HAUORA

Māori Standards of Health IV

A Study of the Years
2000-2005

Te Rōpū Rangahau Hauora a Eru Pōmare
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TE RŌPŪ RANGAHAU HAUORA A ERU PŌMARE

UNIVERSITY
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SAPERE AUDE
Te Whare Wānanga o Otāgo

FOREWORD

E ngā mana
E ngā reo
Rau rangatira mā
Tēnā koutou, tēnā koutou.

Ki te kore ngā pūtake e mākūkūngia, e kore te rākau e tupu…
If the roots of the tree are not watered, the tree will never grow…

Writing this foreword is both an honour and a pleasure. An honour because of the opportunity to be associated with thoughtful and pertinent research in the area of my chosen profession, the Māori health sector. A pleasure because of the ease by which the words flowed from the tip of the pen as a result of the impact made from reading this edition of *Hauora: Māori Standards of Health* (*Hauora Māori*).

Since its inception, in 1980, *Hauora Māori* has been highly regarded, both as a reliable reference work and as an authentically Māori scientific analysis of health and related data.

This edition continues to build on that fine tradition of scientific inquiry. Moreover, the data and associated commentaries are not compiled in stereotypical form. Careful consideration has been given to the manner in which evidence has been presented and the commentaries are rightly written from Māori perspectives.

Obviously this edition of *Hauora Māori* will provide a valuable resource for students, policy makers, various academics and commentators, and a host of other readers. It will also undoubtedly contribute to vigorous debate. This has been the history of *Hauora Māori* since its inception and I am proud to have been an early supporter of both the concept of Māori researchers publishing their own work and also of helping them bring those concepts into reality.

Reality, of course, is what the *Hauora Māori* publications have dealt in since their original release and that reality has sometimes been grim: evidence of unequal treatment, lack of access contributing to health inequalities.

At no time, however, have the research team of *Hauora Māori* avoided the truth and this has added to its reputation for quality. That reputation continues, because of the continuous quality improvement principles which underpin the work ethos of the *Hauora Māori* research team. Therefore, lecturers and their students and other interested readers can rely upon the integrity of the data. Additionally, Māori health sector personnel will find this edition of *Hauora Māori* to be an indispensable resource. Decision making will be aided by reference to the work and it will contribute to informed decision making. In this age of a serious need for Māori health sector workforce development, staff training sessions within the health and disability support sectors will also benefit from the wealth of information contained in this edition.

Since the last publication of *Hauora Māori* there have been considerable structural changes to the publicly funded health sector. Today there are 21 district health boards (DHBs), all of which are charged with producing a Māori health plan. The primary health organisations (PHOs) are another powerful feature of the revised health sector landscape and they too are required to produce Māori health plans. These plans are designed to enable a more effective response to Māori and disability support needs within the various district health boards. This edition of *Hauora Māori* will contribute to the resources required by these organisations to ensure their planning is driven by factual information and is therefore an intelligently informed and planned response to need.

Māori health providers working in this current health sector environment will also benefit from this publication. I am confident that the innovative and unique capabilities of Māori provider organisations will enable them to apply the information derived from *Hauora Māori* to the benefit of their clientele. It has been my happy experience to witness the effectiveness of Māori decision making practices when the Māori decision makers have been provided with ample information to guide their decision making. This edition of *Hauora Māori* will be another tool they can add to their resources.

It has been said that every generation of Māori has had to confront its own obstacles. For example, for our 19th century tupuna it was the musket. In the 20th century the impact of the first and second world wars reached right into the lives of Māori whānau, hapū and iwi. Urbanisation and its subsequent negative effects upon our social cohesion and social strengths has been a major contributor to variability in the state of Māori wellness. However one thing is clear, proven beyond doubt by those of us describing ourselves through census data as Māori, and that is our resilience.

This resilience expresses itself in the increasing numbers of our population even though there is now a declining Māori birth rate. Our numbers now can give us confidence in the continuity of our cultural identity. There is no question, however, that we are still confronting obstacles. Tobacco, alcohol and other drugs continue to impede the full development potential of our race. These are our modern day obstacles that together we must deal with.

The publication of the *Hauora Māori* health data can help us confront those obstacles and help us to deal with them in our own unique and effective ways. Additionally, we should be unafraid to accept advice and offers of assistance when that advice and those offers help to empower our responsiveness to need, and improve the quality of care, and address the issues of Māori health inequalities. The *Hauora Māori* health data helps us and others to help ourselves.

It also provides information to help re-align the distribution of resources and to prioritise key areas of Māori health commencing with the ten health targets set for the nation, if we use our collective wisdom to improve and advance Māori health on all fronts.

Therefore, I am enthusiastic in encouraging and commending this edition of *Hauora Māori* to any and every person who seeks to expand their knowledge of the health status of we the tangatawhenua, or indigenous people of Aotearoa New Zealand.

Nā reira, tēnā anō koutou katoa.

Gwen Tepania-Palmer

MIHI

Whakarongo ake ai au
Ki te tangi a te manu nei
A te mātui, tūī, tūī, tuituia.
Tuia i runga, tuia i raro,
Tuia i waho, tuia i roto.
Tuia i te here-tangata,
Ka rongo te ao, ka rongo te pō.
Tuia i te muka tangata
I takea mai i Hawaiki-nui,
Hawaiki-roa, Hawaiki-pāmamao,
Te Hono ki Wairua,
Ki te whaiao, ki te ao mārama.
Tihei mauriora.

Tēnā rā koutou i ngā mihi ki ō tātou mate tārūrū nui
e hinga ake nei, ā, hinga ake nei.
Ko te mihi aroha ki a koe, e te tuahine, e Vera.
He kōtuku awe nui o te rāwhiti,
He kōtuku rerenga tahi.
Ka moe, whakaaio ki te mate.
Haere, haere, haere.

Pīata mai,
Pīata mai tō wairua.
He aha tērā e pīata mai ana?
E kare, ko tō wairua e,
E ko tō wairua e.

E te rangatira, e Denis,
moe mai ra i te kāinga tūturu mō tāua mō te tangata.
Tae atu ana koe ki ō tūpuna,
ki tō tuahine hoki, ko Miria.
Takoto mai kōrua te tutūtanga o te puehu,
te whiunga o te kupu i ngā wā takatū ai kōrua.
Heoi anō, e taea te aha atu i te tangi,
i te maumahara ki a rātou me tā rātou i mahi ai?

Nō reira, waiho ake rātou ki a rātou, tātou te mahuetanga mai o rātou mā,
ngā waihotanga mai e hapai nei i ō rātou wawata, tūmanako hoki.
Kia ora tātou.

E ngā maunga, e ngā awa, e ngā mana kōrerorero o ngā tai e whā,
Tēnā koutou, tēnā koutou, tēnā koutou katoa.

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E rau rangatira mā, kei te mihi te ngākau ki a koutou katoa.

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INTRODUCTION

This fourth edition of *Hauora: Māori Standards of Health* marks a new milestone in the assessment of Māori health status. The first volume of *Hauora*, published in 1980 and authored by Professor Eru Pōmare, profiled patterns of mortality for Māori and non-Māori over the 20-year period from 1955 to 1975. This volume drew attention to the fact that incidence and mortality from most of the common amenable diseases in this country were still appreciably higher among Māori compared with non-Māori.

The second volume of *Hauora*, authored by Gail de Boer and Eru Pōmare, was published in 1988. The volume included analysis for the years 1970 to 1984, and found that morbidity and mortality continued to be higher for Māori than for non-Māori. In addition, the Treaty of Waitangi, Māori concepts of health, and socioeconomic factors were considered as important influences on health.

Volume III of *Hauora*, authored by Eru Pōmare, Vera Keefe-Ormsby, Clint Ormsby, Neil Pearce, Papaarangi Reid, Bridget Robson and Naina Watene-Haydon in 1995, extended the analysis to assess Māori health trends for the years 1970 to 1991. This volume also profiled socioeconomic factors, health risk behaviours and health services as possible contributors to health status. Again, the volume highlighted the continued disparities between Māori and non-Māori in both disease incidence and mortality.

This fourth volume of the *Hauora* series examines the issues that previous volumes have canvassed and updates the series to the year 2005. This volume also reflects fifteen years of efforts to improve the quality of Māori health data. Māori are now counted accurately in death registrations and there have been significant improvements in morbidity data. This progress is valuable and must be continued.

The first three chapters situate the health statistics within the broader context. Chapter 1 outlines the research, writings and teachings that have influenced understandings of ethnic inequalities in health and sets the tone for how *Hauora* can be read and used. Issues surrounding the different definitions of Māori, as well as key demographic factors, are described in Chapter 2.

In the past decade, the role of social, economic and political influences on health and illness has been a rapidly developing focus of research. Chapter 3 presents information on selected socioeconomic determinants, as a context for understanding Māori health and inequalities in health. This chapter cannot canvas the full extent of this field but does provide some direction as to where to find further information.

The book then turns to the customary *Hauora* chapters. The comparison of Māori and non-Māori health continues for the years 2000 to 2005 in chapters on mortality, public hospitalisations, cancer and mental health. The methods that underpin these chapters are discussed fully in Appendix 1.

This volume of *Hauora* signals an extension of the review of Māori standards of health to include more topic and issue-based approaches. The growing body of Māori health professionals, including researchers, has enabled a range of people to write contributory chapters. The writers have delved into their own areas of interest and expertise to produce more in-depth accounts of particular health issues. Their writings represent their own understandings of the issues they have tackled, built up from their practice and/or research experiences and expertise. This volume includes chapters on cardiovascular disease; diabetes; respiratory disease; oral health; disability; sleep problems; occupational safety and health; health in prisons; and the National Primary Medical Care Survey.

The narratives and the photographs in this volume remind us that the statistics represent real people within whānau who often face the repercussions of serious health events. The narratives also speak to how people respond when faced with a life-changing health challenge.

An exploration of health inequalities is an essential, but by no means sufficient, component of our understanding of Māori health. The inequalities evident in these chapters speak to the (under)valuing of Māori lives and health within this country and the need for a system response that will address, rather than tolerate, Māori health disparities. Kaupapa Māori research is research that sets out to make a positive difference for Māori. This book is, therefore, about evidencing Māori health inequalities in order to prompt system change and increased responsiveness.

1 UNDERSTANDING HEALTH INEQUITIES[1]

Papaarangi Reid, Bridget Robson

Māori have the right to monitor the Crown and to evaluate Crown action and inaction.

This right is derived from different sources. Firstly, from our indigenous rights embodied in the United Nations Declaration on the Rights of Indigenous Peoples (United Nations 2007) and reinforced by the Treaty of Waitangi (CERD 2007). The primary right of indigenous peoples is to self-determination, which includes to name ourselves as tangata whenua and be recognised as such. As tangata whenua, our duty includes ensuring the wellbeing of all people in our territories, Māori and tauiwi. This necessitates Māori monitoring health, including any disparities in health outcomes between Māori and non-Māori.

Secondly, our right to monitor the Crown is derived from the consistent, comprehensive and compelling disparities in health outcomes, exposure to the determinants of ill-health, the lack of health system responsiveness and the under-representation of Māori in the health workforce. Despite the strength of these long-standing health inequalities, they do not create dismay, disbelief or horror. They have become an expected and accepted feature of Māori health. This acceptance and 'normalisation' of inequalities provides an excuse for government inaction.

Internationally this pattern of ethnic inequalities in health is repeated over and over. Research, both here and overseas, shows a complex, layered spectrum of factors associated with these inequalities that need to be addressed in order to eliminate inequalities and prevent their re-creation. National and international human rights conventions recognise the injustice of these inequalities as well as how they, in turn, generate further injustices. These human rights charters acknowledge that inequities are unjust and assert that where systematic inequalities exist governments have a duty to provide interventions such as affirmative action programmes and legislative protection (Bill of Rights Act 1990, NZ; Human Rights Act 1993, NZ; United Nations 1965, 1980, 2001). Despite this legal obligation to intervene, efforts to reduce and prevent ongoing inequalities in health between Māori and non-Māori continue to be met with powerful resistance by non-Māori, who benefit from them and by those Māori recruited to support this resistance.

What are health inequalities?

Disparities in health status between different groups within a population are found worldwide. These include disparities by age, gender, socioeconomic position, ethnicity, impairment and geographical region. In Aotearoa, ethnic inequalities between Māori and non-Māori are the most consistent and compelling inequities in health (Ajwani et al 2003; Ministry of Health and University of Otago 2006).

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[1] This chapter is adapted from Reid P, Robson B. 2006. The state of Māori health. In: M Mulholland (ed) *State of the Māori Nation: Twenty-First Century Issues in Aotearoa*. Auckland: Reed.

Health inequalities, or more correctly health inequities, are defined as "differences which are unnecessary and avoidable, but in addition are considered unfair and unjust" (Whitehead 1992, p. 431). The word 'inequities' is preferred as not all inequalities are unexpected or unfair. For example, men get prostate cancer but women cannot and women get cervical cancer and men cannot. These are inequalities (differences) but not inequities (unfair). Equity, like fairness, is an ethical concept based in a model of justice where distribution of resources ensures everyone has at least their minimum requirements. It does not necessarily mean that resources are equally shared; rather, it acknowledges that sometimes different resourcing is needed in order that different groups enjoy equitable health outcomes.

Health equity is defined as 'the absence of systematic disparities in health (or in the determinants of health) between different social groups who have different levels of underlying social advantage/disadvantage – that is, different positions in a social hierarchy' (Braveman and Gruskin 2003, p. 254). This concept of health equity focuses attention away from the individual and her/his health. Instead it monitors how resources, including health services, are distributed to the community. This includes evaluating the processes that determine how resources are shared and the underlying values of society.

The word 'inequalities' in this country is widely used to mean inequities, as are the terms disparities and gaps. In this volume of *Hauora*, we have also chosen to use these terms interchangeably.

Colonisation and health inequalities

It is impossible to understand Māori health status or intervene to improve it without understanding our colonial history. Central to colonisation is creating a 'new history'. In this 'new history' indigenous knowledge and beliefs are relabelled as myths, legends and superstition. The land gets 'discovered' by colonisers and the landscape is renamed. Unless we recognise colonisation as a deliberate and continuous process it is easy to assume that colonising events are accidental, inevitable and over. We must never assume that colonisation is something confined to our past. The confiscation of Māori rights to the foreshore and seabed confirms colonisation as our constant contemporary.

Ward Churchill (1996) notes that colonisation is based on dehumanising indigenous peoples. Dehumanisation occurs on a spectrum from genocide to neglect, from paternalism to romanticism. This dehumanisation depends on colonisers having a central belief in their own superiority and that they therefore have superior rights to the territory and resources of indigenous peoples.

This colonial belief in white superiority is born from a racist ideology. The concept of 'race' is derived from the simplistic presumption that there is a hierarchy of peoples from black to white, where white is proposed to be more advanced genetically, biologically, intellectually, socially, culturally and spiritually. This idea of a hierarchy of different 'races', has long been discredited, yet the term 'race' still has popular useage even today, with expressions like 'race-based funding'. This return to discredited terminology suggests that the foundations of white superiority are still alive and well in our country today.

In essence, colonisation permits the (mis)appropriation and transfer of power and resources from indigenous peoples to the newcomers. This process of transfer is enabled by layer upon layer of new systems established to determine how resources will be obtained and how they are to be redistributed and to whom. These systems, therefore, construct who will benefit and be privileged.

These new systems are built on new values: they promote new ideas about who is normal (and therefore who is not); who is knowing and who is ignorant; who is civilised and who is barbaric; who is deserving and who is undeserving; and who is good and who is bad. Through this process Māori move from being normal to being 'different' from Pākehā, non-Māori, non-indigenous norms. Māori rights as tangata whenua are appropriated as we become marginalised, reclassified and scrutinised as 'outsiders'.

The new society promotes that their new systems provide equal opportunity for all participants. When unequal Māori outcomes are apparent, the problem is said to lie with Māori through any mix of inferior genes, intellect, education, aptitude, ability, effort or luck. This type of colonial thinking, where the 'problem' or 'deficit' lies with Māori, is called 'deficit theory' or 'victim blame' analysis (Ryan 1976; Valencia 1997). Reports using this analysis seek to brainwash both Māori and non-Māori into believing that the problem is located with us and only us. It ignores system and structural bias. The focus on Māori as 'the problem' ensures that the outcomes of non-Māori are never closely examined and Pākehā privilege never exposed (Fine et al 1997). Evidence repeatedly suggests that Māori are receiving lower levels of health services and poorer quality of service. If Māori are getting less, non-Māori are getting more. Any discussion on equity and rights must be informed by acknowledging this preferential benefit accrued by Pākehā from the systems they introduced and built, and continue to refine and control.

Unequal Māori health outcomes are often represented in terms of increased Māori health needs. Jackson (2002) proposes that it is more appropriate for us to frame Māori health needs as arising as a consequence of our indigenous rights being breached. Recently, both here and internationally, there has been increasing focus on health as an important indicator of human rights, with a growing number of documents discussing the parameters of our right to health (see United Nations 2007).

Understanding causes of ethnic inequalities in health

Some commentators interpret persisting ethnic inequalities in health as evidence of significant genetic or cultural differences between ethnic groups. They hold that what ethnicity measures are factors inherent within the group. However, others disagree and suggest that the health disadvantage measured by ethnicity is external to the group. It stems from the ways in which ethnicity is perceived by and acted on by others (Nazroo 1999).

> The view of ethnicity as a *natural* division between social groups allows the *description* of ethnic variations in health to become their *explanation*. So, explanations are based on cultural stereotypes or suppositions about genetic differences rather than attempting to assess directly the nature and importance of such factors. (Nazroo 1999, p.219)

Krieger (2001) supports the notion that different understandings of ethnic disparities are polarised around two different theoretical positions. First, "the racialised expressions of biology" (Krieger 2001, p. 696), where the different health experienced by ethnic groups is thought to be derived from the groups' different biology or genetic mix. Second, where ethnic inequalities in health result from processes related to "the biological expressions of racism" (Krieger 2001, p. 696), as our social environment and our place in the social hierarchy shape our bodies.

The term 'racism' makes many people uncomfortable. To clarify the term, Jones (2000) differentiates between three types of racism:

1. *Institutionalised racism* is defined as "differential access to the goods, services, and opportunities of society by race[2]" (Jones 2000, p. 1212). It is illustrated by the different distributions of Māori and non-Māori across deprivation deciles, income brackets and occupational classes (Howden-Chapman and Tobias 2000). These differences will mean that these two population groups have different capacities to participate in various activities, make a full range of choices, to be represented and to be heard.
2. *Interpersonal racism* is defined as "prejudice and discrimination, where prejudice means differential assumptions about the abilities, motives and intentions of others according to their race and discrimination means differential actions towards others according to their race" (Jones 2000, pp.1212–1213). We have seen recent examples in the differential treatment of Māori seeking employment or rental housing (Harris et al 2006a, Harris et al 2006b). Jones notes that this personal aspect of racism is what most people think of when they hear the word 'racism'.
3. *Internalised racism* is defined as "acceptance by members of the stigmatised races of negative messages about their own abilities and intrinsic worth" (Jones 2000 p.1213). It is manifest when Māori are anti-Māori.

To accept that environmental factors such as racism can influence our physical health we have to visualise a pathway that enables this. Krieger and colleagues (1993) argue that our social environment affects our bodies just as our physical environment does. It shapes what we know, how we understand the world and relate to it, the level of access we have to societal resources and opportunities, as well as our ability to navigate our way through social systems. A critical measure in this model is power and control. It is demonstrated by whether we feel our opinions are heard and respected and whether we believe that we have any choices in, or control over our lives (Krieger 2001). Societies that foster or permit racism, sexism, homophobia and stigma against disabled people have underlying beliefs about the value of peoples they consider different or inferior. These values impact on health and shape inequalities between groups.

Jones (2001) further suggests there are three main pathways that contribute to ethnic inequalities in health:

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[2] 'Race' is not used as a biological construct reflecting innate differences but a social construct that captures the impacts of racism.

1. *Differential access to the determinants of health or exposures leading to differences in disease incidence*. New Zealand evidence includes the very different profile of Māori to non-Māori with respect to the determinants of health such as education, employment, income, housing, income support, dealings with the criminal justice system, health literacy, deprivation, etc (Ministry of Social Development 2006). These factors also pattern exposures to other risks like tobacco use, poor nutrition, overcrowded and substandard housing, unsafe workplaces, problem gambling, and 'binge' patterns of alcohol use (Howden-Chapman and Tobias 2000; Jarvis and Wardle 1999; Shaw et al 1999).
2. *Differential access to health care.* Examples include: Māori experiencing longer and slower pathways through health care (Sadler et al 2004); hospitalisation rates that are disproportionately low in disease categories where Māori have high death rates and a health service configuration where people without access to transport or resources have more difficulty attending health services for both treatment and prevention (Ministry of Health 2006a).
3. *Differences in the quality of care received.* Evidence of Māori being less likely to receive appropriate levels of care is seen in screening for and treatment of ischaemic heart disease (Bramley et al 2004), pain relief during labour and childbirth (Ministry of Health 2006b), the diagnosis and treatment of depression (Arroll et al 2002), diabetes screening and management (Ministry of Health 2005), and higher levels of adverse events in hospital (Davis et al 2006).

In New Zealand, we have direct evidence linking the personal experience of racial discrimination to poorer health outcomes (Harris et al 2006a). In this national survey Māori reported the highest prevalence of 'ever' experiencing racial discrimination (34%) and were also more likely to report experiencing multiple types of discrimination than other ethnic groups. Therefore, any adverse health outcomes as a result of racism will disproportionately impact on Māori. Socioeconomic inequalities (as a marker of institutional racism) and experience of interpersonal racial discrimination appeared to account for much of the inequality between Māori and Pākehā (Harris et al 2006b).

That anyone should experience racial discrimination is an unacceptable breach of human rights. The findings of this work support the growing body of evidence that racism is a major determinant of health and fundamental driver of ethnic inequalities that must be addressed in order to improve Māori health outcomes and reduce inequalities.

The health status of every population is patterned by a great many influences in complex and layered ways that must be understood in order that health interventions be successful. Māori health status in the current context is likely more complex because of the overlay of indigeneity. Commentators who propose simplistic descriptions of our health, or those based on shallow analyses, seek to deny us the right to this complexity and the right to fully resourced and informed solutions.

Conclusion

There are different views on how to describe Māori health status. These various views debate which measures of health are appropriate, valid and meaningful; what are the current and evolving health challenges facing Māori; what are the likely underlying causes; where (and how) should we intervene; what resources (human, financial and knowledge) are needed to improve Māori health outcomes and eliminate inequalities; and how should progress be monitored. Recognising the diversity of views and opinions in Māori health, in this section we have highlighted various reference points that assist us to understand Māori health within the context of indigenous rights. These issues, in turn, promote approaches to monitoring and intervening for Māori health development.

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2 THE MĀORI POPULATION

Donna Cormack

> Māori are tangata whenua. Not people in the land or over the land, but people of it. (Jackson 1993, p.71)

Key points

- There were 565,329 people who identified as belonging to the Māori ethnic group in the 2006 Census, representing 15% of the total population.
- 18% of the total population (643,977 people) indicated in the 2006 Census that they had Māori ancestry.
- The Māori population continues to grow. Those identifying with Māori ethnicity increased by 7% between the 2001 and 2006 censuses, and by 30% since 1991. The Māori ancestry group also increased by 7% between the 2001 and 2006 censuses, and by 26% since the 1991 census.
- The Māori population is relatively young, with 35% of Māori aged less than 15 years, and 53% aged less than 25 years in 2006. However, the population is ageing overall and the proportion of older Māori (those aged 65 years and over) is projected to increase.
- In spite of a slight narrowing of the gap in life expectancy at birth between Māori and non-Māori in recent years, stark disparities remain.
- Fertility has decreased for both Māori and non-Māori in the last 50 years, but remains higher for Māori. In 2004, the fertility rate for Māori women was 2.7, compared with 1.9 for non-Māori women. The median age at birth of first child for Māori women was 26 years.
- The majority of Māori live in the North Island (87%) and in urban areas. Māori are more mobile than non-Māori, and were slightly more likely to have moved in the five years between the 2001 and 2006 census.

Introduction

The Māori population can be described and defined in a number of ways, reflecting the diversity and dynamism of the population as well as changes in approaches to counting and describing Māori over time and context. Understanding the different ways in which the Māori population is measured and its demographic makeup provides an important background to discussions of Māori health and, in particular, Māori health statistics.

Any discussion of the Māori population must reiterate that tangata whenua rights do not depend on the numbers of Māori in the population. Even if there were only one Māori in the country that one Māori would still have all the rights of indigenous peoples. Thus indigenous rights prevent the 'minoritisation' of indigenous peoples and the subordination of their needs and interests to the 'greater good' (Churchill 1994; Trask 1999).

This chapter first describes how Māori have been and are currently recorded in official statistics and then outlines the demographic profile of the Māori population as a context to the data and discussions about Māori health presented in this book. To this end, the chapter focuses principally on definitions and data drawn from official statistics, while recognising that these may not reflect the different ways in which Māori define themselves.

Definitions of the Māori population in official statistics

Estimates of the Māori population in official statistics are often drawn from the population census. There have been significant changes over time to the way in which ethnicity data has been collected and reported in Aotearoa/New Zealand in official data collections such as the population census. Of significance, this includes a move away from 'biological' definitions of Māori based on 'degrees of blood' (noted as a strategy in limiting government obligations to indigenous peoples), to definitions based on affiliation and self-identification with an ethnic group. In line with this, the ethnicity question in the population census has also changed over time and since 1986 has provided for people to self-identify with more than one ethnic group.[1]

The monitoring of trends over time has been affected by these changes in the definition of ethnicity, but also by the changes in the question used to collect ethnicity data in the five-yearly population census. For example, the ethnicity question in the census changed in the successive 1991, 1996, and 2001 censuses. In particular, the 1996 Census ethnicity question encouraged multiple ethnic affiliations in comparison to the 1991 Census question. In 2001 the census reverted to the 1991 question, and this question was retained for the 2006 Census (Figure 2.1).

The census also contains questions on Māori ancestry (Figure 2.2) and iwi affiliation, which provide other ways of measuring Māori populations. There are three broad

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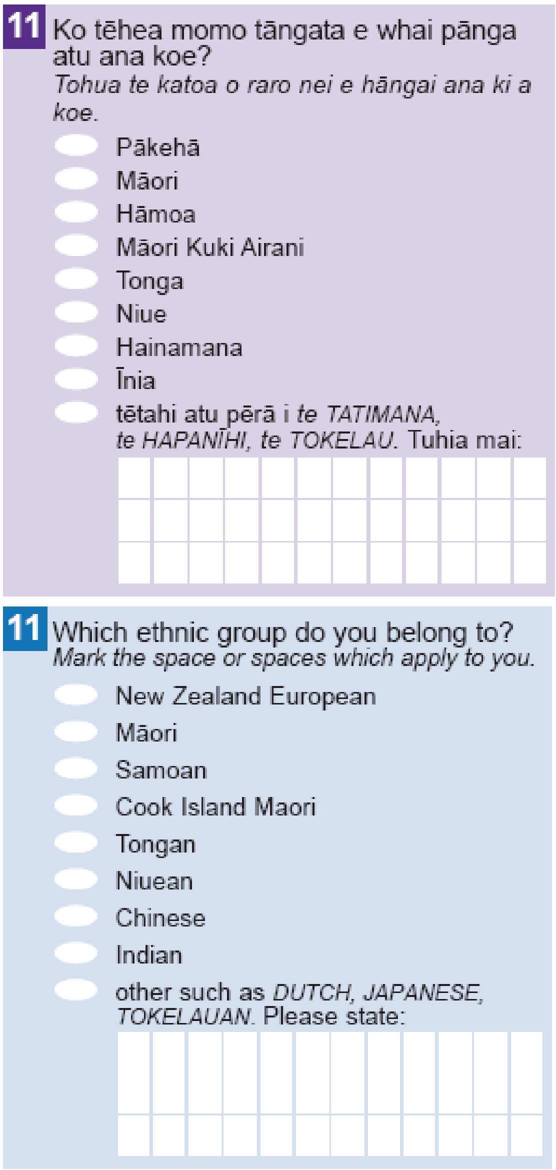
[1] More indepth discussions of ethnicity data issues are available in several documents including Robson and Reid (2001) and Te Rōpū Rangahau Hauora a Eru Pōmare (2000).

Māori populations that can be produced from this current census information. These are:

- ***Māori ethnic group:*** all those who identified Māori as at least one of their ethnic group affiliations (2006 = 565,329)
- ***Sole Māori:*** those who identified solely with Māori on the ethnicity question (2006 = 289,500)
- ***Māori ancestry:*** all those who identified as having Māori ancestry in the ancestry question (2006 = 643,977).

Figure 2.1: 2006 Census ethnicity question



11 Ko tēhea momo tāngata e whai pānga atu ana koe?

Tohua te katoa o raro nei e hāngai ana ki a koe.

○ Pākehā
○ Māori
○ Hāmoa
○ Māori Kuki Airani
○ Tonga
○ Niue
○ Hainamana
○ Īnia
○ tētahi atu pērā i te *TATIMANA, te HAPANĪHI, te TOKELAU*. Tuhia mai:

11 Which ethnic group do you belong to?

Mark the space or spaces which apply to you.

○ New Zealand European
○ Māori
○ Samoan
○ Cook Island Maori
○ Tongan
○ Niuean
○ Chinese
○ Indian
○ other such as *DUTCH, JAPANESE, TOKELAUAN*. Please state:

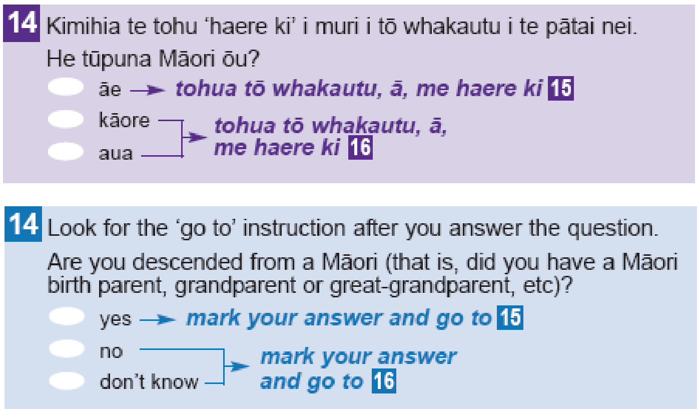
Source: Statistics New Zealand 2006

For some purposes, Māori are defined both through ancestry and self-identification. Māori populations can also be defined at other levels, for example iwi and hapū.

Māori ancestry in official statistics

The ancestry question in the population census provides a count of people of Māori ancestry that is important for constitutional and legal arrangements in Aotearoa/New Zealand, including the right to enrol on the Māori electoral roll and to take a claim to the Waitangi Tribunal. In the 2006 Census, 643,977 people identified that they had Māori ancestry, 17.7% of the total population of Aotearoa/New Zealand. There were a number of people who identified with the Māori ethnic group, but indicated that they did not know if they had Māori ancestry (6,795) or did not have Māori ancestry (4,059) (Statistics New Zealand 2007c).

Figure 2.2: 2006 Census Māori ancestry question



14 Kimihia te tohu 'haere ki' i muri i tō whakautu i te pātai nei.
He tūpuna Māori ōu?
○ āe → *tohua tō whakautu, ā, me haere ki* **15**
○ kāore → *tohua tō whakautu, ā, me haere ki* **16**
○ aua → *tohua tō whakautu, ā, me haere ki* **16**

14 Look for the 'go to' instruction after you answer the question.
Are you descended from a Māori (that is, did you have a Māori birth parent, grandparent or great-grandparent, etc)?
○ yes → *mark your answer and go to* **15**
○ no → *mark your answer and go to* **16**
○ don't know → *mark your answer and go to* **16**

Source: Statistics New Zealand 2006

Information on iwi affiliation is also collected in the census for those people who identify that they have Māori ancestry. Of the 643,977 persons stating that they had Māori ancestry in the 2006 Census, 80% identified affiliation with one or more of the iwi listed in the iwi classification.

Growth in the Māori population

Māori continue to make up a growing proportion of Aotearoa/New Zealand's population. In 2006, 565,329 people identified with the Māori ethnic group, making up 15% of the total population, an increase of 7% since the 2001 Census and of 30% since the 1991 Census (Statistics New Zealand 2007c). The number of people identifying as having Māori ancestry was 643,977 in the 2006 Census, an increase of 7% since the 2001 Census and 26% since the 1991 Census (Statistics New Zealand 2007c). The following table shows growth in the Māori populations between 1991, 2001 and 2006 Censuses (Table 2.1).

Table 2.1: Māori population, 1991–2006 Censuses

Definition	1991	2001	2006
Māori only	323,998	294,726	289,500
Māori ethnic group	434,847	526,281	565,329
Māori ancestry	511,278	604,100	643,977

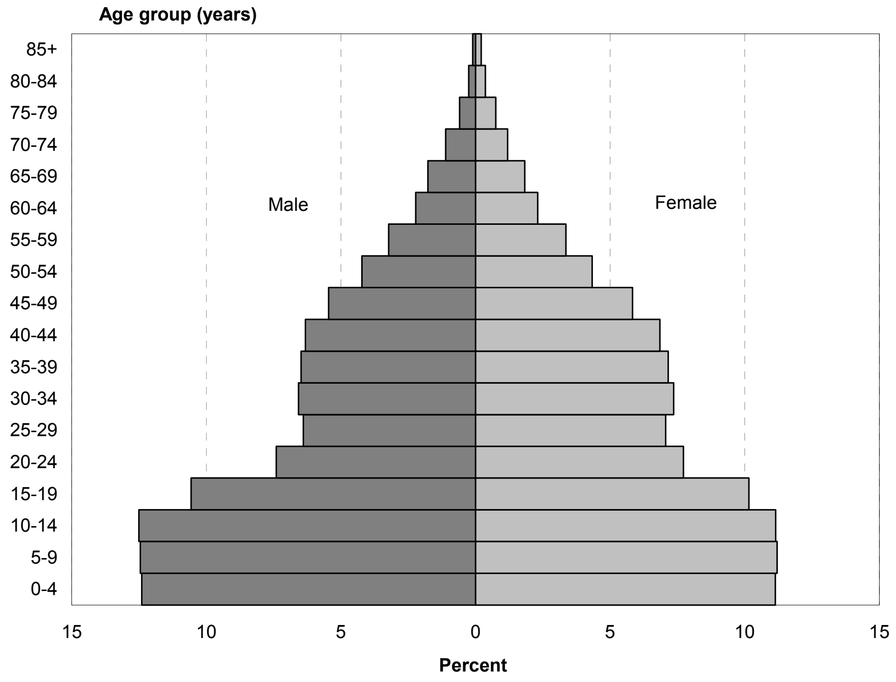
Note: Changes in classifications and questions between Censuses mean that comparisons should be interpreted with caution.

It is projected that the Māori population will continue to increase, although more slowly than in the past (Statistics New Zealand 2005a).[2] Statistics New Zealand estimate that the Māori ethnic group will increase by 28% by 2021, to make up 17% of the total population. In contrast, the European population is projected to increase by 5% by 2021 (Statistics New Zealand 2005b). The drivers of Māori population growth include higher fertility rates and a younger age structure with more people in the main childbearing ages (Statistics New Zealand 2005a).

Age distribution

In 2006, 35% of the Māori population was aged less than 15 years, and 53% were aged less than 25 years (Statistics New Zealand 2007c). The median age for Māori was 23 years in 2006, an increase from 22 years in 2001. This compares with a median age of 36 years for the total population in 2006, reflecting the youthful Māori population. The median age for Māori is projected to increase to 27 years in 2021, as the population ages. The number of Māori children is projected to increase in coming years, although they will make up a smaller proportion of the Māori population in 2021 (Statistics New Zealand 2005a). The proportion of Māori aged 65 years and older is also growing, increasing from 3% in 2001 to 4% in 2006, and projected to increase to an estimated 8% by 2021 (Statistics New Zealand 2005a).

Figure 2.3: Age distribution of the Māori population, males and females, 2006



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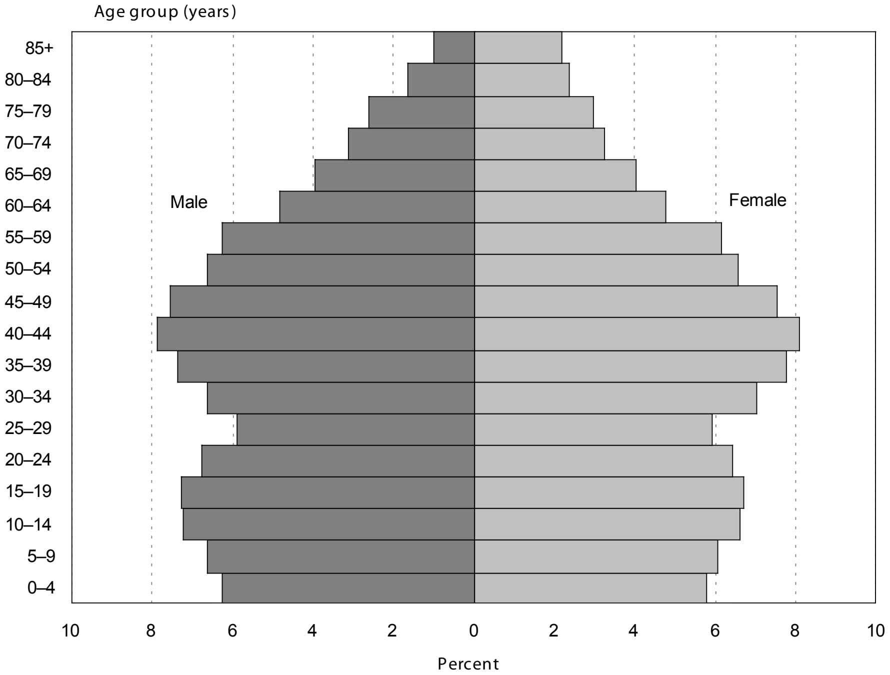
[2] The population projections included in this chapter are based on the Statistics New Zealand Series 6 projections from the 2001 Census. Series 6 assumes medium fertility, medium mortality, medium migration and medium inter-ethnic mobility (Statistics New Zealand 2005b).

Figure 2.4: Age distribution of the non-Māori population, males and females, 2006



Source: Statistics New Zealand 2007

Life expectancy

From the 1950s to the 1980s there was an increase in life expectancy at birth for both Māori and non-Māori. However, during the 1980s and 1990s, Māori life expectancy increased only slightly, while non-Māori life expectancy increased steadily. This led to a widening disparity in life expectancy during this period (Ajwani et al 2003).

For the 2000–2002 period life expectancy at birth was 69.0 years for Māori males and 77.2 years for non-Māori males. For Māori females life expectancy at birth was 73.2 years, compared with 81.9 years for non-Māori females. There was a slight closing of the gap in life expectancy between Māori and non-Māori, from 8.2 years in 1995–1997 to 7.6 years in 2000–2002 (a reduction of 0.6). However, stark disparities in life expectancy between Māori and non-Māori remain (Ministry of Social Development 2006).

Life expectancy varies at different ages, as it is an estimate of how long people could be expected to live at different stages of their life (Table 2.2).

Figure 2.5: Life expectancy at birth, by gender and ethnicity, 1951–2001

Note: This figure includes adjusted life expectancy using data from the New Zealand Census Mortality Study (Ajwani et al 2003). This life expectancy data adjusts for the undercount of Māori deaths during the 1980s and 1990s due to issues with the collection of ethnicity data.

Source: Ajwani et al 2003; Statistics New Zealand

Table 2.2: Life tables for the Māori and non-Māori population, by gender, 2000–2002

Age	Expected years of life remaining (years)		Expected years of life remaining (years)	
	Māori female	Non-Māori female	Māori male	Non-Māori male
0 years	73.2	81.9	69.0	77.2
25 years	49.3	57.7	45.6	53.3
45 years	30.4	38.3	27.3	34.4
65 years	15.1	20.2	12.7	16.9
85 years	5.2	6.5	5.2	5.2

Note: Age is calculated in exact years.

Source: Statistics New Zealand 2004

Fertility

Fertility has fallen for both Māori and non-Māori over the last 50 years.[3] However, the total fertility rate[4] for Māori remains higher than for non-Māori. The fertility rate for Māori females was 2.7 in 2004, compared with 1.9 for non-Māori females (Ministry of Health 2006). The fertility rate for Māori decreased to 2.6 in 2005 (Statistics New Zealand 2007b), but remains well above replacement level. The median age at

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[3] It is difficult to have accurate estimates of the fertility rate over time due to changes in the way in which ethnicity data has been collected on birth registrations since 1996. This means that rates from 1996 onwards cannot be compared directly with earlier rates.

[4] According to Statistics New Zealand, the total fertility rate reflects the "average number of births a woman would have during her life if she experienced the age-specific fertility rates of that year. It excludes the effect of mortality" (Statistics New Zealand 2006).

childbirth has increased over time for both Māori and non-Māori. In 2004 the median age at childbirth for Māori females was 26 years, compared with 30 years for the total population (Statistics New Zealand 2007b).

Geographical distribution and migration

According to the 2006 Census, 87% of Māori live in the North Island (Statistics New Zealand 2007c). Most Māori live in urban areas (areas with a population of more than 30,000). However, Māori are also more likely to live in minor urban areas (areas with a population between 1,000 and 9,999) when compared with the total population (13% and 8% respectively) (Statistics New Zealand 2002).

Table 2.3 contains the Māori and non-Māori populations of each District Health Board (DHB), by age group.

