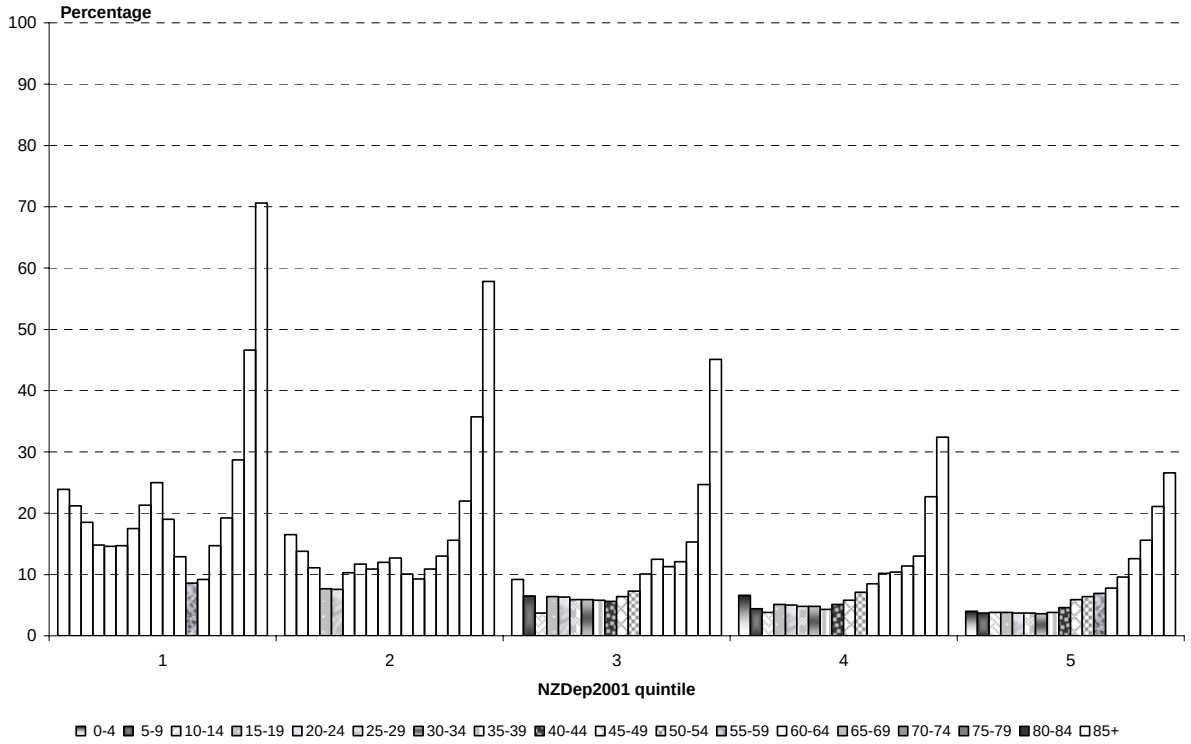
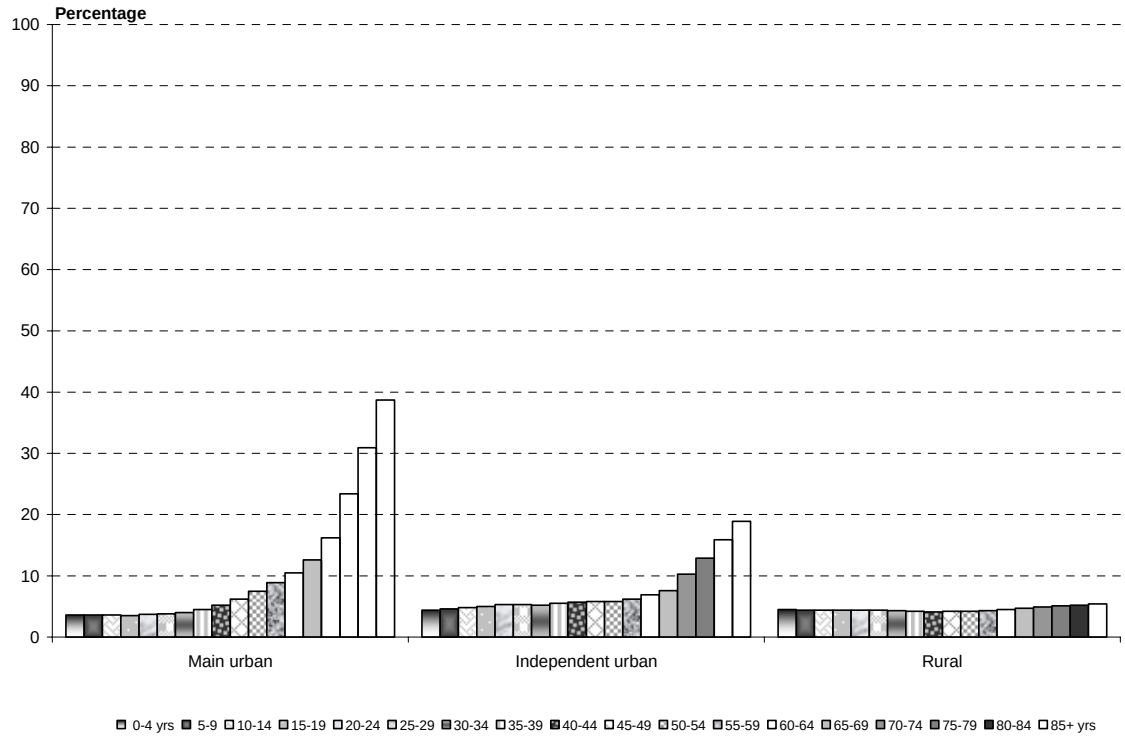


Figure A3.3: Smoothed Māori cancer registration adjusters by age group and rural–urban status (percentage increase)



Using adjusters to estimate Māori and non-Māori cancer registrations

For the calculation of population rates, the number of Māori cancer registrations was multiplied by the relevant adjuster (the ratio). Non-Māori numbers were calculated as the difference between the total number of cancer registrations and the adjusted Māori numbers. Confidence intervals on the rates and ratios incorporate the standard error on the adjusters.