Table 2.3: District Health Board populations, by age group, Māori and non-Māori, 2006

DHB	0–14 years		15–24 years		25–44 years		45–64 years		65+ years		Total	
	Māori	Non-Māori	Māori	Non-Māori	Māori	Non-Māori	Māori	Non-Māori	Māori	Non-Māori	Māori	Non-Māori
Northland	15,555	19,242	6,849	10,302	10,794	24,882	7,473	31,776	2,685	18,696	43,518	104,982
Waitemata	15,303	89,250	7,881	59,826	12,315	130,719	6,024	107,160	1,263	51,738	42,891	438,750
Auckland	8,742	67,344	5,694	61,524	9,348	126,834	4,740	81,633	1,212	37,611	29,862	375,030
Counties-Manukau	25,308	86,751	12,051	53,043	18,216	105,858	9,564	84,132	1,989	36,267	67,251	365,823
Waikato	23,778	53,505	12,354	36,537	17,772	72,393	10,269	69,855	2,829	39,921	67,488	271,746
Bay of Plenty	16,200	27,396	7,314	15,270	11,859	36,996	7,734	41,241	2,313	28,614	45,624	149,289
Tairawhiti	6,804	4,842	3,141	2,613	5,100	6,105	3,564	6,960	1,197	4,167	19,767	24,735
Lakes	10,968	12,852	5,256	7,218	8,376	18,363	5,094	18,510	1,452	10,284	31,374	66,942
Taranaki	5,649	17,061	2,802	10,290	4,155	23,043	2,397	23,487	717	14,712	15,828	88,494
Hawke's Bay	12,102	21,957	5,718	12,546	8,892	29,181	5,466	31,893	1,515	19,041	33,909	114,372
Whanganui	5,106	8,718	2,526	5,346	3,726	11,517	2,337	13,230	702	9,075	14,412	47,796
MidCentral	9,849	24,063	5,088	19,014	7,044	33,885	3,732	33,879	957	21,330	26,709	132,144
Hutt	7,686	23,157	3,888	14,604	6,084	33,024	3,156	29,064	525	14,853	21,474	114,612
Capital & Coast	8,592	43,329	5,229	37,137	8,031	77,226	3,783	55,158	771	27,243	26,502	240,189
Wairarapa	2,067	6,102	909	3,315	1,356	7,734	879	9,957	267	6,048	5,496	33,123
Nelson–Marlborough	3,840	21,927	1,923	12,762	2,976	31,080	1,725	34,569	405	18,762	10,953	119,106
Canterbury	11,814	79,890	6,444	60,027	9,219	122,397	4,749	109,071	1,134	61,635	33,459	432,945
West Coast	1,005	5,430	444	2,928	690	7,698	423	8,358	105	4,206	2,925	28,407
South Canterbury	1,182	9,342	570	5,238	744	12,225	477	14,382	153	9,564	3,162	50,712
Otago	3,699	28,224	2,682	29,004	2,895	42,189	1,608	43,125	399	25,494	11,469	167,925
Southland	3,828	17,973	2,109	11,583	2,988	28,086	1,746	24,615	537	13,326	11,304	95,526

Source: Public Health Intelligence, Ministry of Health

Māori are slightly more mobile than non-Māori. Sixty percent of Māori changed their place of residence between the 2001 and 2006 Censuses, compared with 54.8% for the total population (among those aged over five years) (Statistics New Zealand 2007a). It is likely that this mobility is influenced by differences in age structure and home ownership for Māori and non-Māori (Statistics New Zealand 2005a). Information on migration for Māori is limited, as ethnicity data is no longer collected for arrivals into and departures from New Zealand. It is therefore difficult to have reliable intercensal estimates of migration in and out of New Zealand.

Summary

The Māori population is a youthful and growing population. Although there will be more older Māori (as a proportion) in coming years, Māori will continue to have a relatively young population. Fertility rates for Māori women are higher than those for non-Māori, and well above replacement level, contributing to the growing Māori population. The demographic profile of Māori, including those measures briefly outlined in this chapter, is important in understanding the current context of Māori health, but also in planning effectively and appropriately for the future.

There are a number of ways in which Māori are defined in official statistics. Having an overview of these ways helps us to interpret health statistics and understand something more about the context of health status and disparities in health experiences and outcomes. They also provide us with tools to monitor the Crown. While these definitions are important in this sense, they do not diminish the rights of Māori, as individuals and collectives, to define ourselves in our own ways for our own purposes.

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3 SOCIAL AND ECONOMIC INDICATORS

Bridget Robson, Donna Cormack, Fiona Cram

Introduction

In Aotearoa/New Zealand and internationally there is increasing recognition of the role that various social, economic, environmental, and political factors play in determining health experiences and outcomes for individuals and social groups (Howden-Chapman & Tobias 2000; Wilkinson & Marmot 2003). These factors include such determinants as income, employment status, housing, education, social position, and social exclusion. They can have both direct and indirect impacts on health, as well as having interrelated and cumulative effects over lifetimes.

In many countries there is evidence of a social gradient in health, with those in more advantaged positions enjoying generally better health and lower mortality (Wilkinson & Marmot 2003). In addition, there is growing acknowledgement that disparities in health between different ethnic groups are a consequence of inequalities in the way in which the determinants of health are distributed in society (Robson 2004). In Aotearoa/New Zealand there is clear evidence of the differential distribution of social, environmental, economic, and political determinants of health for Māori and non-Māori.

The right to health cannot be realised if structural inequities in the presence of social, economic, environmental and political determinants of health exist. This chapter focuses on some social and economic indicators of health for Māori, including education, employment and unemployment, income, housing, living standards, deprivation, justice, racism, and language. These indicators need to be understood within the context of the underlying fundamental causes of the differential distribution of social and economic determinants by ethnicity in Aotearoa/New Zealand, namely colonisation and racism.

Education

> "Indigenous peoples have the right to establish and control their educational systems and institutions providing education in their own languages, in a manner appropriate to their cultural methods of teaching and learning. Indigenous individuals, particularly children, have the right to all levels and forms of education of the State without discrimination." United Nations Declaration on the Rights of Indigenous Peoples, Article 14 (UN 2007).

Education is fundamental to the full development of human potential. Māori communities have made a major contribution to education in Aotearoa/New Zealand with the development of the kohanga reo movement, kura kaupapa, wharekura and wānanga. Kaupapa Māori education has led to greater participation in education by Māori at all levels (Te Tāhuhu o te Mātauranga 2006). In addition, programmes such as Te Kotahitanga (Bishop et al 2003) have been developed to mitigate the inequitable teaching provided to Māori students for many decades (Alton-Lee 2003) and lift the teacher performance and engagement with Māori students. However, such programmes are not yet widespread and recent statistics show that too many schools are still failing to provide high quality education to Māori children.

- In 2005 Māori secondary school students were more than twice as likely as non-Māori students to be granted an early-leaving exemption (13% compared to 5%), three times more likely to be suspended from school, and twice as likely to have left school by age 16 (Te Tāhuhu o te Mātauranga 2006).
- In 2005 49% of Māori secondary school students left school without an NCEA qualification, compared to 22% of non-Māori. Only 9% of Māori students left school with an NCEA qualification allowing them to enter university, compared to 34% of non-Māori students (Ministry of Education 2007).
- Between 1997 and 2006 the number of kohanga reo decreased from 675 to 486 and the number of children participating decreased from 13,000 to 9,500. 26,340 Māori students (16%) and 3,000 non-Māori students were enrolled in Māori-medium schools in 2006, 17,000 receiving at least half the curriculum in te reo Māori (Ministry of Education 2007).
- In 2003 the age-standardised tertiary education participation rate for Māori was 20.2%, higher than any other ethnic group. However, a large proportion of Māori students were studying at certificate level. Certificate level students carry a larger student loan debt five years after study, reflecting notably lower earnings. Māori with bachelors' degrees or postgraduate qualifications also had notably higher average leaving loan balances than non-Māori (Te Tāhuhu o te Mātauranga 2006).

During the past 20 years educational qualifications have become an increasingly critical determinant of employment and occupational status. University qualifications now confer a 62% lifelong privilege in earnings (Salmond 2003). The three wānanga, Te Wānanga o Raukawa, Te Wānanga o Awanuiārangi and Te Wānanga o Aotearoa, have been critical in providing Māori controlled and Māori medium tertiary education and staircasing Māori students to higher education. Nevertheless, failure of the school system to perform equitably for Māori transfers the cost of attaining an education onto Māori. The lifetime cost of obtaining an education is thus disproportionately higher on average for Māori.

Employment and unemployment

> "Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and protection against unemployment." Universal Declaration of Human Rights, Article 23 (1) (UN 1948).

The right to work underpins the realisation of other rights including the right to housing, education, and a standard of living adequate for maintaining health and wellbeing (Human Rights Commission 2004). Occupational gradients in health have been well-described, with poorer health among those in unsafe, insecure, low-control and poorly paid jobs (Shaw et al 1999). Redundancy and unemployment are associated with poorer health outcomes (Keefe et al 2002; Blakely et al 2003). Māori work opportunities and work conditions were differentially impacted by economic and social policies of the 1980s and 1990s. The differential position of Māori in the labour market (i.e., both having a job or not and the type of job or occupation) accounted for a significant proportion of the widening gaps in mortality rates between Māori and non-Māori during the 1980s and 1990s (Ministry of Health & University of Otago 2006).

- Unemployment rates for Māori have decreased from 13.0% in 2001 to 7.6% in June 2007 but remain three times higher than that of Pākehā aged 15 years and over (2.6%), and similar to that of the Pacific population (7.8%) (Statistics NZ 2007a; Department of Labour 2007).
- Youth unemployment is particularly high, with 21.4% of Māori aged 15–19 years unemployed in June 2007. This compares to 11.4% of Pākehā and 25.7% of Pacific youth (Statistics NZ 2007b).
- There are differences in the occupational distribution of Māori and non-Māori. In 2006 Māori were most likely to be employed in service industries (16.7%), and as plant/machine operators and assemblers (16.4%) (Department of Labour 2006).
- There is evidence that Māori face discrimination in the labour market – in getting a job, in the type of job obtained, and the wages paid for a particular type of work (Sutherland and Alexander 2002; Alexander et al 2003).

Income

> "Everyone has the right to a standard of living adequate for the health and wellbeing of himself and of his family." Universal Declaration of Human Rights, Article 23(1) (UN 1948)

There is well-established evidence of the relationship between income and health. In general, lower incomes are associated with higher morbidity and mortality for many illnesses and injuries. In addition, among both Māori and non-Māori, death rates of those on high incomes declined more sharply in recent years than those of people with low or middle incomes (Blakely et al 2007). The income gap between Māori and non-Māori remains substantial:

- The median annual income for Māori adults (those aged 15 years and over) in 2006 was $20,900, compared with $24,400 for the total population. The median annual income was $25,900 for Māori males and $17,800 for Māori females (Statistics New Zealand 2007a).
- The average weekly income (from all sources) for Māori was $471 for the June 2005 quarter, compared with $637 for European/Pākehā, $412 for Pacific peoples and $415 for Other ethnic groups (Statistics New Zealand 2005). According to Statistics New Zealand, this is in part reflective of differences in age structure.

- The average hourly rate of pay for Māori grew from $13.8 in 2000 to $17.3 in 2006, while the total New Zealand wage grew from $15.6 to $20.0 (Department of Labour 2006). While there is a gender pay gap in Aotearoa/New Zealand, the ethnic pay gap is larger than the gender pay gap, with Māori women experiencing both an ethnic and gender pay gap (Ministry of Women's Affairs 2001).
- Māori were disproportionately represented in the lowest equivalised household income quintile (25% compared to 15% of European/Pākehā people) and under-represented in the highest income quintile (12% of Māori compared to 24% of European/Pākehā) in 2004. Pacific and Other ethnic groups were also skewed to the lowest income quintile (Perry 2007).
- The proportion of Māori children living in poverty (a household income below 60% of the median, after housing costs) peaked at around 50% in 1994 then declined by 2004 but remains very high at 27% (compared to 16% of European and 40% of Other ethnic groups) (Perry 2007).

Living standards

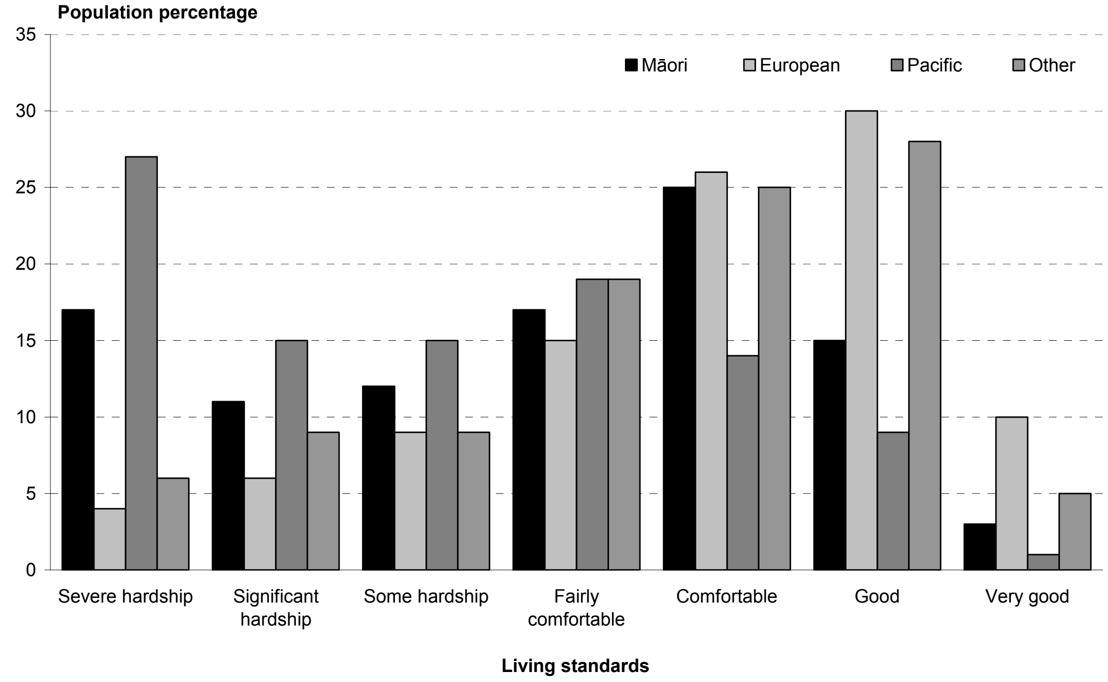
> "States parties recognise the right of every child to a standard of living adequate for the child's physical, mental, spiritual, moral and social development." United Nations Convention on the Rights of the Child, Article 27 (1) (UN 1989).

In Aotearoa/New Zealand the Ministry of Social Development measures living standards of 'economic family units' through a national survey, using the Economic Living Standard Index (ELSI). This Index considers a range of indicators, including income, assets, access to amenities and services, activities and so on (Jensen et al 2006). Childhood hardship not only affects the health of the child, but also has long-term negative impacts over the life course. The living standards of children are therefore of particular significance.

- Living standards for Māori in 2004 were significantly lower on average than for the total population, a pattern also evident in the 2000 Living Standards Survey (Jensen et al 2006).
- Although there was little change overall in average living standards for Māori between 2000 and 2004, there was an increase in the proportion of Māori experiencing 'severe hardship' from 7% in 2000 to 17% in 2004. Forty percent of Māori families and 19% of European families were living in hardship in 2004. Over half of Pacific families were living in some degree of hardship (58%) (Jensen et al 2006).
- Beneficiary families with dependent children were particularly vulnerable to depressed living standards, experiencing a fall in living standards between 2001 and 2004 with 74% living in hardship by 2004 (Jensen et al 2006). In 2006, 93,423 Māori children (45.9%) were living in families dependent on an income-tested benefit compared to 29.6% of Pacific and 12.3% of Pākehā children (Wynd 2006).

Current family assistance policies have a discriminatory impact disadvantaging Māori children. Children of beneficiaries are excluded from the "In Work Payment" that replaced the child tax credit in April 2006. Yet, due to economic policies that put more Māori out of work in the 1980s and 1990s, an education system that continues to fail Māori at an unacceptable rate, and a discriminatory job market and housing market, a relatively high proportion of Māori families require a benefit to survive (whether ACC, sickness, unemployment, domestic purposes or student allowance). Susan St John (in press) identifies that social welfare policies designed to reward work rather than alleviate child poverty have introduced "an unfortunate degree of discrimination against the non-working poor". Māori children and their future wellbeing continue to be most affected.

Figure 3.1: Living standards distributions by ethnicity, 2004



Source: Jensen et al 2006

Housing

> "The International Covenant on Economic, Social and Cultural Rights (ICESCR) provides the most significant legal source of the right to adequate housing. Article 11(1) recognises the right of everyone to an adequate standard of living for himself and his family, including housing, and to the continuous improvement of living conditions." (Human Rights Commission 2004).

Access to safe, secure and good quality housing is an important determinant of good health (Howden-Chapman & Carroll 2004). Household crowding, poor dwelling conditions, and insecure tenure impacts on education, health and access to local services (James 2007). There are significant differences in access to high quality housing for Māori and non-Māori in Aotearoa/New Zealand.

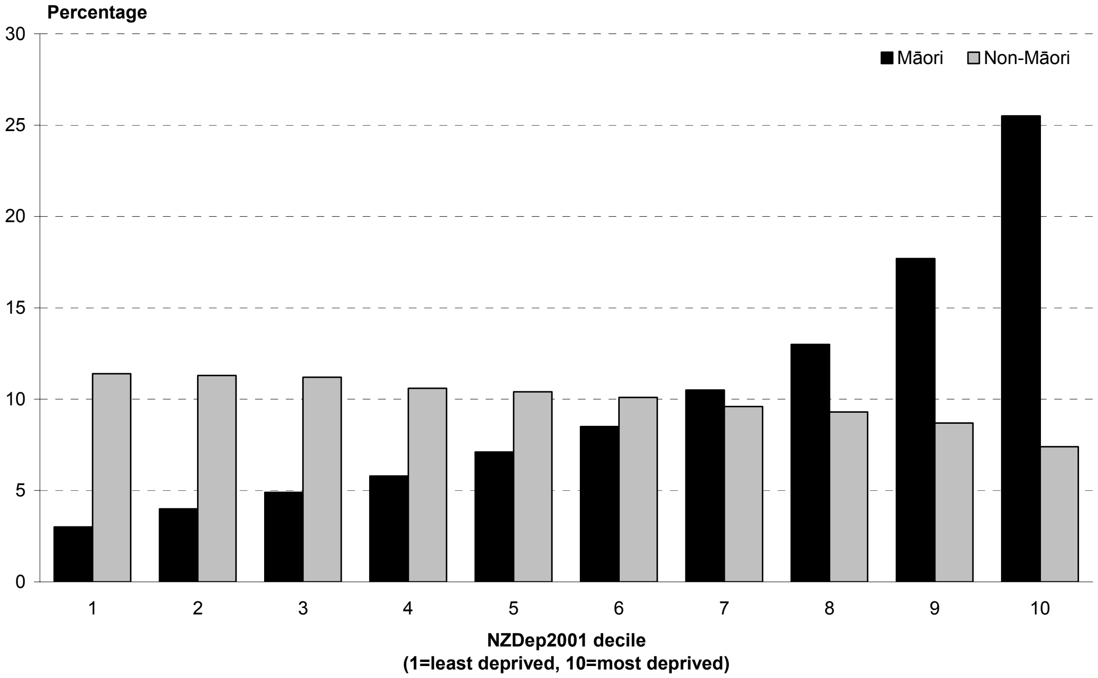
- The Ministry of Women's Affairs identified that Māori are more likely to be in rental or temporary accommodation, and to be living in crowded housing environments than non-Māori (Ministry of Women's Affairs 2001).
- There was an increase in renting among all ethnic groups between 1991 and 2001. In 2001 over 50% of Māori households (households with one or more people of Māori ethnicity) were renting, up from approximately 45% in 1991. Although the percentage of European households renting increased from 28.9 in 1991 to 32.2 in 2001, the proportion remains lower than for other ethnic groups including Māori (Statistics New Zealand 2002).
- In 2001, 31.7% of Māori owned or partly owned their home. This compared with 59.7% of Europeans, 38.8% of Asians, 26.0% of Pacific peoples, and 24.2% of Other ethnic groups (Statistics New Zealand 2002).
- Discrimination in renting or buying a house was the most frequent type of 'unfair treatment' discrimination reported by Māori in the 2002/03 New Zealand Health Survey (Harris et al 2006a). Housing discrimination was significantly associated with a higher risk of smoking and poor mental health (Harris et al 2006b).

Small area socioeconomic deprivation

Small area deprivation is one way of measuring socioeconomic position and has a clear association with mortality and morbidity in New Zealand. The NZDep index uses the population census to measure area-based relative deprivation (see Appendix 1: Methods, for further discussion). It draws on nine variables from the five-yearly population census to assign a deprivation score to each meshblock in Aotearoa/New Zealand, with 1 being the least deprived areas and 10 being the most deprived. In an equitable society, 10% of the Māori population and 10% of the non-Māori population would reside in each decile.

- There is a significant disparity in the distribution of deprivation in Aotearoa/New Zealand. The proportion of Māori living in very deprived areas is significantly higher for Māori than for non-Māori, with over half of the Māori population represented in the most deprived deciles.
- This trend has changed little since 1996.

Figure 3.2: Distribution of deprivation by ethnicity 2001



Source: Ministry of Health

Justice

> "All are equal before the law and are entitled without any discrimination to equal protection of the law." Universal Declaration of Human Rights, Article 7 (UN 1948).

There is evidence of bias against Māori within the justice system in Aotearoa/New Zealand. Māori are more likely to be apprehended by the police than non-Māori at a level not explained by self-reported offending (Fergusson et al 1993). A higher level of public and police vigilance against Māori is likely to be a contributing factor, supported by evidence that young Māori are more likely to come to notice for less serious offences than non-Māori (Maxwell et al 2004).

- Although Māori youth are arrested on average for less severe offences, they are more frequently referred by the police to the Youth Court for minor offences, rather than directly for family group conference. This results in more serious outcomes for young Māori (Maxwell et al 2004). High arrest rates are likely to be contributing to Māori employment disadvantage (Hunter 2005).
- Māori offenders have higher rates of conviction than non-Māori offenders with similar offending history and socioeconomic background (Fergusson et al 2003).
- Differential access to legal information, legal advice and legal representation limits Māori access to justice (Law Commission 2004).
- The Ministry of Justice forecasts an increase of 19% to 25% in the size of the imprisoned population (Wang 2006). This has serious implications for Māori

futures given the current extremely high incarceration rates for young Māori men – 2% for those aged 20–29 years in 2003 (Table 3.1). These high imprisonment rates also mask the true unemployment rate for Māori men.

- Māori were at greater risk of being a victim of a crime in 2005 than other groups, particularly confrontational offences. Risk of victimisation was also associated with sole parenthood, being unemployed or on a benefit, living in rented accommodation, living in socioeconomically deprived areas, and being of younger age (15–29 years) (Mayhew & Reilly 2007).

Table 3.1: Sentenced male prisoners, 2003

Age (years)	Māori		Non-Māori		Rate ratio
	Number	Rate per 1,000 population	Number	Rate per 1,000 population	
14–19	176	4.76	141	0.97	4.92
20–24	486	20.32	412	3.49	5.81
25–29	475	22.11	390	3.87	5.71
30–34	397	18.29	409	3.44	5.31
35–39	315	15.62	317	2.51	6.22
40–49	340	9.98	462	1.81	5.52
50–59	87	4.33	227	1.08	4.01
60+	34	2.08	100	0.36	5.79

Source: Department of Corrections 2004

Racism

> "States parties condemn racial discrimination and undertake to pursue by all appropriate means and without delay a policy of eliminating racial discrimination in all its forms and promoting understanding among all races."
> International Convention on the Elimination of All Forms of Racial Discrimination, Article 2 (UN 1965).

Within New Zealand and internationally racism is recognised as an important social determinant of health and inequalities (Jones 2001, Krieger 2003, Nazroo 2003, Williams 1997, Ministry of Health 2002). There are many forms of racial discrimination that can affect health in different ways. In New Zealand there is direct evidence linking self-reported experience of interpersonal racial discrimination to poorer health outcomes (Harris et al 2006b).

Results from a national survey asked adults (15 years and older) about their experiences of racial discrimination in various settings (Harris et al 2006b). It showed that Māori reported the highest prevalence of 'ever' experiencing racial discrimination compared to other ethnic groups.

- 8.5% of Māori reported 'ever' being the victim of an ethnically motivated physical attack compared to 3.4% of Europeans. 24.5% of Māori reported 'ever' being the victim of an ethnically motivated verbal attack compared to 10.3% of Europeans (Harris et al 2006a).
- Māori were more likely than Europeans to report 'ever' being treated unfairly because of their ethnicity by a health professional (4.5% versus 1.5%), at work

(5.6% versus 2.1%) and when renting or buying a house (9.5% versus 0.7%) (Harris et al 2006a).

- Māori were almost ten times more likely to experience racial discrimination in three or more settings than were European participants (4.5% versus 0.5%) (Harris et al 2006a).
- Overall, a third of Māori reported 'ever' experiencing any of the types of racial discrimination asked about in this study (Harris et al 2006a, Harris et al 2006b).

Language

> "Indigenous peoples have the right to revitalize, use, develop and transmit to future generations their histories, languages, oral traditions, philosophies, writing systems and literature, and to designate and retain their own names for communities, places and persons." United Nations Declaration on the Rights of Indigenous Peoples, Article 13 (UN 2007).

- According to the 2006 Census, almost a quarter of Māori (23.8%) speak more than one language (Statistics NZ 2007a).
- The 2006 Māori language survey shows an increase in proficiency among Māori adults as well as increasing use of the Māori language. In 2006, 27% of Māori adults reported speaking te reo Māori with some degree of proficiency and 43% reported listening proficiency (Te Puni Kōkiri 2007).
- There is a high degree of support among Māori adults for te reo Māori and significant increases in support from non-Māori, although non-Māori participation in te reo increased only slightly between 2000 and 2006 (Te Puni Kōkiri 2006).

Tōku reo, tōku ohooho. Tōku reo, tōku māpihi maurea.

Conclusion

The right of everyone to the enjoyment of the highest attainable standard of physical and mental health encompasses the essential conditions of health, including the right to be free from discrimination. Inequity in the distribution of social, economic, environmental, cultural and political resources must be addressed for the full potential of Māori health to be realised.

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4 MORTALITY

Bridget Robson, Gordon Purdie

Key points

- There were 2,650 deaths a year on average among Māori during 2000–2004. A third occurred in middle age (45–64 years) and 40% among those aged 65 years and over. In the non-Māori population there were 25,300 deaths a year on average, 80% occurring among those aged 65 years or more. The younger age distribution of deaths among Māori was partly due to the young population structure and partly due to higher death rates at younger ages.
- The age-sex-standardised all-cause mortality rate for Māori was twice that of non-Māori (434 per 100,000 and 213 per 100,000 respectively). The Māori/non-Māori rate ratio was highest in the 45–64 year age group and lowest in the 1–4 year age group.
- Māori males had the highest mortality rates in each age group. Māori females had higher death rates than non-Māori males in all age groups except 15–24 years. In each age group death rates were lowest among non-Māori females.
- Mortality rates increased with increasing area socioeconomic deprivation among both Māori and non-Māori. Māori are disproportionately represented in the most deprived areas and, therefore, at higher risk of death overall compared to non-Māori. In addition, within each level of deprivation Māori death rates were higher than those of non-Māori at the same level.
- Cardiovascular disease (heart disease and stroke) was the most common cause of death among Māori accounting for a third of all Māori deaths. Just over a quarter of Māori deaths were caused by cancer. Respiratory disease and accidents caused 8% each, diabetes 7% and suicide 3%.
- Cardiovascular disease death rates were 2.3 times higher for Māori than for non-Māori during 2000–2004. Cancer mortality rates were 77% higher and accidental deaths 94% more common. Deaths due to respiratory disease were 2.6 times more frequent among Māori. The type 2 diabetes mortality rate was seven times the non-Māori rate. The age-sex-standardised rate of suicide was 49% higher among Māori.
- During the five-year period 2000–2004 there was a significant downward trend in all-cause mortality rates for Māori females and for Māori and non-Māori males. Māori death rates decreased for ischaemic heart disease, chronic rheumatic heart disease, heart failure, meningococcal infection, premature birth and SIDS, some cancers (leukaemia, rectal and pancreatic cancers) and diabetes mellitus. There were significant increases among Māori in deaths due to accidental poisoning and exposure to inanimate mechanical forces among Māori.

- Māori infant death rates were 64% higher than those of non-Māori. Perinatal conditions (premature birth in particular) and sudden infant death syndrome (SIDS) were major causes of death among Māori infants.
- Accidents were the main causes of death among Māori children aged 1–4 years. All-cause death rates were 36% higher for Māori compared to non-Māori children.
- Accidents were the most common cause of death among Māori children aged 5–14 years, followed by cancer. Suicide was the fourth most frequent cause of death. All-cause mortality was 47% higher for Māori children in this age group.
- Accidents and suicide were the main causes of death among Māori aged 15–24 years, accounting for 70% of all deaths in this age group. All-cause mortality was 60% higher for Māori youth than for non-Māori youth.
- Accidents, cancer and cardiovascular disease were the main causes of death among Māori aged 25–44 years, causing around a fifth each of all deaths in this age group. Suicide was the fourth leading cause of death. Māori had twice the all-cause mortality rate of non-Māori.
- Cardiovascular disease and cancer were the major causes of death for Māori aged 45–64 years. Diabetes was the third leading cause of death, followed by respiratory disease. All-cause mortality was 2.59 times higher for Māori than non-Māori.
- Cardiovascular disease was the most common cause of death among Māori aged 65 years and over followed by cancer and respiratory disease. The age-standardised all-cause mortality rate was 76% higher for Māori compared to non-Māori.

Introduction

This chapter examines major causes of death among the total Māori and non-Māori populations and by age group and sex during the period 2000–2004. The number of Māori deaths registered each year is comparatively small when presented by age group and specific causes. To overcome the yearly fluctuation in rates that can occur when numbers are small, all deaths in the five-year period were combined. The numbers of deaths shown in the tables are, therefore, the total number of deaths for the five-year period 2000 to 2004 inclusive. Rates are generally reported per 100,000 person-years.

All deaths with Māori recorded on any of the three ethnicity fields on the death registration were classified as Māori. All others were classified as non-Māori.

Age-sex-standardised rates were used to compare the total Māori population with the total non-Māori population. This takes account of the higher proportion of young people in the Māori population, in which fewer deaths are expected. All age-standardised rates were standardised to the 2001 Census Māori population (see Appendix 4). Rates standardised to Segi's world population and the WHO world population will also be available on the *Hauora IV* website www.hauora.maori.nz.

Mortality

Appendix 2 contains a glossary of International Classification of Diseases (ICD) codes used to classify the underlying cause of death. ICD-10-AM groupings were used for deaths.

More detail on statistical methods can be found in Appendix 1.

What is in this chapter?

The data in this chapter is presented for Māori and non-Māori and is divided into three main sections:

- All-cause deaths: age-standardised and age-specific mortality rates for Māori and non-Māori, by sex and by area deprivation (NZDep2001 decile).
- Major causes of death – all ages: age-sex-standardised mortality rates by cause and selected causes of death by area deprivation.
- Major causes of death by age group:[1]
  - infants aged less than 1 year;
  - 1–4 years;
  - 5–14 years;
  - 15–24 years;
  - 25–44 years;
  - 45–64 years;
  - 65 years and over.

All-cause deaths

There were 2,650 deaths a year on average among Māori during 2000–2004. A third occurred in middle age (45–64 years), and 40% in the older age group (65 years and over). In the non-Māori population there were 25,300 deaths a year on average, 80% occurring among those aged 65 years or more (Figure 4.1). The difference in the proportion of deaths in the older age group is partly due to higher death rates at younger ages among Māori but also because of the difference in the underlying age structure of the two populations (the non-Māori population being relatively old).

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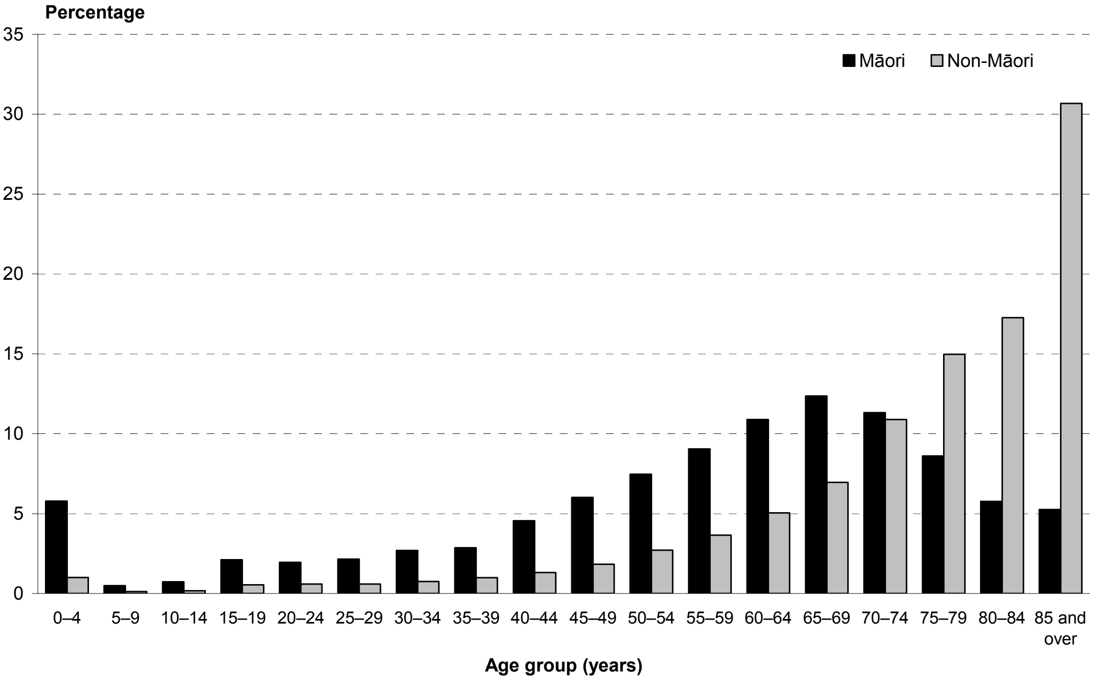
[1] Rates from *Hauora IV* cannot be directly compared with those of previous editions due to the changes in ethnicity classification. For example, *Hauora III* described child mortality as lower among Māori than non-Māori but this is now known not to be the case as deaths among Māori children were severely undercounted prior to 1996.

Figure 4.1: Age-distribution of Māori and non-Māori deaths during 2000–2004



Children aged 5–14 years had the lowest death rates (23 per 100,000 among Māori and 15 per 100,000 among non-Māori), followed by the 1–4 year age group (41 and 30 per 100,000 respectively). The highest death rates were in the oldest age group (5,740 and 3,130[2] per 100,000 respectively) (Table 4.1).

Mortality rates overall were twice as high for Māori as non-Māori (434 per 100,000 compared to 213 per 100,000). The rate ratio was largest in the 45–64 year age group (a ratio of 2.6) and smallest among children (1.36 at ages 1–4 years and 1.47 at 5–14 years). Among older people Māori mortality was 75% higher than that of non-Māori.

The smallest rate difference (the non-Māori rate subtracted from the Māori rate) was in 5–14 year olds (a difference of 7 deaths per 100,000), and the largest was in those aged 65 years and over (2,380 deaths per 100,000). Rate differences were also large for the 45–64 year age group (665 deaths per 100,000) and for infants (340 deaths per 100,000).

Māori males had the highest mortality rates overall and in each age group. Māori females had higher rates of death than non-Māori males overall and in most age groups (apart from 15–24 years). Death rates were lowest for non-Māori females in each age group.

The age-standardised rate of death was 40% higher for males than for females among Māori (508 compared to 360 per 100,000), and 55% higher among non-Māori (247 versus 158 per 100,000). The largest variations between Māori male and female mortality rates were at ages 15–24 years (over twice as high among males) and 25–44 years (nearly 80% higher among males). The male/female differential was generally larger among non-Māori than Māori from the age of 5–14 years and older.

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[2] The crude death rate for Māori aged 65 years and over was 5,484 per 100,000 and for non-Māori 4,564 per 100,000.

The age-standardised rate ratio for Māori compared to non-Māori was higher for females than males (2.16 compared to 1.96). However the rate difference was higher among males than among females (250 deaths per 100,000 for males compared to 190 per 100,000 for females).

Table 4.1: All-cause deaths by sex and age group, 2000–2004

Age group	Māori			Non-Māori			Rate ratio (95% CI)	
	Total number	Rate (95% CI)		Total number	Rate (95% CI)			
Both sexes								
< 1 year	644	840.2	(777.7–907.6)	1,018	501.3	(471.4–533.1)	1.68	(1.52–1.85)
1–4 years	122	40.9	(34.2–48.8)	249	30.1	(26.6–34.1)	1.36	(1.09–1.69)
5–14 years	162	22.7	(19.4–26.4)	353	15.4	(13.9–17.1)	1.47	(1.22–1.77)
15–24 years	538	101.3	(93.1–110.3)	1,422	63.4	(60.2–66.8)	1.60	(1.45–1.77)
25–44 years	1,623	189.8	(180.8–199.3)	4,590	92.8	(90.2–95.5)	2.05	(1.93–2.16)
45–64 years	4,428	1,082.4	(1051.0–1114.8)	16,758	417.6	(411.4–424.0)	2.59	(2.51–2.68)
65 years and over	5,738	5,507.1	(5364.6–5653.3)	102,268	3,127.5	(3105.4–3149.8)	1.76	(1.71–1.81)
All ages	**13,254**	**434.3**	**(426.9–441.8)**	**126,658**	**213.1**	**(211.3–214.8)**	**2.04**	**(2.00–2.08)**
Females								
< 1 year	276	741.7	(659.2–834.6)	459	460.8	(420.5–504.9)	1.61	(1.39–1.87)
1–4 years	52	35.9	(27.3–47.1)	120	29.7	(24.8–35.5)	1.21	(0.87–1.67)
5–14 years	69	19.8	(15.6–25.1)	140	12.6	(10.7–14.9)	1.57	(1.18–2.10)
15–24 years	168	62.9	(54.1–73.2)	401	36.5	(33.1–40.3)	1.72	(1.44–2.06)
25–44 years	621	138.4	(128.0–149.8)	1,638	64.4	(61.4–67.6)	2.15	(1.96–2.36)
45–64 years	1,955	927.6	(887.4–969.7)	6,890	340.7	(332.8–348.9)	2.72	(2.59–2.86)
65 years and over	2,832	4,686.8	(4,516.2–4,863.9)	53,848	2,447.9	(2,422.4–2,473.8)	1.91	(1.84–1.99)
All ages	**5,973**	**360.2**	**(351.1–369.5)**	**63,496**	**166.8**	**(164.7–169.0)**	**2.16**	**(2.10–2.22)**
Males								
< 1 year	367	930.5	(840.0–1030.8)	559	540.4	(497.4–587.1)	1.72	(1.51–1.96)
1–4 years	70	45.6	(36.0–57.6)	129	30.4	(25.6–36.2)	1.50	(1.12–2.00)
5–14 years	93	25.4	(20.7–31.1)	213	18.1	(15.8–20.7)	1.40	(1.10–1.79)
15–24 years	370	140.2	(126.6–155.2)	1,021	89.1	(83.8–94.8)	1.57	(1.40–1.77)
25–44 years	1,002	246.5	(231.7–262.3)	2,952	122.9	(118.5–127.4)	2.01	(1.87–2.16)
45–64 years	2,473	1,246.9	(1198.7–1297.0)	9,868	495.8	(486.1–505.7)	2.52	(2.41–2.63)
65 years and over	2,906	6304	(6,078.5–6,537.9)	48,420	3,771.7	(3,735.7–3,808.0)	1.67	(1.61–1.74)
All ages	**7,281**	**508.3**	**(496.7–520.1)**	**63,162**	**259.6**	**(256.9–262.3)**	**1.96**	**(1.91–2.01)**

Notes: Rates are calculated per 100,000; rates for 'all ages' and the 65 years and over age group were age-sex-standardised to the 2001 Māori population.

All-cause deaths by area deprivation

Figure 4.2: Māori and non-Māori deaths by gender and area deprivation, 2000–2004

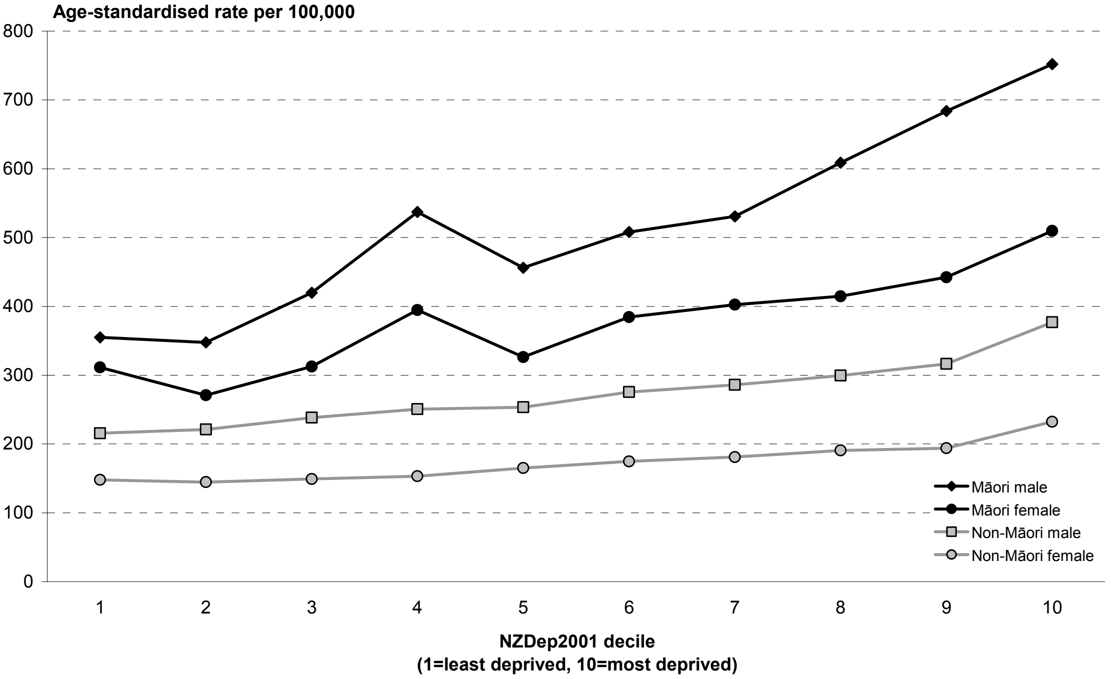


Figure 4.2 shows age-standardised mortality rates for Māori and non-Māori males and females, by NZDep2001 decile (the New Zealand index of small-area deprivation) for the period 2000–2004. Death rates increased with increasing socioeconomic deprivation for each population group.

Within each gender the association between deprivation and mortality was significantly stronger among Māori than non-Māori. The rate of increase in mortality rate per increasing deprivation decile was 6.6% (95% CI 4.3–9.0%) for Māori females compared to 2.2% (1.6–2.8%) for non-Māori females. For Māori males the rate of increase per successive decile was 9.2 (7.0–11.4%) compared to 4.4% (3.8–5.0%) for non-Māori males.

Within each deprivation decile there was a significant disparity between Māori and non-Māori rates. Māori males had the highest death rates in each decile, followed by Māori females, then non-Māori males. Non-Māori females had the lowest rates in each decile.

The mortality rate for non-Māori females at the *most* deprived level was significantly lower than that of Māori females at the *least* deprived level. Adjusted for age and sex, Māori females had 2.3 times the mortality rate of non-Māori females in the same deprivation decile (95% CI 1.98–2.73).

Among males, Māori mortality rates averaged 2.06 times higher than those of non-Māori living in the same deprivation decile areas (95% CI 1.96–2.18). The mortality rate for the most deprived non-Māori males was significantly lower than that for Māori males in decile 4 and above.

Major causes of death – all ages

Figure 4.3: Leading causes of death among Māori, 2000–2004

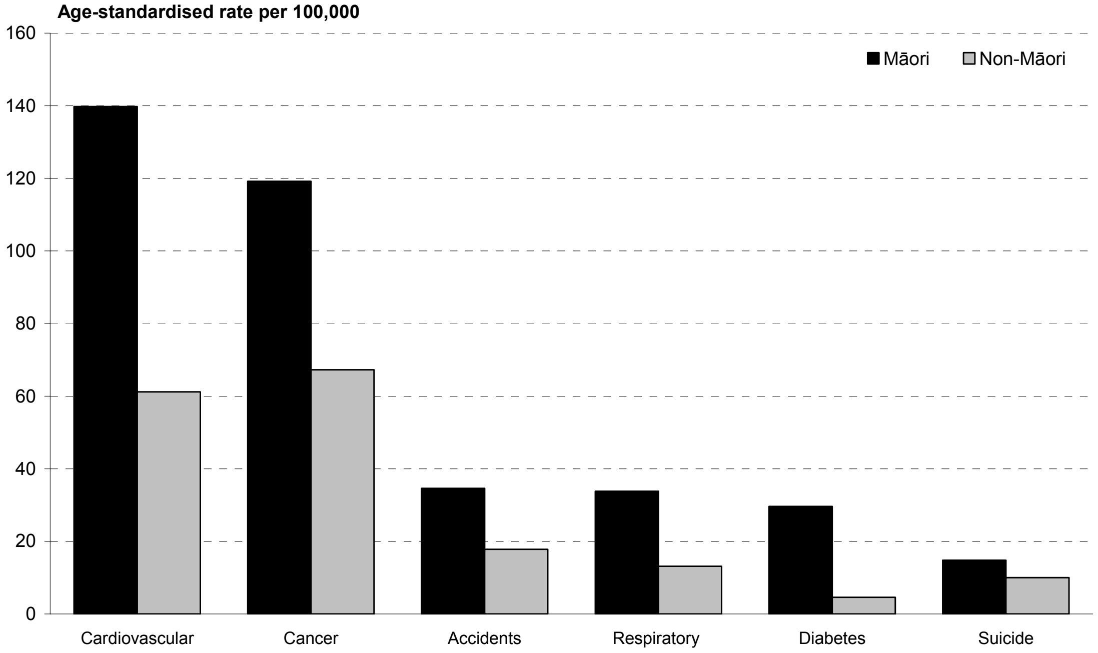


Figure 4.3 shows the leading causes of death for Māori. Cardiovascular disease and cancer were the two most common causes. Accidents, respiratory disease, diabetes and suicide were the next most frequent. Māori age-sex-standardised mortality rates were significantly higher than non-Māori rates for each of these major causes.

Table 4.2 presents the most common causes of Māori death within each major category. Māori age-sex-standardised rates were significantly higher than non-Māori rates for most specific causes except colorectal cancer, Alzheimer's disease, and vascular dementia. Any significant time trends in mortality rate over the five-year period 2000–2004 are included in the descriptions below.

Circulatory system

Circulatory system disease (cardiovascular disease) was the most common cause of death among Māori, accounting for a third of all Māori deaths. On average, 860 Māori died from circulatory disease per year during 2000–2004. The majority of deaths were caused by ischaemic heart disease (heart attacks), followed by strokes and chronic rheumatic heart disease. Māori rates of death were over twice those of non-Māori for IHD, 60% higher for stroke and seven times higher for chronic rheumatic heart disease.

There was a significant downward trend among Māori in deaths from circulatory disease during the period 2000–2004,with rates decreasing by 6% per year on average. The trend was significant for deaths from ischaemic heart disease (6% decrease per year), chronic rheumatic heart disease and heart failure (both decreasing by 13% per year).

Cancer

Cancer was the second most common major cause of death, causing 730 deaths per year on average among Māori. The age-sex-standardised rate of death from cancer was nearly 80% higher for Māori than non-Māori, accounting for nearly a fifth of the all-cause mortality difference. Lung cancer was the most common cause of cancer death, with 225 deaths per year on average among Māori. Female breast, colorectal, and stomach cancer were the next most common causes of cancer death. Apart from colorectal cancer, Māori mortality was higher than that of non-Māori for each of these cancers.

Among Māori females there was a small but significant downward trend in cancer mortality during 2000 to 2004, decreasing by 3% per year on average. The trend was similar but not significant for Māori males.

Endocrine, nutritional, metabolic diseases

Type 2 diabetes was the most common cause of death from endocrine, nutritional and metabolic diseases. Māori mortality rates were more than seven times the non-Māori rate for type 2 diabetes. Type 1 diabetes deaths were also higher among Māori (2.9 times higher). Obesity was recorded as the underlying cause of death for approximately 20 Māori and 40 non-Māori per year.

There was a significant downward trend in Māori diabetes mortality rates over the period 2000–2004, decreasing by 3% per year on average.

Respiratory disease

Over two-thirds of deaths from respiratory disease were due to COPD with 150 deaths per year on average among Māori. Most other respiratory disease deaths were caused by pneumonia, asthma and bronchiectasis. The rate ratios for asthma and bronchiectasis were very high (4.1 and 6.7 respectively), but COPD had the largest rate difference (15 more deaths per 100,000 among Māori).

Accidents

Transport accidents were the main cause of accidental death among Māori (60%). The rate of fatal transport accidents was 89% higher for Māori than non-Māori. Other accidental deaths were caused by drowning (over twice as high among Māori), falls (38% higher), poisoning (over twice as high). Deaths from accidental suffocation or strangulation in bed occurred mostly in infants, with the Māori rate well over three times the non-Māori rate.

Suicide

On average there were 87 suicides per year among Māori during 2000–2004. The age-sex-standardised rate was 49% higher for Māori than non-Māori. Among Māori most suicides (90%) occurred among those aged under 45 years. Among non-Māori 40% occurred among people aged 45 years and over.

Perinatal conditions and unknown causes

Nearly all deaths from unknown causes and from conditions originating in the perinatal period (around birth) were among infants. Premature birth was responsible for half the Māori deaths from perinatal conditions, with Māori infants at 87% higher risk than non-Māori infants. However, during 2000 to 2004 there was a significant downward trend in deaths due to premature birth among Māori.

The majority of deaths from unknown causes were classed as SIDS. During 2000–2004 on average 33 Māori babies died from SIDS each year. However, there was also a significant downward trend in Māori mortality rates during this period (a decrease of 5% per year on average).

Nervous system diseases

Epilepsy, Alzheimer's disease, infantile cerebral palsy and bacterial meningitis made up the majority of deaths in this disease category. There were no differences between Māori and non-Māori mortality rates for epilepsy or Alzheimer's disease, but Māori rates were significantly higher for deaths from infantile cerebral palsy (79% higher) and bacterial meningitis (174% higher).

Renal failure

Renal failure deaths were 3.5 times more common among Māori than non-Māori. There was a significant downward trend in deaths from renal failure among non-Māori but no change among Māori during the 2000–2004 period.

Certain infectious diseases

Deaths from tuberculosis were 6 times more common among Māori than non-Māori. Meningococcal infection mortality was 75% higher among Māori than non-Māori, but there was a significant downward trend in Māori deaths from this disease during 2000 to 2004.

Homicide

On average 22 Māori and 35 non-Māori died per year as a result of homicide. The risk of death for Māori was 3.5 times the risk for non-Māori.

Mental disorders

Māori mortality rates for vascular dementia were lower than non-Māori rates, but deaths due to psychoactive substance use were twice as high. These two causes made up the majority of deaths from mental and behavioural disorders. There was a significant downward trend in the rate of death due to opioids among Māori during 2000 to 2004.

Table 4.2: Selected causes of death, all-ages, 2000–2004

Cause of death	Māori		Non-Māori		Rate ratio (95% CI)
	Number	Rate	Number	Rate	
Circulatory system diseases	**4,316**	**139.8**	**51,805**	**61.2**	**2.29 (2.21–2.36)**
Ischaemic heart disease	2,449	80.0	28,688	35.5	2.25 (2.16–2.35)
Stroke	685	21.7	13,092	13.5	1.61 (1.49–1.74)
Chronic rheumatic heart disease	186	6.0	545	0.8	7.46 (6.19–9.00)
Cancer	**3,640**	**119.2**	**36,372**	**67.3**	**1.77 (1.71–1.83)**
Lung	1,127	36.8	6,206	11.4	3.23 (3.03–3.45)
Breast: female	344	21.3	2,806	12.4	1.71 (1.53–1.92)
Colorectal	254	8.4	5,481	9.4	0.89 (0.78–1.01)
Stomach	213	7.0	1,316	2.4	2.97 (2.56–3.45)
Endocrine, nutritional, metabolic	**1,082**	**35.4**	**4,069**	**6.8**	**5.20 (4.83–5.59)**
Diabetes (type 2)	825	27.0	2,738	3.6	7.40 (6.81–8.03)
Diabetes (type 1)	80	2.6	436	0.9	2.88 (2.24–3.69)
Obesity	105	3.5	206	0.6	5.43 (4.25–6.94)
Respiratory diseases	**1,037**	**33.8**	**10,658**	**13.1**	**2.59 (2.42–2.76)**
COPD	759	24.7	7,453	9.3	2.65 (2.45–2.86)
Pneumonia	98	3.3	1,940	1.8	1.86 (1.50–2.31)
Asthma	79	2.6	286	0.6	4.10 (3.12–5.40)
Bronchiectasis	64	2.1	193	0.3	6.70 (4.88–9.21)
Accidents	**1,030**	**34.6**	**4,521**	**17.8**	**1.94 (1.81–2.08)**
Transport	642	21.5	2,166	11.4	1.89 (1.72–2.06)
Drowning	83	2.8	215	1.3	2.15 (1.65–2.79)
Falls	82	2.7	1,453	2.0	1.38 (1.10–1.75)
Poisoning	56	1.9	142	0.8	2.40 (1.74–3.29)
Suffocation in bed	39	1.3	30	0.3	3.87 (2.38–6.28)
Suicide	**437**	**14.8**	**2,004**	**10.0**	**1.49 (1.34–1.65)**
Digestive system diseases	**235**	**7.6**	**3,568**	**4.7**	**1.61 (1.40–1.84)**
Perinatal conditions	**224**	**7.6**	**517**	**6.4**	**1.19 (1.01–1.39)**
Premature birth	103	3.5	151	1.9	1.87 (1.46–2.40)
Unknown causes	**221**	**7.5**	**328**	**1.5**	**4.98 (4.04–6.14)**
SIDS	166	5.7	77	1.0	5.94 (4.53–7.79)
Nervous system diseases	**183**	**5.9**	**4,290**	**7.1**	**0.83 (0.71–0.97)**
Epilepsy	42	1.4	250	1.2	1.17 (0.84–1.64)
Alzheimer's disease	38	1.1	1,875	1.4	0.77 (0.55–1.07)
Genitourinary system diseases	**174**	**5.7**	**1,685**	**1.8**	**3.19 (2.71–3.76)**
Renal failure	101	3.3	1,035	1.0	3.51 (2.84–4.34)
Congenital anomalies	**161**	**5.4**	**761**	**6.0**	**0.91 (0.76–1.08)**
Certain infectious diseases	**137**	**4.5**	**665**	**2.0**	**2.22 (1.82–2.72)**
Tuberculosis	29	0.9	80	0.1	6.39 (3.96–10.33)
Meningococcal infection	23	0.8	53	0.4	1.75 (1.06–2.90)
Homicide	**109**	**3.6**	**175**	**1.0**	**3.52 (2.74–4.52)**
Mental disorders	**103**	**3.3**	**3,434**	**3.1**	**1.06 (0.86–1.30)**
Vascular dementia	53	1.6	3,099	2.2	0.75 (0.57–1.00)
Psychoactive substance use	38	1.3	177	0.7	1.98 (1.38–2.84)

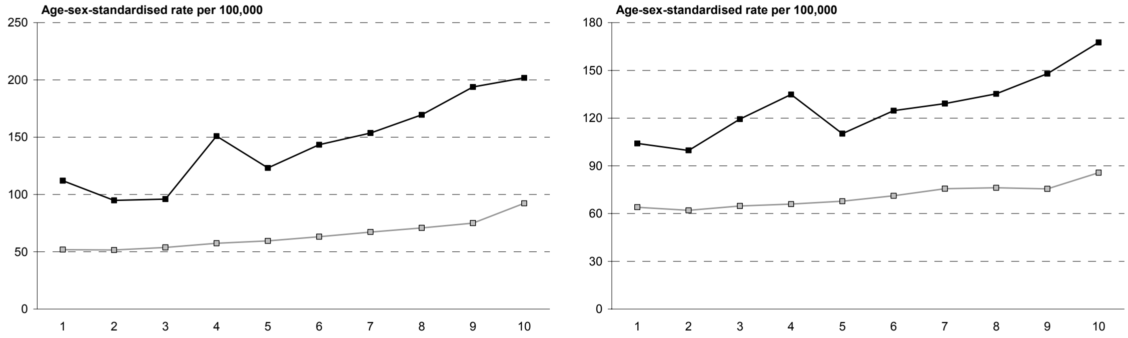
Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population. Rates for female breast cancer are sex-specific

Selected causes of death by deprivation

Figure 4.4: Māori and non-Māori deaths by deprivation, selected causes, 2000–2004

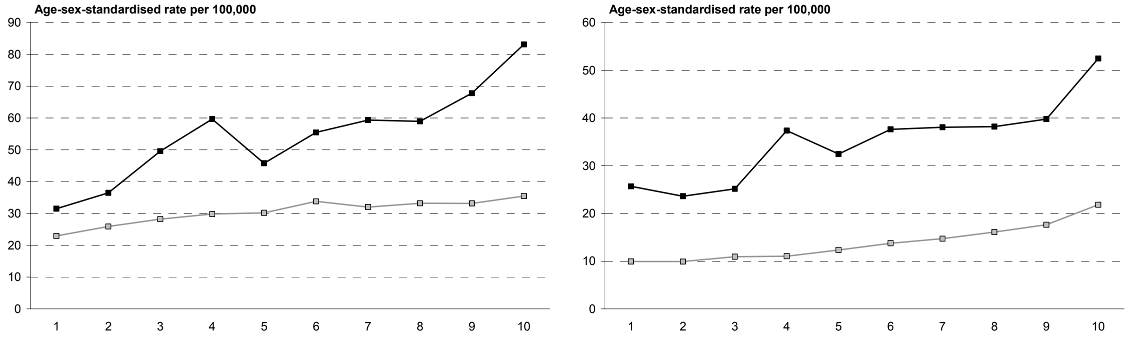
a: Circulatory system diseases

b: Cancer



c: External causes

d: Respiratory disease



e: Diabetes mellitus (type 2)

f: SIDS

Note: Rates were age-sex-standardised to the 2001 Māori population.

Figure 4.4 presents age-sex-standardised mortality rates by deprivation for selected causes of death during the period 2000 to 2004. The risk of death increased with increasing deprivation among both Māori and non-Māori for these major causes of death. For deaths from circulatory disease, cancer, diabetes, and respiratory disease, the mortality rate among Māori living in the *least* deprived deciles was higher than that of non-Māori living in the *most* deprived deciles.

The association between deprivation and mortality was strongest among Māori for deaths from SIDS, with the risk increasing by 19% per successive decile, and non-insulin dependent diabetes (13% per decile). There was also a clear relationship with deaths from external causes (9% per decile), circulatory disease (9% per decile), cancer (6% per decile) and respiratory disease (8% per decile).

Among males, the higher proportion of Māori living in deprived areas accounted for 20% of the difference in deaths from SIDS, 18% of the difference in deaths from diabetes and 12% for respiratory disease deaths.

Among females, socioeconomic deprivation accounted for around 7% of the disparities in deaths from external causes and respiratory disease, 12% of the difference in type 2 diabetes mortality and 23% of the SIDS disparity. For circulatory disease and cancer mortality adjusting for deprivation reduced the female rate ratio by only 4% (Table 4.3).

Table 4.3: Māori/non-Māori mortality rate ratios adjusted for age and deprivation, 2000–2004

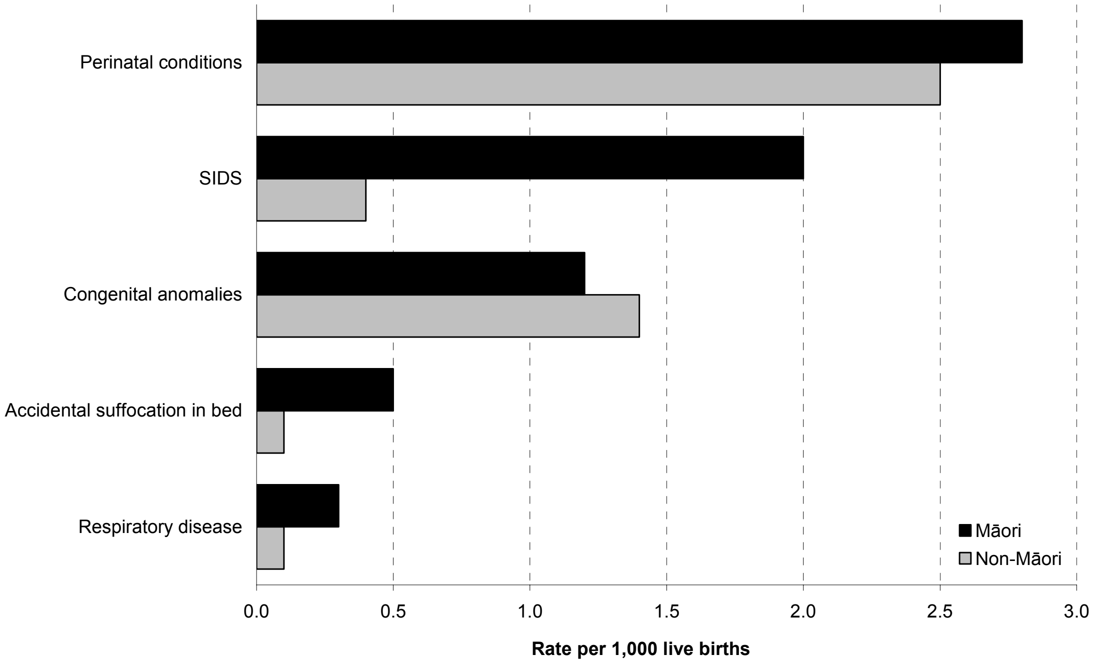
Cause of death	Sex	Rate ratio adjusted for age (95% CI)	Rate ratio adjusted for age and NZDep2001 decile (95% CI)	Area deprivation contribution (%)
Circulatory disease	Female	2.64 (2.05–3.41)	2.55 (2.33–2.78)	4
	Male	2.52 (2.07–3.08)	2.31 (2.14–2.49)	9
Cancer	Female	2.13 (1.94–2.33)	2.04 (1.93–2.15)	4
	Male	1.87 (1.78–1.97)	1.76 (1.66–1.87)	6
External causes	Female	2.16 (1.90–2.45)	2.00 (1.78–2.24)	7
	Male	2.03 (1.90–2.17)	1.89 (1.76–2.02)	7
Diabetes (type 2)	Female	7.95 (7.05–8.96)	7.03 (5.98–8.26)	12
	Male	7.94 (7.11–8.86)	6.52 (5.66–7.52)	18
Respiratory disease	Female	3.24 (2.55–4.12)	2.96 (2.64–3.33)	8
	Male	2.61 (2.38–2.87)	2.31 (2.04–2.62)	12
SIDS	Female	8.42 (5.28–13.42)	6.49 (3.67–11.48)	23
	Male	5.62 (4.02–7.84)	4.48 (3.11–6.43)	20

Note: Rate ratios were calculated using Poisson regression – see Methods Appendix 1.

Major causes of death by age group

Infants (aged under 1 year)

Figure 4.5: Major causes of infant death, 2000–2004



During 2000–2004 there were 130 deaths per year on average among Māori infants aged less than one year and 200 deaths per year among non-Māori infants. The risk of death among Māori infants was nearly two-thirds higher than that of non-Māori infants (8.1 per 1,000 live births compared to 5.0 per 1,000 live births) (Table 4.4).

A third of the deaths among Māori babies were due to perinatal conditions, with premature birth the main cause. During the five-year period there was a significant downward trend in Māori rates of death from premature birth, decreasing by 9% per year on average.

The cause of death was unknown for 30% of Māori infants with the majority classified as sudden infant death syndrome (SIDS). The SIDS rate for Māori infants was 2.0 deaths per 1,000 live births, over five times the non-Māori rate of 0.4 per 1,000 live births, accounting for half the overall mortality disparity. Male babies had a higher risk of death from SIDS than female babies. Nevertheless, the rate among Māori females was over three times that of non-Māori males. There was a significant downward trend in the rate of death from SIDS during the five years, decreasing by 5% per year on average. However, some of this may be due to a shift in category to accidental suffocation in bed, which showed a non-significant increase.

Congenital anomalies was the third leading cause of death among Māori infants and second leading cause among non-Māori, with no significant difference between the rates.

Accidental suffocation and strangulation in bed was the fourth leading cause of death, responsible for 6% of all Māori infant deaths. The rate of death was four times higher among Māori infants than non-Māori, accounting for 13% of the total disparity.

Respiratory diseases were the fifth leading cause of infant death among Māori, the majority caused by pneumonia. The rate of death was four times higher for Māori than for non-Māori.

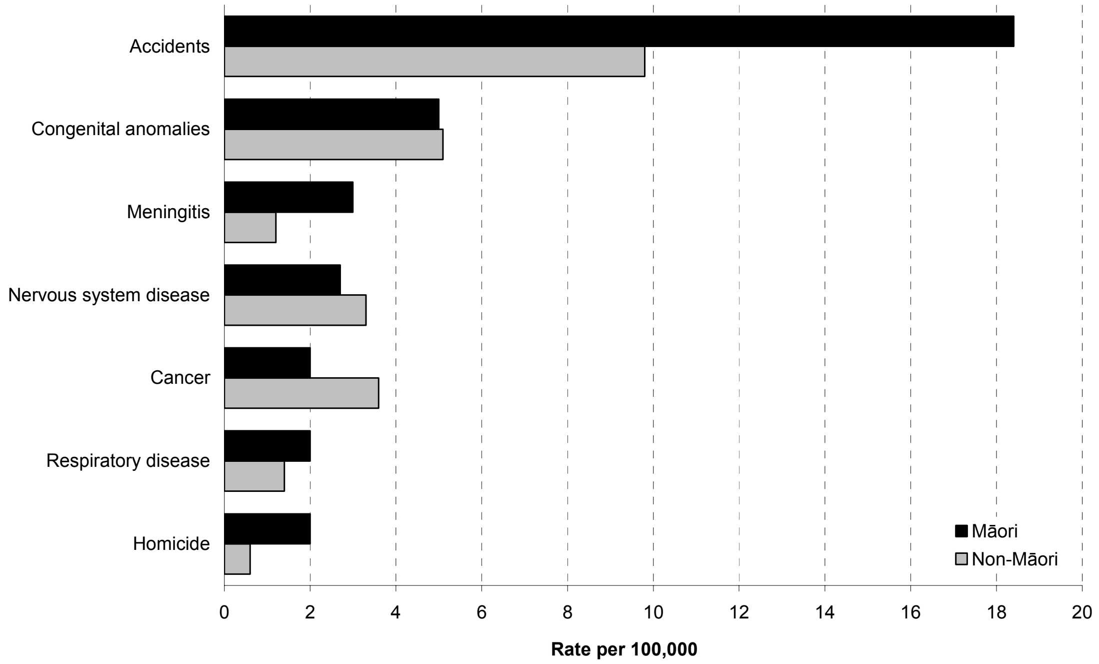
Table 4.4: Major causes of death, infants aged under 1 year, 2000–2004

Cause of death	Māori			Non-Māori			Rate ratio
	Total number	Rate	Rank	Total number	Rate	Rank	
Total: all causes	**644**	**8.1**		**1,018**	**5.0**		**1.64**
Perinatal conditions	**221**	**2.8**	**1**	**514**	**2.5**	**1**	**1.11**
• Premature birth	103	1.3		151	0.7		1.76
Unknown causes	**192**	**2.4**	**2**	**84**	**0.4**	**3**	**5.91**
• Sudden infant death syndrome	162	2.0		74	0.4		5.66
Congenital anomalies	**93**	**1.2**	**3**	**281**	**1.4**	**2**	**0.86**
Accidents	**54**	**0.7**	**4**	**34**	**0.2**	**4**	**4.10**
• Accidental suffocation in bed	38	0.5		23	0.1		4.27
Respiratory diseases	**27**	**0.3**	**5**	**17**	**0.1**	**7**	**4.11**
• Pneumonia	19	0.2		9	0.0		5.46
• Acute bronchitis and bronchiolitis	5	0.1		3	0.0		4.31
Female: all causes	**276**	**7.2**		**459**	**4.6**		**1.56**
Perinatal conditions	**89**	**2.3**	**1**	**238**	**2.4**	**1**	**0.97**
• Premature birth	47	1.2		76	0.8		1.61
• Birth asphyxia	5	0.1		18	0.2		0.72
Unknown causes	**87**	**2.3**	**2**	**28**	**0.3**	**3**	**8.08**
• Sudden infant death syndrome	67	1.7		22	0.2		7.92
Congenital anomalies	**38**	**1.0**	**3**	**131**	**1.3**	**2**	**0.75**
Accidents	**25**	**0.7**	**4**	**15**	**0.2**	**4**	**4.33**
• Accidental suffocation in bed	20	0.5		12	0.1		4.33
Respiratory diseases	**15**	**0.4**	**5**	**6**	**0.1**	**7**	**6.50**
• Pneumonia	11	0.3		5	0.05		5.72
Male: all causes	**367**	**9.0**		**559**	**5.3**		**1.69**
Perinatal conditions	**132**	**3.3**	**1**	**276**	**2.6**	**1**	**1.23**
• Premature birth	56	1.4		75	0.7		1.92
• Birth asphyxia	9	0.2		14	0.1		1.66
Unknown causes	**119**	**3.0**	**2**	**79**	**0.8**	**3**	**3.90**
• Sudden infant death syndrome	95	2.3		52	0.5		4.70
Congenital anomalies	**54**	**1.3**	**3**	**150**	**1.4**	**2**	**0.93**
Accidents	**29**	**0.7**	**4**	**19**	**0.2**	**4**	**3.93**
• Accidental suffocation in bed	18	0.4		11	0.1		4.21
Respiratory diseases	**12**	**0.3**	**5**	**11**	**0.1**	**6**	**2.81**
• Pneumonia	8	0.2		4	0.04		5.15

Notes: Rates are calculated per 1,000 live births; shaded rate ratios are statistically significant at the 5% level.

Ages 1–4 years

Figure 4.6: Major causes of death among children aged 1–4 years, 2000–2004



During 2000–2004 there were 24 deaths per year on average among Māori children aged 1–4 years and 50 deaths per year among non-Māori children. The rate of death among Māori children was a third higher than that of non-Māori children (Table 4.5).

The majority of deaths in this age group were caused by accidents. Accidental injury accounted for 45% of the Māori deaths and 33% of the non-Māori deaths. Drowning, pedestrian accidents, motor vehicle accidents and fires were the main causes of accidental death. Māori children had significantly higher rates of death from these causes than non-Māori children, with the exception of pedestrian accidents. Deaths from accidents accounted for most of the mortality disparity between Māori and non-Māori children in this age group.

Congenital anomalies were the second leading cause of death for Māori children, at a rate similar to that of non-Māori children. Infectious and parasitic diseases were the third leading cause of death for Māori. Meningococcal infection was responsible for the deaths of nine Māori children in this age group, at a rate 2.5 times that of non-Māori. Diseases of the nervous system (half of which were infantile cerebral palsy) were the fourth most common cause of death among Māori children. Cancer and homicide were the fifth leading causes of death for Māori. Five Māori boys died from unknown causes.

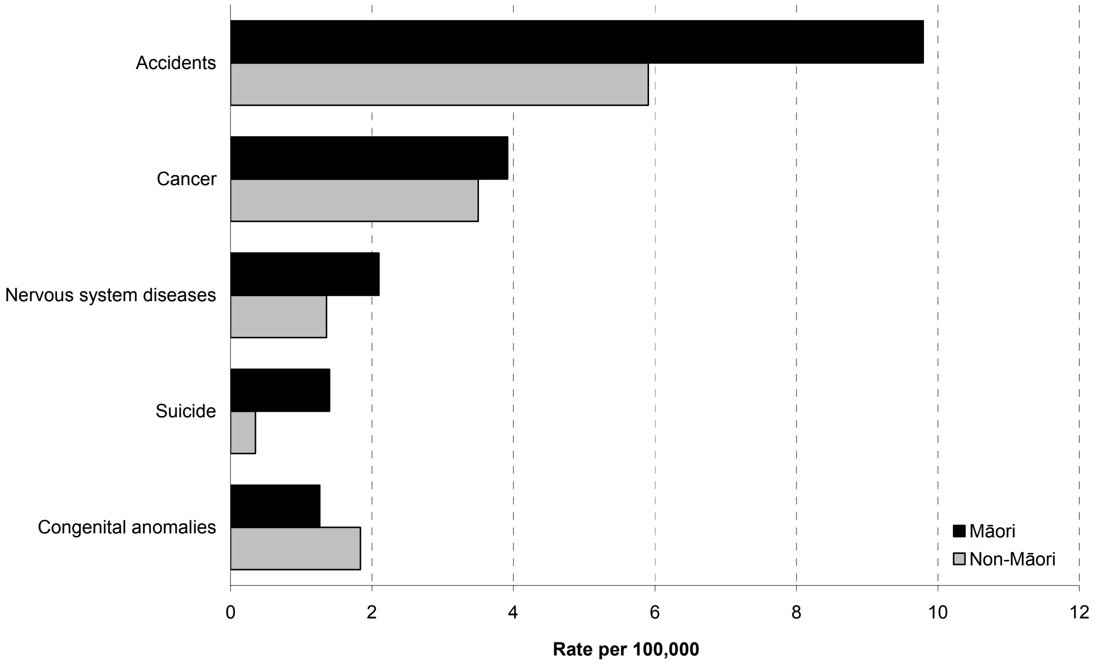
Table 4.5: Major causes of death, ages 1–4 years, 2000–2004

Cause of death	Māori			Non-Māori			Rate ratio
	Number	Rate	Rank	Number	Rate	Rank	
Total: all causes	**122**	**40.9**		**249**	**30.1**		**1.36**
Accidents	**55**	**18.4**	**1**	**81**	**9.8**	**1**	**1.88**
• Drowning	19	6.4		23	2.8		2.29
• Pedestrian	13	4.4		20	2.4		1.80
• Motor vehicle (land)	11	3.7		12	1.4		2.54
• Fires	7	2.3		6	0.7		3.23
Congenital anomalies	**15**	**5.0**	**2**	**42**	**5.1**	**2**	**0.99**
Infectious diseases	**11**	**3.7**	**3**	**21**	**2.5**	**5**	**1.45**
• Meningococcal infection	9	3.0		10	1.2		2.49
Nervous system diseases	**8**	**2.7**	**4**	**27**	**3.3**	**4**	**0.82**
• Infantile cerebral palsy	5	1.7		9	1.1		1.54
Cancer	**6**	**2.0**	**5=**	**30**	**3.6**	**3**	**0.55**
Homicide	**6**	**2.0**	**5=**	**5**	**0.6**	**11**	**3.33**
Female: all causes	**52**	**35.9**		**120**	**29.7**		**1.21**
Accidents	**25**	**17.3**	**1**	**32**	**7.9**	**1**	**2.18**
• Drowning	11	7.6		9	2.2		3.41
• Pedestrian	6	4.1		11	2.7		1.52
• Motor vehicle (land)	5	3.5		3	0.7		4.65
Congenital anomalies	**7**	**4.8**	**2**	**23**	**5.7**	**2**	**0.85**
Infectious diseases	**5**	**3.5**	**3**	**11**	**2.7**	**5**	**1.27**
• Meningococcal infection	3	2.1		5	1.2		1.67
Nervous system diseases	**4**	**2.8**	**4**	**14**	**3.5**	**4**	**0.80**
• Infantile cerebral palsy	3	2.1		4	1.0		2.09
Respiratory diseases	**3**	**2.1**	**5**	**5**	**1.2**	**8**	**1.67**
Male: all causes	**70**	**45.6**		**129**	**30.4**		**1.50**
Accidents	**30**	**19.5**	**1**	**49**	**11.6**	**1**	**1.69**
• Drowning	8	5.2		14	3.3		1.58
• Pedestrian	7	4.6		9	2.1		2.14
• Motor vehicle (land)	6	3.9		9	2.1		1.84
• Fires	5	3.3		5	1.2		2.76
Congenital anomalies	**8**	**5.2**	**2**	**19**	**4.5**	**2**	**1.16**
Infectious diseases	**6**	**3.9**	**3**	**10**	**2.4**	**5**	**1.65**
• Meningococcal infection	6	3.9		5	1.2		3.31
Cancer	**5**	**3.3**	**4**	**16**	**3.8**	**3**	**0.86**
• Leukaemias	2	1.3		3	0.7		1.84
• Brain	2	1.3		6	1.4		0.92
Unknown causes	**5**	**3.3**	**5**	**2**	**0.5**	**9**	**6.89**

Notes: Rates are calculated per 100,000; shaded rate ratios are statistically significant at the 5% level.

Ages 5–14 years

Figure 4.7: Major causes of death among Māori aged 5–14 years, 2000–2004



During 2000 to 2004 there were 32 deaths per year on average among Māori children and 71 among non-Māori children. The mortality rate among Māori children was 47% higher than that of non-Māori children. The risk of death was higher for boys than girls, 28% higher among Māori and 44% higher among non-Māori (Table 4.6).

Accidents caused over 40% of the deaths among children in this age group. Approximately five Māori children a year died in motor vehicle accidents and three in pedestrian accidents. Drowning was the other main cause of accidental death. Fatal accidents were two-thirds more common among Māori children than among non-Māori children, accounting for half of the overall mortality disparity.

Cancer was the second most common cause of death, causing nearly 6 deaths per year among Māori children and 16 per year among non-Māori children. Brain cancer and leukaemias constituted 75% of the Māori cancer deaths. There was no difference in the overall cancer death rate for Māori and non-Māori children.

Diseases of the nervous system, the third major cause of death among Māori children, were mostly due to infantile cerebral palsy and epilepsy.

An average of two Māori children per year (all aged between 10 and 14 years) died from suicide. The rate of suicide was four times higher among Māori than among non-Māori children.

Congenital anomalies was the fifth leading cause of death, with no significant difference in rates between Māori and non-Māori children.

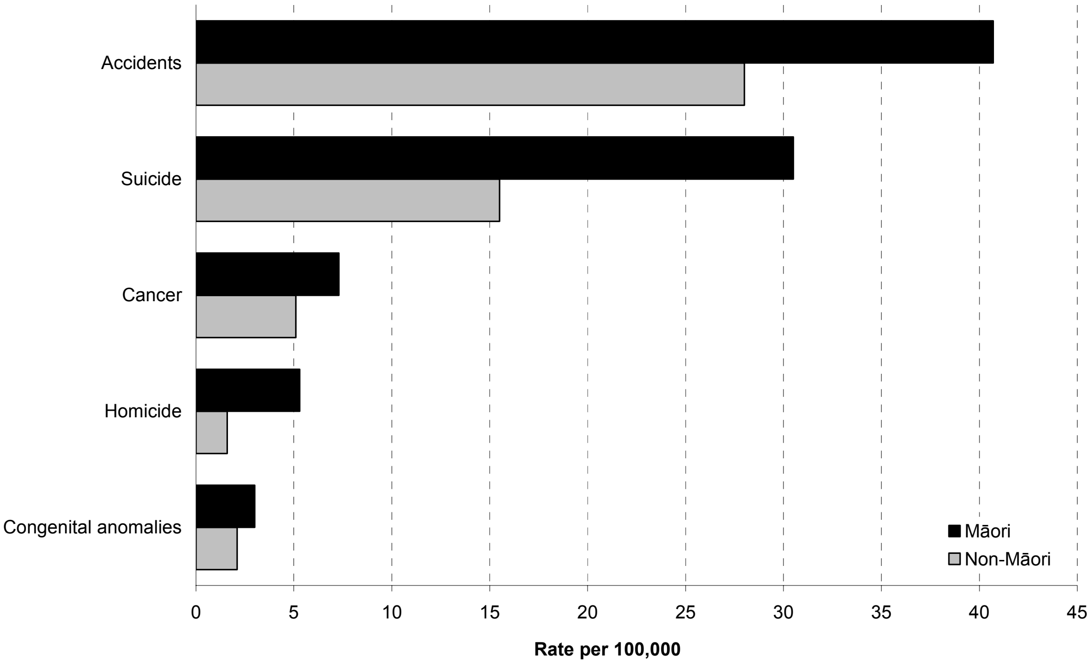
Table 4.6: Major causes of death, ages 5–14 years, 2000–2004

Cause of death	Māori			Non-Māori			Rate ratio
	Total number	Rate	Rank	Total number	Rate	Rank	
Total: all causes	**162**	**22.7**		**353**	**15.4**		**1.47**
Accidents	**70**	**9.8**	**1**	**135**	**5.9**	**1**	**1.66**
• Motor vehicle (land)	24	3.4		46	2.0		1.67
• Pedestrian	13	1.8		23	1.0		1.81
• Drowning	12	1.7		16	0.7		2.40
Cancer	**28**	**3.9**	**2**	**80**	**3.5**	**2**	**1.12**
• Brain	15	2.1		26	1.1		1.84
• Leukaemias	6	0.8		22	1.0		0.87
Nervous system diseases	**15**	**2.1**	**3**	**31**	**1.4**	**4**	**1.55**
• Infantile cerebral palsy	7	1.0		14	0.6		1.60
• Epilepsy	4	0.6		9	0.4		1.42
Suicide	**10**	**1.4**	**4**	**8**	**0.4**	**8**	**4.00**
Congenital anomalies	**9**	**1.3**	**5**	**42**	**1.8**	**3**	**0.69**
Female: all causes	**69**	**19.8**		**140**	**12.6**		**1.57**
Accidents	**29**	**8.3**	**1**	**45**	**4.1**	**1**	**2.05**
• Motor vehicle (land)	12	3.4		22	2.0		1.74
• Pedestrian	5	1.4		4	0.4		3.98
• Drowning	5	1.4		3	0.3		5.31
Cancer	**17**	**4.9**	**2**	**31**	**2.8**	**2**	**1.75**
• Brain	9	2.6		8	0.7		3.59
• Leukaemia	4	1.1		11	1.0		1.16
Nervous system diseases	**5**	**1.4**	**3**	**15**	**1.4**	**4**	**1.06**
• Infantile cerebral palsy	3	0.9		8	0.7		1.20
Congenital anomalies	**5**	**1.4**	**4**	**16**	**1.4**	**3**	**1.00**
Suicide	**3**	**0.9**	**5**	**3**	**0.3**	**8**	**3.19**
Male: all causes	**93**	**25.4**		**213**	**18.1**		**1.40**
Accidents	**41**	**11.2**	**1**	**90**	**7.7**	**1**	**1.46**
• Motor vehicle (land)	12	3.3		24	2.0		1.60
• Pedestrian	8	2.2		19	1.6		1.35
• Drowning	7	1.9		13	1.1		1.73
Cancer	**11**	**3.0**	**2**	**49**	**4.2**	**2**	**0.72**
Nervous system diseases	**10**	**2.7**	**3**	**16**	**1.4**	**4**	**2.01**
• Infantile cerebral palsy	4	1.1		6	0.5		2.14
• Epilepsy	3	0.8		6	0.5		1.60
Suicide	**7**	**1.9**	**4**	**5**	**0.4**	**8**	**4.49**

Notes: Rates are calculated per 100,000; shaded rate ratios are statistically significant at the 5% level.

Ages 15–24 years

Figure 4.8: Major causes of death among Māori aged 15–24 years, 2000–2004



During 2000–2004 there were 108 deaths per year on average among Māori aged 15–24 years and 284 deaths per year among non-Māori. Young Māori adults had a 60% higher risk of death than their non-Māori counterparts (38 more deaths per 100,000). Males had twice the risk of death compared to females in both groups (Table 4.7).

Accidents caused 40% of Māori deaths in this age group. The majority were motor vehicle accidents. The rate of accidental death was 45% higher for Māori than non-Māori, accounting for a third of the overall mortality disparity.

Youth suicide was the second most common cause of death, twice as frequent among Māori as among non-Māori, accounting for 40% of the total mortality disparity. The risk of suicide was more than twice as high among males as among females.

Cancer was the third leading cause of death. Leukaemia was the most common cause of cancer death in this age group, followed by soft tissue cancers. Rates of death from cancer were 43% higher for Māori than non-Māori.

Homicide was the fourth most frequent cause of death for Māori in this age group, more frequent among males than females. Māori were at greater risk of death from homicide, with three times the mortality rate of non-Māori, accounting for 10% of the overall disparity.

Other main causes of death included congenital anomalies and circulatory system disease. There were no significant differences between Māori and non-Māori for these causes.