Table A3.7 shows the percentage increase in the total number of Māori registrations after the adjusters were applied, by sex and cancer. The overall increase was around 10% (9.9% for Māori females and 11.1% for Māori males). This varied by type of cancer, with greater increases in cancers with an older age profile (e.g. prostate cancer 13.9% compared to 2.6% for testicular cancer). The increases for the most common cancers were around 10% (lung 12%, colorectal 11%, breast 9%).

Table A3.7: Unadjusted and adjusted cancer registrations, by sex and type of cancer, 2002–2006

Sex	Cancer	Number of Māori registrations		Number of non-Māori registrations		% increase in Māori registrations
		Unadjusted	Adjusted	Unadjusted	Adjusted	
Female	All sites	3,666	4,029	40,010	39,647	9.9%
	Bladder	31	35	592	588	12.2%
	Brain	39	42	490	487	7.6%
	Breast	1,141	1,244	10,971	10,868	9.0%
	Cervix	134	144	695	685	7.3%
	Colorectal	223	248	6,475	6,450	11.3%
	Kidney	49	54	633	628	9.5%
	Leukaemias	112	120	1,313	1,305	7.5%
	Liver	41	45	267	263	10.2%
	Lung	676	758	3,057	2,975	12.1%
	Melanoma	69	74	4,529	4,524	7.4%
	Non-Hodgkin's lymphoma	93	102	1,424	1,415	10.0%
	Oesophagus	23	26	404	401	13.4%
	Oral cancer	31	33	489	487	8.0%
	Ovary	113	123	1,311	1,301	9.0%
	Pancreas	82	93	876	865	12.9%
	Stomach	131	144	588	575	10.1%
	Thyroid	101	108	559	552	7.0%
	Uterus	203	223	1,531	1,511	9.9%
Male	All sites	2,977	3,307	45,001	44,671	11.1%
	Bladder	48	53	1,762	1,757	11.3%
	Brain	46	49	739	736	6.5%
	Colorectal	268	300	6,643	6,611	11.9%
	Kidney	95	104	1,093	1,084	9.6%
	Leukaemias	131	143	1,711	1,699	9.2%
	Liver	137	151	541	527	10.3%
	Lung	598	672	4,372	4,298	12.4%
	Melanoma	40	43	4,972	4,969	8.1%
	Non-Hodgkin's lymphoma	103	113	1,664	1,654	9.3%
	Oesophagus	69	78	734	725	12.8%
	Oral cancers	91	100	908	899	9.5%
	Pancreas	73	82	816	807	11.7%
	Prostate	583	664	12,556	12,475	13.9%
	Stomach	159	176	1,005	988	10.6%
	Testis	144	148	606	602	2.6%
	Thyroid	37	40	226	223	8.3%

Conclusion

Our results suggest that substantial undercount of Māori cancer registrations still exist, despite the improvement in the count of Māori registrations from the new ethnicity algorithm. The undercount ranges from approximately 2% to 22% depending on age.

The undercount varies by level of deprivation, with a higher undercount among Māori living in less deprived areas, compared to Māori living in more deprived areas. Within each deprivation level, the age

pattern is fairly similar in shape, if not in magnitude, showing an increasing undercount with increasing age.

The profile of the undercount also varies by rural–urban status, with a higher undercount among middle aged and older Māori living in main urban areas compared to independent urban or rural areas but a lower undercount among young main urban residents. While there is a strong age gradient among Māori in main urban areas, there is very little variation by age among rural Māori. Māori living in independent urban communities have an age-related undercount intermediary between that of main urban and rural residents.

The adjusters applied in this chartbook increased the total number of Māori cancer registrations by around 10% (9.9% for females and 11.1% for males). The increase varies a little by cancer, with greater increases for cancers with an older age profile.

It is important to note that the adjusters were created using links close to the main time period of analysis, and may not be applicable to other time periods or databases. In addition, the new ethnicity algorithm applied to the cancer registrations by the Ministry of Health means that the ethnicity on cancer registrations is dynamic and is likely to change at each point of data extraction, even for the cancer registrations from the same time period.

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APPENDIX 4: STAGE AT DIAGNOSIS 2002–2006

Key Findings

- During the period 2002–2006, of the leading cancers, stage at diagnosis was unknown for the majority of prostate cancer registrations (around 75%), just under half of lung cancer registrations, and around 40% of cervical cancer registrations. A quarter of Māori stomach cancer registrations and a third of non-Māori also did not have stage recorded on the registration.
- Other cancers for which the majority of registrations had no stage at diagnosis recorded included cancers of the bladder, larynx, liver and oesophagus.
- Cancers with the lowest proportions of registrations with unknown stage at diagnosis (less than 10%) were cancers of the brain, colon, melanoma, ovary, testis, thyroid, and melanoma of the skin. Around 10% of uterine and kidney cancer registrations had no stage recorded.
- After adjusting for sex and age at diagnosis, Māori had significantly higher odds than non-Māori of having stage at diagnosis not recorded on the registration for female breast, colorectal, lung, and prostate cancers.
- The majority of breast, cervical, colorectal, and uterine cancers were diagnosed at localised or regional stage for both Māori and non-Māori, as were cancers of the kidney, testis, thyroid, uterus, and melanoma of the skin.
- Only a small proportion of lung, prostate cancers and around a third of stomach cancers were diagnosed at the early stages of disease spread. Similarly, less than 20% of cancers of the bladder, gallbladder, liver, oesophagus, and pancreas were diagnosed at localised or regional stages.
- Among those for whom stage information was recorded, Māori had lower odds than non-Māori of being diagnosed at a localised stage, and higher odds of being diagnosed at a distant stage for most of the leading cancers (breast, cervical, colorectal, lung, and prostate cancers), as well as for oral cancers and melanoma of the skin. Māori also had lower odds of being diagnosed at a localised stage for cancers of the testis and kidney, and higher odds of being diagnosed at a distant stage for cancer of the gallbladder, after adjusting for age at diagnosis.