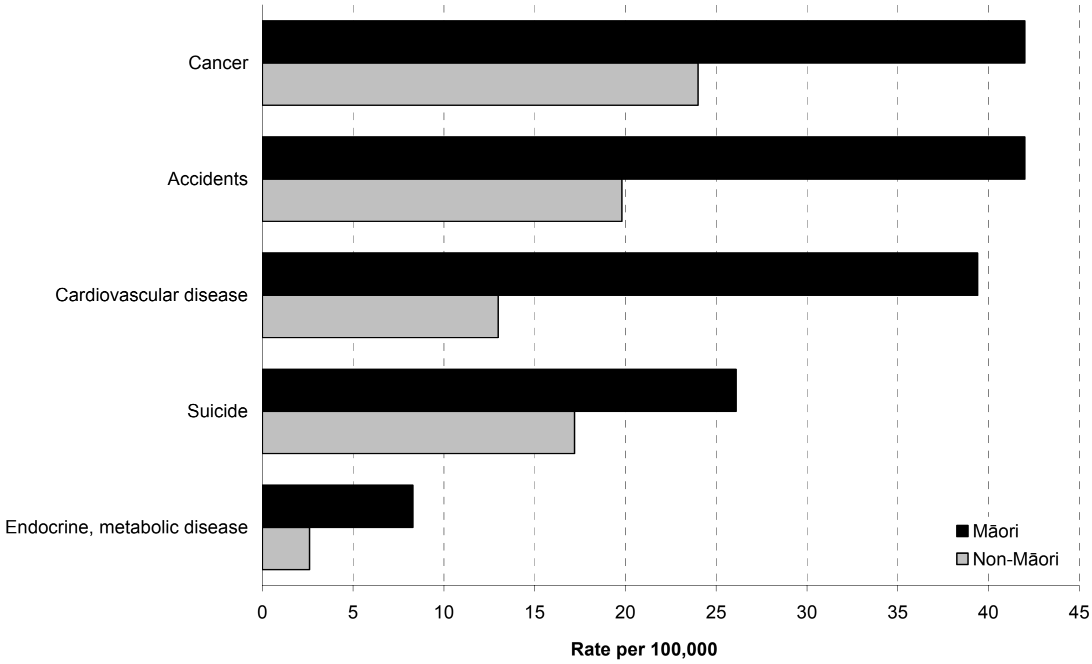
Table 4.7: Major causes of death, ages 15–24 years, 2000–2004

Cause of death	Māori			Non-Māori			Rate ratio
	Number	Rate	Rank	Number	Rate	Rank	
Total: all causes	**538**	**101.3**		**1,422**	**63.4**		**1.60**
Accidents	**216**	**40.7**	**1**	**628**	**28.0**	**1**	**1.45**
• Motor vehicle (land)	150	28.3		430	19.2		1.47
• Pedestrian	18	3.4		32	1.4		2.38
• Poisoning	17	3.2		28	1.2		2.57
Suicide	**162**	**30.5**	**2**	**348**	**15.5**	**2**	**1.97**
Cancer	**39**	**7.3**	**3**	**115**	**5.1**	**3**	**1.43**
• Leukaemias	10	1.9		20	0.9		2.11
• Soft tissue	6	1.1		7	0.3		3.62
Homicide	**28**	**5.3**	**4**	**35**	**1.6**	**8**	**3.38**
Congenital anomalies	**16**	**3.0**	**5**	**47**	**2.1**	**6**	**1.44**
Females: all causes	**168**	**62.9**		**401**	**36.5**		**1.72**
Accidents	**62**	**23.2**	**1**	**142**	**12.9**	**1**	**1.80**
• Motor vehicle (land)	46	17.2		110	10.0		1.72
• Poisoning	8	3.0		11	1.0		2.99
Suicide	**47**	**17.6**	**2**	**82**	**7.5**	**2**	**2.36**
Cancer	**14**	**5.2**	**3**	**50**	**4.6**	**3**	**1.15**
Congenital anomalies	**8**	**3.0**	**4**	**21**	**1.9**	**4**	**1.57**
Homicide	**7**	**2.6**	**5**	**14**	**1.3**	**8**	**2.06**
Males: all causes	**370**	**140.2**		**1,021**	**89.1**		**1.57**
Accidents	**154**	**58.3**	**1**	**486**	**42.4**	**1**	**1.38**
• Motor vehicle (land)	104	39.4		320	27.9		1.41
• Pedestrian	16	6.1		24	2.1		2.89
• Poisoning	9	3.4		17	1.5		2.30
Suicide	**115**	**43.6**	**2**	**266**	**23.2**	**2**	**1.88**
Cancer	**25**	**9.5**	**3**	**65**	**5.7**	**3**	**1.67**
Homicide	**21**	**8.0**	**4**	**21**	**1.8**	**7**	**4.34**
Circulatory system diseases	**13**	**4.9**	**5**	**35**	**3.1**	**5**	**1.61**

Notes: Rates are calculated per 100,000; shaded rate ratios are statistically significant at the 5% level.

Ages 25–44 years

Figure 4.9: Major causes of death among Māori aged 25–44 years, 2000–2004



There were 325 deaths a year on average among Māori aged 25–44 years and around 920 among non-Māori during 2000 to 2004. The rate of death among Māori was twice the non-Māori rate. Males had an 80% higher risk of death than females among Māori and 90% higher risk among non-Māori (Table 4.8).

Cancer, accidents, and circulatory system diseases caused around a fifth each of Māori deaths and suicide a further 14%. Circulatory system disease accounted for over a quarter of the difference in overall mortality rates between Māori and non-Māori in this age group, accidents and cancer around a fifth each and suicide nearly a tenth.

Cancer mortality was 75% higher for Māori than non-Māori. On average there were 72 cancer deaths per year among Māori. Breast cancer was the most common cause of cancer death for Māori women with 16 deaths per year on average, a rate 75% higher than that of non-Māori. Deaths from cancer of the lung, stomach and cervix were also more common for Māori women compared to non-Māori women. The leading causes of cancer death among Māori men aged 25–44 years were cancers of the lung, stomach, liver, testis and non-Hodgkin's lymphoma. Mortality rates were higher for Māori males than non-Māori males for these causes.

Transport accidents (mainly motor vehicle) were responsible for two-thirds of accidental deaths among Māori, followed by drowning and poisoning (8% each). Māori rates of death from these causes were more than twice the non-Māori rates.

Deaths from circulatory system diseases were three times more frequent among Māori than non-Māori. Among Māori males the majority of deaths (55%) were due to ischaemic heart disease, but among females stroke was the most common followed by ischaemic heart disease and chronic rheumatic heart disease. Māori were nearly nine times more likely than non-Māori to die from chronic rheumatic heart disease in this age group.

The rate of suicide among Māori was 52% higher than the non-Māori rate. Suicides were four times more common among males than females. Among males the rate in this age group was similar to that of 15–24 year olds.

Other major causes of death among Māori aged 25–44 years included obesity, diabetes, and respiratory disease (including chronic obstructive pulmonary disease, asthma and bronchiectasis) and homicide. The mortality rate ratios for these diseases were very high, although the rate differences were not large compared to the other main causes.

Table 4.8: Major causes of death, ages 25–44 years, 2000–2004

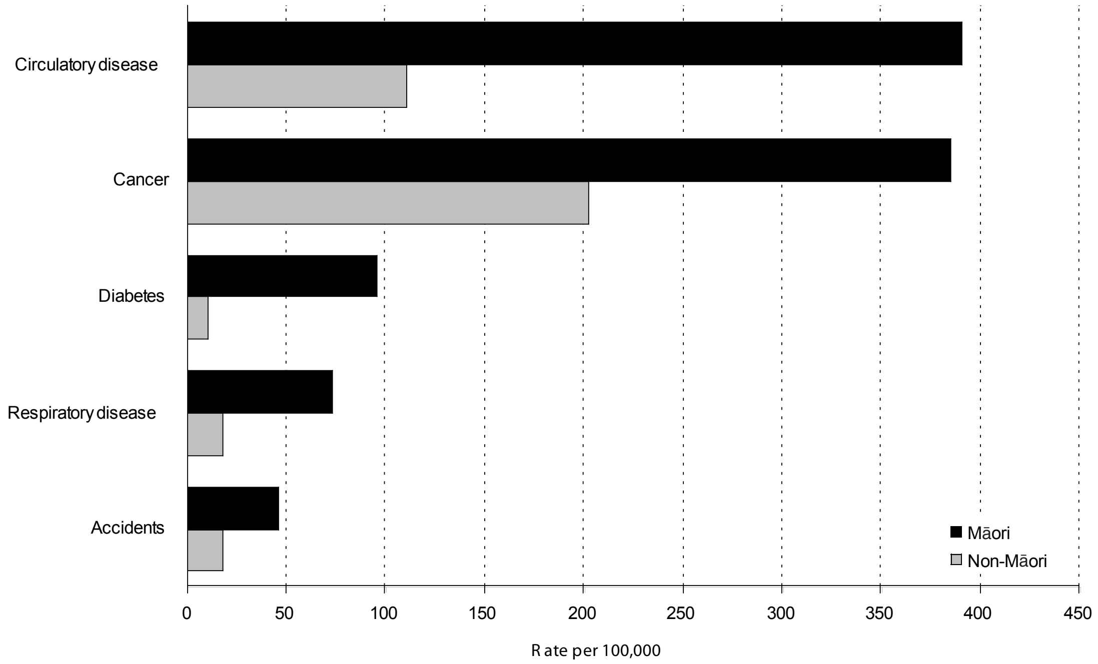
Cause of death	Māori			Non-Māori			Rate ratio
	Number	Rate	Rank	Number	Rate	Rank	
Total: all causes	**1,623**	**189.8**		**4,590**	**92.8**		**2.05**
Accidents	**359**	**42.0**	**1**	**977**	**19.8**	**2**	**2.13**
• Transport accidents	237	27.7		671	13.6		2.04
• Drowning	30	3.5		69	1.4		2.51
• Poisoning	30	3.5		66	1.3		2.63
Cancer	**359**	**42.0**	**2**	**1,185**	**24.0**	**1**	**1.75**
• Breast: female	79	17.6		256	10.1		1.75
• Lung	40	4.7		90	1.8		2.57
• Stomach	36	4.2		44	0.9		4.73
• Colorectal	20	2.3		95	1.9		1.22
• Liver	20	2.3		25	0.5		4.63
Circulatory system	**337**	**39.4**	**3**	**642**	**13.0**	**4**	**3.04**
• Ischaemic heart disease	146	17.1		305	6.2		2.77
• Stroke	58	6.8		134	2.7		2.50
• Chronic rheumatic heart disease	41	4.8		27	0.5		8.78
Suicide	**223**	**26.1**	**4**	**849**	**17.2**	**3**	**1.52**
Endocrine, metabolic, nutritional	**71**	**8.3**	**5**	**127**	**2.6**	**6**	**3.23**
• Obesity	37	4.3		37	0.7		5.78
• Diabetes mellitus	27	3.2		52	1.1		3.00
Respiratory disease	**59**	**6.9**		**84**	**1.7**	**8**	**4.06**
• COPD	20	2.3		16	0.3		7.23
• Asthma	17	2.0		36	0.7		2.73
• Bronchiectasis	14	1.6		7	0.1		11.57
Homicide	**47**	**5.5**		**58**	**1.2**	**12**	**4.69**

Cause of death	Māori			Non-Māori			Rate ratio
	Number	Rate	Rank	Number	Rate	Rank	
Females: all causes	**621**	**138.4**		**1,638**	**64.4**		**2.15**
Cancer	**220**	**49.0**	**1**	**705**	**27.7**	**1**	**1.77**
• Breast	79	17.6		256	10.1		1.75
• Lung	22	4.9		50	2.0		2.49
• Stomach	20	4.5		15	0.6		7.56
• Cervix	19	4.2		37	1.5		2.91
Circulatory system diseases	**123**	**27.4**	**2**	**182**	**7.2**	**4**	**3.83**
• Stroke	37	8.2		64	2.5		3.28
• Ischaemic heart disease	28	6.2		46	1.8		3.45
• Chronic rheumatic heart	23	5.1		11	0.4		11.85
Accidents	**88**	**19.6**	**3**	**206**	**8.1**	**2**	**2.42**
• Transport accidents	61	13.6		161	6.3		2.15
• Poisoning	10	2.2		19	0.7		2.98
Suicide	**45**	**10.0**	**4**	**184**	**7.2**	**3**	**1.39**
Endocrine, nutritional, metabolic	**30**	**6.7**	**5**	**47**	**1.8**	**6**	**3.62**
• Diabetes mellitus	14	3.1		21	0.8		3.78
• Obesity	12	2.7		15	0.6		4.53
Homicide	**16**	**3.6**		**19**	**0.7**	**12**	**4.77**
Males: all causes	**1,002**	**246.5**		**2,952**	**122.9**		**2.01**
Accidents	**271**	**66.7**	**1**	**771**	**32.1**	**1**	**2.08**
• Transport accidents	176	43.3		510	21.2		2.04
• Drowning	26	6.4		64	2.7		2.40
Suicide	**178**	**43.8**	**2**	**665**	**27.7**	**2**	**1.58**
Circulatory system diseases	**214**	**52.7**	**3**	**460**	**19.1**	**4**	**2.75**
• Ischaemic heart disease	118	29.0		259	10.8		2.69
• Stroke	21	5.2		70	2.9		1.77
• Chronic rheumatic heart disease	18	4.4		16	0.7		6.65
Cancer	**139**	**34.2**	**4**	**480**	**20.0**	**3**	**1.71**
• Lung	18	4.4		40	1.7		2.66
• Stomach	16	3.9		29	1.2		3.26
• Liver	16	3.9		19	0.8		4.98
• Testis	11	2.7		15	0.6		4.34
• Non-Hodgkin's lymphoma	11	2.7		30	1.2		2.17
Endocrine, nutritional, metabolic	**41**	**10.1**	**5**	**80**	**3.3**	**6**	**3.03**
• Obesity	25	6.2		22	0.9		6.72
• Diabetes mellitus	13	3.2		31	1.3		2.48
Homicide	**31**	**7.6**		**39**	**1.6**	**12**	**4.70**

Notes: Rates are calculated per 100,000; shaded rate ratios are statistically significant at the 5% level.

Ages 45–64 years

Figure 4.10: Major causes of death among Māori aged 45–64 years, 2000–2004



During the years 2000–2004 there were 885 deaths per year on average among Māori aged 45 to 64 years and 3,350 among non-Māori. The rate of death among Māori was 2.6 times the non-Māori rate. Chronic diseases were the main causes of death for this age group. Just over a third of Māori deaths were caused by circulatory system disease, another third were due to cancer. Diabetes was the underlying cause of death for 9% and respiratory disease for 7%. Accidental deaths constituted 4% of Māori deaths.

Deaths from circulatory disease were 3.5 times more common among Māori than non-Māori in this age group. Ischaemic heart disease was the leading single cause of death for Māori and accounted for a quarter of the overall difference in mortality between Māori and non-Māori. On average, 190 Māori per year died from ischaemic heart disease (heart attacks), 41 from stroke and 19 from chronic rheumatic heart disease. Extreme disparities between Māori and non-Māori were evident in deaths from chronic rheumatic heart disease (over 14 times more frequent among Māori than non-Māori) and hypertensive disease (over eight times more frequent). Increasing area deprivation was strongly associated with increasing mortality for each circulatory system disease.

Cancer was the leading cause of death among Māori females and the second leading cause among Māori males. A third of the cancer deaths among Māori were from lung cancer, at a rate 3.7 times the non-Māori rate, accounting for half the cancer mortality disparity. Breast cancer was the second leading cause of cancer death, 66% more common among Māori than non-Māori women. Liver cancer was the second most frequent cause of cancer death among Māori men, with a mortality rate nearly seven times that of non-Māori men. Colorectal cancer was the third most frequent cause of cancer death among Māori males and females, at rates similar to non-Māori. Cervical cancer was the fourth most common cancer death for Māori females, at three times the non-Māori rate. Stomach cancer was the fourth most frequent cause of cancer death among Māori males, with a rate 2.4 times the non-Māori rate.

Diabetes was the most common cause of death from endocrine, nutritional and metabolic disease. Deaths from diabetes were nine times more frequent among Māori than non-Māori, accounting for 12% of the overall mortality disparity. On average, 35 Māori females and 43 Māori males aged 45 to 64 years died from diabetes each year during 2000 to 2004.

Respiratory disease mortality was four times higher among Māori than non-Māori. Chronic obstructive pulmonary disease (COPD) was the most common cause of death, with 46 Māori deaths per year on average, followed by asthma (seven deaths per year), bronchiectasis (four deaths per year) and pneumonia (three deaths per year). Māori mortality from COPD was four times higher than that of non-Māori (an extra 42 deaths per 100,000). Asthma and bronchiectasis mortality were seven times higher.

The rate of accidental death was 2.5 times higher for Māori than for non-Māori. Two-thirds were caused by transport accidents.

Table 4.9: Major causes of death, ages 45–64 years, 2000–2004

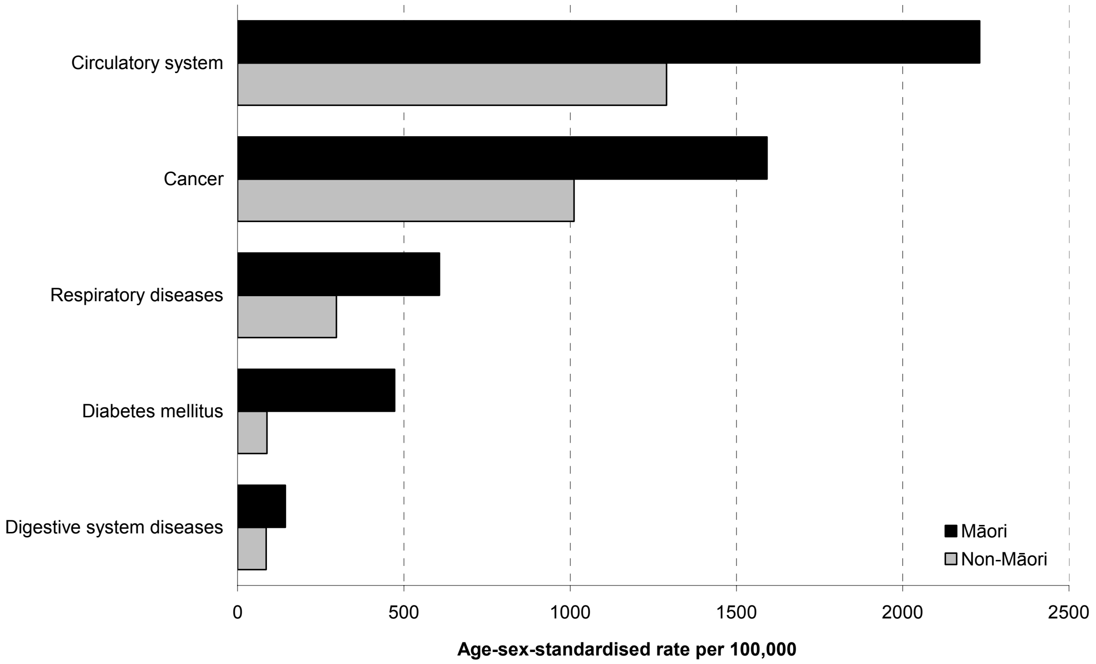
Cause of death	Māori			Non-Māori			Rate ratio
	Number	Rate	Rank	Number	Rate	Rank	
Total: all causes	**4,428**	**1,082.4**		**16,758**	**417.6**		**2.59**
Circulatory system diseases	**1,598**	**390.6**	**1**	**4,444**	**110.8**	**2**	**3.53**
• Ischaemic heart disease	958	234.2		2,872	71.6		3.27
• Stroke	203	49.6		761	19.0		2.62
• Chronic rheumatic heart disease	96	23.5		61	1.5		15.44
• Hypertensive diseases	57	13.9		67	1.7		8.34
Cancer	**1,574**	**384.8**	**2**	**8,113**	**202.2**	**1**	**1.90**
• Lung	533	130.3		1,420	35.4		3.68
• Breast: female	177	84.0		1,023	50.6		1.66
• Colorectal	115	28.1		1,182	29.5		0.95
• Liver	84	20.5		159	4.0		5.18
• Stomach	77	18.8		294	7.3		2.57
Endocrine, nutritional and metabolic	**469**	**114.6**	**3**	**614**	**15.3**	**5**	**7.49**
• Diabetes mellitus	390	95.3		421	10.5		9.09
• Obesity	52	12.7		93	2.3		5.48
Respiratory diseases	**300**	**73.3**	**4**	**723**	**18.0**	**4**	**4.07**
• COPD	228	55.7		548	13.7		4.08
• Asthma	34	8.3		47	1.2		7.10
• Bronchiectasis	19	4.6		26	0.6		7.17
• Pneumonia	15	3.7		50	1.2		2.94
Accidents	**188**	**46.0**	**5**	**731**	**18.2**	**3**	**2.52**
• Transport accidents	122	29.8		479	11.9		2.50
• Falls	25	6.1		79	2.0		3.10

Cause of death	Māori			Non-Māori			Rate ratio
	Number	Rate	Rank	Number	Rate	Rank	
Females: all causes	**1,955**	**927.6**		**6,890**	**340.7**		**2.72**
Cancer	**831**	**394.3**	**1**	**3,977**	**196.7**	**1**	**2.00**
• Lung	287	136.2		609	30.1		4.52
• Breast	177	84.0		1,023	50.6		1.66
• Colorectal	54	25.6		536	26.5		0.97
• Cervix	30	14.2		93	4.6		3.10
Circulatory system	**575**	**272.8**	**2**	**1,223**	**60.5**	**2**	**4.51**
• Ischaemic heart disease	277	131.4		605	29.9		4.39
• Stroke	122	57.9		348	17.2		3.36
• Chronic rheumatic heart	54	25.6		35	1.7		14.80
• Hypertensive disease	28	13.3		26	1.3		10.33
Endocrine, nutritional, metabolic	**201**	**95.4**	**3**	**237**	**11.7**	**4**	**8.14**
• Diabetes mellitus	173	82.1		152	7.5		10.92
• Obesity	20	9.5		55	2.7		3.49
Respiratory diseases	**185**	**87.8**	**4**	**366**	**18.1**	**3**	**4.85**
• COPD	141	66.9		279	13.8		4.85
• Asthma	25	11.9		31	1.5		7.74
Accidents	**50**	**23.7**	**5**	**205**	**10.1**	**7**	**2.34**
• Transport accidents	33	15.7		141	7.0		2.25
Males: all causes	**2,473**	**1,246.9**		**9,868**	**495.8**		**2.52**
Circulatory system	**1,023**	**515.8**	**1**	**3,221**	**161.8**	**2**	**3.19**
• Ischaemic heart disease	681	343.4		2,267	113.9		3.01
• Stroke	81	40.8		413	20.7		1.97
• Chronic rheumatic heart	42	21.2		26	1.3		16.21
• Hypertensive disease	29	14.6		41	2.1		7.10
Cancer	**743**	**374.6**	**2**	**4,136**	**207.8**	**1**	**1.80**
• Lung	246	124.0		811	40.7		3.04
• Liver	73	36.8		107	5.4		6.85
• Colorectal	61	30.8		646	32.5		0.95
• Stomach	49	24.7		205	10.3		2.40
Endocrine, nutritional, metabolic	**268**	**135.1**	**3**	**377**	**18.9**	**4**	**7.13**
• Diabetes mellitus	217	109.4		269	13.5		8.10
• Obesity	32	16.1		38	1.9		8.45
Accidents	**138**	**69.6**	**4**	**526**	**26.4**	**3**	**2.63**
• Transport accidents	89	44.9		338	17.0		2.64
• Falls	18	9.1		60	3.0		3.01
Respiratory diseases	**115**	**58.0**	**5**	**357**	**17.9**	**6**	**3.23**
• COPD	87	43.9		269	13.5		3.25

Notes: Rates are calculated per 100,000; shaded rate ratios are statistically significant at the 5% level.

Ages 65 years and over

Figure 4.11: Major causes of death among Māori aged 65 years and over, 2000–2004



Note: Rates were age-sex-standardised to the 2001 Māori population.

During 2000–2004 there were 1,150 deaths per year on average among Māori aged 65 years and over, and 20,450 among non-Māori. The age-standardised rate of death among Māori was three-quarters higher than that of non-Māori. Chronic diseases were the main causes of death in this age group (Table 4.10).

Circulatory system disease was the leading cause of death among Māori and non-Māori aged 65 years and over. On average 470 Māori died from circulatory disease each year. Māori males and females had higher rates of death from this group of diseases than either non-Māori males or females, which accounted for 40% of the total mortality disparity. Over half the deaths in this category were caused by ischaemic heart disease (heart attacks), followed by stroke. Other major circulatory disease deaths were caused by hypertensive disease (a 3.8 times higher rate for Māori than non-Māori) and heart failure (more than twice as common). Although relatively rare in this age group, deaths from chronic rheumatic heart disease were 3.5 times more frequent among Māori than non-Māori.

Cancer was the second leading cause of death, causing just over a quarter of Māori and non-Māori deaths in this age group. Deaths from cancer were more common among males than females and more than 50% more common among Māori than non-Māori, accounting for a quarter of the overall mortality difference. A third of the cancer deaths among Māori were due to lung cancer. Prostate and breast cancers were the next most common causes of cancer death among Māori males and females (respectively), with rates around 50% higher than those of non-Māori. Colorectal and stomach cancers were the next most common causes of cancer death for Māori males and females.

Stomach cancer mortality was higher for Māori than non-Māori. Colorectal cancer mortality was higher for non-Māori females than Māori females but similar for Māori and non-Māori males.

Respiratory diseases caused a tenth of the deaths among both Māori and non-Māori, were more common among males than females, and were twice as frequent among Māori as non-Māori. The majority of respiratory deaths were due to COPD. This disease accounted for 86% of the excess Māori mortality from respiratory disease. Pneumonia and bronchiectasis were the other main respiratory diseases. Although relatively rare, deaths from bronchiectasis were 5.6 times more frequent among Māori than non-Māori, accounting for 10% of the disparity in all-cause mortality between Māori and non-Māori.

Diabetes mellitus caused 8% of the deaths among Māori and 3% among non-Māori and was more common among males than females. Diabetes accounted for 16% of the all-cause mortality difference between Māori and non-Māori, with Māori mortality rates over five times higher than those of non-Māori.

Diseases of the digestive system were the fifth leading major cause of death among both Māori and non-Māori.

Table 4.10: Major causes of death, ages 65 years and over, 2000–2004

Cause of death	Māori			Non-Māori			Rate ratio
	Total number	Rate	Rank	Total number	Rate	Rank	
Total: all causes	**5,738**	**5,507.1**		**102,268**	**3,127.5**		**1.76**
Circulatory system	**2,352**	**2,231.8**	**1**	**46,636**	**1,289.7**	**1**	**1.73**
• Ischaemic heart disease	1,345	1,290.4		25,510	746.3		1.73
• Stroke	418	388.9		12,184	306.8		1.27
• Hypertensive disease	94	89.0		958	23.3		3.82
• Heart failure	84	73.3		1,796	34.9		2.10
• Chronic rheumatic heart	48	44.3		452	12.4		3.56
Cancer	**1,632**	**1,591.9**	**2**	**26,843**	**1,011.5**	**2**	**1.57**
• Lung	553	535.8		4,694	197.4		2.71
• Prostate	131	289.5		2,569	196.0		1.48
• Colorectal	118	116.6		4,196	157.2		0.74
• Stomach	97	96.0		978	36.7		2.61
• Breast: female	87	150.0		1,524	100.3		1.50
Respiratory diseases	**628**	**607.1**	**3**	**9,802**	**297.0**	**3**	**2.04**
• COPD	511	493.7		6,888	227.6		2.17
• Pneumonia	53	52.5		1,854	38.2		1.37
• Bronchiectasis	30	28.0		158	5.0		5.63
Endocrine, nutritional, metabolic	**527**	**509.1**	**4**	**3,265**	**108.4**	**5**	**4.70**
• Diabetes mellitus	488	472.4		2,696	87.8		5.38
Digestive system diseases	**151**	**143.8**	**5**	**3,044**	**85.9**	**7**	**1.67**

Cause of death	Māori			Non-Māori			Rate ratio
	Total number	Rate	Rank	Total number	Rate	Rank	
Females: all causes	**2,832**	**4,686.8**		**53,848**	**2,447.9**		**1.91**
Circulatory system	**1,191**	**1,933.5**	**1**	**25,907**	**1,012.8**	**1**	**1.89**
• Ischaemic heart disease	621	1,010.7		12,962	527.6		1.92
• Stroke	249	403.4		7,769	297.5		1.36
• Heart failure	55	81.2		1,238	35.2		2.30
• Hypertensive disease	46	72.7		638	23.5		3.10
• Chronic rheumatic heart disease	36	62.8		304	14.5		4.33
Cancer	**765**	**1,315.2**	**2**	**12,130**	**758.9**	**2**	**1.73**
• Lung	275	478.9		1,743	127.4		3.76
• Breast	87	150.0		1,524	100.3		1.50
• Colorectal	45	76.2		2,125	130.2		0.59
• Stomach	38	65.5		375	21.3		3.07
Respiratory diseases	**315**	**527.0**	**3**	**4,809**	**226.1**	**3**	**2.33**
• COPD	256	432.1		3,037	164.3		2.63
• Pneumonia	21	30.9		1,196	35.5		0.87
• Bronchiectasis	19	32.1		108	6.3		5.10
• Asthma	11	18.8		134	6.2		3.03
Endocrine, nutritional, metabolic	**248**	**421.0**	**4**	**1,686**	**88.5**	**7**	**4.76**
• Diabetes mellitus	226	383.3		1,379	70.9		5.40
Digestive system diseases	**79**	**130.3**	**5**	**1,815**	**77.3**	**6**	**1.68**
Males: all causes	**2,906**	**6,304.0**		**48,420**	**3,771.7**		**1.67**
Circulatory system	**1,161**	**2,530.0**	**1**	**20,729**	**1,557.6**	**1**	**1.62**
• Ischaemic heart disease	724	1,570.0		12,548	965.0		1.63
• Stroke	169	374.4		4,415	316.1		1.18
• Hypertensive diseases	48	105.2		320	23.0		4.57
• Heart failure	29	65.4		558	34.5		1.89
Cancer	**867**	**1,868.7**	**2**	**14,713**	**1,264.0**	**2**	**1.48**
• Trachea, bronchus and lung	278	592.8		2,951	267.3		2.22
• Prostate	131	289.5		2,569	196.0		1.48
• Colorectal	73	156.9		2,071	184.2		0.85
• Stomach	59	126.4		603	52.2		2.42
Respiratory diseases	**313**	**687.1**	**4**	**4,993**	**367.9**	**3**	**1.87**
• COPD	255	555.4		3,851	290.9		1.91
• Pneumonia	32	74.0		658	40.9		1.81
• Bronchiectasis	11	23.9		50	3.7		6.55
Endocrine, nutritional, metabolic	**279**	**597.2**	**3**	**1,579**	**128.2**	**4**	**4.66**
• Diabetes mellitus	262	561.4		1,317	104.7		5.36
Digestive system diseases	**72**	**157.4**	**5**	**1,229**	**94.5**	**6**	**1.67**

Notes: Rates are calculated per 100,000 and age-standardised to the 2001 Māori population; shaded rate ratios are statistically significant at the 5% level.

Conclusion

Mortality statistics (or death rates and numbers) provide a very limited and often stark picture of health status – "numbers without tears". Yet each number represents a person and a loss to their whānau. As discussed earlier, mortality disparities are the end result of breaches of rights and a reflection of the unjust distribution of resources that affect health outcomes. These statistics must lead to actions to decrease the number of premature deaths suffered disproportionately by Māori whānau and the loss of contribution to the whole of our society.

Mārama's story

Mārama and Tāne are seasonal workers in the shearing sheds. They reside in Raupunga and have six children. During the year 2000, one of their sons was involved in a car accident in Wairoa, which left him seriously injured and hospitalised at Hastings Hospital in the intensive care unit. He was to spend almost all of his hospital stay there. Mārama stayed with her son, Kani, and was his nurse/caregiver during this time. Tāne returned home to Raupunga, (two hours drive northeast of Hastings) to look after the rest of the children. They were to lead two separate lives for the next five months, which proved to be very draining on the whānau, healthwise and financially.

One life was with Tāne at home caring for their children – managing the family unit with their daily living like the food, the monthly bills such as the power and phone as well as the mortgage – all adding up to a high financial burden for Tāne to look after. The power tariff in Wairoa is amongst one of the dearest in New Zealand.

The second life involved the daily living costs within the hospital such as the payment for lodgings at the whānau whare (hospital accommodation). Mārama had to supply their own food or buy from the hospital cafeteria, which wasn't cheap and doesn't cater for long-term residential whānau in terms of a discount. Yet discounted meals, if not free, were made available for some hospital staff.

One of the biggest expenses for the whānau was the petrol. Mārama and Tāne were not given any travel assistance and, because they were seasonal workers, during the off season they were faced with a stand-down period of up to 12 weeks.

"Tāne was spending most of our money on petrol, and then I said, "Fill up our cupboards, like for the kids' lunches", so we were just living on like gee!! Like sometimes he would leave me on the Sunday and then come back and I would only have $20 to last me until Thursday and that's the pits. You imagine living on $20. There was three (Mārama, Kani and Manu, Mārama's youngest daughter) of us and you're spending like so much a day on food and those cafés are so expensive."

The stress didn't stop here for Mārama and her whānau. For Mārama it was also dealing with the racism that she witnessed on a day-to-day basis by some professional hospital staff, which angered Mārama a lot.

"Well I've seen it, you know, when you're in the children's ward, well my son was under 16, and you don't go up to the other wards until you're 16 and over and I have seen many, like they'll run and do this person and they won't go and do this person and you can guarantee because there are three of us in there, they'll be running to a Pākehā and not a Māori. That's only some reasons but I have seen it happen."

However, she and her family learned to cope with the indifferences that they saw. After a long five months, Kani was well enough to be allowed home, with a lot of ongoing rehabilitation and visits back to the hospital. Apart from this, it was a big relief for the whānau that they were once again reunited as a whole and able to refamiliarise and get back into the routine of their daily whānau lives.

Source: Rameka R. 2006. *He Arakanihi ki te Oranga*. Wellington: Te Rōpū Rangahau Hauora a Eru Pōmare.

5 HOSPITALISATIONS

Bridget Robson, Carey Robson, Ricci Harris, Gordon Purdie

Key points

- In 2005 just over one in eight Māori and just under one in eight non-Māori people were admitted to public hospitals, with an average of 1.7 admissions each among Māori and 1.6 admissions among non-Māori.
- Māori age-standardised rates of public hospitalisations (not individuals) were 30% higher than non-Māori rates during 2003–2005. The rates were higher in each age group except for babies under the age of one, among whom the rate was 80% that of non-Māori. In the 45–64 years age group Māori had more than twice the rate of admissions of non-Māori.
- Infants had the highest rate of hospitalisations. Those aged 65 years and over had the second highest rate. The age group least likely to be hospitalised was 5–14 years. This pattern held among Māori and non-Māori, and among males and females.
- All-cause hospitalisation rates increased with increasing socioeconomic deprivation among Māori and non-Māori males and females in each age group. Because Māori are disproportionately represented in the most deprived areas, Māori are at higher risk overall of hospitalisation than non-Māori. With the exception of children under the age of 15 years, Māori public hospitalisation rates were higher than non-Māori rates at the same level of deprivation, in each age group.
- There was a small increase in all-cause public hospital admission rates among both Māori and non-Māori between 2000 and 2005. The largest rate increases among Māori were in the 45–64 years age group (15%) and those aged 65 years and over (13%). Non-Māori rates changed very little in any age group. The total *number* of hospital admissions increased by 20% among Māori and by 7% among non-Māori (an increase of 44% and 49% among Māori aged 45–64 and 65 years and over respectively).
- Apart from admissions for specific procedures and healthy newborns (factors influencing health status not associated with illness, injury or childbirth), pregnancy and childbirth was the most common cause of admission among Māori, followed by injuries and respiratory disease. The leading causes were similar for non-Māori, but cardiovascular disease replaced respiratory disease as the fourth leading major cause.
- The largest causes of female hospitalisations were those related to pregnancy and childbirth.

- Higher rates of admissions for pregnancy and childbirth among Māori women accounted for a third of the difference in total hospitalisation rates between Māori and non-Māori.
- Women were more likely than men to be admitted for genitourinary diseases, cancer, signs and symptoms, and factors relating to health status.
- Males had a higher risk of hospital admission than females for injuries and poisoning, mental and behavioural disorders, ear diseases, circulatory diseases, and infectious diseases.
- Māori had higher rates of hospitalisation than non-Māori for preventable conditions, including skin infections, glue ear, dental caries, injuries, asthma, COPD, bronchiectasis, bronchitis and bronchiolitis, diabetes and its complications, hypertensive disease, congestive heart failure, acute rheumatic fever and chronic rheumatic heart disease.
- Age-specific rates of hospital discharges among middle-aged Māori were similar to or exceeded those of non-Māori aged between 15 to 25 years older for chronic conditions associated with age, such as non-insulin dependent diabetes, hypertensive disease, heart failure, and COPD (including transfers and readmissions).
- The main causes of hospitalisations involving injury and poisoning were falls, exposure to mechanical forces, transport accidents, and complications of medical and surgical care. Māori hospitalisation rates were higher than non-Māori rates for each of these causes and for injuries from assault.
- Publicly funded surgical procedure rates for 2003–2005 were higher among Māori for procedures related to ear disease, diabetes and its complications, some cardiac procedures including angiography, heart valve replacements and coronary artery bypass and graft (CABG), but not angioplasty. CABG and angioplasty rates remain lower than expected for Māori given the high mortality rates. Caesarean section rates were lower for Māori women.
- There was a large increase in the rate of haemodialysis for Māori between 2000 and 2005 while the rates did not increase significantly for non-Māori. Cardiac procedure rates have increased generally since the early 1990s as best practice changed. Between 2000 and 2005, rates of angiography and angioplasty rates continued to increase for both Māori and non-Māori, but at a faster rate for Māori. CABG rates decreased between 2000 and 2005 among both groups.
- The major causes of hospital admission for Māori infants (apart from healthy live births) were perinatal conditions and respiratory disease. Māori admission rates were lower than those of non-Māori for perinatal conditions but higher for respiratory disease.
- For Māori children aged 1–4 years respiratory disease was the leading cause of hospitalisation, followed by injuries, ear disease and dental caries. Māori rates were higher than non-Māori rates for these causes.

- Among Māori children aged 5–14 years injury was the main cause of admission followed by respiratory and ear disease.
- At ages 15–24 and 25–44 years pregnancy and childbirth were the main causes of admission for Māori, followed by injury.
- For Māori adults aged 45–64 years and 65 years and over admissions for specific procedures (mainly dialysis) were the most common, followed by cardiovascular disease and respiratory disease. Although the rate of admissions for dialysis was very high among Maori, the proportion of individuals admitted for dialysis was relatively small compared to the proportion of people admitted for CVD or respiratory disease. The high admission rate for dialysis is driven by the large number of admissions per person.

Introduction

This chapter describes patterns of public hospitalisations for Māori and non-Māori during the period 2003–2005 for all ages, by sex, by age group, and by deprivation quintile. Annual rates between 2000 and 2005 are also examined for all-cause hospitalisations.

Hospitalisation data is one measure of health care utilisation. By itself it is not a measure of need, nor of the extent to which the health system is meeting need. Nevertheless, it can provide some information on the performance of the health system, including the effectiveness of the primary care sector. Alongside other data such as mortality or incidence, hospital data can contribute to an assessment of whether Māori are receiving appropriate and equitable access to the most resource-intensive sector of the health system. Trends in hospital admissions can assist the planning of future services and health strategies.

Statistical coverage

The statistics in this chapter refer to publicly funded hospital discharges[1], including inpatients and day patients. An inpatient is "a person who is admitted to hospital for medical, surgical, psychiatric, or obstetric treatment, observation or care and stays at least one night. It also includes healthy persons if formally admitted by the hospital as boarders" (NZHIS 2006). Healthy babies born in hospital are counted as inpatients. Day patients are admitted and discharged on the same day. Outpatients are excluded.

Publicly funded hospital discharges include inpatient care provided by district health boards, community health trusts, and publicly funded hospital services provided in private hospitals. Privately funded hospital care is not included.

The unit of analysis is generally the number of discharges (episodes of care). Therefore, each readmission of a patient for the same condition is counted as a separate episode of care and patients transferred to another public hospital are counted twice. A smaller

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[1] Hospitalisations from routinely collected data are counted when a person is discharged from hospital. While hospitalisations and hospital admissions are often used in describing the data, strictly speaking these refer to hospital discharges.

proportion of Māori admissions were coded as transfers from another hospital than non-Māori patients (4.47% compared to 6.71%) during the period of our analysis.

Māori hospital admissions are known to be undercounted in the national data set but the net undercount varies by age, increasing in the elderly. Therefore, we adjusted for the estimated undercount of Māori in each age group. Non-Māori hospitalisations were calculated as the difference between the total number of hospitalisations and the adjusted number of Māori hospitalisations. See Appendix 3 for details. Because the adjustments do not apply to hospital discharge data from the 1990s we only examined hospitalisations from the year 2000 on.

All age-standardised rates were standardised to the Māori population. Rates standardised to Segi's world population and the WHO world population will also be available on the *Hauora IV* website www.hauora.maori.nz. These standard populations are included as Appendix 4. All rates were calculated per 100,000 person-years. The NZDep2001 index of small area deprivation was used to examine patterns by socioeconomic status. The International Classification of Diseases (ICD) codes and the groupings used in this volume are listed in Appendix 2. More detail on statistical methods can be found in Appendix 1.

What is in this chapter?

The data in this chapter are presented for Māori and non-Māori and are divided into four main sections:

- All-cause public hospitalisations:
  - Numbers and rates of hospital discharges during the period 2003–2005 by sex and age group;
  - Rates of public hospital discharges by deprivation quintile (NZDep2001) and age group for 2003–2005;
  - Numbers and rates of hospitalisations by year from 2000 to 2005 for all ages and by age group.
- Major causes of public hospitalisation for all ages:
  - Leading causes of hospital admission among Māori and non-Māori during the years 2003–2005 (numbers and rates by ICD chapter);
  - Selected causes of hospital admission by sex, numbers, age-standardised rates for 2003–2005;
  - Five-year age-specific rates of admission for selected causes for the years 2003–2005;
  - Causes of public hospital admissions involving injury or poisoning, numbers and age-sex-standardised rates for 2003–2005.
- Publicly funded surgical procedures:
  - Numbers and age-sex-standardised rates for 2003–2005;
  - Yearly rates of selected procedures during the period 2000 to 2005;

- Major causes of public hospitalisation during 2003–2005 for the following age groups:
  - infants < 1 year;
  - 1–4 years;
  - 5–14 years;
  - 15–24 years;
  - 25–44 years;
  - 45–64 years;
  - 65 years and over.

All-cause public hospitalisations

Table 5.1: Public hospitalisation rates by sex and age group, 2003–2005

Age group	Female			Male		
	Māori rate	Non-Māori rate	Rate ratio	Māori rate	Non-Māori rate	Rate ratio
All ages	25,915.2	19,803.0	1.31	20,968.7	15,761.0	1.33
Under 1 year	125,380.2	157,187.7	0.80	135,865.6	165,460.1	0.82
1–4 years	15,700.1	14,766.3	1.06	19,463.4	18,738.8	1.04
5–14 years	7,338.2	6,918.0	1.06	8,992.6	8,218.1	1.09
15–24 years	29,151.3	16,195.6	1.80	10,599.5	8,161.1	1.30
25–44 years	27,376.4	22,407.4	1.22	13,803.0	9,111.4	1.51
45–64 years	30,292.2	14,690.6	2.06	34,504.1	15,847.3	2.18
65 years and over	63,029.5	35,555.2	1.77	82,474.7	44,974.1	1.83

Notes: Rates are calculated per 100,000; rates for 'all ages' and 65 years and over were age-standardised to the 2001 Māori population; shaded rate ratios are statistically significant at the 5% level.

During 2003–2005 there were approximately 148,000 public hospital discharges per year on average among Māori and 690,000 per year among non-Māori. Just over one in 8 Māori and just under one in 8 non-Māori were hospitalised each year. The average number of admissions per person was 1.7 for Māori and 1.6 for non-Māori. Age-standardised rates of hospital discharges were around a third higher for Māori than non-Māori among both males and females (Table 5.1).

Males had higher rates of hospitalisation than females in every age group except 25–44 years, when pregnancy and childbirth accounted for the greater number of female hospitalisations.

Infants had the highest admission rates among both Māori and non-Māori. This was partly because births in hospital are counted as admissions (over 40% of infant admissions). However, after taking healthy newborns into account infant admission rates were still higher than those of other age groups (65,230 per 100,000 for Māori females; 79,240 for Māori males; 83,340 for non-Māori females and 97,990 for non-Māori males).

Among Māori the second highest admission rates were among the elderly (65 years and over)[2] followed by the 45–64 years age group. School aged children (5–14 years) had the lowest risk of going to hospital. Among males, children aged 1–4 years had higher public hospital discharge rates than young adults aged 15–24 and 25–44 years.

Māori infants were around 20% less likely than non-Māori infants to be admitted to hospital. At all other ages Māori discharge rates were higher than non-Māori rates, ranging from around 5% higher among children under 15 years to twice as high at middle age (45–64 years). Among those aged 65 and over, Māori rates were 80% higher than non-Māori (age-standardised). Pregnancy and childbirth accounted for 80% of the difference between Māori and non-Māori females at ages 15–24 years and 14% at ages 25–44 years.

All-cause hospitalisations by deprivation and age group

Figure 5.1 shows Māori and non-Māori age-specific public hospital discharge rates by NZDep2001 quintile during the period 2003–2005. NZDep2001 is the New Zealand Index of small-area socioeconomic deprivation based on Census data. The Māori population is disproportionately represented in the most deprived areas.

In each age group the risk of being admitted to hospital increased with increasing socioeconomic deprivation among both Māori and non-Māori. Public hospitalisation rates in the most deprived areas were two or more times higher than those in the least deprived areas among Māori adults aged 25 years and over. In the younger age groups hospitalisations were around 70% to 80% higher in the most deprived areas compared to the least deprived areas.

In the adult age groups (15–24 years and over) public hospital discharge rates were higher for Māori than non-Māori at each level of deprivation. Among preschoolers Māori rates were lower than those of non-Māori at each level of deprivation except the most deprived quintile where they were similar. Among children aged 5–14 years Māori and non-Māori rates were similar in each quintile.

While the magnitude of rates was different by gender, the patterns of difference between Māori and non-Māori by deprivation were generally similar for males and females.

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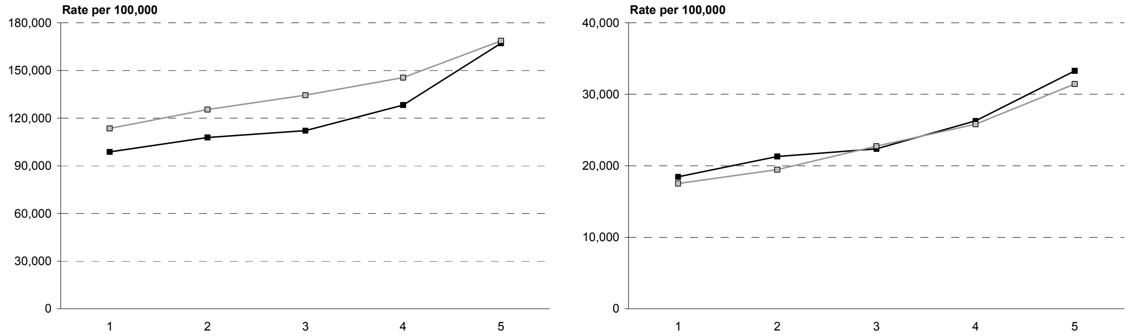
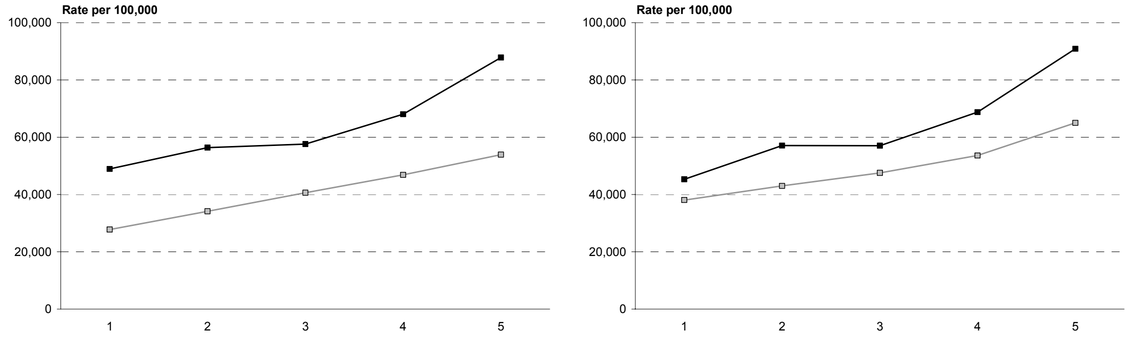
[2] The crude rates for non-Māori aged 65 years and over were 43,500 per 100,000 for females and 51,000 per 100,000 for males. The standardised rate for Māori approximates the crude rate.

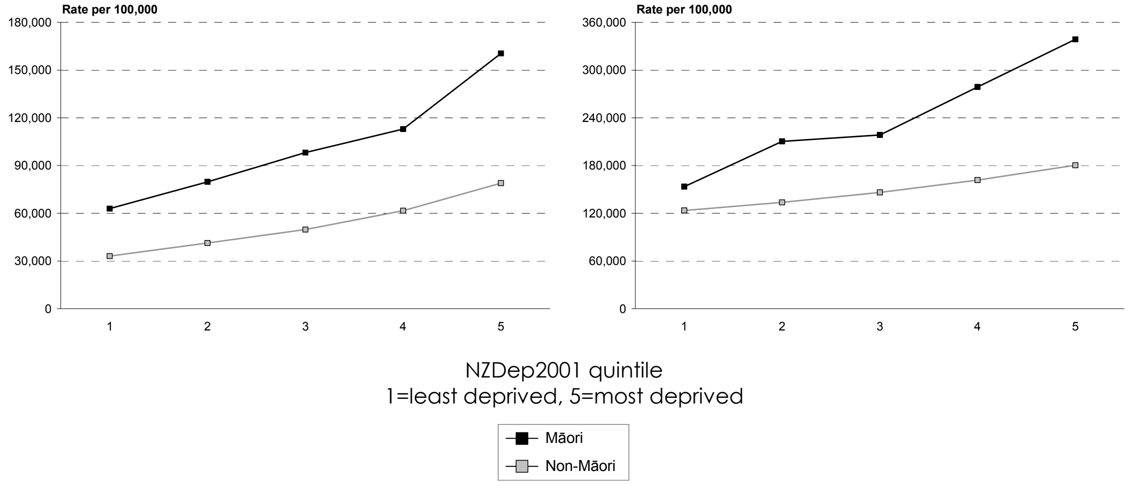
Figure 5.1: Public hospitalisations by NZDep2001 quintile and age group, 2003–2005


a: 0–4 years

b: 5–14 years


c: 15–24 years

d: 25–44 years


e: 45–64 years

f: 65 years and over

All-cause public hospitalisations by year, 2000 to 2005

Trends in hospital admission rates provide information on changing health need, and, in some cases, the effectiveness of primary care and population-based initiatives. The number of Māori and non-Māori hospital admissions is also useful for planning services to meet the needs of increasing populations and changes in age structure. Therefore, we report increases in the *number* of admissions among Māori and non-Māori by age group, as well as changes in *rates* of admission.

The previous volume *Hauora: Māori Standards of Health III* showed a rising rate of hospital admissions. This trend continued in the 1990s for both Māori and non-Māori in each age group. However during the years 2000 to 2005 substantial increases in rates occurred only in the older age groups (45–64 years and 65 years and over) among Māori. Māori rates in the younger age groups and non-Māori rates in all age groups remained fairly steady during the first half of this decade. This resulted in an increase in the Māori/non-Māori age-sex-standardised rate ratios that was mostly driven by increasing gaps in the middle and older age groups (Table 5.2).

- Between 2000 and 2005 the age-sex-standardised *rate* of hospital admission increased by 7.0% for Māori and 2.2% for non-Māori.[3] The *number* of public hospitalisations, on the other hand, increased by 20% among Māori and by 7% among non-Māori.
- Among Māori aged 65 years and over hospitalisation rates increased by 13%, with a 3% decrease in non-Māori rates (age-standardised), resulting in an increase in the rate ratios between 2000 and 2005. The number of Māori admissions grew by 49% and non-Māori by 7%.
- Māori rates of hospitalisation in the 45–64 year age group increased by 15% between 2000 and 2005, while there was little change in non-Māori rates. Rate ratios increased from 1.91 to 2.12. The number of admissions increased by 44% for Māori and 18% for non-Māori.
- There was little change in the rates of admission among 25–44 year olds but the number of Māori hospital admissions increased by 9% (non-Māori increased by 2%). Rate ratios remained similar through the six-year period at a third higher for Māori.
- In the 15–24 year age group admission rates increased slightly for Māori and decreased slightly for non-Māori, resulting in a small increase in rate ratios. The number of admissions increased by 20% among Māori and 11% among non-Māori.
- Among children aged 5–14 years and 1–4 years there was little change in rates of admission or in rate ratios, with Māori rates remaining similar to or slightly higher than non-Māori rates. There was an increase of 12% in the number of Māori admissions aged 5–14 years (4% in non-Māori). In the 1–4 year age group the number of Māori admissions grew by 4%, with a small decrease in the number of non-Māori admissions.
- There was little change in the infant hospitalisation rates over the six years for either Māori or non-Māori. Māori rates remained over 20% lower than those of non-Māori babies.

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[3] The population standard affects apparent increases in age-standardised rates. Using the WHO standard, Māori rates increased by 8.3% and non-Māori by 1.3%. Segi's standard produced similar increases to using the WHO standard.

Table 5.2: Public hospitalisations, all causes, by age group and year, 2000–2005

Age group	Year	Māori		Non-Māori		Rate ratio (95% CI)
		Number	Rate	Number	Rate	
All ages	2000	127,799	22,019.9	652,090	17,376.5	1.27 (1.26–1.28)
	2001	135,494	22,866.0	687,517	18,234.4	1.25 (1.24–1.27)
	2002	137,703	22,758.4	678,570	17,877.9	1.27 (1.26–1.28)
	2003	142,336	23,038.4	676,350	17,621.8	1.31 (1.30–1.32)
	2004	148,603	23,440.3	694,912	17,637.8	1.33 (1.32–1.34)
	2005	152,861	23,553.4	697,039	17,756.6	1.33 (1.31–1.34)
Under 1 year	2000	20,026	132,619.5	65,301	156,448.1	0.85 (0.82–0.88)
	2001	20,353	132,508.2	65,810	162,653.8	0.81 (0.79–0.85)
	2002	19,337	128,828.4	66,067	170,143.9	0.76 (0.73–0.79)
	2003	20,087	132,327.1	65,842	163,989.4	0.81 (0.78–0.84)
	2004	20,764	129,774.8	66,739	159,319.7	0.81 (0.78–0.85)
	2005	21,079	130,277.5	65,580	161,090.9	0.81 (0.78–0.84)
1–4 years	2000	10,153	17,237.1	27,453	16,372.4	1.05 (1.01–1.10)
	2001	10,448	17,637.5	28,374	17,098.6	1.03 (0.99–1.08)
	2002	11,016	18,396.1	29,158	17,574.8	1.05 (1.00–1.09)
	2003	11,128	18,553.5	28,305	17,245.2	1.08 (1.03–1.12)
	2004	10,384	17,145.9	27,289	16,642.9	1.03 (0.99–1.07)
	2005	10,579	17,219.0	26,982	16,490.4	1.04 (1.00–1.09)
5–14 years	2000	10,725	7,729.4	33,874	7,419.2	1.04 (1.01–1.07)
	2001	11,757	8,306.6	35,604	7,830.5	1.06 (1.03–1.09)
	2002	11,436	7,977.0	35,202	7,697.5	1.04 (1.01–1.07)
	2003	11,896	8,197.9	34,733	7,551.3	1.09 (1.05–1.12)
	2004	11,890	8,147.0	34,034	7,446.8	1.09 (1.06–1.13)
	2005	12,054	8,224.4	35,069	7,766.4	1.06 (1.03–1.09)
15–24 years	2000	19,259	18,853.2	53,448	12,551.6	1.50 (1.47–1.54)
	2001	20,861	20,155.8	57,212	13,312.8	1.51 (1.48–1.55)
	2002	20,643	19,504.1	54,882	12,300.1	1.59 (1.55–1.62)
	2003	21,464	19,811.4	55,609	11,919.5	1.66 (1.62–1.70)
	2004	21,851	19,664.2	56,520	11,890.5	1.65 (1.62–1.69)
	2005	23,206	20,201.6	59,519	12,390.8	1.63 (1.59–1.67)
25–44 years	2000	34,392	20,758.4	155,600	15,596.0	1.33 (1.31–1.35)
	2001	36,325	21,549.1	162,599	16,526.3	1.30 (1.28–1.32)
	2002	36,326	21,230.6	157,261	15,964.7	1.33 (1.31–1.35)
	2003	35,691	20,541.6	156,324	15,832.2	1.30 (1.28–1.32)
	2004	37,193	21,145.5	158,229	15,966.9	1.32 (1.30–1.34)
	2005	37,375	21,051.5	158,378	16,049.7	1.31 (1.29–1.33)
45–64 years	2000	21,288	28,570.2	113,358	14,921.7	1.91 (1.88–1.95)
	2001	23,513	30,145.1	124,339	15,960.9	1.89 (1.86–1.92)
	2002	25,558	31,312.8	123,201	15,380.6	2.04 (2.00–2.07)
	2003	26,423	30,991.2	124,348	15,061.7	2.06 (2.02–2.09)
	2004	29,718	33,133.8	129,313	15,262.9	2.17 (2.14–2.21)
	2005	30,759	32,770.6	134,141	15,458.7	2.12 (2.09–2.15)
65 years and over	2000	11,960	64,359.6	203,074	41,063.6	1.57 (1.53–1.60)
	2001	12,249	62,336.2	213,613	42,211.2	1.48 (1.45–1.51)
	2002	13,394	64,601.4	212,812	41,195.1	1.57 (1.54–1.60)
	2003	15,651	71,683.0	211,200	39,863.4	1.80 (1.76–1.83)
	2004	16,808	73,475.9	222,794	41,218.5	1.78 (1.75–1.82)
	2005	17,811	73,043.0	217,379	39,723.9	1.84 (1.81–1.87)

Notes: Rates are calculated per 100,000; rates for ‘all ages’ and 65 years and over were age-sex-standardised to the 2001 Māori population.

Major causes of hospitalisation

Table 5.3: Public hospitalisations by major cause of admission (ICD-10 chapter), 2003–2005

ICD chapter	Māori		Non-Māori		Rate ratio (95% CI)
	Number	Rate	Number	Rate	
All public hospital discharges	443,800	23,442.0	2,068,301	17,781.9	1.32 (1.31–1.33)
Factors influencing health status	94,974	5,038.1	293,773	3,456.3	1.46 (1.44–1.48)
Pregnancy, childbirth and puerperium*	60,832	6,423.6	213,596	4,544.1	1.41 (1.40–1.43)
Injury and poisoning	43,091	2,311.1	206,887	1,822.3	1.27 (1.25–1.28)
Respiratory disease	42,182	2,249.8	138,034	1,367.2	1.65 (1.62–1.68)
Digestive system disease	29,428	1,556.3	173,892	1,299.4	1.20 (1.18–1.22)
Symptoms and signs	24,723	1,284.5	157,645	1,133.9	1.13 (1.12–1.15)
Circulatory system disease	22,326	1,119.9	183,516	643.2	1.74 (1.71–1.77)
Genitourinary system disease	17,940	922.8	97,348	738.1	1.25 (1.23–1.27)
Cancers	14,209	720.4	148,405	671.7	1.07 (1.05–1.09)
Skin diseases	12,445	664.8	47,132	395.2	1.68 (1.64–1.72)
Mental and behavioural disorders	12,376	658.1	49,373	364.0	1.81 (1.77–1.85)
Musculoskeletal diseases	11,874	617.7	88,137	532.4	1.16 (1.14–1.19)
Infectious and parasitic diseases	11,430	620.8	48,370	636.9	0.97 (0.95–1.00)
Perinatal conditions	10,432	582.9	44,278	923.1	0.63 (0.61–0.65)
Ear diseases	9,463	522.3	23,367	367.6	1.42 (1.38–1.47)
Nervous system diseases	7,158	374.7	44,408	314.4	1.19 (1.16–1.23)
Endocrine, nutritional and metabolic	7,007	356.3	31,030	188.5	1.89 (1.83–1.95)
Congenital anomalies	4,690	259.7	18,660	340.7	0.76 (0.73–0.79)
Diseases of the eye	3,867	196.5	34,896	164.3	1.20 (1.15–1.24)
Diseases of the blood	3,269	168.9	25,251	148.0	1.14 (1.10–1.19)

Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population;* rates are sex-specific.

Table 5.3 shows the total number of hospital discharges among Māori and non-Māori by major cause (ICD chapter) for the three-year period 2003–2005 with age-sex-standardised rates. The rate ratio column shows the relative risk of hospitalisation for Māori compared to non-Māori.

- “Factors influencing health status and contact with health services” was the most common category of hospital admission among both Māori and non-Māori (21% and 14% of total admissions respectively). This category covers a broad range of admissions that are not a disease or injury or covered by other ICD chapters. These include admissions for examinations and investigations; live births (comprising nearly 30% of Māori and non-Māori admissions in this chapter); and admissions for specific procedures (comprising 54% of Māori and 40% of non-Māori admissions in this chapter) (see Table 5.6 for specific procedure rates). A higher proportion of non-Māori admissions in this chapter were for rehabilitative and convalescent care (17%) compared to Māori (3%). Admissions for dialysis made up a larger proportion of Māori admissions (43%) than non-Māori admissions (8%).
- The second most frequent cause of hospital admission among Māori related to pregnancy and childbirth (14% of the total discharges and 24% of the female

discharges), followed by injury and poisoning (6% of female and 14% of male discharges), and respiratory disease (11% of male and 8% of female discharges).

- Among non-Māori pregnancy and childbirth was the second most common cause of admission (10% of the total and 18% of the female discharges), followed by injury and poisoning (10% of the total), and circulatory system disease (9% of total admissions).
- Māori rates of admission for pregnancy and childbirth were 41% higher than those of non-Māori. This accounted for a third of the overall difference in hospital admission rates between Māori and non-Māori females.
- Rates of hospitalisation for respiratory disease were 65% higher among Māori than non-Māori (accounting for 16% of the total disparity), admissions due to injury and poisoning were 27% more frequent (comprising 9% of the total difference), and those caused by circulatory disease 74% more common (contributing 8% of the total disparity).
- Rates of admission for skin diseases were 68% higher for Māori than non-Māori, and mental and behavioural disorders 81% higher, but each accounted for only 5% of the all-cause rate difference.
- Admissions for endocrine, nutritional and metabolic disorders were 89% higher among Māori but were responsible for only 3% of the difference in all-cause discharge rates. However, admissions related to complications arising from diabetes are included in other chapters. For example, renal failure admissions are included in the genitourinary system chapter, and renal dialysis in "factors influencing health services".
- Non-Māori had higher rates of hospitalisations than Māori for perinatal conditions (58% higher), congenital anomalies (31% higher), and certain infectious and parasitic diseases (3% higher).
- Māori admission rates for diseases of the ear were 42% higher than those of non-Māori, and musculoskeletal disease, nervous system diseases, eye diseases and diseases of the blood around 15–20% higher.

Table 5.4: Public hospitalisations, selected causes of admission, by gender, 2003–2005

Cause of admission	Females					Males				
	Māori		Non-Māori		Rate ratio (95% CI)	Māori		Non-Māori		Rate ratio (95% CI)
	No.	Rate	No.	Rate		No.	Rate	No.	Rate	
Respiratory disease										
Asthma	4,408	474.0	9,120	235.7	2.01 (1.92–2.11)	4,052	440.5	7,933	254.8	1.73 (1.64–1.82)
Pneumonia	3,397	351.2	13,517	203.4	1.73 (1.64–1.82)	3,537	381.9	15,123	240.5	1.59 (1.51–1.66)
COPD	3,167	293.1	12,413	69.6	4.21 (4.01–4.42)	2,164	229.0	13,378	77.8	2.94 (2.80–3.10)
Bronchitis, bronchiolitis	2,867	327.1	3,416	124.3	2.63 (2.42–2.86)	4,040	440.0	4,979	191.4	2.30 (2.14–2.47)
Acute URTI	2,649	295.4	7,774	252.0	1.17 (1.11–1.24)	2,959	322.1	8,712	296.9	1.09 (1.03–1.14)
Tonsils and adenoids	1,003	111.8	5,242	171.0	0.65 (0.61–0.70)	835	90.9	4,070	139.4	0.65 (0.60–0.71)
Bronchiectasis	431	42.7	1,146	13.5	3.16 (2.69–3.70)	380	40.7	577	9.6	4.23 (3.48–5.16)
Circulatory system										
Ischaemic heart disease	3,048	283.2	27,143	140.8	2.01 (1.93–2.10)	3,822	401.8	45,194	337.1	1.19 (1.15–1.23)
Heart failure	1,523	136.9	8,635	30.2	4.53 (4.22–4.86)	2,154	228.4	8,919	48.5	4.71 (4.44–4.99)
Stroke	1,337	123.0	11,294	55.4	2.22 (2.08–2.37)	1,030	109.1	10,933	71.1	1.54 (1.43–1.65)
Chronic rheumatic heart disease	301	29.5	585	6.1	4.84 (3.96–5.90)	195	20.9	419	4.8	4.34 (3.39–5.55)
Hypertensive disease	272	26.4	1,299	9.8	2.68 (2.29–3.15)	182	19.5	801	8.7	2.25 (1.87–2.70)
Acute rheumatic fever	114	12.8	137	4.4	2.90 (2.05–4.10)	205	22.2	148	4.6	4.88 (3.39–7.03)
Cancers										
Breast: female*	959	92.3	6,203	55.8	1.65 (1.54–1.78)					
Lung	718	67.9	2,470	17.3	3.93 (3.57–4.33)	597	62.6	3,790	25.1	2.50 (2.27–2.74)
Prostate						297	31.7	4,513	25.6	1.24 (1.09–1.40)
Cervix	214	20.9	834	9.7	2.15 (1.81–2.54)					
Colorectal	216	20.1	5,233	29.8	0.67 (0.58–0.78)	300	31.7	5,243	34.1	0.93 (0.82–1.05)
Stomach	181	17.3	602	3.6	4.83 (3.86–6.04)	247	26.3	952	6.5	4.04 (3.42–4.79)
Infectious diseases										
Intestinal infection	1,645	184.2	7,613	230.5	0.80 (0.75–0.85)	1,778	193.4	7,616	241.1	0.80 (0.75–0.85)
Meningococcal	144	16.4	401	12.4	1.33 (1.06–1.66)	221	23.9	445	14.1	1.70 (1.39–2.08)
Viral hepatitis	127	12.8	648	10.3	1.25 (1.02–1.53)	266	28.7	1,267	19.5	1.47 (1.28–1.70)
Skin infections	4,204	443.4	12,930	216.0	2.05 (1.96–2.15)	5,197	563.7	16,888	316.9	1.78 (1.71–1.85)
Middle ear, mastoid	3,767	426.3	7,676	286.4	1.49 (1.42–1.56)	4,853	528.8	10,174	370.7	1.43 (1.36–1.49)
Digestive system										
Dental caries	2,775	316.8	5,591	193.6	1.64 (1.54–1.74)	2,839	310.5	6,214	204.5	1.52 (1.43–1.61)
Gastric ulcers	1,100	106.6	5,680	58.7	1.82 (1.69–1.96)	1,219	130.2	5,942	67.8	1.92 (1.79–2.06)
Mental disorders										
Mood disorders	1,796	180.3	9,671	131.6	1.37 (1.30–1.45)	1,171	128.4	5,452	80.9	1.59 (1.48–1.70)
Schizophrenia	1,650	168.3	2,597	39.3	4.28 (3.93–4.66)	3,192	356.0	5,011	90.1	3.95 (3.72–4.20)
Diabetes mellitus										
IDDM (type 1)	523	54.7	2,655	60.0	0.91 (0.82–1.01)	340	37.1	2,476	50.5	0.73 (0.65–0.83)
NIDDM (type 2)	1,743	164.1	6,145	37.2	4.42 (4.13–4.72)	2,110	222.8	7,245	51.6	4.32 (4.07–4.58)
Epilepsy	935	99.1	2,797	61.7	1.61 (1.47–1.76)	1,029	112.5	3,773	80.0	1.41 (1.30–1.52)
Renal failure	365	35.2	1,781	13.9	2.52 (2.20–2.90)	496	52.9	2,457	24.0	2.20 (1.97–2.46)

Note: Rates are calculated per 100,000 and were age-standardised to the 2001 Māori population. *Rates are sex-specific.

Table 5.4 presents age-standardised rates of hospitalisations for selected specific causes of admission during 2003–2005, grouped by major disease category. Most of these causes are considered either preventable through population-based health promotion strategies or responsive to treatment in primary care settings (ambulatory-sensitive).[4]

Respiratory disease

Asthma was the most common cause of admission for respiratory disease among Māori. Māori asthma admission rates were twice those of non-Māori among females and 73% higher among males. Admission rates were fairly similar across all ages apart from a very high rate among 0–4 year olds (see Figure 5.3e). Māori rates were consistently higher than non-Māori rates across all age groups (see the Respiratory Disease chapter for more on asthma).

Pneumonia admissions were higher among Māori than non-Māori (73% for females and 59% for males). This disease is strongly associated with age and was the most frequent cause of admission for respiratory disease among non-Māori.

Rates of admission for chronic obstructive pulmonary disease (COPD) were very high among Māori – over four times higher than non-Māori rates for females and nearly three times higher than those of non-Māori males. This disease is more common among older people. However, Māori rates reach those of non-Māori at about 20 years younger, and far exceed those of older non-Māori from the age of 65 years on (see Figure 5.3f).

Bronchitis and bronchiolitis are also common causes of respiratory disease admissions, more than twice as common among Māori as among non-Māori.

Māori and non-Māori were admitted at fairly similar rates for acute upper respiratory tract infections. For diseases of the tonsils and adenoids Māori admission rates were significantly lower than those of non-Māori (65% the non-Māori rate).

Bronchiectasis admissions were three times more frequent among Māori women than non-Māori women and four times more common among Māori men than non-Māori men. Although this disease is less common than other respiratory diseases, the disparities are extreme, with Māori death rates 5.9 times higher than those of non-Māori among females and 7.6 times higher among males (see the Respiratory Disease chapter for more on bronchiectasis).

Circulatory system

Ischaemic heart disease (IHD) was the most common cause of admission for circulatory system disease, accounting for 29% of Māori cardiovascular admissions and 32% of the non-Māori cardiovascular admissions. Males were more likely than females to be hospitalised for IHD.

Despite having over twice the risk of death from IHD, Māori males were admitted to hospital at a rate only 19% higher than non-Māori males. Māori females have 2.5 times

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[4] See Ministry of Health (2006) for the aggregated Māori and non-Māori avoidable and ambulatory sensitive hospitalisation rates, and full list of categories.

the mortality rate of non-Māori females from IHD but admissions were only twice as high (see the Cardiovascular Disease chapter for more on IHD).

Heart failure admissions were four and a half times more common among Māori females and males than among their non-Māori counterparts.

Stroke admissions were over twice as high for Māori women compared to non-Māori women. Māori males were admitted for stroke at a rate 54% higher than non-Māori males. Māori rates of admission for hypertensive disease were more than twice those of non-Māori (see the Cardiovascular Disease chapter for more on stroke).

The disparities between Māori and non-Māori rates of admission for chronic rheumatic heart disease were very high (4.8 times higher in females, and 4.3 times higher in males). The continuing disparity in admissions for acute rheumatic fever is very concerning as it an indicator of ongoing and future disparities in chronic rheumatic heart disease.

Cancer

Among females, Māori admission rates were higher than those of non-Māori for lung, breast, cervix, and stomach cancers, and lower for colorectal cancer. This aligns with the relative cancer incidence patterns among Māori and non-Māori, although it is likely that non-Māori women were more likely than Māori to be admitted to private hospitals for breast, colorectal, and cervical cancer.

Among males, lung cancer and stomach cancer admission rates were considerably higher for Māori than non-Māori, commensurate with the higher incidence of these cancers among Māori. Conversely, colorectal cancer admissions were similar. Admissions for prostate cancer were 24% higher among Māori, although prostate cancer is less common among Māori males than non-Māori. This may be a reflection of higher levels of private treatment among non-Māori and/or that Māori males are more likely to be diagnosed at later stages of disease spread.

Certain communicable diseases

During 2003–2005, Māori were 20% less likely than non-Māori to be admitted to hospital for intestinal infections, more likely than non-Māori to be admitted for meningococcal infection (males 70% more likely, females 33% more likely), viral hepatitis (females 25%, males 47% more likely), skin infections (females twice as likely, males 78% more likely). Middle ear disease admissions (mostly glue ear – a result of infection) were over 40% more common for Māori. Within each population males were more likely than females to be admitted for these causes.

Digestive system

Dental caries hospitalisations are most common in the very young and the disparity between Māori and non-Māori admission rates is highest in children, but also significant in the middle age groups. The higher rate of admission among Māori may be a sign of lower levels of access to private dental care (see the Oral Health chapter for further discussion).

Admissions for stomach ulcers were around 80% more common for Māori than non-Māori.

Mental disorders

Māori females were 37% more likely than non-Māori females to be admitted to hospital for mood disorders and Māori males 59% more likely than non-Māori. For both males and females, Māori were four times more likely than non-Māori to be admitted for schizophrenia. Admissions for schizophrenia were more common in males than females. For mood disorders females were more likely to be admitted than males. The mental health chapter discusses psychiatric admissions in more detail.

Diabetes

Māori were more likely to be hospitalised for type 2 diabetes mellitus (NIDDM) than non-Māori, and less likely than non-Māori to be admitted for type 1 diabetes mellitus (IDDM). Around 80% of the Māori admissions and 75% of the non-Māori admissions were for type 2 diabetes (see the Diabetes chapter for more detail).

Genitourinary system

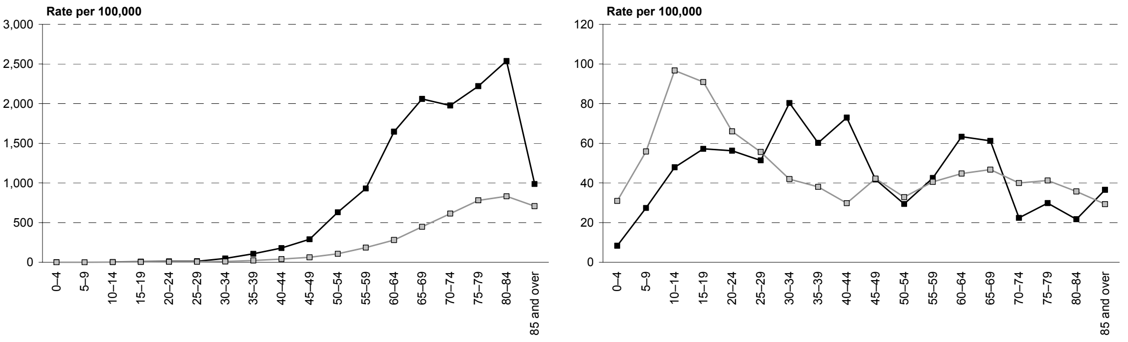
Hospital admissions for renal failure were over twice as frequent among Māori as among non-Māori. More than half the deaths from genitourinary system disease were due to renal failure. Renal failure increases with age, but the age gradient was much steeper among Māori. For example, the rate of admissions for Māori in the 25–44 year age group was similar to that of non-Māori aged 45–64 years. Likewise, the rate for Māori at 45–64 years was similar to the non-Māori rate at 65 years and over.

Selected causes of public hospitalisation by five-year age group

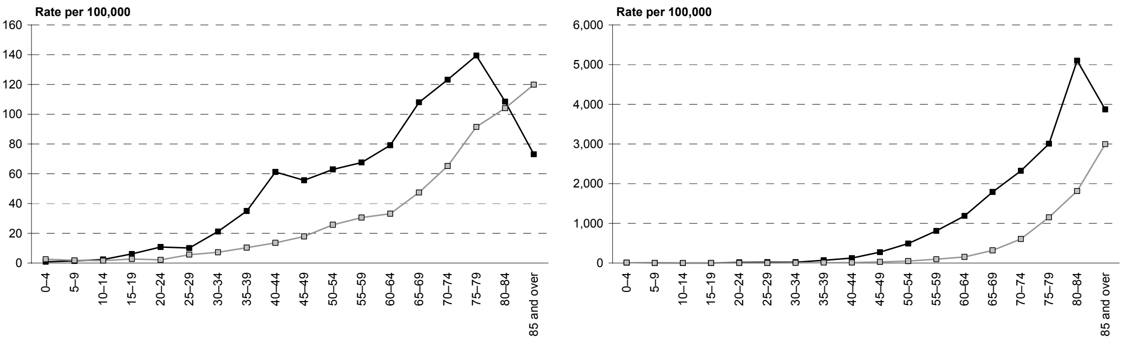
Figure 5.2 shows age-specific rates of hospitalisation by five-year age group during the years 2003–2005 for certain causes of admission considered sensitive to effective primary care.

- Among the causes more likely to develop in later life (i.e., type 2 diabetes, hypertensive disease, heart failure, COPD) Māori hospitalisation rates at middle age reached those of non-Māori 15–25 years older. For example, the admission rate for type 2 diabetes among Māori aged 50–54 years was higher than that of non-Māori aged 70–74 years. The age-shift for heart failure admissions and COPD was about 15 years.
- Māori rates of admission for type 2 diabetes from the age of 55 years and for COPD from the age of 65 years exceed those of non-Māori at any age.
- For other conditions more likely to be experienced life-long, such as epilepsy and asthma, Māori rates exceeded those of non-Māori across most ages.
- The pattern of admissions for type 1 diabetes shows lower rates among Māori during childhood and youth, but higher rates in adulthood. This raises a question as to whether blood sugar levels are more tightly controlled among young non-Māori (resulting in hypoglycaemic attacks) and whether Māori with type 1 diabetes are more likely to experience complications from diabetes in adulthood.
- Policies and funding for primary care and age-related services need to recognise the higher levels of need among Māori at younger ages, and the need to improve Māori access to best practice management of chronic conditions.

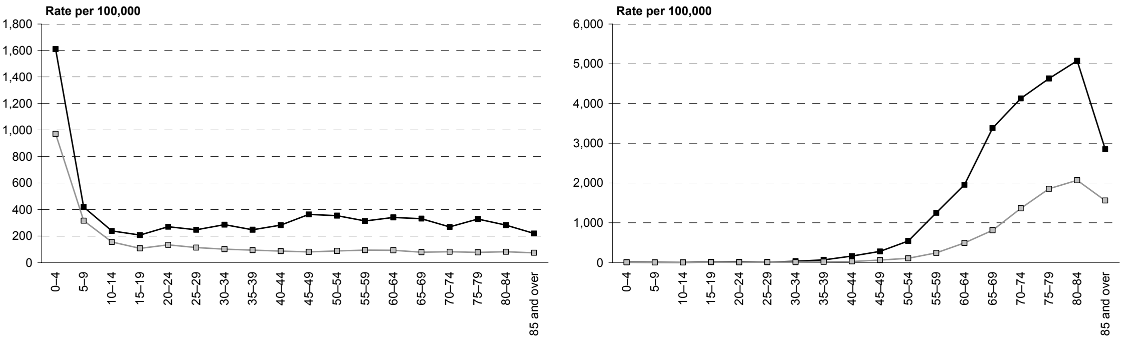
Figure 5.2: Public hospitalisations by five-year age group, selected causes, 2003–2005


a: Type 2 diabetes mellitus

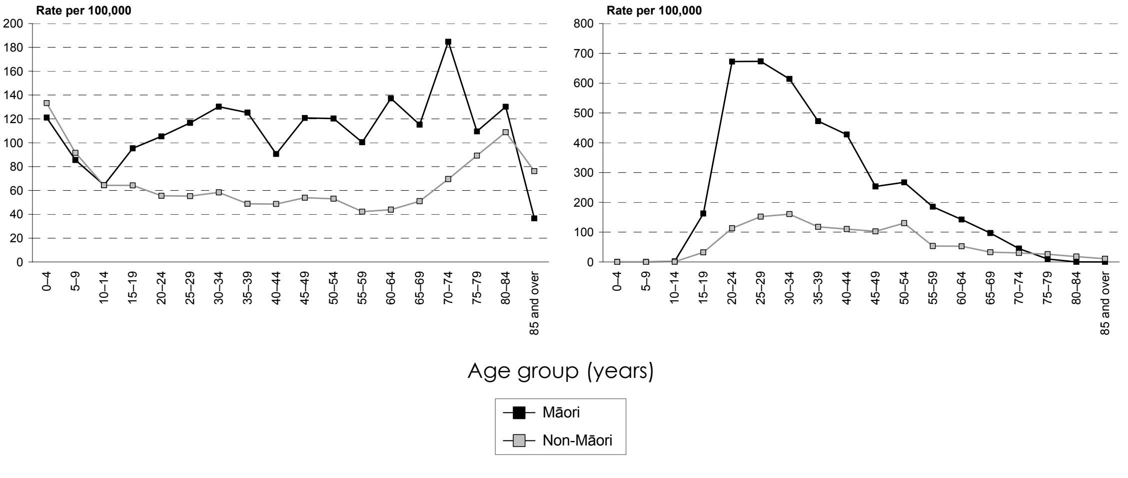
b: Type 1 diabetes mellitus


c: Hypertensive disease

d: Congestive heart failure


e: Asthma

f: Chronic obstructive pulmonary disease


g: Epilepsy

h: Schizophrenia

Public hospitalisations by cause of injury or poisoning

Table 5.5: Public hospitalisations for injury, by cause of injury, 2003–2005

Circumstance of injury	Māori		Non-Māori		Rate ratio (95% CI)
	Number	Rate	Number	Rate	
Total injury and poisoning discharges	**43,075**	**2,310.3**	**206,730**	**1,820.9**	**1.27 (1.25–1.29)**
Transport accidents	**7,036**	**377.9**	**31,532**	**329.7**	**1.15 (1.11–1.18)**
Pedestrian	680	37.0	2,340	24.3	1.52 (1.37–1.68)
Pedal cyclist	965	52.9	4,839	60.1	0.88 (0.81–0.95)
Other land transport accidents (traffic)	4,840	258.2	20,488	200.3	1.29 (1.24–1.34)
Other transport accidents	552	29.9	3,864	45.0	0.66 (0.60–0.73)
Other accidental causes	**24,053**	**1,300.1**	**123,056**	**1,090.1**	**1.19 (1.17–1.21)**
Falls	9,805	527.7	65,439	487.8	1.08 (1.05–1.11)
Exposure to mechanical forces	9,580	520.7	36,228	390.7	1.33 (1.30–1.37)
• inanimate mechanical forces	8,863	481.7	33,740	366.0	1.32 (1.28–1.35)
• animate mechanical forces	717	39.1	2,488	24.7	1.58 (1.43–1.75)
Poisoning	1,088	59.0	4,420	56.0	1.05 (0.98–1.13)
Drowning	71	3.9	197	2.8	1.41 (1.03–1.95)
Accidental threats to breathing	70	3.8	385	4.6	0.83 (0.62–1.10)
Fires	258	13.9	847	8.8	1.57 (1.34–1.85)
Other accident	3,181	171.0	15,540	139.3	1.23 (1.18–1.28)
Complications of medical and surgical care	**5,502**	**285.1**	**32,143**	**198.7**	**1.43 (1.39–1.48)**
Assault	**4,222**	**227.4**	**7,858**	**84.2**	**2.70 (2.58–2.83)**
Intentional self-harm	**2,018**	**106.8**	**11,360**	**110.4**	**0.97 (0.92–1.02)**
Event of undetermined intent	**189**	**10.1**	**736**	**7.3**	**1.38 (1.15–1.65)**
Legal intervention	**55**	**3.0**	**46**	**0.5**	**6.56 (3.52–12.22)**

Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population.

Table 5.5 includes only hospital admissions involving injury or poisoning during the period 2003–2005, and reports rates of hospitalisation by cause of the injury or poisoning. The data was obtained from external cause codes ('e-codes') associated with each admission.

- During 2003–2005 there were approximately 14,360 Māori and 68,900 non-Māori admissions on average per year due to injury or poisoning. Māori age-sex-standardised rates of hospitalisation were 27% higher than non-Māori rates overall (Table 5.5).
- Falls, exposure to mechanical forces, transport accidents, and complications of medical and surgical care were the most common causes of hospitalisation for injury or poisoning. Māori admission rates were higher than those of non-Māori for each of these causes.
- The main causes that contributed to the overall difference in hospitalisations for injury between Māori and non-Māori included assault (accounting for 30% of the rate difference), exposure to mechanical forces (27%), and complications of medical and surgical care (18%).
- Of the transport accidents, motor vehicle accidents (other land transport accidents) accounted for the highest number of hospitalisations, with Māori at

29% higher risk than non-Māori. Māori admissions due to pedal cyclist accidents were 12% lower than those of non-Māori, while pedestrian accident admissions were 52% higher.

- Admissions for assault exceeded admissions for self-inflicted injury among Māori, while the pattern was the reverse for non-Māori.