The chapters on stage at diagnosis in the main body of this chartbook present data from the period 1996–2006 to inform the survival analyses. This appendix presents data on stage at diagnosis for the period 2002–2006 in order to fulfil a monitoring function related to efforts to increase equity in early diagnosis of cancer.

Table A4.1: Distribution of stage at diagnosis 2002–2006 (unadjusted)

Cancer		Total number	Localised		Regional		Distant		Unknown	
			Number	%	Number	%	Number	%	Number	%
Bladder	Māori	79	7	8.9	7	8.9	14	17.7	51	64.6
	Non-Māori	2,354	150	6.4	166	7.1	129	5.5	1,909	81.1
Bone	Māori	32	4	12.5	7	21.9	7	21.9	14	43.8
	Non-Māori	168	38	22.6	23	13.7	29	17.3	78	46.4
Brain	Māori	85	76	89.4	0	0.0	3	3.5	6	7.1
	Non-Māori	1,229	1,198	97.5	0	0.0	8	0.7	23	1.9
Breast: female	Māori	1,141	474	41.5	471	41.3	53	4.6	143	12.5
	Non-Māori	10,971	5,359	48.8	3,740	34.1	406	3.7	1,466	13.4
Cervix	Māori	134	45	33.6	9	6.7	24	17.9	56	41.8
	Non-Māori	695	320	46.0	62	8.9	57	8.2	256	36.8
Colorectal	Māori	491	107	21.8	183	37.3	137	27.9	64	13.0
	Non-Māori	13,118	3,581	27.3	5,486	41.8	2,488	19.0	1,563	11.9
Colon	*Māori*	*304*	*66*	*21.7*	*122*	*40.1*	*102*	*33.6*	*14*	*4.6*
	Non-Māori	*8,666*	*2,324*	*26.8*	*3,887*	*44.9*	*1,779*	*20.5*	*676*	*7.8*
Rectum	*Māori*	*187*	*41*	*21.9*	*61*	*32.6*	*35*	*18.7*	*50*	*26.7*
	Non-Māori	*4,452*	*1,257*	*28.2*	*1,599*	*35.9*	*709*	*15.9*	*887*	*19.9*
Gallbladder	Māori	31	3	9.7	4	12.9	13	41.9	11	35.5
	Non-Māori	457	51	11.2	96	21.0	132	28.9	178	38.9
Ill-defined sites	Māori	201	1	0.5	2	1.0	194	96.5	4	2.0
	Non-Māori	2,269	4	0.2	15	0.7	2,197	96.8	53	2.3
Kidney	Māori	144	67	46.5	29	20.1	35	24.3	13	9.0
	Non-Māori	1,726	857	49.7	245	14.2	381	22.1	243	14.1
Larynx	Māori	47	1	2.1	9	19.1	5	10.6	32	68.1
	Non-Māori	345	29	8.4	50	14.5	35	10.1	231	67.0
Liver	Māori	178	25	14.0	3	1.7	32	18.0	118	66.3
	Non-Māori	808	70	8.7	24	3.0	161	19.9	553	68.4
Lung	Māori	1,274	52	4.1	99	7.8	505	39.6	618	48.5
	Non-Māori	7,429	425	5.7	566	7.6	3,085	41.5	3,353	45.1
Melanoma	Māori	109	81	74.3	13	11.9	12	11.0	3	2.8
	Non-Māori	9,501	8,153	85.8	568	6.0	517	5.4	263	2.8
Mesothelial and soft tissue	Māori	92	31	33.7	4	4.3	15	16.3	42	45.7
	Non-Māori	1,052	203	19.3	65	6.2	168	16.0	610	58.0
Oesophagus	Māori	92	3	3.3	14	15.2	23	25.0	52	56.5
	Non-Māori	1,138	62	5.4	107	9.4	271	23.8	698	61.3
Oral cancers	Māori	122	18	14.8	50	41.0	12	9.8	42	34.4
	Non-Māori	1,397	411	29.4	420	30.1	79	5.7	487	34.9
Ovary	Māori	113	30	26.5	14	12.4	60	53.1	9	8.0
	Non-Māori	1,311	241	18.4	193	14.7	773	59.0	104	7.9
Pancreas	Māori	155	1	0.6	11	7.1	90	58.1	53	34.2
	Non-Māori	1,692	27	1.6	132	7.8	822	48.6	711	42.0

Table A4.1 (continued)