Publicly funded surgical procedures

Table 5.6: Selected publicly funded surgical procedures, 2003–2005

Procedure	Māori		Non-Māori		Ratio (95% CI)
	Number	Rate	Number	Rate	
Myringotomy (grommets)	6,788	379.1	15,772	304.5	1.24 (1.20–1.29)
Myringoplasty (repair of eardrum)	1,071	57.4	1,580	20.3	2.83 (2.55–3.14)
Mastoidectomy	204	10.7	530	5.4	1.97 (1.62–2.39)
Tonsillectomy and adenoidectomy	3,036	168.3	12,510	216.4	0.78 (0.74–0.81)
Angiography	5,029	253.9	44,084	186.0	1.36 (1.32–1.41)
Heart valve replacement	375	19.2	2,015	9.2	2.10 (1.85–2.38)
Angioplasty	826	41.9	11,577	47.7	0.88 (0.81–0.95)
Coronary artery bypass and graft	876	44.5	9,591	36.7	1.21 (1.13–1.30)
Endarterectomy	91	4.5	1,508	4.4	1.01 (0.81–1.26)
Stripping of varicose veins	492	25.5	1,666	9.5	2.67 (2.38–3.00)
Hemodialysis	42,514	2,175.0	27,907	145.5	14.95 (14.51–15.41)
Peritoneal dialysis	1,781	90.7	2,041	10.9	8.28 (7.48–9.16)
Kidney transplant	36	1.8	276	2.2	0.83 (0.58–1.20)
Amputation of lower limb	663	33.9	3,117	11.8	2.87 (2.59–3.19)
Cataract surgery	2,629	128.5	21,824	56.5	2.28 (2.17–2.38)
Cholecystectomy (gallbladder removal)	1,701	87.0	10,139	59.5	1.46 (1.38–1.55)
Hernia repair	1,759	95.6	9,065	80.2	1.19 (1.12–1.27)
Total hip replacement	931	46.3	8,895	29.3	1.58 (1.47–1.70)
Partial hip replacement	62	2.6	2,941	3.7	0.69 (0.53–0.91)
Mastectomy*	417	39.9	2,779	23.6	1.69 (1.51–1.89)
Total reconstruction of breast	76	7.4	740	9.5	0.78 (0.61–0.99)
Prostatectomy	317	33.6	5,809	34.4	0.98 (0.87–1.10)
Diagnostic procedures on cervix	444	45.6	2,374	41.5	1.10 (0.99–1.23)
Conisation of cervix	141	14.1	836	12.9	1.09 (0.91–1.32)
Other excision of lesion of cervix	979	101.0	4,260	77.6	1.30 (1.21–1.40)
Diagnostic procedures on uterus	1,928	188.8	9,553	129.0	1.46 (1.39–1.54)
Total abdominal hysterectomy	953	92.5	4,439	54.3	1.70 (1.58–1.84)
Vaginal hysterectomy	292	28.4	2,701	32.1	0.88 (0.78–1.00)
Tubal ligation (female sterilisation)	2593	270.7	6535	121.7	2.23 (2.11–2.35)
Insertion of intrauterine contraceptive device	2518	261.7	5556	105.7	2.48 (2.34–2.62)
Vasectomy (male sterilisation)	79	8.8	484	8.8	1.00 (0.78–1.29)
Caesarean section	5,218	10,263.9	33,826	18,156.1	0.57 (0.45–0.72)

Notes: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population; *rates for each procedure from mastectomy down to caesarean section are sex-specific; caesarean section rates were calculated per 100,000 deliveries in hospital.

Table 5.6 shows age-sex-standardised rates of publicly funded surgical procedures for the period 2003–2005. Data on procedures performed privately was not available and it is important to note that non-Māori are more likely to receive private care than Māori.

Key findings include:

- Māori had higher rates of procedures for diseases of the ear and mastoid process (grommet insertions, myringoplasty, and mastoidectomy) but lower rates of tonsillectomy and adenoidectomy;
- some cardiovascular procedures were more common among Māori (angiography, heart valve replacement, CABG, stripping of varicose veins), but angioplasties were less common and endarterectomy rates were similar;
- rates of procedures potentially related to complications of diabetes and renal failure (hemodialysis, peritoneal dialysis, and lower limb amputations) were higher among Māori, but rates of kidney transplant were lower (although not significant);
- gallbladder removals were 46% more frequent among Māori than non-Māori;
- hernia repairs were 19% more common among Māori;
- total hip replacement rates were higher among Māori but partial replacements were lower;
- mastectomies were more frequent among Māori women but total breast reconstruction rates were less frequent;
- prostatectomy rates were similar for Māori and non-Māori men;
- cervical procedures were around 30% higher for Māori women, although rates of diagnostic procedures and conisation were similar;
- total abdominal hysterectomies were more common among Māori women but rates of vaginal hysterectomies were lower;
- tubal ligations and insertion of intrauterine contraceptive devices were more than twice as common for Māori women as for non-Māori women;
- vasectomy rates were similar for Māori and non-Māori men;
- Māori women giving birth in public hospital were two-thirds as likely as non-Māori women to deliver by caesarean section.

Figure 5.3 presents rates of publicly funded procedures performed for cardiovascular disease over the period 2000 to 2005.

The rate of heart valve replacements for Māori remained around twice the rate for non-Māori. However, during this period Māori mortality from chronic rheumatic heart disease was over seven times the rate of non-Māori.

Ischaemic heart disease procedures increased in general during the 1990s, in line with changing knowledge of best practice management. Prior to the year 2000 Māori were less likely to receive these procedures than non-Māori. However rates of publicly funded angiography have increased at a faster rate for Māori than non-Māori, with Māori rates exceeding those of non-Māori since 2000. Māori rates of angioplasty (also called percutaneous coronary intervention or PCI) also increased at a faster rate than for non-Māori, but in 2005 Māori rates were still lower than non-Māori rates. Receipt of

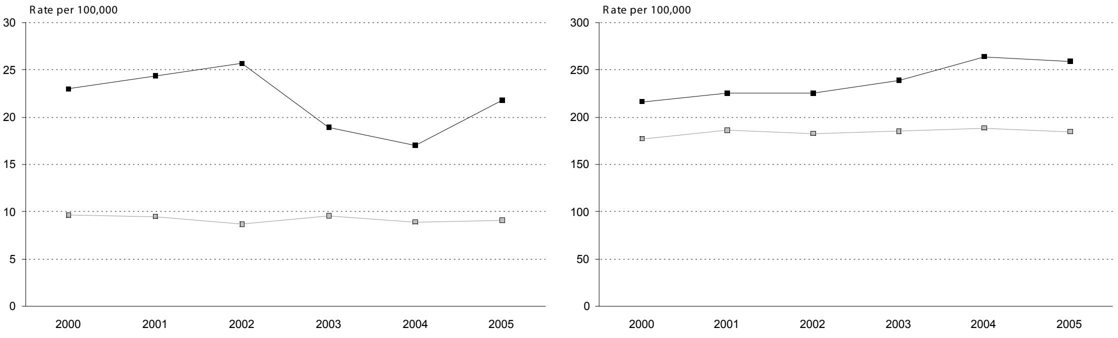
CABG was less common among Māori in the late 1990s but more common from 2000 to 2005. There was a decline in the rate of CABGs among both Māori and non-Māori during the last five years.

While these data show an improvement in access to cardiac surgical services for Māori, it does not show whether this increase meets the greater need. Māori had 2.25 times the non-Māori mortality rate for ischaemic heart disease in the recent period (see the Cardiovascular Disease chapter for more discussion).

Figure 5.3: Selected cardiovascular procedures by year, 2000–2005

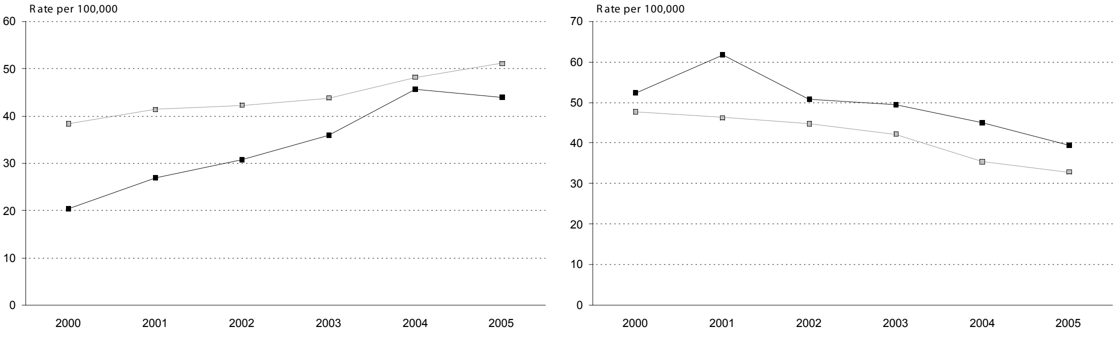
a: Heart valve replacement

b: Angiography



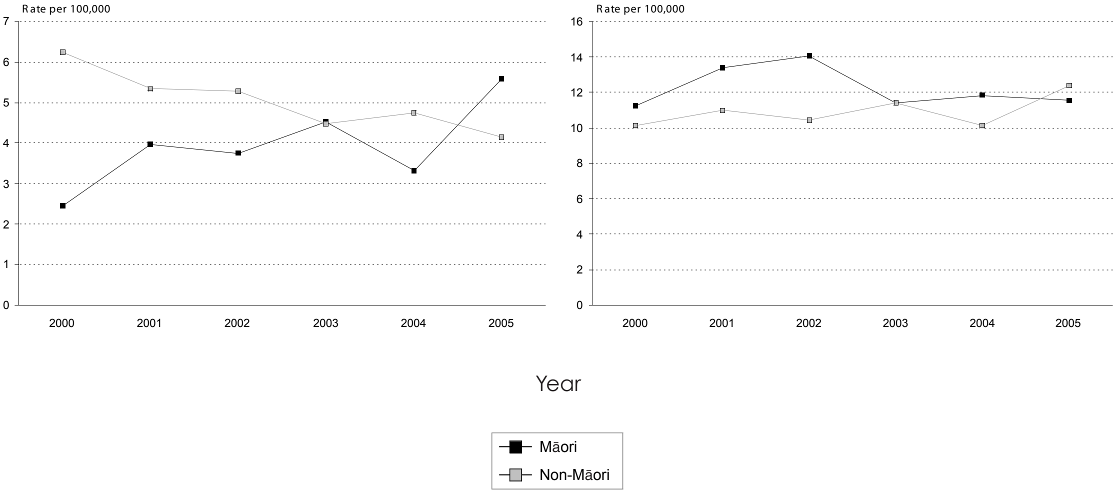
c: Angioplasty

d: Coronary artery bypass and graft



e: Endarterectomy

f: Pacemaker procedure



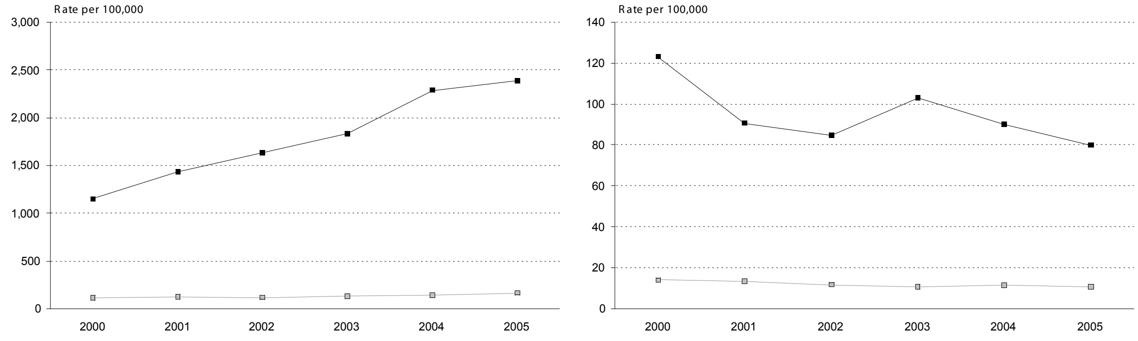
Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population.

Māori rates of endarterectomy (a procedure to reduce the risk of stroke) remained static between 2000 and 2005, while non-Māori rates steadily declined to a level equivalent to that of Māori. There was little change over the six years in rates of pacemaker procedures and little difference between Māori and non-Māori.

Figure 5.4: **Procedures related to complications from diabetes, by year, 2000–2005**

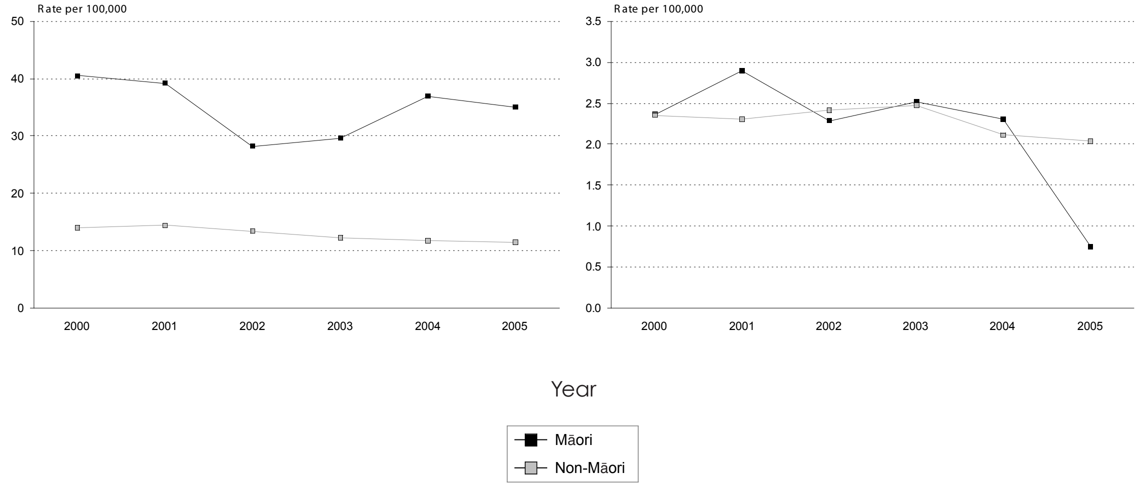
a: Hemodialysis

b: Peritoneal dialysis



c: Amputation of lower limb

d: Kidney transplant



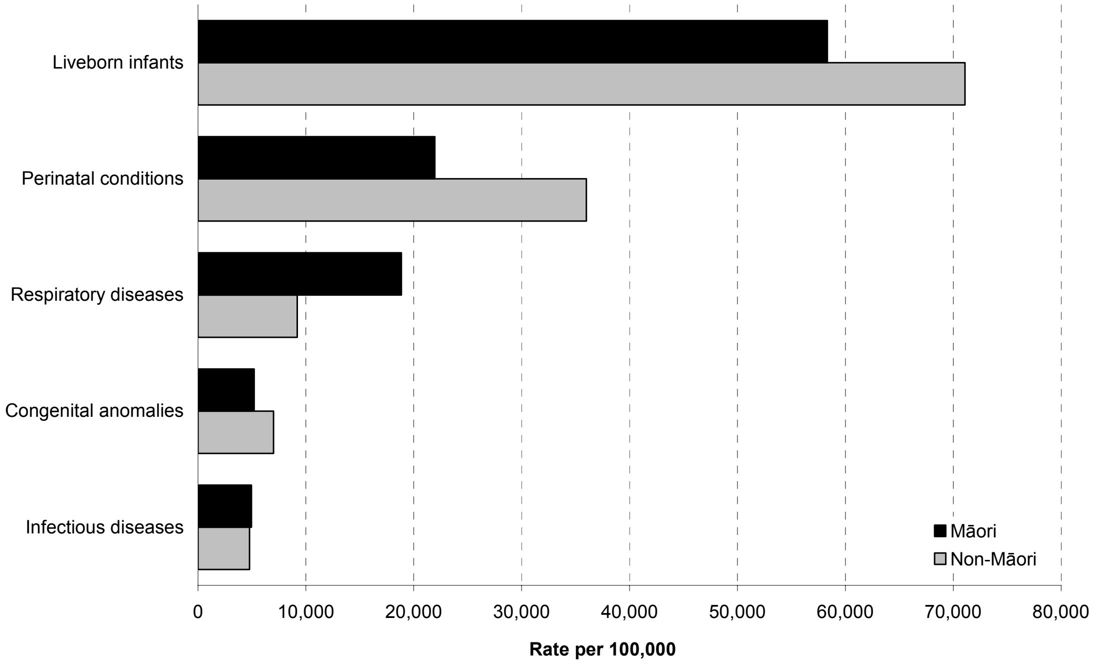
Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population.

Haemodialysis, and peritoneal dialysis are performed when the kidneys have failed. Diabetes is the most common cause of kidney failure and the dominant risk factor for lower limb amputation. Figure 5.4 shows that rates of haemodialysis have steadily increased for Māori, with only a small increase for non-Māori. It is important to note that this data includes multiple admissions for dialysis for the same individuals. Lower limb amputations have declined steadily among non-Māori but remain high for Māori. These can be considered 'hyperdisparities'– those where higher rates indicate less effective medical care. The New Zealand Health Survey 2002/03 estimated that the prevalence of diabetes was around 2.6 times higher among Māori than non-Māori (Ministry of Health 2006). However, these data suggest that complication rates may be disproportionately higher than the prevalence for Māori. The evidence of a much higher rate of kidney failure does not translate to kidney transplantations; Māori transplant rates were similar to those of non-Māori (see the Diabetes chapter for more discussion).

Major causes of hospitalisation by age group

Infants aged less than one year

Figure 5.5: Leading causes of public hospitalisation, infants, 2003–2005



The leading causes of public hospital admission for babies under the age of one year during 2003–2005 were: healthy live births, perinatal conditions, respiratory disease, congenital anomalies, and infectious diseases. In this age group the leading causes were the same for Māori and non-Māori (Table 5.7).

Māori babies were less likely to be admitted to hospital than non-Māori (80% as likely). The ratio was similar when healthy live births in hospital were excluded.

Healthy newborns accounted for 45% of Māori and 44% of non-Māori infant discharges.

Māori infants had twice the rate of admissions for respiratory diseases of non-Māori infants. The majority of respiratory admissions were for acute bronchitis and/or bronchiolitis, followed by acute upper respiratory tract infections.

Māori babies had only around 60% the non-Māori rate of admissions for perinatal conditions, including lower rates of admission for premature birth.

Māori admissions for congenital anomalies were 74% the non-Māori rate.

Māori and non-Māori infants were admitted at similar rates for infectious diseases.

Table 5.7: Public hospitalisations, leading causes for infants under one year old, 2003–2005

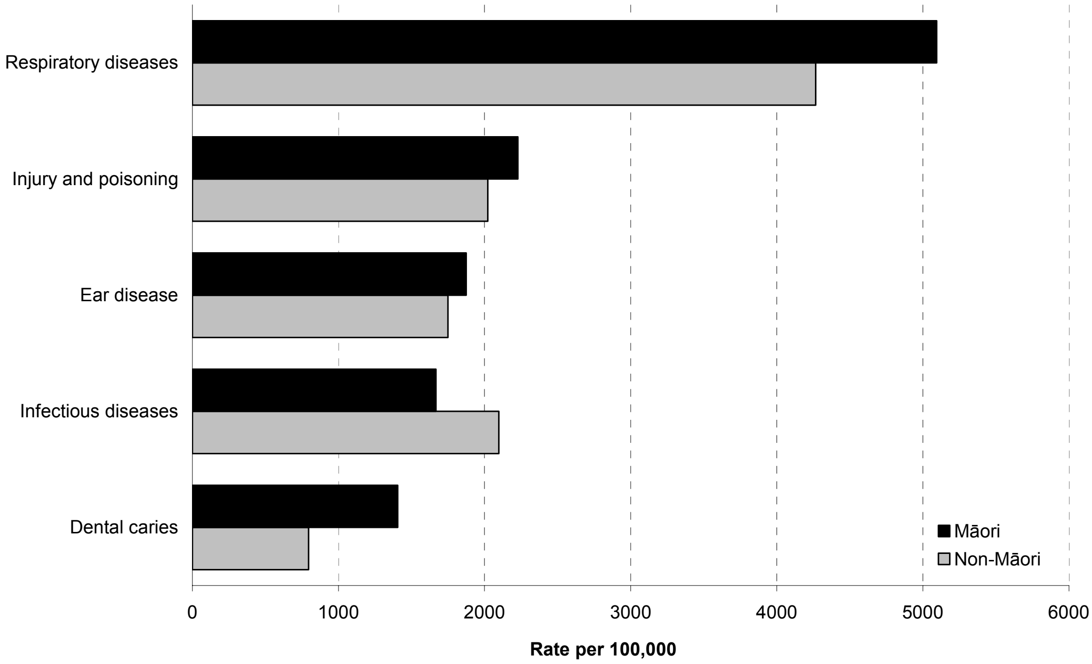
Cause of admission	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Total: all causes		**61,930**	**130,764.6**		**198,161**	**161,434.5**	**0.81**
Liveborn infants	**1**	**27,629**	**58,338.0**	**1**	**87,265**	**71,092.7**	**0.82**
Perinatal conditions	**2**	**10,400**	**21,958.5**	**2**	**44,194**	**36,003.6**	**0.61**
• Premature birth		3,028	6,393.9		9,688	7,892.3	0.81
• Respiratory and cardiovascular disorders		2,238	4,724.6		9,380	7,641.9	0.62
Respiratory diseases	**3**	**8,929**	**18,853.6**	**3**	**11,310**	**9,213.8**	**2.05**
• Acute bronchitis and bronchiolitis		5,853	12,358.7		6,150	5,010.1	2.47
• Acute upper respiratory infections		1,524	3,217.2		2,927	2,384.8	1.35
• Pneumonia		811	1,711.9		1,309	1,066.6	1.61
Congenital anomalies	**4**	**2,464**	**5,203.2**	**4**	**8,605**	**7,010.0**	**0.74**
Infectious diseases	**5**	**2,347**	**4,956.0**	**5**	**5,866**	**4,778.7**	**1.04**
• Intestinal infectious diseases		1,034	2,183.7		2,571	2,094.3	1.04
Females: all causes		**28,888**	**125,380.2**		**94,045**	**157,187.7**	**0.80**
Liveborn infants	**1**	**13,859**	**60,150.2**	**1**	**44,182**	**73,846.6**	**0.81**
Perinatal conditions	**2**	**4,733**	**20,541.1**	**2**	**19,569**	**32,708.2**	**0.63**
• Premature		1,402	6,086.6		4,523	7,559.2	0.81
• Respiratory and cardiovascular disorders		920	3,994.6		3,844	6,424.3	0.62
Respiratory diseases	**3**	**3,629**	**15,752.2**	**3**	**4,391**	**7,338.6**	**2.15**
• Acute bronchitis and bronchiolitis		2,338	10,145.9		2,265	3,786.4	2.68
• Acute upper respiratory infections		662	2,872.4		1,242	2,076.2	1.38
Infectious diseases	**4**	**1,057**	**4,585.7**	**5**	**2,646**	**4,423.3**	**1.04**
• Intestinal infectious diseases		477	2,068.9		1,150	1,922.7	1.08
Congenital anomalies	**5**	**1,015**	**4,405.6**	**4**	**3,707**	**6,195.8**	**0.71**
Males: all causes		**33,043**	**135,865.6**		**104,107**	**165,460.1**	**0.82**
Liveborn infants	**1**	**13,770**	**56,621.3**	**1**	**43,079**	**68,465.8**	**0.83**
Perinatal conditions	**2**	**5,667**	**23,301.3**	**2**	**24,624**	**39,135.6**	**0.60**
• Premature		1,626	6,685.0		5,165	8,209.2	0.81
• Respiratory and cardiovascular disorders		1,317	5,416.3		5,537	8,799.7	0.62
Respiratory diseases	**3**	**5,300**	**21,791.9**	**3**	**6,919**	**10,996.8**	**1.98**
• Acute bronchitis and bronchiolitis		3,515	14,455.0		3,885	6,173.8	2.34
• Acute upper respiratory infections		862	3,543.8		1,685	2,678.3	1.32
• Pneumonia		491	2,016.9		769	1,223.0	1.65
Congenital anomalies	**4**	**1,449**	**5,958.8**	**4**	**4,897**	**7,782.6**	**0.77**
Infectious diseases	**5**	**1,291**	**5,306.9**	**5**	**3,219**	**5,116.6**	**1.04**
• Intestinal infectious diseases		558	2,292.5		1,420	2,257.6	1.02

Notes: Rates are calculated as per 100,000; shaded rate ratios are statistically significant at the 5% level;

Liveborn infants do not include all live births. They are discharges with live birth recorded as the principal diagnosis. These rates use babies born in hospital as the numerator and intercensal estimates of the number of Māori and non-Māori babies as the denominator. They do not reflect the higher birth rates among Māori, where the rate is based on numbers of women giving birth.

Ages 1–4 years

Figure 5.6: Leading causes of public hospital admission, children aged 1–4 years, 2003–2005



The leading causes of public hospital admission during 2003–2005 for children aged 1–4 years included respiratory diseases, injury and poisoning, ear diseases (mainly glue ear), digestive system diseases (mainly dental caries), and infectious diseases (Table 5.8).

Māori all-cause admission rates were 5% higher than those of non-Māori children. Males had higher admission rates than females for each cause, among both Māori and non-Māori children.

Respiratory disease admission rates were a fifth higher for Māori children than non-Māori children. Asthma admissions were 60% more common, bronchitis/bronchiolitis 85%, and pneumonia 15% more common. Acute upper respiratory tract infection admissions were similar to non-Māori rates.

Injury and poisoning was the second major cause of admission for Māori. A third of these admissions were associated with falls and a further quarter associated with exposure to inanimate mechanical forces (at rates similar to non-Māori). Transport accidents and poisoning caused a further 10% each, at higher rates from transport accidents but lower rates for poisoning.

Admissions for glue ear were only 9% higher for Māori children than for non-Māori children. This seems relatively low given the high rates of hearing failure among Māori children at the age of five years (Ministry of Health 2006). Grommet insertion rates were similar for Māori and non-Māori children (1,597 per 100,000 and 1,615 per 100,000 respectively).

Māori children had lower rates of admission for intestinal infectious diseases and viral infections. This may indicate differential access to health care for these conditions.

Table 5.8: Public hospitalisations, leading causes for children aged 1–4 years, 2003–2005

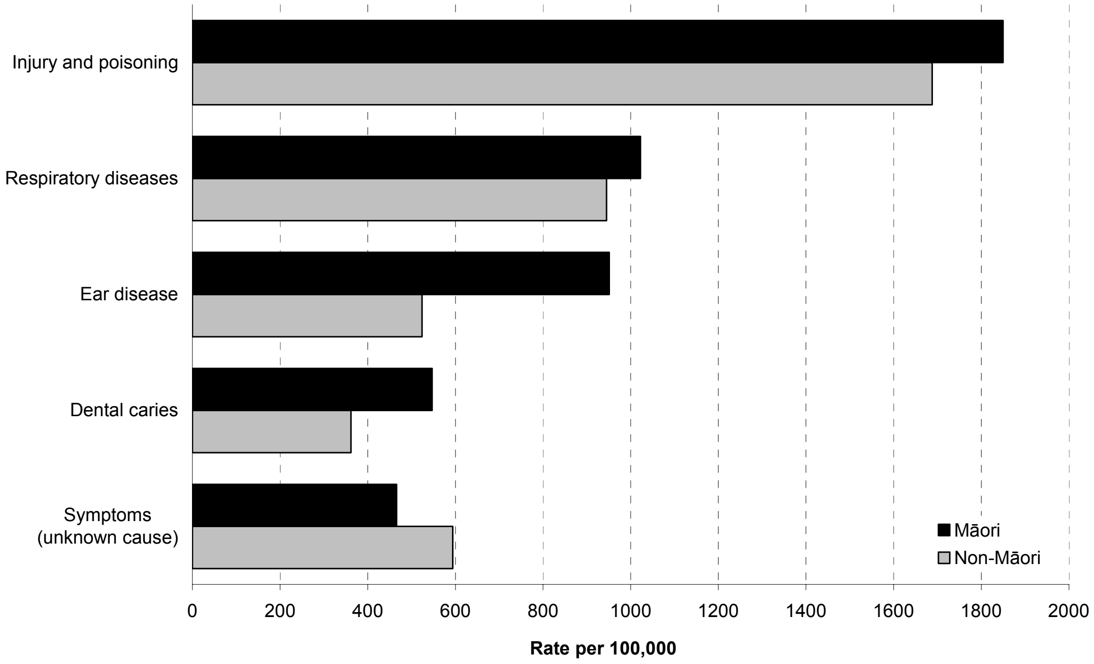
Cause	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Total: all causes		**32,091**	**17,634.5**		**82,576**	**16,793.2**	**1.05**
Respiratory diseases	**1**	**9,271**	**5,094.3**	**1**	**20,980**	**4,266.7**	**1.19**
• Asthma		3,417	1,877.4		5,777	1,175.0	1.60
• Acute upper respiratory infections		2,168	1,191.6		6,003	1,220.7	0.98
• Pneumonia		1,689	927.9		3,980	809.5	1.15
• Acute bronchitis and bronchiolitis		783	430.3		1,146	233.0	1.85
Injury and poisoning	**2**	**4,054**	**2,227.6**	**3**	**9,944**	**2,022.3**	**1.10**
• Accidental falls		1,299	713.9		3,480	707.7	1.01
• Inanimate mechanical forces		1,019	560.1		2,551	518.7	1.08
• Transport accidents		439	241.5		602	122.3	1.97
• Accidental poisoning		413	226.9		1,288	262.0	0.87
Digestive system	**3**	**3,645**	**2,003.1**	**5**	**7,270**	**1,478.4**	**1.35**
• Dental caries		2,559	1,406.2		3,909	795.0	1.77
Ear disease	**4**	**3,411**	**1,874.5**	**4**	**8,599**	**1,748.7**	**1.07**
• Glue ear		2,406	1,322.0		5,958	1,211.7	1.09
Infectious diseases	**5**	**3,033**	**1,666.9**	**2**	**10,310**	**2,096.6**	**0.80**
• Intestinal infectious diseases		1,364	7549.6		5,042	1,025.4	0.73
• Viral infection		1,061	582.9		3,919	797.0	0.73
Females: all causes		**13,885**	**15,700.1**		**35,562**	**14,766.3**	**1.06**
Respiratory diseases	**1**	**4,033**	**4,559.7**	**1**	**8,838**	**3,670.0**	**1.24**
• Asthma		1,407	1,590.5		2,278	946.1	1.68
• Acute upper respiratory infections		905	1,023.8		2,518	1,045.4	0.98
• Pneumonia		808	913.1		1,852	769.2	1.19
Injury and poisoning	**2**	**1,716**	**1,940.6**	**3**	**4,208**	**1,747.2**	**1.11**
Digestive system	**2**	**1,651**	**1,867.2**	**5**	**3,169**	**1,315.7**	**1.42**
• Dental caries		1,257	1,420.8		1,862	773.3	1.84
Infectious diseases	**4**	**1,380**	**1,560.4**	**2**	**4,851**	**2,014.3**	**0.77**
• Intestinal infectious diseases		635	718.2		2,418	1,003.9	0.72
Ear disease	**5**	**1,376**	**1,555.6**	**4**	**3,507**	**1,456.3**	**1.07**
• Glue ear		951	1,075.5		2,387	991.1	1.09
Males: all causes		**18,206**	**19,463.4**		**47,014**	**18,738.8**	**1.04**
Respiratory diseases	**1**	**5,238**	**5,599.8**	**1**	**12,142**	**4,839.5**	**1.16**
• Asthma		2,010	2,148.7		3,499	1,394.7	1.54
• Acute upper respiratory infections		1,263	1,350.2		3,485	1,389.1	0.97
• Pneumonia		881	941.8		2,128	848.2	1.11
Injury and poisoning	**2**	**2,338**	**2,499.0**	**2**	**5,736**	**2,286.4**	**1.09**
Ear disease	**3**	**2,035**	**2,176.0**	**4**	**5,092**	**2,029.4**	**1.07**
• Glue ear		1,454	1,554.9		3,572	1,423.5	1.09
Digestive system	**4**	**1,994**	**2,131.6**	**5**	**4,101**	**1,634.6**	**1.30**
• Dental caries		1,302	1,392.3		2,047	815.8	1.71
Infectious diseases	**5**	**1,653**	**1,767.6**	**3**	**5,459**	**2,175.7**	**0.81**
• Intestinal infectious diseases		729	779.2		2,624	1,045.9	0.74

Notes: Rates are calculated as per 100,000; shaded rate ratios are statistically significant at the 5% level.

Admissions for dental caries were 77% higher among Māori preschool children. These are generally admissions for dental treatment requiring a general anaesthetic and may indicate differential access to private or school dental service care (see Oral Health chapter for more discussion).

Ages 5–14 years

Figure 5.7: Leading causes of public hospital admission, ages 5–14 years, 2003–2005



The leading causes of public hospital admissions for children aged 5–14 years during 2003–2005 were injuries, respiratory diseases, ear diseases (mainly glue ear), dental caries, and admissions for symptoms and signs where the cause was not known. Māori and non-Māori had the same five leading causes, although there were significant differences in rates within each cause (Table 5.9).

Males and females in this age group had the same leading causes but males had higher rates of hospitalisation, for injuries in particular.

A fifth of admissions were due to injuries. Forty percent of these admissions were caused by falls, a fifth by exposure to mechanical forces, and a fifth caused by transport accidents. Transport accidents included pedal cycles (over a third), pedestrians (a tenth), traffic accidents (a third), and other accidents.

Māori children had higher rates of admission for asthma (42% higher), dental caries (51% higher), and glue ear (84% higher) than non-Māori.

Non-Māori children had significantly higher rates of admission for tonsils and adenoids (27% higher), symptoms and signs (27% higher), and for appendicitis (21% higher).

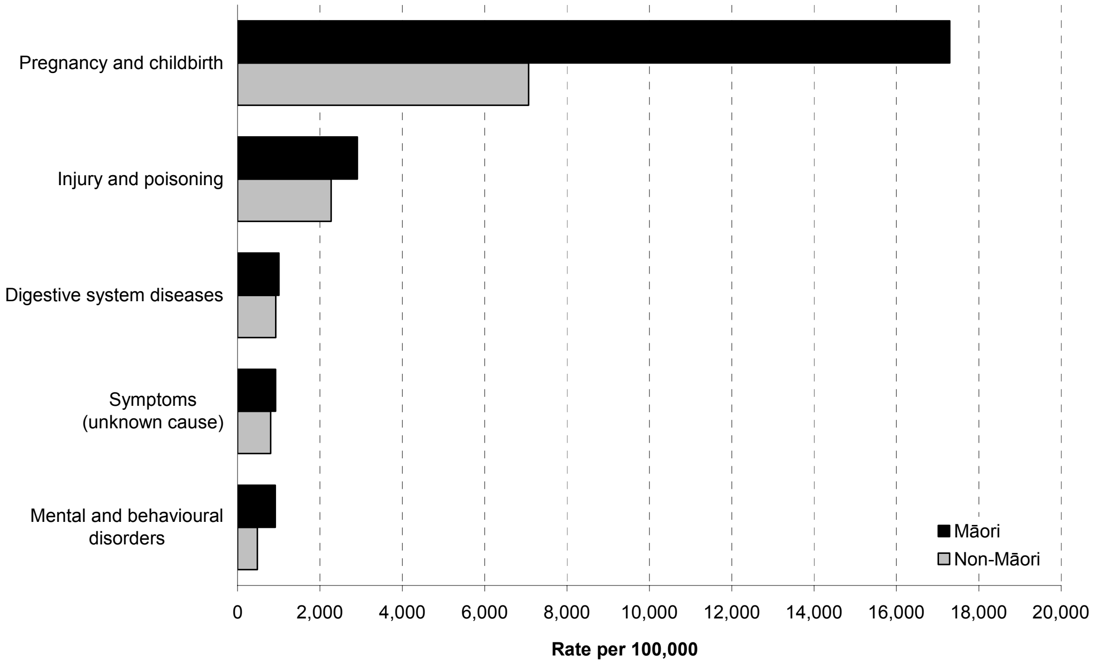
Table 5.9: Public hospital discharges, leading causes for ages 5–14 years, 2003–2005

	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Total: all causes		**35,840**	**8,189.8**		**103,836**	**7,587.4**	**1.08**
Injury and poisoning	**1**	**8,097**	**1,850.3**	**1**	**23,096**	**1,687.6**	**1.10**
- Falls		3,333	761.7		9,887	722.4	1.05
- Mechanical forces		1,817	415.1		4,915	359.2	1.16
- Transport accidents		1,725	394.2		4,863	355.3	1.11
Digestive system diseases	**2**	**4,726**	**1,079.8**	**2**	**13,128**	**959.3**	**1.13**
- Dental caries		2,395	547.4		4,959	362.3	1.51
- Appendix		633	144.6		2,413	176.3	0.82
Respiratory diseases	**3**	**4,473**	**1,022.0**	**3**	**12,929**	**944.8**	**1.08**
- Asthma		1,441	329.2		3,174	231.9	1.42
- Tonsils and adenoids		1,014	231.7		4,043	295.4	0.78
Ear diseases	**4**	**4,160**	**950.5**	**5**	**7,167**	**523.7**	**1.81**
- Glue ear		2,521	576.1		4,285	313.1	1.84
Symptoms and signs (unknown cause)	**5**	**2,040**	**466.2**	**4**	**8,124**	**593.6**	**0.79**
Females: all causes		**15,589**	**7,338.2**		**45,948**	**6,918.0**	**1.06**
Injury and poisoning	**1**	**2,987**	**1,406.1**	**1**	**8,544**	**1,286.4**	**1.09**
- Falls		1,345	633.4		3,857	580.6	1.09
- Mechanical forces		576	271.1		1,684	253.5	1.07
- Transport accidents		564	265.6		1,569	236.2	1.12
Digestive system	**2**	**2,161**	**1,017.1**	**3**	**5,907**	**889.4**	**1.14**
- Dental caries		1,157	544.8		2,336	351.7	1.55
- Appendix		261	122.7		999	150.4	0.82
Respiratory diseases	**3**	**2,045**	**962.7**	**2**	**6,076**	**914.8**	**1.05**
- Asthma		613	288.7		1,392	209.6	1.38
- Tonsils and adenoids		514	242.2		2,177	327.7	0.74
Ear disease	**4**	**1,843**	**867.7**	**5**	**3,185**	**479.5**	**1.81**
- Glue ear		1,081	508.7		1,895	285.4	1.78
Symptoms and signs (unknown cause)	**5**	**1,002**	**471.6**	**4**	**4,197**	**631.9**	**0.75**
Males: all causes		**20,250**	**8,992.6**		**57,884**	**8,218.1**	**1.09**
Injury and poisoning	**1**	**5,109**	**2,268.9**	**1**	**14,549**	**2,065.6**	**1.10**
- Falls		1,988	882.8		6,028	855.8	1.03
- Mechanical forces		1,241	551.0		3,230	458.6	1.20
- Transport accidents		1,160	515.0		3,294	467.7	1.10
Digestive system diseases	**2**	**2,565**	**1,139.0**	**2**	**7,221**	**1,025.2**	**1.11**
- Dental caries		1,238	549.8		2,623	372.4	1.48
- Appendix		372	165.2		1,414	200.7	0.82
Respiratory diseases	**3**	**2,427**	**1,077.9**	**3**	**6,854**	**973.1**	**1.11**
- Asthma		828	367.5		1,782	253.1	1.45
- Tonsils and adenoids		500	221.9		1,866	265.0	0.84
Ear disease	**4**	**2,317**	**1,028.7**	**4**	**3,982**	**565.4**	**1.82**
- Glue ear		1,440	639.7		2,390	339.3	1.89
Symptoms and signs (unknown cause)	**5**	**1,038**	**461.0**	**5**	**3,926**	**557.4**	**0.83**

Notes: Rates are calculated as per 100,000; shaded rate ratios are statistically significant at the 5% level.

Ages 15–24 years

Figure 5.8: Leading causes of public hospital admission, ages 15–24 years, 2003–2005



Note: Rates for pregnancy and childbirth are sex-specific.

The five leading causes of hospitalisation for Māori in the 15–24 year age group during 2003–2005 included pregnancy and childbirth, injury and poisoning, digestive system diseases, admissions for symptoms with unknown causes, and mental and behavioural disorders. For non-Māori the causes were similar, except that respiratory disease was the fifth leading cause of admission (Table 5.10).

Males and females had different patterns of admission in this age group. Māori females had nearly three times as many admissions as Māori males – most of them to do with pregnancy and childbirth, and for 'factors related to reproduction', which includes admissions for contraceptive management, sterilisation, and monitoring of high-risk pregnancies. The other leading causes for both Māori and non-Māori females were injury and poisoning, genitourinary diseases, and general symptoms and signs (unknown causes).

The main contributor to disparities between Māori and non-Māori females was pregnancy and childbirth (2.45 times higher among Māori women and accounting for 80% of the difference in total admission rates). This reflects a pattern of younger childbearing for Māori.

The leading causes for Māori males were: injury and poisoning, mental and behavioural disorders (60% related to schizophrenia), diseases of the digestive system, admissions for specific procedures (58% dialysis procedures), and respiratory diseases. For non-Māori males admissions for symptoms with unknown cause was the fourth leading cause.