Cancer		Total number	Localised		Regional		Distant		Unknown	
			Number	%	Number	%	Number	%	Number	%
Prostate	Māori	583	46	7.9	31	5.3	44	7.5	462	79.2
	Non-Māori	12,557	1,898	15.1	614	4.9	681	5.4	9,364	74.6
Stomach	Māori	290	41	14.1	68	23.4	109	37.6	72	24.8
	Non-Māori	1,593	174	10.9	356	22.3	486	30.5	577	36.2
Testis	Māori	144	95	66.0	21	14.6	22	15.3	6	4.2
	Non-Māori	606	462	76.2	60	9.9	63	10.4	21	3.5
Thyroid	Māori	138	94	68.1	23	16.7	12	8.7	9	6.5
	Non-Māori	785	455	58.0	185	23.6	50	6.4	95	12.1
Uterus	Māori	203	116	57.1	48	23.6	22	10.8	17	8.4
	Non-Māori	1,531	902	58.9	306	20.0	146	9.5	177	11.6

Table A4.2: Māori:non-Māori odds ratios (ORs) for unknown stage at diagnosis, cancer registrations, adjusted for age and sex, 2002–2006

Cancer	OR	(95% CI)	p value
Bladder	**0.55**	**(0.34–0.90)**	**0.018**
Bone	0.93	(0.43–2.03)	0.86
Brain	1.64	(0.58–4.61)	0.35
Breast: female	**1.42**	**(1.17–1.73)**	**0.0003**
Cervix	1.39	(0.94–2.07)	0.10
Colorectal	**1.47**	**(1.12–1.94)**	**0.005**
Colon	*1.24*	*(0.71–2.16)*	*0.46*
Rectum	***1.64***	***(1.17–2.30)***	***0.004***
Gallbladder	1.62	(0.66–4.02)	0.29
Ill-defined sites	0.73	(0.26–2.08)	0.56
Kidney	1.12	(0.61–2.08)	0.72
Larynx	1.08	(0.56–2.10)	0.81
Liver	1.16	(0.81–1.67)	0.41
Lung	**1.61**	**(1.42–1.83)**	**<0.0001**
Melanoma of skin	1.16	(0.37–3.71)	0.80
Mesothelial and soft tissue	0.78	(0.50–1.22)	0.28
Oesophagus	1.32	(0.83–2.11)	0.24
Oral cancers	1.10	(0.74–1.63)	0.64
Ovary	1.66	(0.79–3.47)	0.18
Pancreas	1.18	(0.81–1.72)	0.38
Prostate	**1.41**	**(1.14–1.73)**	**0.001**
Stomach	0.99	(0.72–1.34)	0.93
Testis	1.11	(0.43–2.86)	0.82
Thyroid	0.56	(0.27–1.14)	0.11
Uterus	1.20	(0.70–2.08)	0.50

(1) An odds ratio of 1.00 means the odds of having unknown stage at diagnosis are the same for Māori and non-Māori. An odds ratio higher than 1 indicates higher odds for Māori, and an odds ratio lower than 1 indicates lower odds for Māori compared to non-Māori.

(2) Odds ratios in grey should be interpreted with caution due to the small number of registrations.

(3) Odds ratio in **bold** are statistically significant at the 5% level.

Table A4.3: Māori:non-Māori odds ratios (ORs) for localised or distant stage at diagnosis, cancer registrations, adjusted for age and sex (staged cancers only), 2002–2006

Cancer	Localised			Distant		
	OR	(95% CI)	p value	OR	(95% CI)	p value
Bladder	0.58	(0.23–1.46)	0.25	3.17	(1.37–7.33)	0.007
Bone	0.44	(0.13–1.47)	0.18	1.16	(0.40–3.41)	0.78
Brain						
Breast: female	**0.71**	**(0.62–0.81)**	**<0.0001**	**1.53**	**(1.13–2.06)**	**0.006**
Cervix	**0.45**	**(0.26–0.77)**	**0.004**	**4.11**	**(2.16–7.80)**	**<0.0001**
Colorectal	**0.78**	**(0.62–0.97)**	**0.026**	**1.59**	**(1.29–1.96)**	**<0.0001**
Colon	*0.76*	*(0.57–1.01)*	*0.056*	***1.74***	***(1.35–2.23)***	***<0.0001***
Rectum	*0.82*	*(0.57–1.20)*	*0.31*	*1.28*	*(0.86–1.91)*	*0.21*
Gallbladder	0.71	(0.19–2.59)	0.60	**2.93**	**(1.08–7.95)**	**0.035**
Ill-defined sites	1.47	(0.16–13.82)	0.74	1.26	(0.34–4.57)	0.73
Kidney	**0.65**	**(0.45–0.94)**	**0.022**	1.42	(0.93–2.16)	0.10
Larynx	0.22	(0.03–1.75)	0.15	1.08	(0.34–3.43)	0.89
Liver	1.50	(0.82–2.74)	0.19	0.89	(0.49–1.61)	0.69
Lung	**0.66**	**(0.48–0.89)**	**0.007**	**1.25**	**(1.02–1.53)**	**0.029**
Melanoma of skin	**0.30**	**(0.19–0.47)**	**<0.0001**	**3.05**	**(1.65–5.66)**	**0.0004**
Mesothelial and soft tissue	1.82	(0.98–3.36)	0.057	0.70	(0.37–1.34)	0.28
Oesophagus	0.45	(0.13–1.53)	0.20	0.90	(0.47–1.76)	0.77
Oral cancers	**0.34**	**(0.20–0.59)**	**0.0001**	**1.96**	**(1.00–3.81)**	**0.049**
Ovary	0.98	(0.61–1.59)	0.95	1.17	(0.76–1.80)	0.48
Pancreas	0.27	(0.04–2.04)	0.20	1.83	(0.96–3.47)	0.065
Prostate	**0.36**	**(0.24–0.54)**	**<0.0001**	**3.38**	**(2.13–5.39)**	**<0.0001**
Stomach	1.15	(0.77–1.71)	0.50	1.07	(0.79–1.47)	0.65
Testis	**0.60**	**(0.40–0.91)**	**0.017**	1.44	(0.84–2.46)	0.18
Thyroid gland	1.39	(0.91–2.12)	0.13	1.56	(0.79–3.10)	0.20
Uterus	0.74	(0.54–1.03)	0.073	1.27	(0.78–2.08)	0.33

(1) An odds ratio of 1.00 means the odds of having unknown stage at diagnosis are the same for Māori and non-Māori. An odds ratio higher than 1 indicates higher odds for Māori, and an odds ratio lower than 1 indicates lower odds for Māori compared to non-Māori.

(2) Odds ratios in **bold** are statistically significant at the 5% level.

(3) Odds ratios in grey should be interpreted with caution due to the small number of registrations. Missing odds ratios have been excluded due to insufficient numbers.

Table A4.4: Distribution of stage at diagnosis on cancer registration, numbers, % (unadjusted for age) by NZDep2001 quintile, 2002–2006

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Bladder	1	3	406	0	0.0	25	6.2	0	0.0	35	8.6	0	0.0	17	4.2	3	100.0	329	81.0
	2	9	434	1	11.1	23	5.3	2	22.2	36	8.3	3	33.3	27	6.2	3	33.3	348	80.2
	3	13	504	2	15.4	30	6.0	3	23.1	30	6.0	2	15.4	26	5.2	6	46.2	418	82.9
	4	18	600	3	16.7	39	6.5	0	0.0	34	5.7	4	22.2	35	5.8	11	61.1	492	82.0
	5	36	404	1	2.8	32	7.9	2	5.6	30	7.4	5	13.9	24	5.9	28	77.8	318	78.7
Brain	1	2	236	2	100.0	232	98.3	0	0.0	0	0.0	0	0.0	1	0.4	0	0.0	3	1.3
	2	4	241	4	100.0	238	98.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	1.2
	3	11	238	9	81.8	233	97.9	0	0.0	0	0.0	2	18.2	2	0.8	0	0.0	3	1.3
	4	32	298	30	93.8	287	96.3	0	0.0	0	0.0	0	0.0	3	1.0	2	6.3	8	2.7
	5	36	207	31	86.1	199	96.1	0	0.0	0	0.0	1	2.8	2	1.0	4	11.1	6	2.9
Breast: female	1	56	2,115	27	48.2	1,105	52.2	23	41.1	722	34.1	0	0.0	58	2.7	6	10.7	230	10.9
	2	96	2,216	46	47.9	1,109	50.0	34	35.4	742	33.5	3	3.1	64	2.9	13	13.5	301	13.6
	3	176	2,369	62	35.2	1,146	48.4	78	44.3	819	34.6	11	6.3	98	4.1	25	14.2	306	12.9
	4	278	2,419	108	38.8	1,157	47.8	128	46.0	804	33.2	12	4.3	102	4.2	30	10.8	356	14.7
	5	532	1,818	230	43.2	829	45.6	207	38.9	643	35.4	27	5.1	82	4.5	68	12.8	264	14.5
Cervix	1	2	106	1	50.0	51	48.1	0	0.0	12	11.3	0	0.0	8	7.5	1	50.0	35	33.0
	2	14	123	6	42.9	72	58.5	2	14.3	5	4.1	2	14.3	5	4.1	4	28.6	41	33.3
	3	24	150	9	37.5	66	44.0	6	25.0	17	11.3	3	12.5	11	7.3	6	25.0	56	37.3
	4	33	159	11	33.3	63	39.6	0	0.0	20	12.6	6	18.2	13	8.2	16	48.5	63	39.6
	5	61	154	18	29.5	67	43.5	1	1.6	8	5.2	13	21.3	20	13.0	29	47.5	59	38.3
Colorectal	1	32	2,197	7	21.9	577	26.3	11	34.4	938	42.7	8	25.0	404	18.4	6	18.8	278	12.7
	2	48	2,481	12	25.0	699	28.2	19	39.6	1,057	42.6	11	22.9	456	18.4	6	12.5	269	10.8
	3	84	2,897	18	21.4	793	27.4	29	34.5	1,227	42.4	26	31.0	552	19.1	11	13.1	325	11.2
	4	122	3,247	27	22.1	878	27.0	46	37.7	1,347	41.5	33	27.0	616	19.0	16	13.1	406	12.5
	5	204	2,263	43	21.1	629	27.8	78	38.2	900	39.8	58	28.4	454	20.1	25	12.3	280	12.4

Table A4.4 (continued)