Table 5.10: Public hospitalisations, leading causes for ages 15–24 years, 2003–2005

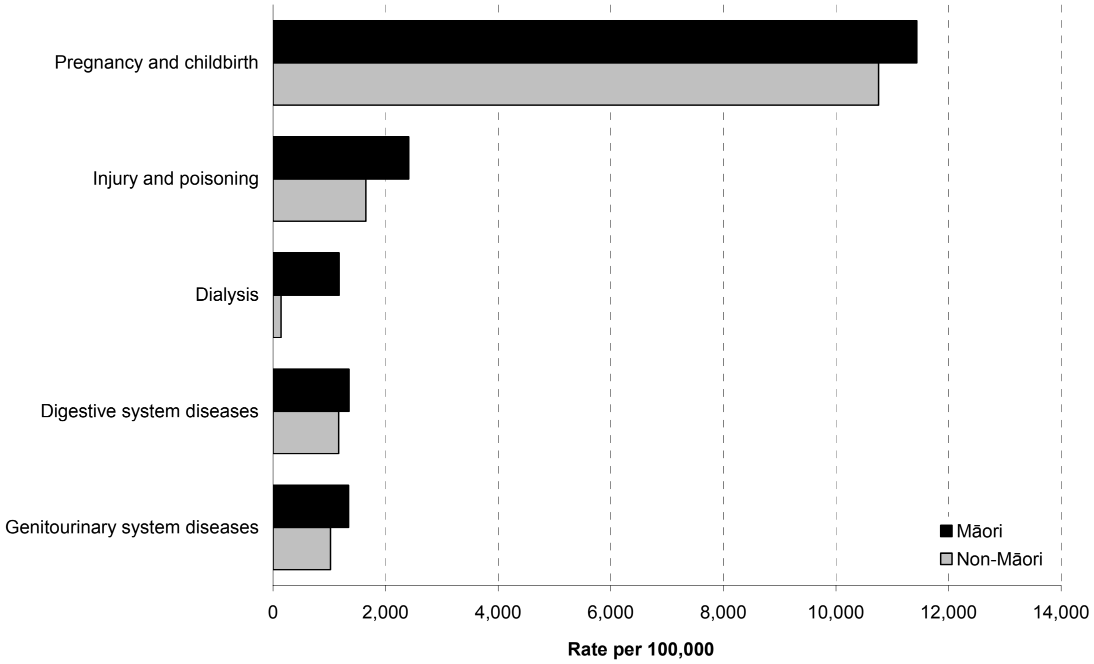
	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Total: all causes		**66,520**	**19,896.6**		**171,649**	**12,069.0**	**1.65**
Pregnancy and childbirth*	**1**	**28,977**	**17,296.3**	**1**	**48,876**	**7,066.1**	**2.45**
Injury and poisoning	**2**	**9,727**	**2,909.3**	**2**	**32,320**	**2,272.5**	**1.28**
• Mechanical forces		2,474	740.0		7,014	493.2	1.50
• Transport accidents		2,183	653.1		8,299	583.5	1.12
• Assault		1,588	475.0		3,315	233.1	2.04
Digestive system diseases	**3**	**3,361**	**1,005.4**	**3**	**13,210**	**928.8**	**1.08**
• Appendix		778	232.8		3,523	247.7	0.94
• Teeth and gums		548	164.0		2,149	151.7	1.09
• Gallstones		456	136.5		857	60.2	2.27
Symptoms and signs (unknown cause)	**4**	**3,079**	**921.0**	**4**	**11,388**	**800.7**	**1.15**
Mental and behavioural disorders	**5**	**3,053**	**913.1**	**6**	**6,881**	**483.8**	**1.89**
• Schizophrenic disorders		1,645	492.1		1,668	117.3	4.20
• Mood disorder		471	141.0		1,787	125.6	1.12
• Psychoactive substance use		456	136.3		1,411	99.2	1.37
Females: all causes		**48,837**	**29,151.3**		**112,025**	**16,195.6**	**1.80**
Pregnancy and childbirth	**1**	**28,977**	**17,296.3**	**1**	**48,876**	**7,066.1**	**2.45**
Injury and poisoning	**2**	**3,006**	**1,794.1**	**2**	**10,150**	**1,467.4**	**1.22**
• Transport accidents		784	467.8		2,588	374.2	1.25
• Intentional self-harm		493	294.0		2,477	358.2	0.82
• Mechanical forces		445	265.7		1,265	182.9	1.45
• Assault		390	232.9		396	57.2	4.07
Genitourinary system diseases	**3**	**2,357**	**1,406.6**	**3**	**7,733**	**1,117.9**	**1.26**
Symptoms and signs (unknown cause)	**4**	**2,165**	**1,292.3**	**4**	**7,594**	**1,097.9**	**1.18**
Procedures related to reproduction	**5**	**1,999**	**1,193.1**	**7**	**4,218**	**609.8**	**1.96**
Males: all causes		**17,680**	**10,599.5**		**59,619**	**8,161.1**	**1.30**
Injury and poisoning	**1**	**6,720**	**4,028.8**	**1**	**22,168**	**3,034.5**	**1.33**
• Mechanical forces		2,029	1,216.4		5,748	786.8	1.55
• Transport accidents		1,399	838.5		5,709	781.5	1.07
• Assault		1,198	718.2		2,919	399.6	1.80
• Falls		952	571.0		3,523	482.2	1.18
Mental and behavioural disorders	**2**	**1,973**	**1,182.9**	**5**	**3,469**	**474.8**	**2.49**
• Schizophrenic disorders		1,229	736.7		1,235	169.1	4.36
Digestive system diseases	**3**	**1,433**	**859.1**	**2**	**6,154**	**842.4**	**1.02**
• Appendix		383	229.6		1,948	266.7	0.86
• Teeth and gums		223	133.4		914	125.2	1.07
Specific procedures	**4**	**1,214**	**727.7**	**8**	**2,588**	**354.3**	**2.05**
• Care involving dialysis		705	422.9		663	90.7	**4.66**
Respiratory diseases	**5**	**1,109**	**664.6**	**3**	**4,035**	**552.4**	**1.20**
• Asthma		257	154.3		610	83.5	1.85
• Acute upper respiratory tract infection		184	110.0		823	112.7	0.98
• Pneumonia		159	95.5		501	68.5	1.39

Notes: Rates are calculated as per 100,000; shaded rate ratios are statistically significant at the 5% level; *rates for pregnancy and childbirth are sex-specific.

The largest contributors to differences in the overall admission rate between Māori and non-Māori men were injuries and poisoning (accounting for 40% of the difference in total admission rates), and mental disorders (29%). The high rate of admissions for schizophrenic disorders among Māori males was notable (four times higher than non-Māori).

Ages 25–44 years

Figure 5.9: Leading causes of public hospitalisation, ages 25–44 years, 2003–2005



The leading causes of hospital admission for Māori in the 25–44 year age group were: pregnancy and childbirth, injury and poisoning, admissions for care involving dialysis, digestive system diseases, and genitourinary diseases. The leading causes for non-Māori were: pregnancy and childbirth, injury and poisoning, diseases of the digestive system, symptoms with unknown causes, and genitourinary diseases (Table 5.11).

Males and females had different patterns of admissions, with females admitted at more than twice the rates of males. Pregnancy and childbirth, reproductive health, and genitourinary system diseases were the main contributors to the higher rates of female admissions. Males had twice the rate of admission for injuries compared to females.

Injuries were the third leading cause of admission for Māori women, with a rate 44% higher than that of non-Māori women. The main causes of injury included complications of medical or surgical care, falls, assault, and intentional self-harm. The rate of admission for assault was six times higher for Māori women than non-Māori women. Self-harm admissions were not significantly different.

Injuries were the leading reason for Māori male admission. The main causes of injury were exposure to mechanical forces, assault, transport accidents, and falls. The second leading cause of admission for Māori men was for certain procedures (80% for care involving dialysis), followed by mental and behavioural disorders (60% schizophrenic disorders), diseases of the digestive system, and general symptoms and signs with unknown causes. Non-Māori males had similar leading causes with the addition of musculoskeletal disorders (ranked fourth).

Māori men had a 50% higher rate of admission than non-Māori men. The key contributors to the difference were admissions for dialysis (seven times higher for Māori), injuries, and mental disorders. Māori had higher rates of admission for injuries from assault (2.8 times higher) and schizophrenia (3.6 times higher).

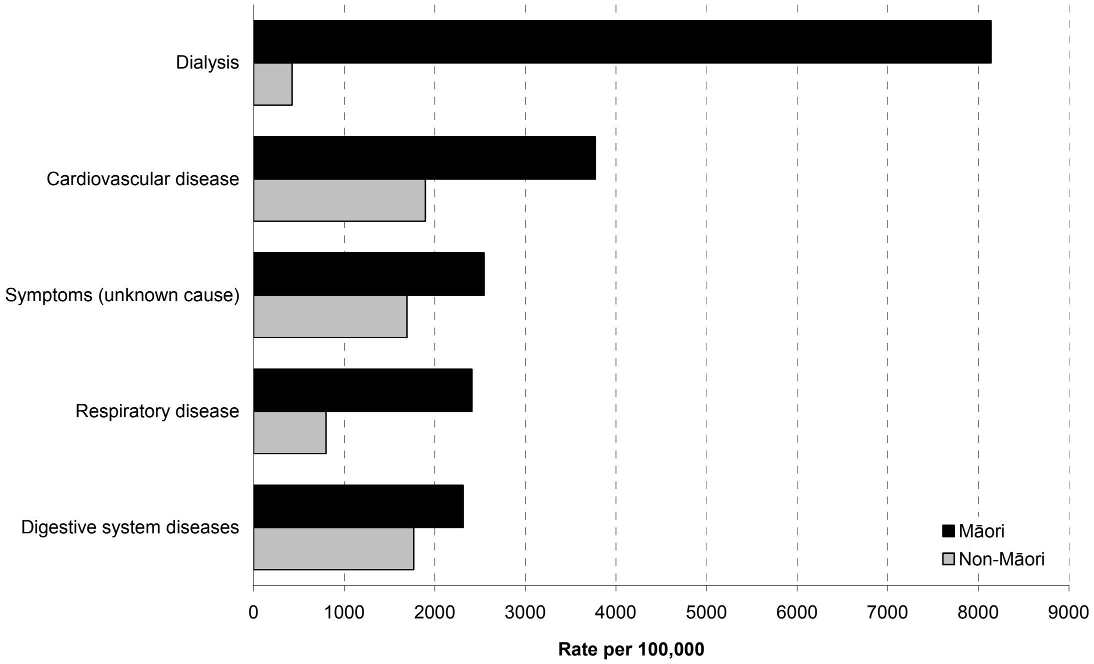
Table 5.11: Public hospitalisations, leading causes for ages 25–44 years, 2003–2005

Cause	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Total: all causes		**110,259**	**20,914.8**		**472,931**	**15,949.6**	**1.31**
Pregnancy and childbirth*	**1**	**31,587**	**11,435.8**	**1**	**164,021**	**10,755.7**	**1.06**
Injury and poisoning	**2**	**12,697**	**2,408.5**	**2**	**48,875**	**1,648.3**	**1.46**
• Exposure to mechanical forces		2,988	566.9		11,250	379.4	1.49
• Assault		1,986	376.7		3,219	108.6	3.47
• Falls		1,865	353.7		7,614	256.8	1.38
• Transport accidents		1,848	350.5		9,483	319.8	1.10
Specific procedures and heatlh care	**3**	**8,041**	**1,525.3**	**11**	**11,613**	**391.6**	**3.89**
• Care involving dialysis		6,200	1,176.0		4,243	143.1	8.22
Digestive system diseases	**4**	**7,117**	**1,350.1**	**4**	**34,586**	**1,166.4**	**1.16**
• Gallstones		1,496	283.8		4,627	156.0	1.82
• Gastroenteritis and colitis		692	131.3		5,092	171.7	0.76
Genitourinary system diseases	**5**	**7,092**	**1,345.2**	**6**	**30,239**	**1,019.8**	**1.32**
• Kidney stones		693	131.4		4,169	140.6	0.93
• Urinary tract infection		504	95.7		1,425	48.0	1.99
Females: all causes		**75,616**	**27,376.4**		**341,706**	**22,407.4**	**1.22**
Pregnancy and childbirth	**1**	**31,587**	**11,435.8**	**1**	**164,021**	**10,755.7**	**1.06**
Genitourinary system diseases	**2**	**6,010**	**2,175.9**	**3**	**24,192**	**1,586.4**	**1.37**
Injury and poisoning	**3**	**4,663**	**1,688.3**	**5**	**17,936**	**1,176.1**	**1.44**
• Complications of medical/surgical care		808	292.6		3,362	220.5	1.33
• Falls		699	253.2		2,822	185.0	1.37
• Assault		699	253.2		609	40.0	6.33
• Intentional self-harm		605	219.2		3,541	232.2	0.94
Factors related to reproduction	**4**	**4,276**	**1,548.2**	**2**	**25,518**	**1,673.3**	**0.93**
Digestive system diseases	**5**	**4,168**	**1,508.9**	**4**	**18,567**	**1,217.6**	**1.24**
• Gallstones		1,309	473.8		3,925	257.4	1.84
Males: all causes		**34,641**	**13,803.0**		**131,222**	**9,111.4**	**1.51**
Injury and poisoning	**1**	**8,033**	**3,200.7**	**1**	**30,938**	**2,148.2**	**1.49**
• Mechanical forces		2,337	931.2		8,927	619.8	1.50
• Assault		1,287	512.9		2,610	181.2	2.83
• Transport accidents		1,264	503.5		6,497	451.1	1.12
• Falls		1,164	463.9		4,793	332.8	1.39
Specific procedures and health care	**2**	**31,359**	**3,314.1**	**6**	**60,530**	**642.4**	**5.16**
• Care involving dialysis		4,003	1,595.0		3,268	226.9	7.03
Mental and behavioural disorders	**3**	**3,557**	**1,417.4**	**5**	**8,431**	**585.4**	**2.42**
• Schizophrenic disorders		2,139	852.3		3,434	238.4	3.57
• Mood disorders		633	252.4		2,020	140.2	1.80
Digestive system diseases	**4**	**2,950**	**1,175.4**	**2**	**16,018**	**1,112.2**	**1.06**
Symptoms and signs (unknown cause)	**5**	**2,414**	**961.8**	**3**	**12,700**	**881.8**	**1.09**

Notes: Rates are calculated as per 100,000; shaded rate ratios are statistically significant at the 5% level; *rates are sex-specific.

Ages 45–64 years

Figure 5.10: Leading causes of public hospitalisation, ages 45–64 years, 2003–2005



The leading causes of hospitalisation for Māori in the 45–64 years age group were: admissions for care involving dialysis, circulatory system disease, admissions for symptoms and signs with unknown causes, respiratory disease, and diseases of the digestive system (Figure 5.10). For Māori females cancer admissions were more frequent than digestive system diseases. For Māori males injury and poisoning was the third leading cause of admission (Table 5.12).

Admissions for 'specific procedures and health care' were the leading cause for both Māori and non-Māori. For Māori and non-Māori most of these admissions involved dialysis. However, many of these admissions were readmissions for the same individuals. When analysed by the number of individual people admitted to hospital each year, a larger proportion of the population were admitted for cardiovascular disease (2.4%) and respiratory disease (1.6%) than for dialysis (0.2%). In 2005 the rate of individuals admitted to hospital for care involving dialysis was 223.6 per 100,000 for Māori and 27.0 per 100,000 for non-Māori, giving a ratio of 8.28 (95% CI: 6.40–10.72).

Ischaemic heart disease was the most common cause of admission for cardiovascular or circulatory system disease, with a rate 59% higher for Māori than non-Māori. Heart failure admissions were extremely high for Māori (over seven times higher than non-Māori rates), and admissions for atrial fibrillation or flutter were nearly twice as high for Māori. Stroke admissions were 2.7 times higher for Māori women than non-Māori women.

A third of respiratory disease admissions among Māori were due to chronic obstructive pulmonary disease (COPD), with Māori rates four times those of non-Māori.

Benign cancers were the most common cause of Māori female cancer admissions, followed by cancers of unknown primary site, breast, and lung cancer.

Table 5.12: Public hospitalisations, leading causes for ages 45–64 years, 2003–2005

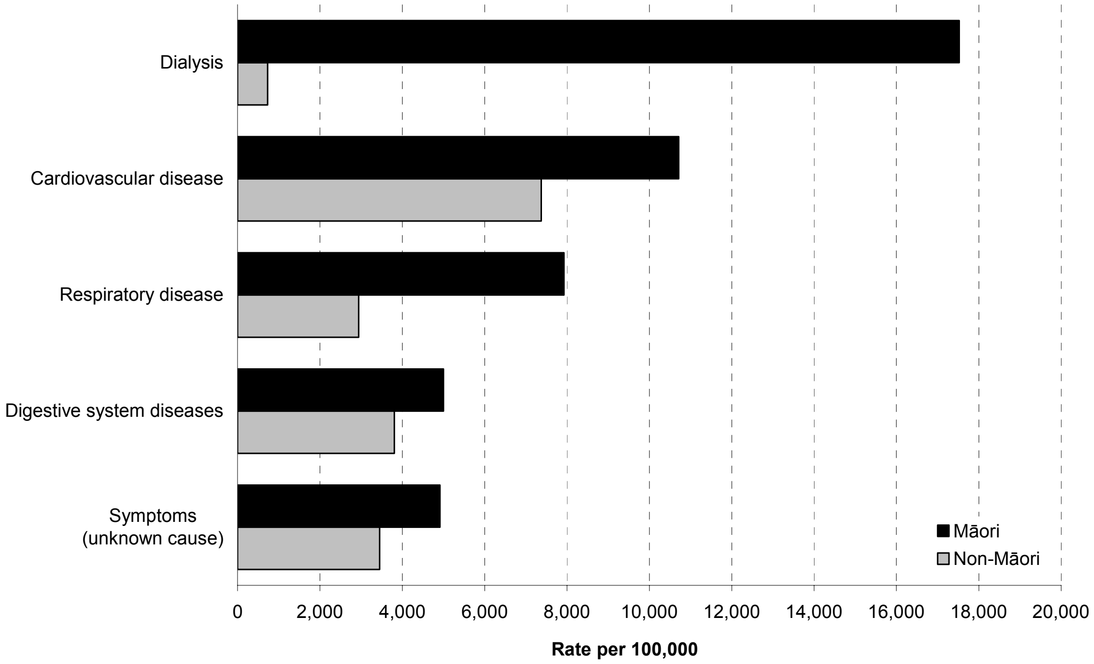
Cause	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Total: All cause		**86,899**	**32,327.4**		**387,803**	**15,264.4**	**2.12**
Specific procedures and health care	**1**	**24,462**	**9,100.3**	**6**	**27,689**	**1,089.9**	**8.35**
• Care involving dialysis		21,882	8,140.3		10,802	425.2	19.15
Circulatory system	**2**	**10,140**	**3,772.1**	**1**	**48,202**	**1,897.3**	**1.99**
• Ischaemic heart disease		3,861	1,436.4		22,966	904.0	1.59
• Heart failure		1,568	583.2		1,916	75.4	7.73
• Atrial fibrillation and flutter		1,084	403.8		5,261	207.1	1.95
Symptoms and signs (unknown cause)	**3**	**6,841**	**2,544.9**	**3**	**43,061**	**1,694.9**	**1.50**
Respiratory system	**4**	**6,478**	**2,410.0**	**9**	**20,321**	**799.9**	**3.01**
• COPD		2,166	805.6		5,105	200.9	4.01
• Pneumonia		1,301	484.0		4,371	172.0	2.81
• Asthma		932	346.6		2,236	88.0	3.94
Digestive system	**5**	**6,219**	**2,313.6**	**2**	**44,923**	**1,768.2**	**1.31**
Females: all causes		**42,112**	**30,292.2**		**188,183**	**14,690.6**	**2.06**
Specific procedures and health care	**1**	**9,218**	**6,630.9**	**7**	**11,713**	**914.4**	**7.25**
• Care involving dialysis		7,833	5,634.5		2,919	227.9	24.73
Circulatory system	**2**	**4,459**	**3,207.2**	**5**	**15,967**	**1,246.5**	**2.57**
• Ischaemic heart disease		1,646	1,183.8		6,073	474.1	2.50
• Heart failure		559	402.2		656	51.2	7.85
• Stroke		536	385.4		1,846	144.1	2.67
• Atrial fibrillation and flutter		508	365.3		1,700	132.7	2.75
Symptoms and signs (unknown cause)	**3**	**3,839**	**2,761.6**	**3**	**22,065**	**1,722.5**	**1.60**
Respiratory system	**4**	**3,726**	**2,680.5**	**8**	**10,657**	**831.9**	**3.22**
• Chronic obstructive pulmonary disease		1,348	969.5		2,861	223.4	4.34
• Asthma		645	464.0		1,588	124.0	3.74
• Pneumonia		621	446.9		2,033	158.7	2.82
Cancer	**5**	**3,395**	**2,442.4**	**1**	**23,428**	**1,828.9**	**1.34**
• Benign neoplasms		724	520.8		4,484	350.0	1.49
• Breast		523	376.3		2,937	229.3	1.64
• Ill-defined site		470	338.4		3,300	257.6	1.31
• Lung, trachea, and bronchus		394	283.5		979	76.4	3.71
Males: All cause		**44,783**	**34,504.1**		**199,613**	**15,847.3**	**2.18**
Specific procedures and health care	**1**	**15,244**	**11,745.3**	**6**	**15,976**	**1,268.3**	**9.26**
• Care involving dialysis		14,049	10,824.4		7,883	625.8	17.30
Circulatory system	**2**	**5,681**	**4,377.1**	**1**	**32,234**	**2,559.1**	**1.71**
• Ischaemic heart disease		2,215	1,706.9		16,893	1,341.1	1.27
• Heart failure		1,009	777.0		1,260	100.1	7.77
Injury and poisoning	**3**	**3,321**	**2,558.6**	**3**	**22,225**	**1,764.5**	**1.45**
• Complications of medical/surgical care		1,072	825.7		4,547	361.0	2.29
• Mechanical forces		675	520.3		5,539	439.7	1.18
• Falls		542	417.7		4,711	374.0	1.12
Digestive system	**4**	**3,044**	**2,345.5**	**2**	**22,559**	**1,790.9**	**1.31**
Symptoms and signs (unknown cause)	**5**	**3,002**	**2,312.7**	**4**	**20,994**	**1,666.7**	**1.39**

Notes: Rates are calculated as per 100,000; shaded rate ratios are statistically significant at the 5% level.

Complications of medical and surgical care was the most common cause of admission for injury or poisoning for Māori men and women. Māori men had a rate over twice that of non-Māori men. Exposure to mechanical forces (eg. sports equipment, machinery at work or home, glass cuts, etc) and falls were the next most frequent causes associated with an admission for injury among Māori men.

Ages 65 years and over

Figure 5.11: Leading causes of public hospitalisation, ages 65 years and over, 2003–2005



Notes: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population

The leading causes of public hospital admissions for Māori aged 65 years and over during 2003–2005 were: admissions for care involving dialysis, circulatory system disease, respiratory disease, digestive system diseases, and admissions for symptoms with unknown cause. However, when analysed by the number of individual people admitted to hospital each year, a far larger proportion of the Māori population were admitted for cardiovascular disease (7%) and respiratory disease (5%) than for dialysis (0.4%). When analysed separately by sex, cancer was the fifth major cause of admission for both Māori men and women. The leading causes for non-Māori in this age group were similar but cancer was the second leading cause of admission after circulatory system disease (Table 5.13).

The key contributors to the overall differences in admission rates were: admissions for dialysis (accounting for 52% of the rate difference), respiratory diseases (particularly COPD), and circulatory system disease (particularly heart failure).

Rate ratios for admissions involving dialysis were extreme, with the Māori rate 24 times the non-Māori rate. However, many of these admissions were readmissions for the same individuals. When calculated by individuals rather than by hospital admissions, the rate ratio reduced but was still very high: in 2005 the age-standardised rate of individuals 65 and over who were admitted for care involving dialysis was 399.1 per 100,000 for Māori and 49.6 for non-Māori, giving a ratio of 8.04 (95% CI: 5.92–10.92). This included 94 Māori individuals and 195 non-Māori individuals.

The leading causes for Māori women in this age group were: admissions for specific procedures (most involving dialysis), circulatory system, respiratory diseases, symptoms and signs, and cancer. The leading causes for non-Māori women were circulatory diseases, admissions for specific procedures, cancer, injury, and digestive system.

The largest contributors to the overall disparity for women were admissions for dialysis, circulatory diseases (particularly heart failure), and respiratory diseases (particularly COPD). Although the admission rate for dialysis was high, the number of people admitted for cardiovascular disease or respiratory disease was higher. For example, in 2005 the rate of individual women admitted for care involving dialysis was 246.9 per 100,000 people for Māori (32 women) and 36.6 per 100,000 for non-Māori (73 women), giving a rate ratio of 6.74.

The leading causes of admission for Māori men were admissions for specific procedures (most involving dialysis), circulatory diseases, respiratory diseases, digestive system diseases, and cancer. Non-Māori men had the same leading causes, but in a different order. Non-Māori men had higher admission rates for ischaemic heart disease and for cancer, particularly for skin cancer. However, Māori men had higher rates for some individual cancers, especially lung cancer. In 2005 the rate of individual men admitted for care involving dialysis was 551.3 for Māori (62 men) and 62.6 for non-Māori (122 men), giving a rate ratio of 8.80.

Table 5.13: Public hospitalisations, leading causes for ages 65 years and over, 2003–2005

Cause of admission	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Total: all causes		**50,270**	**72,752.1**		**651,373**	**40,264.7**	**1.81**
Specific procedures	**1**	**13,833**	**20,643.5**	**3**	**68,449**	**3,805.7**	**5.42**
• Care involving dialysis		11,627	17,525.4		8,934	728.3	24.06
• Rehabilitation procedures		1,334	1,852.1		44,516	2,012.7	0.92
Circulatory system diseases	**2**	**7,505**	**10,712.4**	**1**	**120,543**	**7,382.6**	**1.45**
• Ischaemic heart disease		2,299	3,300.9		46,546	3,050.8	1.08
• Heart failure		1,734	2,472.1		15,242	760.5	3.25
• Stroke		1,003	1,411.2		16,843	937.8	1.50
• Atrial fibrillation and flutter		751	1,062.7		11,696	746.2	1.42
Respiratory diseases	**3**	**5,580**	**7,924.9**	**7**	**48,465**	**2,941.6**	**2.69**
• COPD		2,722	3,866.9		20,032	1,277.2	3.03
• Pneumonia		1,351	1,928.3		13,903	755.3	2.55
Digestive system diseases	**4**	**3,457**	**5,001.9**	**4**	**57,886**	**3,807.4**	**1.31**
• Gastric ulcers		545	789.2		5,143	333.7	2.36
• Gallstones		455	656.1		6,239	420.3	1.56
• Hernia		351	537.3		5,657	413.2	1.30
Symptoms and signs (unknown cause)	**5**	**3,435**	**4,917.7**	**5**	**53,903**	**3,450.5**	**1.43**

Cause of admission	Māori			Non-Māori			Rate ratio
	Rank	Number	Rate	Rank	Number	Rate	
Females: all causes		**242,68**	**63,036.7**		**337,462**	**35,525.6**	**1.77**
Specific procedures	**1**	**5,260**	**14,265.7**	**2**	**37,329**	**3,290.1**	**4.34**
• Care involving dialysis		4,077	11,303.1		2,361	321.3	35.18
• Rehabilitation procedures		741	1,804.7		28,365	2,132.3	0.85
Circulatory system diseases	**2**	**3,902**	**9,944.3**	**1**	**58,313**	**5,800.0**	**1.71**
• Ischemic heart disease		1,174	3,024.8		20,417	2,149.7	1.41
• Heart failure		837	2,078.4		7,827	602.9	3.45
• Stroke		554	1,382.7		8,921	805.7	1.72
Respiratory diseases	**3**	**3,074**	**7,866.7**	**7**	**23,168**	**2,456.2**	**3.20**
• COPD		1,529	3,945.6		9,190	1,056.0	3.74
• Pneumonia		688	1,729.4		6,693	600.2	2.88
Symptoms and signs (unknown cause)	**4**	**1,845**	**4,766.8**	**6**	**28,738**	**3,227.0**	**1.48**
Cancer	**5**	**1,678**	**4,397.0**	**3**	**36,060**	**4,211.4**	**1.04**
• Lung, trachea and bronchus		281	743.3		1,411	197.1	3.77
• Breast		171	459.3		2,372	320.7	1.43
Males: all causes		**26,002**	**82,442.7**		**313,911**	**44,929.0**	**1.83**
Specific procedures	**1**	**8,574**	**27,021.2**	**3**	**31,119**	**4,321.2**	**6.25**
• Care involving dialysis		7,549	23,747.8		6,574	1,135.4	20.92
• Rehabilitation procedures		593	1,899.4		16,151	1,893.1	1.00
Circulatory system diseases	**2**	**3,603**	**11,480.5**	**1**	**62,230**	**8,965.2**	**1.28**
• Ischaemic heart disease		1,125	3,577.0		26,129	3,952.0	0.91
• Heart failure		897	2,865.8		7,415	918.1	3.12
• Stroke		449	1,439.7		7,922	1,069.8	1.35
Respiratory diseases	**3**	**2,506**	**7,983.0**	**5**	**25,297**	**3,426.9**	**2.33**
• COPD		1,193	3,788.2		10,842	1,498.5	2.53
• Pneumonia		663	2,127.2		7,210	910.4	2.34
Digestive system diseases	**4**	**1,827**	**5,804.5**	**4**	**27,595**	**4,092.2**	**1.42**
• Gastric ulcers		292	927.6		2,439	363.1	2.55
• Hernia		282	892.1		4,030	622.9	1.43
Cancer	**5**	**1,628**	**5,157.4**	**2**	**46,454**	**6,678.5**	**0.77**
• Lung, trachea and bronchus		251	793.2		2,662	411.7	1.93
• Ill-defined site		206	651.9		4,105	619.1	1.05
• Prostate		204	649.9		3,665	528.1	1.23

Notes: Rates are calculated as per 100,000 and were age-sex-standardised to the 2001 Māori population; shaded rate ratios are statistically significant at the 5% level.

Discussion

The rates of hospital admissions for Māori were higher than those of non-Māori for nearly every major cause, for both genders, and in all but the youngest age groups. The leading causes of admission did not vary greatly between Māori and non-Māori in the younger age groups and, with a few exceptions (mostly respiratory diseases), the rates were not a great deal higher. However, the patterns of hospitalisation increasingly diverged in the older age groups, with Māori hospitalised for a different range of causes, and at greater rates. This difference was most marked in the 45–65 years age group.

Two types of disparities can be shown by hospitalisation data. There are those where some groups have substantially lower rates of hospital utilisation that may indicate poorer access to health care (or a healthier population). There are also those disparities that can be considered 'hyperdisparities' (La Veist 2002) where greater rates of hospitalisation indicate a poorer quality and outcome of healthcare. Hyperdisparities can include hospitalisation as a result of medical error and missed diagnoses. Ambulatory-sensitive admissions are also hyperdisparities.

Māori were predominantly over-represented in those causes that can be considered potentially preventable with good primary care, health promotion, and injury prevention. Those for which Māori had higher admission rates include diabetes and complications of diabetes, dental conditions, injuries, pneumonia, asthma, infectious diseases, injuries, congestive heart failure, and chronic obstructive pulmonary disease.

Higher rates of hospitalisation indicate a greater need for health services. What this data does not show is whether the greater number of hospitalisations for Māori meets the greater need. Causes, patterns of diagnosis, and treatments, vary for different diseases so it is difficult to generalise from overall rates of hospitalisation. Health rationing policies change over time, as do practices and treatments, with more conditions treated on a daypatient, or on an outpatient basis. These data do not show outpatient visits, which is how hospital treatment is delivered for most patients.

Assessing the quality of health care requires more than just counting the use of services. The type and appropriateness of the services also needs to be considered. For many, if not most, health care services there is an expectation of benefit, and that benefit extends beyond such obviously important outcomes as avoiding death to more subtle quality-of-life values such as physical and social functioning.

By itself, hospital admission data does not give a measure of health status. It needs to be considered alongside other information. Disparate rates in hospital admissions may indicate a disparate need for health services, but not the extent of the need, nor the extent to which that need is being met. However, higher hospitalisation rates for preventable conditions suggest Māori are receiving less than adequate health care, contributing to poorer health outcomes.

For further information on hospitalisations see, for example:

- New Zealand Health Information Service. 2006. *Selected Morbidity Data for Publicly Funded Hospitals*. Wellington: Ministry of Health. www.nzhis.govt.nz
  - includes data on Māori and non-Māori hospitalisations involving injury or poisoning, mean length of stay and bed days, youth hospitalisations for intentional self-harm
- Ministry of Health. 2006. *Tatau Kahukura: Māori health chart book*. Wellington: Ministry of Health. www.moh.govt.nz
  - includes data on preventable hospitalisations, ambulatory-sensitive hospitalisations, and injury-preventable hospitalisations.

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6 CANCER

Donna Cormack, Gordon Purdie, Bridget Robson

Key points

- In the period 2000–2004, there were 6,697 new Māori and 83,926 new non-Māori cancer registrations, an average of approximately 1,340 new Māori cancer registrations and 16,785 new non-Māori registrations each year. The five most commonly occurring cancers for Māori were lung, female breast, prostate, colorectal, and stomach cancers.
- There were 3,587 Māori and 35,596 non-Māori deaths from cancer in the period 2000–2004, giving an average of approximately 720 Māori and 7,120 non-Māori deaths each year. The five most common causes of cancer death for Māori were lung, female breast, colorectal, stomach, and prostate cancers.
- The age-sex-standardised incidence rate for cancers overall was 219.0 per 100,000 for Māori, 9% higher than the non-Māori rate (200.5 per 100,000).
- The age-sex-standardised mortality rate for cancers overall was 117.5 per 100,000 for Māori, 77% higher than that for non-Māori (66.3 per 100,000).
- Cancer registrations and deaths were significantly higher among Māori for many specific cancer sites compared with non-Māori. In addition, Māori/non-Māori age-standardised mortality ratios were higher than incidence ratios for many types of cancer.
- There were differences in the distribution of stage at diagnosis between Māori and non-Māori, including a reduced likelihood of being diagnosed at an early stage and an increased likelihood for Māori of being diagnosed at a distant stage for several cancer types.
- Māori had a significantly higher risk of death from cancer after diagnosis than non-Māori for many cancer types. Differences in stage at diagnosis explain some of this survival disparity for some cancers.

Introduction

Cancer refers to a range of diseases that can affect different sites in the body. Although some factors are known to increase or decrease the risk of cancer, the causes of many cancers remain unknown (AIHW & AACR 2004). As cancers develop and progress in different ways, there are various options for prevention, detection, management and treatment.

Cancer is a significant health concern for Māori that has a major and disproportionate impact on Māori communities. In Aotearoa inequalities exist between Māori and non-Māori in exposure to the risk and protective factors for cancer (Ministry of Health 2004a), in cancer incidence and cancer outcomes (Ajwani et al 2003; Jeffreys et al 2005;

Robson et al 2006), and in access to cancer services, such as breast and cervical screening (Ministry of Health 2004b).

It is important to have an understanding of Māori patterns of cancer in order to develop strategies and programmes for cancer prevention and control, and to monitor equity of access and outcome. This section provides an overview of cancer statistics for Māori and non-Māori for the period 2000–2004. It includes information on the most commonly occurring cancers and causes of cancer death, cancer numbers and rates, and disparities in incidence, mortality, and survival between Māori and non-Māori. It also highlights differences in stage at diagnosis and the contribution that these differences make to disparities in cancer outcomes.[1]

This section uses data from the New Zealand Cancer Registry (NZCR) and death registrations from the New Zealand Health Information Service (NZHIS). The Methods chapter in Appendix 1 provides more detail on data sources, how the data was analysed, and the methods by which ethnicity data from the Cancer Registry was adjusted.

Cancer registrations and deaths

In the period 2000–2004, there were a total of 6,697 new Māori cancer registrations (3,071 male and 3,626 female), an average of approximately 1,340 new Māori cancer cases each year (614 male and 725 female). For the same period, there were 83,926 new non-Māori cancer registrations (44,887 male and 39,039 female), averaging 16,785 new registrations each year (8,977 male and 7,808 female).

For the period 2000–2004, there were 3,587 Māori deaths from cancer (1,823 female and 1,764 male), an average of around 720 deaths each year. For the same period, there were 35,596 non-Māori deaths (16,545 female and 19,051 male), averaging approximately 7,120 deaths per year.

Most common cancer registration sites and causes of death

Lung cancer was the most commonly occurring cancer registration site for Māori. Other leading cancer sites were female breast, prostate, and colorectal cancer, which together with lung cancer accounted for over 50% of all new Māori cancer registrations in this period (Table 6.1). For Māori females breast cancer was the leading cancer site (30% of all new registrations), followed by lung cancer (20%). Other leading cancer registration sites for this period included colorectal cancer, and cancers of the cervix and uterus. Lung cancer was the leading site for Māori males overall (24% of all new registrations), followed by prostate (20%), and colorectal cancer (8%). Stomach and liver cancers were also among the five most common registration sites for Māori men. Melanoma of the skin and bladder cancers were among the 10 leading sites for non-Māori, but not for Māori.

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[1] More detailed analyses are presented in the report *Unequal Impact: Māori and non-Māori cancer statistics 1996-2001* (Robson et al 2006).

Table 6.1: Cancer registrations, 10 leading sites, 2000–2004

Māori			Rank	Non-Māori		
Site	Number	% of new cases		Site	Number	% of new cases
Total (both sexes)						
Lung	1,366	20.4	1	Prostate	13,565	16.2
Female breast	1,069	16.0	2	Colorectal	12,710	15.1
Prostate	606	9.8	3	Female breast	10,587	12.6
Colorectal	469	7.0	4	Melanoma of skin	8,967	10.7
Stomach	288	4.3	5	Lung	7,079	8.4
Leukaemias	244	3.6	6	Leukaemias	3,114	3.7
Non-Hodgkin's lymphoma	201	3.0	7	Non-Hodgkin's lymphoma	2,887	3.4
Liver	186	2.8	8	Bladder	2,877	3.4
Cervix uteri	174	2.6	9	Kidney	1,642	2.0
Pancreas	149	2.2	10	Stomach	1,624	1.9
Females						
Breast	1,069	29.5	1	Breast	10,587	27.1
Lung	713	19.7	2	Colorectal	6,334	16.2
Colorectal	214	5.9	3	Melanoma of skin	4,440	11.4
Cervix uteri	174	4.8	4	Lung	2,831	7.3
Uterus	169	4.7	5	Uterus	1,400	3.6
Ovary	135	3.7	6	Ovary	1,366	3.5
Stomach	129	3.6	7	Non-Hodgkin's lymphoma	1,365	3.5
Leukaemias	107	3.0	8	Leukaemias	1,325	3.4
Non-Hodgkin's lymphoma	95	2.6	9	Pancreas	767	2.0
Thyroid gland	92	2.5	10	Bladder	752	1.9
Males						
Lung	653	24.3	1	Prostate	13,565	30.2
Prostate	606	19.7	2	Colorectal	6,375	14.2
Colorectal	256	8.3	3	Melanoma of skin	4,527	10.1
Stomach	159	5.2	4	Lung	4,248	9.5
Liver	143	4.7	5	Bladder	2,125	4.7
Testis	136	4.4	6	Leukaemias	1,790	4.0
Leukaemias	136	4.4	7	Non-Hodgkin's lymphoma	1,522	3.4
Non-Hodgkin's lymphoma	106	3.5	8	Kidney	1,034	2.3
Kidney	86	2.8	9	Stomach	1,014	2.3
Pancreas	74	2.4	10	Lip, oral cavity and pharynx	834	1.9

Notes: Cancers of ill-defined, secondary and unspecified sites have been excluded from this table. For Māori, there were 281 cancers of ill-defined secondary and unspecified sites (129 for Māori females and 159 for Māori males). Among non-Māori, there were 2,499 (1250 for non-Māori females and 1,249 for Māori males). Some cancer site names have been abbreviated in this table, see Table A2.2 in Appendix 2.

The most common causes of cancer death included lung, female breast, colorectal, and prostate cancers for both Māori and non-Māori (although the proportions and rank order differed) (Table 6.2). For example, while lung cancer was the leading cause of cancer death for both Māori and non-Māori, it contributed over 31% of Māori cancer deaths compared with 17% of non-Māori cancer deaths.

Table 6.2: Cancer deaths, 10 leading sites, 2000–2004

Māori			Rank	Non-Māori		
Site	Number	% of cancer deaths		Site	Number	% of cancer deaths
Total (both sexes)						
Lung	1,127	31.4	1	Lung	6,206	17.4
Breast: female	344	9.6	2	Colorectal	5,481	15.4
Colorectal	254	7.1	3	Female breast	2,806	7.9
Stomach	213	5.9	4	Prostate	2,761	7.8
Prostate	153	4.3	5	Pancreas	1,433	4.0
Liver	141	3.9	6	Non-Hodgkin's lymphoma	1,364	3.8
Pancreas	128	3.6	7	Stomach	1,316	3.7
Non-Hodgkin's lymphoma	105	2.9	8	Melanoma of skin	1,244	3.5
Leukaemias	94	2.6	9	Leukaemias	1,214	3.4
Oesophagus	81	2.3	10	Brain	1,037	2.9
Females						
Lung	585	32.1	1	Female breast	2,806	17.0
Female breast	344	18.9	2	Colorectal	2,725	16.5
Colorectal	112	6.1	3	Lung	2,404	14.5
Stomach	88	4.8	4	Ovary	817	4.9
Cervix uteri	65	3.6	5	Pancreas	719	4.3
Ovary	63	3.5	6	Non-Hodgkin's lymphoma	634	3.8
Pancreas	62	3.4	7	Leukaemias	533	3.2
Non-Hodgkin's lymphoma	53	2.9	8	Stomach	479	2.9
Uterus	47	2.6	9	Melanoma of skin	473	2.9
Leukaemias	42	2.3	10	Brain	409	2.5
Males						
Lung	542	30.7	1	Lung	3,802	20.0
Prostate	153	8.7	2	Prostate	2,761	14.5
Colorectal	142	8.0	3	Colorectal	2,756	14.5
Stomach	125	7.1	4	Stomach	837	4.4
Liver	116	6.6	5	Melanoma of skin	771	4.0
Pancreas	66	3.7	6	Non-Hodgkin's lymphoma	730	3.8
Oesophagus	61	3.5	7	Pancreas	714	3.7
Non-Hodgkin's lymphoma	52	2.9	8	Leukaemias	681	3.6
Leukaemias	52	2.9	9	Brain	628	3.3
Kidney	43	2.4	10	Oesophagus	581	3.0

Note: Some site names have been abbreviated in this table, see Table A2.2 in Appendix 2.

Age-standardised cancer incidence and mortality

When cancer incidence was standardised by age and sex, the Māori rate for cancers overall (all sites) was 219.0 per 100,000 for the 2000–2004 period. This rate was 9% higher than the non-Māori rate of 200.6 per 100,000 (Table 6.3).

In addition to a higher incidence rate for cancer overall, Māori had significantly higher rates for cancers of the lung, female breast, stomach, cervix, and liver. Cancers of the oesophagus, pancreas, larynx, uterus, testis, thyroid, multiple myeloma, and those of ill-defined sites, were also more common among Māori than non-Māori.

Non-Māori had higher rates of melanoma of the skin, prostate, colorectal, bladder, and brain cancer, and Hodgkin's disease. There were no significant differences between Māori and non-Māori in the age-sex-standardised rates of oral, gallbladder, bone, mesothelioma and soft tissue cancers, non-Hodgkin's lymphoma or leukaemia.

For the period 2000–2004, the overall age-standardised cancer death rate was 117.5 per 100,000 for Māori, compared with 66.3 for non-Māori, giving a cancer death rate for Māori 77% higher than that for non-Māori (Table 6.3).