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Kidney	1	8	270	5	62.5	142	52.6	0	0.0	39	14.4	2	25.0	55	20.4	1	12.5	34	12.6
	2	16	333	10	62.5	158	47.4	1	6.3	53	15.9	4	25.0	75	22.5	1	6.3	47	14.1
	3	21	378	8	38.1	180	47.6	4	19.0	68	18.0	6	28.6	77	20.4	3	14.3	53	14.0
	4	28	442	9	32.1	221	50.0	9	32.1	50	11.3	6	21.4	102	23.1	4	14.3	69	15.6
	5	71	294	35	49.3	150	51.0	15	21.1	34	11.6	17	23.9	70	23.8	4	5.6	40	13.6
Liver	1	6	105	1	16.7	12	11.4	0	0.0	3	2.9	1	16.7	25	23.8	4	66.7	65	61.9
	2	20	136	1	5.0	14	10.3	0	0.0	6	4.4	6	30.0	34	25.0	13	65.0	82	60.3
	3	16	155	7	43.8	9	5.8	1	6.3	3	1.9	2	12.5	29	18.7	6	37.5	114	73.5
	4	47	196	4	8.5	16	8.2	1	2.1	4	2.0	8	17.0	34	17.3	34	72.3	142	72.4
	5	89	206	12	13.5	18	8.7	1	1.1	8	3.9	15	16.9	36	17.5	61	68.5	144	69.9
Lung	1	51	906	2	3.9	72	7.9	5	9.8	78	8.6	20	39.2	361	39.8	24	47.1	395	43.6
	2	97	1,215	1	1.0	72	5.9	8	8.2	111	9.1	42	43.3	504	41.5	46	47.4	528	43.5
	3	161	1,629	11	6.8	93	5.7	14	8.7	124	7.6	58	36.0	708	43.5	78	48.4	704	43.2
	4	304	1,977	18	5.9	99	5.0	26	8.6	148	7.5	118	38.8	825	41.7	142	46.7	905	45.8
	5	657	1,675	20	3.0	89	5.3	45	6.8	105	6.3	266	40.5	668	39.9	326	49.6	813	48.5
Melanoma	1	10	1,895	9	90.0	1,661	87.7	1	10.0	84	4.4	0	0.0	93	4.9	0	0.0	57	3.0
	2	12	1,974	9	75.0	1,700	86.1	2	16.7	111	5.6	0	0.0	103	5.2	1	8.3	60	3.0
	3	20	2,127	16	80.0	1,840	86.5	2	10.0	119	5.6	2	10.0	111	5.2	0	0.0	57	2.7
	4	21	2,046	19	90.5	1,739	85.0	0	0.0	153	7.5	2	9.5	106	5.2	0	0.0	48	2.3
	5	46	1,432	28	60.9	1,190	83.1	8	17.4	100	7.0	8	17.4	102	7.1	2	4.3	40	2.8
Oesophagus	1	3	160	1	33.3	6	3.8	0	0.0	13	8.1	0	0.0	37	23.1	2	66.7	104	65.0
	2	10	208	1	10.0	9	4.3	2	20.0	18	8.7	3	30.0	54	26.0	4	40.0	127	61.1
	3	13	242	0	0.0	15	6.2	2	15.4	21	8.7	2	15.4	64	26.4	9	69.2	142	58.7
	4	22	318	0	0.0	18	5.7	3	13.6	35	11.0	8	36.4	66	20.8	11	50.0	199	62.6
	5	44	207	1	2.3	14	6.8	7	15.9	19	9.2	10	22.7	49	23.7	26	59.1	125	60.4

Table A4.4 (continued)

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Oral	1	7	213	2	28.6	64	30.0	3	42.9	62	29.1	0	0.0	8	3.8	2	28.6	79	37.1
	2	13	255	2	15.4	77	30.2	4	30.8	90	35.3	1	7.7	10	3.9	6	46.2	78	30.6
	3	18	301	4	22.2	85	28.2	8	44.4	97	32.2	0	0.0	18	6.0	6	33.3	101	33.6
	4	40	317	5	12.5	89	28.1	18	45.0	91	28.7	6	15.0	23	7.3	11	27.5	114	36.0
	5	44	302	5	11.4	96	31.8	17	38.6	78	25.8	5	11.4	19	6.3	17	38.6	109	36.1
Ovary	1	5	239	1	20.0	45	18.8	0	0.0	46	19.2	3	60.0	133	55.6	1	20.0	15	6.3
	2	10	251	4	40.0	42	16.7	0	0.0	36	14.3	5	50.0	157	62.5	1	10.0	16	6.4
	3	17	262	4	23.5	54	20.6	1	5.9	34	13.0	11	64.7	151	57.6	1	5.9	23	8.8
	4	26	312	4	15.4	53	17.0	4	15.4	39	12.5	15	57.7	196	62.8	3	11.5	24	7.7
	5	55	237	17	30.9	46	19.4	9	16.4	36	15.2	26	47.3	131	55.3	3	5.5	24	10.1
Pancreas	1	8	260	0	0.0	10	3.8	0	0.0	26	10.0	4	50.0	120	46.2	4	50.0	104	40.0
	2	16	305	1	6.3	4	1.3	0	0.0	27	8.9	11	68.8	161	52.8	4	25.0	113	37.0
	3	17	390	0	0.0	2	0.5	2	11.8	41	10.5	9	52.9	188	48.2	6	35.3	159	40.8
	4	29	420	0	0.0	7	1.7	3	10.3	24	5.7	17	58.6	197	46.9	9	31.0	192	45.7
	5	84	311	0	0.0	4	1.3	6	7.1	14	4.5	49	58.3	153	49.2	29	34.5	140	45.0
Prostate	1	27	2,369	1	3.7	450	19.0	1	3.7	122	5.1	2	7.4	84	3.5	23	85.2	1,713	72.3
	2	52	2,520	6	11.5	422	16.7	2	3.8	148	5.9	4	7.7	115	4.6	40	76.9	1,835	72.8
	3	85	2,692	8	9.4	397	14.7	2	2.4	144	5.3	5	5.9	139	5.2	70	82.4	2,012	74.7
	4	145	2,874	9	6.2	382	13.3	13	9.0	125	4.3	14	9.7	182	6.3	109	75.2	2,185	76.0
	5	271	2,055	22	8.1	239	11.6	13	4.8	74	3.6	18	6.6	152	7.4	218	80.4	1,590	77.4
Stomach	1	15	248	0	0.0	33	13.3	3	20.0	58	23.4	6	40.0	74	29.8	6	40.0	83	33.5
	2	21	290	5	23.8	33	11.4	3	14.3	74	25.5	11	52.4	85	29.3	2	9.5	98	33.8
	3	45	342	5	11.1	35	10.2	10	22.2	78	22.8	20	44.4	104	30.4	10	22.2	125	36.5
	4	48	388	7	14.6	39	10.1	13	27.1	87	22.4	19	39.6	111	28.6	9	18.8	151	38.9
	5	161	313	24	14.9	33	10.5	39	24.2	57	18.2	53	32.9	108	34.5	45	28.0	115	36.7

Table A4.4 (continued)

Cancer	NZDep 2001 quintile	Māori	Non-Māori	Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Total no.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Testis	1	7	107	4	57.1	84	78.5	1	14.3	12	11.2	2	28.6	7	6.5	0	0.0	4	3.7
	2	13	113	8	61.5	88	77.9	1	7.7	12	10.6	2	15.4	8	7.1	2	15.4	5	4.4
	3	22	130	14	63.6	105	80.8	6	27.3	10	7.7	2	9.1	11	8.5	0	0.0	4	3.1
	4	30	143	22	73.3	101	70.6	5	16.7	16	11.2	2	6.7	21	14.7	1	3.3	5	3.5
	5	72	110	47	65.3	81	73.6	8	11.1	10	9.1	14	19.4	16	14.5	3	4.2	3	2.7
Thyroid	1	9	146	3	33.3	92	63.0	4	44.4	33	22.6	1	11.1	6	4.1	1	11.1	15	10.3
	2	14	123	10	71.4	76	61.8	2	14.3	31	25.2	1	7.1	7	5.7	1	7.1	9	7.3
	3	16	161	12	75.0	99	61.5	2	12.5	34	21.1	0	0.0	4	2.5	2	12.5	24	14.9
	4	30	177	23	76.7	92	52.0	5	16.7	47	26.6	0	0.0	13	7.3	2	6.7	25	14.1
	5	69	174	46	66.7	95	54.6	10	14.5	40	23.0	10	14.5	18	10.3	3	4.3	21	12.1
Uterus	1	8	264	6	75.0	162	61.4	0	0.0	55	20.8	1	12.5	16	6.1	1	12.5	31	11.7
	2	15	265	8	53.3	158	59.6	4	26.7	55	20.8	2	13.3	21	7.9	1	6.7	31	11.7
	3	30	316	16	53.3	191	60.4	7	23.3	60	19.0	6	20.0	30	9.5	1	3.3	35	11.1
	4	45	358	29	64.4	208	58.1	11	24.4	72	20.1	0	0.0	38	10.6	5	11.1	40	11.2
	5	104	322	56	53.8	178	55.3	26	25.0	64	19.9	13	12.5	41	12.7	9	8.7	39	12.1

Table A4.5: Distribution of stage at diagnosis on cancer registration, numbers, % (unadjusted for age) by NZDep2001 quintile, 2002–2006

Cancer	Urban rural status	Total number		Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Māori	Non-Māori	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Bladder	Main urban	47	1,762	5	10.6	111	6.3	6	12.8	124	7.0	10	21.3	93	5.3	26	55.3	1,434	81.4
	Independent urban	15	366	1	6.7	23	6.3	1	6.7	22	6.0	2	13.3	22	6.0	11	73.3	299	81.7
	Rural		221	1	5.9	15	6.8	0	0.0	20	9.0	2	11.8	14	6.3	14	82.4	172	77.8
Brain	Main urban	54	932	47	87.0	910	97.6	0	0.0	0	0.0	1	1.9	5	0.5	6	11.1	17	1.8
	Independent urban	16	157	15	93.8	155	98.7	0	0.0	0	0.0	1	6.3	1	0.6	0	0.0	1	0.6
	Rural		131	14	93.3	124	94.7	0	0.0	0	0.0	1	6.7	2	1.5	0	0.0	5	3.8
Breast: female	Main urban	755	8,296	324	42.9	4,038	48.7	309	40.9	2,852	34.4	34	4.5	312	3.8	88	11.7	1,094	13.2
	Independent urban	231	1,545	92	39.8	733	47.4	95	41.1	510	33.0	15	6.5	57	3.7	29	12.6	245	15.9
	Rural	17	1,099	58	37.9	576	52.4	66	43.1	370	33.7	4	2.6	35	3.2	25	16.3	118	10.7
Cervix	Main urban	88	564	36	40.9	261	46.3	8	9.1	44	7.8	11	12.5	49	8.7	33	37.5	210	37.2
	Independent urban	28	76	5	17.9	29	38.2	1	3.6	9	11.8	5	17.9	7	9.2	17	60.7	31	40.8
	Rural	15	53	4	22.2	30	56.6	0	0.0	9	17.0	8	44.4	1	1.9	6	33.3	13	24.5
Colorectal	Main urban	308	9,451	64	20.8	2,568	27.2	113	36.7	3,955	41.8	92	29.9	1,741	18.4	39	12.7	1,187	12.6
	Independent urban	93	2,286	21	22.6	634	27.7	34	36.6	940	41.1	22	23.7	469	20.5	16	17.2	243	10.6
	Rural	153	1,349	22	24.7	373	27.7	36	40.4	574	42.6	22	24.7	272	20.2	9	10.1	130	9.6
Kidney	Main urban	102	1,247	51	50.0	616	49.4	19	18.6	182	14.6	20	19.6	267	21.4	12	11.8	182	14.6
	Independent urban	20	291	7	35.0	145	49.8	4	20.0	38	13.1	9	45.0	67	23.0	0	0.0	41	14.1
	Rural	18	179	9	40.9	90	50.3	6	27.3	24	13.4	6	27.3	45	25.1	1	4.5	20	11.2
Liver	Main urban	112	662	15	13.4	59	8.9	2	1.8	21	3.2	22	19.6	124	18.7	73	65.2	458	69.2
	Independent urban	31	87	4	12.9	5	5.7	0	0.0	0	0.0	4	12.9	22	25.3	23	74.2	60	69.0
	Rural	89	50	6	17.1	5	10.0	1	2.9	3	6.0	6	17.1	12	24.0	22	62.9	30	60.0
Lung	Main urban	760	5,459	29	3.8	319	5.8	68	8.9	440	8.1	309	40.7	2,262	41.4	354	46.6	2,438	44.7
	Independent urban	272	1,282	9	3.3	61	4.8	17	6.3	74	5.8	105	38.6	530	41.3	141	51.8	617	48.1
	Rural	22	662	14	5.9	45	6.8	13	5.5	52	7.9	90	37.8	275	41.5	121	50.8	290	43.8
Melanoma	Main urban	74	7,012	53	71.6	6,005	85.6	8	10.8	435	6.2	11	14.9	368	5.2	2	2.7	204	2.9
	Independent urban	23	1,352	18	78.3	1,151	85.1	4	17.4	79	5.8	0	0.0	91	6.7	1	4.3	31	2.3
	Rural	35	1,111	10	83.3	976	87.8	1	8.3	52	4.7	1	8.3	56	5.0	0	0.0	27	2.4

238

Table A4.5 (continued)

Cancer	Urban rural status	Total number		Localised				Regional				Distant				Unknown			
				Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori		Māori		Non-Māori	
		Māori	Non-Māori	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Oesophagus	Main urban	54	852	2	3.7	43	5.0	5	9.3	78	9.2	15	27.8	199	23.4	32	59.3	532	62.4
	Independent urban	20	177	0	0.0	12	6.8	4	20.0	17	9.6	5	25.0	43	24.3	11	55.0	105	59.3
	Rural		106	1	5.6	7	6.6	5	27.8	11	10.4	3	16.7	28	26.4	9	50.0	60	56.6
Oral	Main urban	75	1,024	12	16.0	274	26.8	30	40.0	317	31.0	7	9.3	67	6.5	26	34.7	366	35.7
	Independent urban	26	220	3	11.5	91	41.4	13	50.0	51	23.2	3	11.5	8	3.6	7	26.9	70	31.8
	Rural		144	3	14.3	45	31.3	7	33.3	51	35.4	2	9.5	3	2.1	9	42.9	45	31.3
Ovary	Main urban	70	1,011	17	24.3	181	17.9	11	15.7	157	15.5	35	50.0	590	58.4	7	10.0	83	8.2
	Independent urban	24	180	7	29.2	36	20.0	2	8.3	21	11.7	14	58.3	110	61.1	1	4.2	13	7.2
	Rural		110	6	31.6	23	20.9	1	5.3	13	11.8	11	57.9	68	61.8	1	5.3	6	5.5
Pancreas	Main urban	95	1,260	1	1.1	19	1.5	9	9.5	104	8.3	57	60.0	602	47.8	28	29.5	535	42.5
	Independent urban	31	262	0	0.0	3	1.1	1	3.2	20	7.6	18	58.1	124	47.3	12	38.7	115	43.9
	Rural		165	0	0.0	5	3.0	1	3.4	8	4.8	15	51.7	93	56.4	13	44.8	59	35.8
Prostate	Main urban	332	8,982	24	7.2	1,410	15.7	18	5.4	416	4.6	24	7.2	472	5.3	266	80.1	6,684	74.4
	Independent urban	137	1,986	15	10.9	233	11.7	6	4.4	90	4.5	9	6.6	130	6.5	107	78.1	1,533	77.2
	Rural		1,544	7	6.3	248	16.1	7	6.3	107	6.9	11	9.8	70	4.5	87	77.7	1,119	72.5
Stomach	Main urban	176	1,198	33	18.8	129	10.8	35	19.9	269	22.5	66	37.5	359	30.0	42	23.9	441	36.8
	Independent urban	64	243	5	7.8	26	10.7	19	29.7	49	20.2	25	39.1	84	34.6	15	23.4	84	34.6
	Rural		141	3	6.0	18	12.8	14	28.0	36	25.5	18	36.0	40	28.4	15	30.0	47	33.3
Testis	Main urban	107	471	72	67.3	356	75.6	14	13.1	47	10.0	16	15.0	51	10.8	5	4.7	17	3.6
	Independent urban	19	62	13	68.4	44	71.0	3	15.8	8	12.9	2	10.5	8	12.9	1	5.3	2	3.2
	Rural		70	10	55.6	59	84.3	4	22.2	5	7.1	4	22.2	4	5.7	0	0.0	2	2.9
Thyroid	Main urban	96	639	70	72.9	363	56.8	14	14.6	155	24.3	6	6.3	42	6.6	6	6.3	79	12.4
	Independent urban	17	81	9	52.9	50	61.7	4	23.5	17	21.0	4	23.5	3	3.7	0	0.0	11	13.6
	Rural		61	15	60.0	41	67.2	5	20.0	13	21.3	2	8.0	3	4.9	3	12.0	4	6.6
Uterus	Main urban	144	1,191	88	61.1	701	58.9	33	22.9	226	19.0	13	9.0	123	10.3	10	6.9	141	11.8
	Independent urban	31	212	15	48.4	123	58.0	7	22.6	52	24.5	4	12.9	15	7.1	5	16.1	22	10.4
	Rural		125	13	46.4	76	60.8	8	28.6	28	22.4	5	17.9	8	6.4	2	7.1	13	10.4