Death rates were significantly higher for Māori for a number of cancer sites, including cancers of the breast, cervix, lung, liver, testis, thyroid, uterus, pancreas, prostate, stomach, larynx, oesophagus, multiple myeloma, non-Hodgkin's lymphoma, and those of ill-defined sites. Māori had a significantly lower mortality rate than non-Māori for melanoma of the skin and colon cancer.

For many cancer sites, the Māori/non-Māori age-standardised mortality ratios were higher than the incidence ratios.

Table 6.3: Cancer registrations and deaths, 2000–2004

Cancer site	Registrations					Deaths				
	Number		Rate		Rate ratio	Number		Rate		Rate ratio
	Māori	Non-Māori	Māori	Non-Māori		Māori	Non-Māori	Māori	Non-Māori	
All sites	6,697	83,926	219.0	200.5	1.09	3,587	35,596	117.5	66.3	1.77
Bladder	87	2,877	2.9	5.3	0.54	38	837	1.2	1.1	1.08
Bone	30	162	1.0	1.0	1.06	15	83	0.5	0.4	1.28
Brain	86	1,204	2.8	4.4	0.65	78	1,037	2.6	3.1	0.82
Breast: female*	1,069	10,587	66.8	58.4	1.14	344	2,806	21.3	12.4	1.71
Cervix*	174	731	10.9	5.8	1.89	65	258	4.0	1.3	3.10
Colorectal	469	12,710	15.4	24.8	0.62	254	5,481	8.4	9.4	0.89
Colon	*281*	*8,412*	*9.2*	*15.5*	*0.59*	*135*	*3,683*	*4.4*	*6.1*	*0.72*
Rectum	*188*	*4,298*	*6.2*	*9.3*	*0.67*	*119*	*1,798*	*3.9*	*3.3*	*1.20*
Gallbladder	32	458	1.0	0.8	1.23	23	355	0.7	0.6	1.19
Hodgkin's disease	37	367	1.2	1.8	0.69	2	69	0.1	0.2	0.32
Ill-defined sites	281	2,499	9.2	4.4	2.07	223	2,170	7.3	3.5	2.10
Kidney	138	1,642	4.6	4.3	1.08	65	707	2.2	1.4	1.55
Larynx	38	345	1.3	0.7	1.75	13	142	0.5	0.2	1.85
Leukaemias	244	3,114	8.1	8.9	0.91	94	1,214	3.1	2.6	1.21
Lymphoid leukaemia	*131*	*1,912*	*4.4*	*5.7*	*0.77*	*30*	*400*	*1.0*	*1.0*	*1.07*
Myeloid leukaemia	*91*	*975*	*3.0*	*2.7*	*1.11*	*56*	*728*	*1.8*	*1.5*	*1.22*
Other leukaemias	*22*	*227*	*0.7*	*0.5*	*1.42*	*8*	*86*	*0.3*	*0.1*	*2.11*
Liver	186	633	6.2	1.5	4.21	141	599	4.7	1.2	3.81
Lung	1,366	7,079	44.6	13.7	3.26	1,127	6,206	36.8	11.4	3.23
Melanoma of skin	84	8,967	2.7	26.7	0.10	22	1,244	0.7	2.9	0.26
Mesothelial and soft tissue	81	971	2.6	2.8	0.95	46	574	1.5	1.3	1.21
Multiple myeloma	106	1,312	3.5	2.5	1.41	55	718	1.8	1.1	1.56
Non-Hodgkin's lymphoma	201	2,887	6.6	7.2	0.92	105	1,364	3.4	2.6	1.31
Oesophagus	82	1,110	2.8	2.0	1.40	81	913	2.7	1.5	1.78
Oral cancers	119	1,298	4.0	3.6	1.11	58	543	1.9	1.1	1.71
Ovary*	135	1,366	8.4	7.5	1.13	63	817	3.9	3.2	1.22
Pancreas	149	1,521	4.8	2.7	1.76	128	1,433	4.1	2.5	1.68
Prostate*	606	13,565	42.7	55.9	0.76	153	2,761	11.2	7.7	1.46
Stomach	288	1,624	9.5	3.1	3.02	213	1,316	7.0	2.4	2.97
Testis*	136	580	9.5	6.5	1.46	15	31	1.0	0.3	3.56
Thyroid gland	122	711	3.9	2.8	1.42	14	86	0.5	0.2	2.91
Uterus*	169	1,400	10.5	6.7	1.58	47	368	2.9	1.3	2.29

Notes: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population; *rates are sex-specific; shaded rate ratios are statistically significant at the 5% level; some site names have been abbreviated in this table, see Table A.2.2 in Appendix 2.

The age-standardised incidence rates for all cancers combined was 224.6 per 100,000 for Māori females, 17% higher than the rate for non-Māori females (191.5 per 100,000) (Table 6.4). The cancer death rate for this period was 111.5 per 100,000 for Māori females, almost twice the rate of 58.3 for non-Māori females (RR 1.91; 95% CI 1.82–2.01).

There were significantly higher registrations and deaths among Māori females for cancers of the lung (over four times higher) and stomach (over 3.5 times higher). Cervical cancer was almost twice as common for Māori females, with deaths over three times higher. Breast, liver, thyroid gland, pancreas, uterus, multiple myeloma, and ill-defined cancers also had significantly higher registrations and deaths among Māori females.

Table 6.4: Female cancer registrations and deaths, 2000–2004

Cancer site	Registrations					Deaths				
	Number		Rate		Rate ratio	Number		Rate		Rate ratio
	Māori	Non-Māori	Māori	Non-Māori		Māori	Non-Māori	Māori	Non-Māori	
All sites	3,626	39,039	224.6	191.5	1.17	1,823	16,545	111.5	58.3	1.91
Bladder	32	752	1.9	2.5	0.76	18	270	1.0	0.5	1.99
Bone	9	67	0.6	0.9	0.72	4	33	0.3	0.4	0.74
Brain	40	491	2.6	3.6	0.73	40	409	2.6	2.3	1.13
Breast: female	1,069	10,587	66.8	58.4	1.14	344	2,806	21.3	12.4	1.71
Cervix	174	731	10.9	5.8	1.89	65	258	4.0	1.3	3.10
Colorectal	214	6,334	13.0	22.7	0.57	112	2,725	6.8	8.3	0.82
Colon	*139*	*4,557*	*8.4*	*15.5*	*0.55*	*65*	*1,984*	*4.0*	*5.9*	*0.68*
Rectum	*75*	*1,777*	*4.6*	*7.3*	*0.63*	*47*	*741*	*2.8*	*2.4*	*1.18*
Gallbladder	22	273	1.3	0.9	1.47	15	204	0.9	0.6	1.43
Hodgkin's disease	17	166	1.1	1.7	0.63	1	28	0.1	0.2	0.37
Ill-defined sites	129	1,250	7.8	3.9	1.98	97	1,114	5.8	3.1	1.87
Kidney	52	608	3.3	3.2	1.02	22	263	1.4	1.0	1.42
Larynx	4	44	0.3	0.2	1.60	0	17	-	0.05	-
Leukaemias	107	1,325	6.8	7.4	0.92	42	533	2.6	2.1	1.29
Lymphoid leukaemia	*40*	*772*	*2.5*	*4.4*	*0.57*	*9*	*167*	*0.6*	*0.7*	*0.86*
Myeloid leukaemia	*56*	*451*	*3.5*	*2.5*	*1.40*	*30*	*324*	*1.9*	*1.3*	*1.46*
Other leukaemias	*12*	*101*	*0.7*	*0.4*	*1.73*	*3*	*42*	*0.2*	*0.1*	*2.32*
Liver	43	229	2.6	0.9	2.91	25	227	1.5	0.7	2.06
Lung	713	2,831	43.8	10.8	4.04	585	2,404	35.8	8.4	4.24
Melanoma of skin	57	4,440	3.5	27.3	0.13	7	473	0.4	2.0	0.21
Mesothelial and soft tissue	42	345	2.6	2.2	1.19	17	168	1.1	0.8	1.43
Multiple myeloma	49	551	3.0	1.9	1.55	27	315	1.6	0.9	1.89
Non-Hodgkin's lymphoma	95	1,365	5.8	6.1	0.95	53	634	3.2	2.0	1.55
Oesophagus	18	390	1.1	1.1	0.99	20	332	1.2	0.8	1.47
Oral cancers	35	465	2.2	2.3	0.98	13	167	0.8	0.5	1.54
Ovary	135	1,366	8.4	7.5	1.13	63	817	3.9	3.2	1.22
Pancreas	75	767	4.5	2.3	1.98	62	719	3.7	2.0	1.85
Stomach	129	610	7.9	2.1	3.79	88	479	5.4	1.4	3.77
Thyroid gland	92	518	5.8	4.1	1.40	7	56	0.4	0.2	2.72
Uterus	169	1,400	10.5	6.7	1.58	47	368	2.9	1.3	2.29

Notes: Rates are calculated per 100,000 and were age-standardised to the 2001 Māori population; shaded rate ratios are statistically significant at the 5% level; some site names have been abbreviated in this table, see Table A2.2 in Appendix 2.

The age-standardised incidence rate for Māori males was 213.4 per 100,000, compared with 209.7 per 100,000 for non-Māori males (Table 6.5). Although the incidence rate was not significantly different, the cancer death rate was 66% higher for Māori males (123.4 per 100,000) than for non-Māori males (74.3 per 100,000). Māori males had significantly higher rates of registration and death for liver (over four times higher), lung, and stomach cancer (over 2.5 times higher). Testicular, laryngeal, and ill-defined cancers also had higher registrations and deaths among Māori males. Prostate cancer incidence was significantly lower for Māori males, however mortality rates were significantly higher than those for non-Māori males.

Table 6.5: Male cancer registrations and deaths, 2000–2004

Cancer site	Registrations					Deaths				
	Number		Rate		Rate ratio	Number		Rate		Rate ratio
	Māori	Non-Māori	Māori	Non-Māori		Māori	Non-Māori	Māori	Non-Māori	
All sites	3,071	44,887	213.4	209.7	1.02	1,764	19,051	123.4	74.3	1.66
Bladder	55	2,125	3.8	8.2	0.47	20	567	1.5	1.8	0.82
Bone	21	95	1.4	1.0	1.33	11	50	0.8	0.4	1.74
Brain	45	714	3.1	5.2	0.60	38	628	2.6	4.0	0.65
Colorectal	256	6,375	17.8	26.9	0.66	142	2,756	9.9	10.5	0.94
Colon	*142*	*3,855*	9.9	*15.6*	*0.63*	*70*	*1,699*	*4.9*	*6.4*	*0.77*
Rectum	*113*	*2,521*	7.9	*11.3*	*0.70*	*72*	*1,057*	5.0	*4.2*	*1.21*
Gallbladder	10	185	0.7	0.7	0.95	8	151	0.6	0.6	0.95
Hodgkin’s disease	21	200	1.4	1.9	0.74	1	41	0.1	0.2	0.29
Ill-defined sites	152	1,249	10.6	5.0	2.14	126	1,056	8.9	3.9	2.28
Kidney	86	1.034	5.9	5.3	1.11	43	444	2.9	1.8	1.62
Larynx	33	302	2.3	1.3	1.77	13	125	0.9	0.4	2.06
Leukaemias	136	1,790	9.5	10.4	0.91	52	681	3.6	3.2	1.15
Lymphoid leukaemia	*91*	*1,140*	*6.3*	*7.0*	*0.91*	*21*	*233*	*1.5*	*1.2*	*1.18*
Myeloid leukaemia	*35*	*524*	*2.5*	*2.9*	*0.87*	*26*	*404*	*1.8*	*1.7*	*1.05*
Other leukaemias	*10*	*126*	*0.7*	*0.6*	*1.19*	*5*	*44*	*0.3*	*0.2*	*2.00*
Liver	143	404	9.8	2.0	4.78	116	372	7.9	1.7	4.55
Lung	653	4,248	45.4	16.5	2.75	542	3,802	37.8	14.3	2.64
Melanoma of skin	39	4,527	1.9	26.0	0.07	15	771	1.1	3.7	0.29
Mesothelial and soft tissue	38	626	2.6	3.3	0.79	29	406	2.0	1.8	1.12
Multiple myeloma	57	761	4.0	3.0	1.32	28	403	2.0	1.4	1.36
Non-Hodgkin’s lymphoma	106	1,522	7.4	8.2	0.90	52	730	3.6	3.1	1.16
Oesophagus	65	719	4.5	2.9	1.55	61	581	4.2	2.2	1.89
Oral cancers	83	834	5.7	4.8	1.17	45	376	3.1	1.8	1.76
Pancreas	74	754	5.1	3.2	1.60	66	714	4.6	2.9	1.56
Prostate	606	13,565	42.7	55.9	0.76	153	2,761	11.2	7.7	1.46
Stomach	159	1,014	11.0	4.2	2.64	125	837	8.7	3.3	2.63
Testis	136	580	9.5	6.5	1.46	15	31	1.0	0.3	3.56
Thyroid gland	30	193	2.1	1.4	1.47	7	30	0.5	0.2	3.11

Notes: Rates were calculated per 100,000 and age-standardised to the 2001 Māori population; shaded rate ratios are statistically significant at the 5% level; some cancer site names have been abbreviated in this table, see Table A2.2 in Appendix 2.

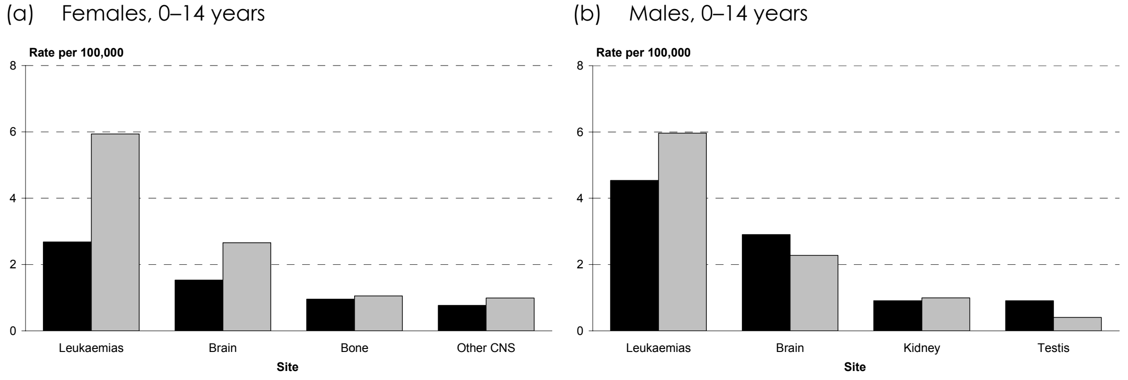
Cancer

Cancer incidence and mortality by age group

The incidence of different cancers varies by age group, with the overall risk of cancer generally increasing with age. Some specific cancers, however, have higher rates in younger age groups or decrease in incidence with age (AIHW & AACR 2004). Incidence rates for all cancers combined (all sites) increased with age for both Māori and non-Māori in the period 2000–2004.

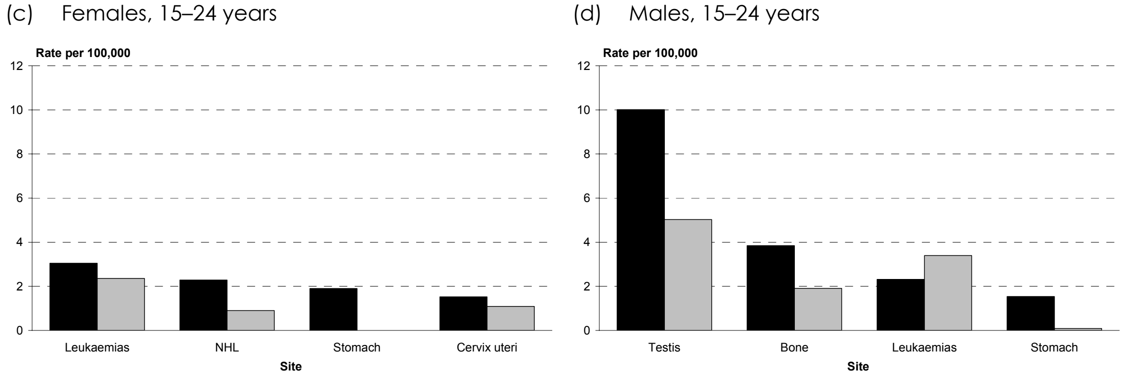
The most commonly occurring cancers for Māori by age group and sex are presented below (Figure 6.1).[2] Leukaemias and brain cancers were the most commonly occurring cancers in Māori under 15 years. For Māori females aged 15–24 years the most commonly occurring cancers were leukaemias, non-Hodgkin's lymphoma, stomach, and cervical cancer. For Māori men in this age group testicular cancer was the most frequently occurring cancer, followed by cancers of the bone, leukaemias, and stomach cancer. Breast and cervical cancers were the most commonly occurring cancers for Māori women aged between 25–44 years, while testicular cancer was the most common cancer for Māori men in this age group. For Māori aged 45 years and over, lung, breast, and prostate cancers were the most commonly occurring cancers.

Figure 6.1: Age-specific leading cancer incidence rates, by sex, 2000–2004



(a) Females, 0–14 years

(b) Males, 0–14 years



(c) Females, 15–24 years

(d) Males, 15–24 years

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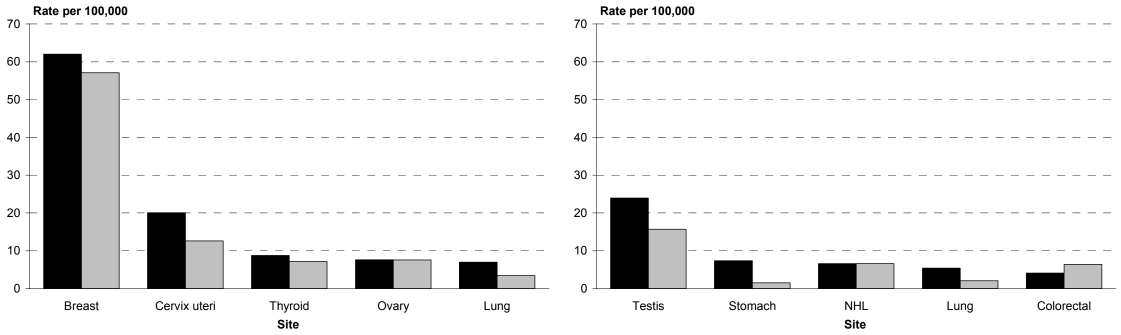
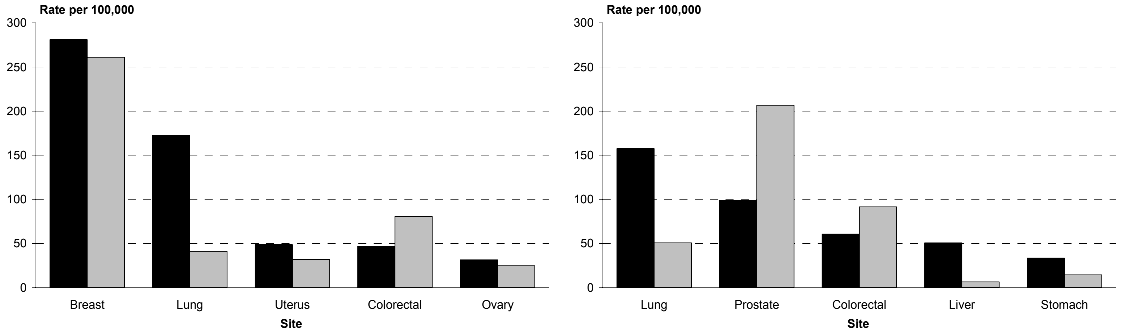
[2] Non-Māori rates are included in the graphs for comparison, however the graphs do not necessarily reflect the five most common sites for non-Māori, as they are ranked by Māori incidence.



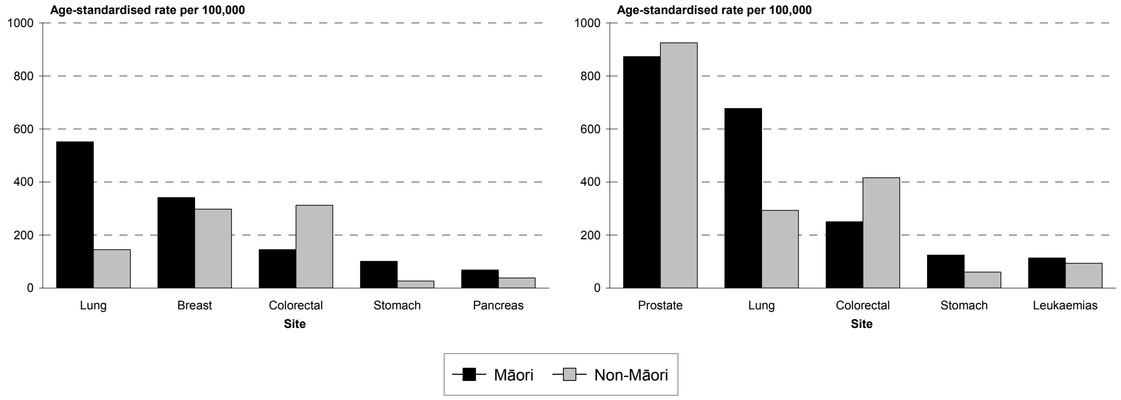
(e) Females, 25–44 years

(f) Males, 25–44 years



(g) Females, 45–64 years

(h) Males, 45–64 years



(i) Females, 65 years and over

(j) Males, 65 years and over

Notes: Rates are calculated per 100,000; rates for the 65 years and over age group were age-standardised to the 2001 Māori population; cancers of ill-defined, secondary, and unspecified sites have been excluded from these graphs. They were the fourth most commonly occurring cancers for Māori males and females in the 65 years and over age group; some site names have been abbreviated in these figures, see Table A2.2 in Appendix 2.

As with cancer incidence, age-specific cancer mortality rates overall increase with age for both Māori and non-Māori. There were some differences in the leading sites by age group. Leukaemias and brain cancers were the leading causes of cancer death for Māori aged under 15 years. For Māori aged 15–24 years, leukaemias, brain cancers, and soft tissue cancers were the most common causes of cancer death. For Māori females aged 25–44 years, breast and lung cancers were the most common causes of cancer death, compared with lung and liver cancers for Māori males in this age group. In Māori aged over 45 years, lung cancer was the leading cause of cancer death.

Cancer stage at diagnosis

The stage of cancer at diagnosis provides information about the extent of disease spread.[3] This information is often important in making decisions about management and treatment of cancers. For some cancer sites the majority of new cases were diagnosed at an early stage of disease spread (localised) for both Māori and non-Māori, such as melanoma of the skin and cancers of the uterus, testis, thyroid, and brain. In contrast, other cancers had relatively high proportions of cancers diagnosed at a distant stage (over 40%), namely pancreatic and ovarian cancers. There were also some cancer sites for which relatively high proportions of registrations (over 40%) had an unknown stage at diagnosis, including cancers of the bladder, bone, larynx, liver, lung, mesothelioma, oesophagus, pancreas, and prostate.

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[3] The New Zealand Cancer Registry (NZCR) records stage at diagnosis for cancer sites, 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), or unknown. These classifications are not applicable to leukaemias or lymphomas, and these are therefore excluded from the stage tables. There is variation in the completeness of staging information on the NZCR by cancer site.

Table 6.6: Distribution of stage at diagnosis, cancer registrations, 2000–2004

Cancer		Total number	Localised		Regional		Distant		Unknown	
			Number	%	Number	%	Number	%	Number	%
Bladder	Māori	79	6	7.6	6	7.6	8	10.1	59	74.7
	Non-Māori	2,885	131	4.5	156	5.4	110	3.8	2,488	86.2
Bone	Māori	29	3	10.3	5	17.2	8	27.6	13	44.8
	Non-Māori	163	30	18.4	26	16.0	26	16.0	81	49.7
Brain	Māori	81	74	91.4	0	0.0	4	4.9	3	3.7
	Non-Māori	1,209	1,181	97.7	1	0.1	13	1.1	14	1.2
Breast: female	Māori	988	384	38.9	415	42.0	41	4.1	148	15.0
	Non-Māori	10,668	5,106	47.9	3,505	32.9	401	3.8	1,656	15.5
Cervix uteri	Māori	164	69	42.1	17	10.4	20	12.2	58	35.4
	Non-Māori	741	368	49.7	83	11.2	47	6.3	243	32.8
Colorectal	Māori	425	83	19.5	159	37.4	129	30.4	54	12.7
	Non-Māori	12,754	3,481	27.3	5,608	44.0	2,471	19.4	1,194	9.4
Gallbladder	Māori	29	3	10.3	5	17.2	10	34.5	11	37.9
	Non-Māori	461	50	10.8	104	22.6	126	27.3	181	39.3
Kidney	Māori	127	51	40.2	28	22.0	37	29.1	11	8.7
	Non-Māori	1,653	803	48.6	220	13.3	396	24.0	234	14.2
Larynx	Māori	34	3	8.8	9	26.5	4	11.8	18	52.9
	Non-Māori	349	34	9.7	47	13.5	24	6.9	244	69.9
Oral cancers	Māori	110	19	17.3	40	36.4	11	10.0	40	36.4
	Non-Māori	1,307	366	28.0	425	32.5	68	5.2	448	34.3
Liver	Māori	170	18	10.6	3	1.8	28	16.5	121	71.2
	Non-Māori	649	55	8.5	22	3.4	107	16.5	465	71.6
Lung	Māori	1,231	46	3.7	74	6.0	478	38.8	633	51.4
	Non-Māori	7,214	433	6.0	548	7.6	2,771	38.4	3,462	48.0
Melanoma of skin	Māori	78	51	65.4	15	19.2	8	10.3	4	5.1
	Non-Māori	8,973	7,807	87.0	474	5.3	468	5.2	222	2.5
Mesothelioma	Māori	12	0	0.0	1	8.3	4	33.3	7	58.3
	Non-Māori	361	3	0.8	10	2.8	51	14.1	297	82.3
Oesophagus	Māori	74	2	2.7	11	14.9	17	23.0	44	59.5
	Non-Māori	1,118	58	5.2	114	10.2	247	22.1	699	62.5
Ovary	Māori	125	45	36.0	8	6.4	64	51.2	8	6.4
	Non-Māori	1,376	400	29.1	124	9.0	767	55.7	85	6.2
Pancreas	Māori	135	3	2.2	10	7.4	67	49.6	55	40.7
	Non-Māori	1,535	31	2.0	123	8.0	704	45.9	677	44.1
Prostate	Māori	541	42	7.8	16	3.0	36	6.7	447	82.6
	Non-Māori	13,630	1,993	14.6	701	5.1	645	4.7	10,291	75.5
Soft tissue	Māori	63	15	23.8	2	3.2	12	19.0	34	54.0
	Non-Māori	616	195	31.7	46	7.5	98	15.9	277	45.0
Stomach	Māori	264	35	13.3	53	20.1	97	36.7	79	29.9
	Non-Māori	1,648	173	10.5	402	24.4	484	29.4	589	35.7
Testis	Māori	133	81	60.9	24	18.0	19	14.3	9	6.8
	Non-Māori	583	448	76.8	61	10.5	52	8.9	22	3.8
Thyroid	Māori	114	76	66.7	25	21.9	8	7.0	5	4.4
	Non-Māori	719	430	59.8	190	26.4	41	5.7	58	8.1
Uterus	Māori	155	92	59.4	29	18.7	21	13.5	13	8.4
	Non-Māori	1,414	838	59.3	267	18.9	146	10.3	163	11.5

For the period 2000–2004, there were differences between Māori and non-Māori in the odds of being diagnosed at localised or distant stage, or having an unknown stage at diagnosis for a range of cancer sites (Table 6.7). For example, Māori were significantly less likely than non-Māori to have stage at diagnosis information recorded on cancer registrations for stomach, colorectal, lung, breast, and prostate cancers. For bladder cancers, however, Māori were more likely than non-Māori to have stage data recorded.

When comparing those cancers for which stage data was available, Māori were significantly less likely to be diagnosed at an early stage of disease spread for testicular, prostate, oral, kidney, cervical, lung, rectal, and female breast cancers, and melanoma of the skin.

There were also a number of cancers for which Māori were significantly more likely to be diagnosed at a distant stage of disease. These included prostate, cervical, oral, colorectal, lung, kidney, and female breast cancers, and melanoma of the skin.

Table 6.7: Māori/non-Māori odds ratios for unknown stage, localised stage or distant stage at diagnosis, adjusted for age and sex, cancer registrations, 2000–2004

Site	All cancers	Staged cancers only	
	Stage unknown	Localised	Distant
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Bladder	0.54 (0.32–0.92)	0.85 (0.31–2.32)	1.96 (0.75–5.14)
Brain	1.08 (0.28–4.14)	0.37 (0.11–1.22)	2.91 (0.87–9.75)
Breast: female	1.52 (1.26–1.84)	0.65 (0.56–0.75)	1.45 (1.04–2.04)
Cervix	1.45 (0.99–2.11)	0.55 (0.34–0.89)	3.11 (1.64–5.90)
Colorectal	2.03 (1.50–2.74)	0.70 (0.54–0.89)	1.81 (1.45–2.26)
Colon	*2.02 (1.16–3.50)*	*0.73 (0.53–1.00)*	*1.75 (1.33–2.30)*
Rectum	*1.97 (1.35–2.85)*	*0.65 (0.43–0.97)*	*1.91 (1.30–2.79)*
Kidney	1.09 (0.56–2.12)	0.50 (0.34–0.74)	1.55 (1.01–2.36)
Liver	1.31 (0.88–1.95)	1.16 (0.59–2.29)	1.19 (0.62–2.32)
Lung	1.57 (1.38–1.79)	0.57 (0.41–0.78)	1.66 (1.33–2.06)
Melanoma of skin	2.36 (0.85–6.56)	0.20 (0.12–0.33)	2.77 (1.31–5.85)
Mesothelial	1.00 (0.62–1.62)	0.77 (0.37–1.57)	1.54 (0.75–3.14)
Oesophagus	1.45 (0.86–2.43)	0.42 (0.10–1.82)	0.97 (0.46–2.06)
Oral cancers	1.31 (0.87–1.98)	0.49 (0.28–0.85)	2.34 (1.15–4.74)
Ovary	2.08 (0.94–4.61)	0.97 (0.64–1.47)	1.13 (0.76–1.69)
Pancreas	1.45 (0.99–2.13)	0.70 (0.20–2.41)	1.53 (0.81–2.91)
Prostate	1.71 (1.36–2.15)	0.49 (0.32–0.76)	4.95 (2.93–8.35)
Stomach	1.43 (1.05–1.96)	1.13 (0.74–1.74)	1.33 (0.95–1.86)
Testis	1.54 (0.67–3.53)	0.48 (0.31–0.74)	1.74 (0.96–3.13)
Thyroid gland	0.63 (0.24–1.64)	1.22 (0.78–1.90)	1.40 (0.63–3.14)
Uterus	1.16 (0.63–2.14)	0.84 (0.58–1.22)	1.50 (0.90–2.49)

Note: Some site names have been abbreviated in this table, see Table A2.2 in Appendix 2.

Cancer survival

There are different ways of estimating survival from cancer. Cancer-specific hazard ratios give an estimate of the relative risk of dying from a specific cancer after being diagnosed.[4]

The risk of dying from a cancer after diagnosis was significantly higher for Māori than non-Māori for many cancers, with the differences remaining after adjustment for age, sex, and stage at diagnosis (Table 6.8). Of concern, age-sex-adjusted disparities were significant for cancers that have good treatment options and for those that are potentially curable if detected early, such as breast, cervical, colorectal, and oral cancers.

Table 6.8: Relative risk of dying from cancer after diagnosis among Māori compared to non-Māori, cancer-specific hazard ratios, 2000–2004

Cancer type	Adjusted for age and sex			Adjusted for age, sex and stage (including unstaged)		
	Hazard ratio	(95% CI)	p value	Hazard ratio	(95% CI)	p value
Bladder	2.76	(1.81–4.22)	<0.0001	2.03	(1.32–3.10)	0.001
Bone	2.18	(1.06–4.48)*	0.035	1.95	(0.96–3.94)*	0.063
Brain	1.58	(1.19–2.10)	0.002	1.53	(1.15–2.04)	0.004
Breast: female	1.78	(1.47–2.15)	<0.0001	1.65	(1.36–1.99)	<0.0001
Cervix	1.56	(1.06–2.31)	0.025	1.06	(0.71–1.59)	0.77
Colorectal	1.58	(1.34–1.87)	<0.0001	1.31	(1.10–1.55)	0.002
Colon	*1.43*	*(1.15–1.79)*	*0.002*	*1.22*	*(0.98–1.53)*	*0.081*
Rectum	*1.82*	*(1.40–2.38)*	*<0.0001*	*1.44*	*(1.11–1.88)*	*0.007*
Gallbladder	1.22	(0.72–2.07)	0.46	1.10	(0.65–1.85)	0.73
Hodgkin's disease	1.10	(0.26–4.73)	0.90		n/a	
Kidney	1.68	(1.23–2.29)	0.001	1.23	(0.90–1.68)	0.20
Larynx	1.38	(0.65–2.91)	0.40	0.97	(0.45–2.07)	0.94
Leukaemias	1.37	(1.05–1.79)	0.022		n/a	
Liver	1.27	(1.02–1.58)	0.033	1.35	(1.09–1.68)	0.007
Lung	1.25	(1.16–1.34)	<0.0001	1.22	(1.13–1.31)	<0.0001
Melanoma of skin	3.89	(2.19–6.91)	<0.0001	2.12	(1.19–3.79)	0.011
Mesothelial and soft tissue	1.23	(0.84–1.81)	0.29	1.12	(0.76–1.65)	0.57
Multiple myeloma	1.30	(0.87–1.93)	0.20		n/a	
Non-Hodgkin's lymphoma	1.93	(1.51–2.45)	<0.0001		n/a	
Oesophagus	1.73	(1.31–2.28)	<0.0001	1.76	(1.34–2.32)	<0.0001
Oral cancers	1.73	(1.17–2.55)	0.006	1.54	(1.04–2.28)	0.029
Ovary	1.55	(1.11–2.15)	0.009	1.79	(1.29–2.49)	0.0005
Pancreas	1.16	(0.94–1.42)	0.17	1.19	(0.97–1.47)	0.10
Prostate	2.43	(1.92–3.09)	<0.0001	2.04	(1.60–2.59)	<0.0001
Stomach	1.16	(0.98–1.38)	0.093	1.17	(0.99–1.39)	0.068
Testis	2.14	(0.92–4.97)*	0.076	1.48	(0.61–3.58)*	0.38
Thyroid	1.18	(0.56–2.48)*	0.67	0.96	(0.44–2.08)*	0.91
Uterus	1.96	(1.30–2.95)	0.001	2.10	(1.39–3.15)	0.0004

Notes: Hazard ratios in grey text have small numbers and should be interpreted with caution. Some site names have been abbreviated in this table, see Table A2.2 in Appendix 2.

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[4] A hazard ratio above 1 means that the risk for Māori of dying from their cancer is higher than the risk for non-Māori patients of the same age.

A later stage at diagnosis was associated with significantly higher risk of death for most cancers. Differences in the distribution of stage at diagnosis between Māori and non-Māori contributed in part to survival disparities for bladder, breast, cervical, colorectal, kidney, melanoma, oral, and prostate cancers (Table 6.8). However, with the exception of cervical cancer, survival disparities remained after adjustment for stage. Differential stage at diagnosis accounted for all of the higher mortality risk for cervical cancer. For other particular cancers, including brain, liver, lung, oesophagus, ovarian, stomach, and uterine cancers, stage at diagnosis did not contribute to excess mortality.

Where the staging classification is not applicable, the relative risk of death was higher for Māori compared to non-Māori diagnosed with leukaemia or non-Hodgkin's lymphoma, but not significantly different for those diagnosed with Hodgkin's disease or multiple myeloma.

Discussion

The data presented in this chapter demonstrate the significant impact of cancer for Māori communities and the stark disparities in cancer incidence and outcome between Māori and non-Māori in Aotearoa. These disparities include significantly higher overall incidence and mortality rates (from all cancers combined), and differences in rates, ratios, distribution of stage, and survival for specific cancer sites. This is consistent with substantial international evidence of ethnic disparities in cancer incidence and outcomes, and of the disproportionate impact of cancer on indigenous peoples (Mandelblatt et al 1999; Smedley et al 2002; Shavers and Brown 2002; Condon et al 2005).

There has been a reduction in the disparity between Māori and non-Māori in both cancer incidence and mortality overall when compared with 1996–2001 (Robson et al 2006), although changes in ethnicity data may partly account for this. Of note is the fact that during the five-year period 2000–2004 alone, there was a significant decrease in the incidence of cervical cancer among both Māori and non-Māori women.

However, overall cancer incidence remains 9% higher for Māori, and mortality rates are 77% higher for the time period 2000–2004. It is a cause for concern that significant disparities in survival between Māori and non-Māori remain for a number of specific cancers that are potentially curable when detected early or that have good treatment options.

Factors contributing to mortality differences include differences in exposure to risk and protective factors, in access to regular screening, and in access to timely, high quality treatments (Jemal et al, 2005). The differential exposure of Māori and non-Māori to risk and protective factors for cancer needs to be addressed. This includes a focus on the fundamental drivers of inequalities in Aotearoa/New Zealand that manifest in the differential distribution of determinants such as socioeconomic status by ethnicity, and drive disparities in exposure to risk factors such as smoking.

There is also evidence in Aotearoa/New Zealand that the national screening programmes for breast and cervical cancer have not achieved equitable coverage for Māori women (Page et al 2007; NCSP IMG 2007). There is less information available about disparities in access to early detection for other sites. However, the differences outlined in this chapter in the distribution of stage at diagnosis between Māori and non-Māori for many sites suggest that differential access to early detection, diagnosis, and investigation may exist.

Although an early stage at diagnosis often offers the best prognosis, disparities in cancer-specific mortality risk exist for Māori after adjusting for stage at diagnosis. It is important, therefore, to ensure that Māori with cancer have timely and equitable access to high quality treatments, and to the necessary rehabilitation and support services.

Cancer policy and practice needs to take into account Māori cancer priorities if Māori are to benefit equitably from future developments in cancer control. Reducing the incidence and impact of cancer within Māori communities, as well as eliminating inequities in cancer, necessitates a commitment to addressing disparities in exposure to risk and protective factors for cancer, and in access to quality cancer care.

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7 MENTAL HEALTH: PSYCHIATRIC DISORDER AND SUICIDE

Joanne Baxter

Key points

- In 2003/04, Te Rau Hinengaro, the New Zealand Mental Health Survey showed that just over half of Māori had experienced a mental disorder during their lifetime, and just under a third within the past 12 months.
- The most common lifetime disorders for Māori were anxiety (31.3%), substance (26.5%) and mood (24.3%) disorders.
- Mental disorders for Māori were more common in those aged 16 to 24 and 25 to 44 years, those living in low income households and those living in areas of higher deprivation. There were no differences in rates by region or rurality.
- Māori had higher overall rates of disorder and higher rates of serious disorders than Pacific people and non-Māori non-Pacific people.
- Contact with health services for mental health needs was low for Māori relative to need. Only half of those with a serious disorder in the previous 12 months had any contact with mental health services (compared with two-thirds of non-Māori). General practice was the leading source of service contact.
- In 2003–2005 the leading causes of hospitalisation for mental disorder among Māori were schizophrenia followed by bipolar disorder (more than half).
- Māori age-sex-standardised rates of hospitalisation for mental disorder were 80% higher than those of non-Māori.
- Māori were less likely than non-Māori to be hospitalised for depressive, personality and eating disorders, but over 3.5 times more likely for schizophrenia and 2.4 times more likely to be hospitalised for bipolar disorder.
- In 2000–2004 suicide mortality was highest among Māori aged 15–24 and 25–44 years.
- Māori aged 15–24 years were two times more likely to die by suicide than non-Māori, and 1.5 times more likely than non-Māori at ages 25–44 years.
- Suicide rates among Māori in older age groups were lower than rates for non-Māori.

Introduction

Over the 1990s a growing awareness of mental health as an important health issue for Māori was evident (Pōmare et al 1995; Dyall 1997; Durie 1999). Concerns regarding mental health were reflected in commentary from the Māori Health Commission: “There is a crisis in Māori Mental Health of unprecedented proportions” (Māori Health

Commission 1998, p. 14), and the Mental Health Commission who stated "mental illness is now the number one health concern for Māori" (Mental Health Commission 1998, p. vii). Alongside these concerns there was a call for more information on Māori mental health (Dyall 1997; Baxter 1998). *Hauora: Māori Standards of Health III* stated that "a comprehensive review of Māori mental health is necessary" (Pōmare et al 1995, p. 161).

Recognition of Māori mental health need occurred alongside a raised awareness of the need to address mental health as a health issue. Inquiries into forensic psychiatric services and the growth of community based mental health care have led to changes in both where and how mental health services are delivered. Within New Zealand health policy stated priorities include the reduction of suicide and the reduction of alcohol- and drug-related harm (Minister of Health 2000).

In response to mental health need, the Mental Health Commission described a need for more and better mental health services including services for young people, early intervention services, and mental health workforce development (Mental Health Commission 1998). Alongside these policies the development of Māori mental health services and Māori mental health workforce initiatives occurred. Thus the 1990s could be seen as a time of mental health development, including development of Māori mental health initiatives and services in response to identified need.

Within this chapter we review literature on Māori mental health and update current knowledge about Māori hospitalisation for mental disorders, with analysis of hospitalisation data and suicide mortality data. The aim is to provide a picture of the status of Māori mental health based on recent data.

This chapter is divided into four sections. Firstly, there is a review of the evidence for mental health in Māori and disparities in mental health outcomes from an epidemiology perspective based on published reports and research. Secondly, there is an analysis of hospitalisation patterns and rates for mental disorders, firstly within Māori (e.g., by age and gender) followed by comparisons with non-Māori for data from 2003 to 2005. Thirdly, analysis of suicide mortality is presented for the years 2000 to 2004. Finally, a discussion covering key issues concludes the chapter.

A limitation of this chapter is a lack of commentary on Māori mental wellbeing. Although it is beyond the chapter's scope to fully address mental wellbeing this does not reduce the importance of broader concepts. Using broader definitions Māori over-representation in terms of socioeconomic disadvantage, and experience of high imprisonment rates, may be considered as indicators of mental health needs. Factors including the impact of colonisation and its consequences on Māori mental health, and access to tikanga and te reo have been considered by Māori health commentators as influencing mental health (Dyall 1997). The impact of racism or discrimination, access to and effectiveness of services are also described as having an impact on Māori health outcomes.

Māori mental health – a review of the evidence

Until recently, much of the information available about Māori mental health has been based on analyses of routinely collected health sector data. Community-based research or research investigating mental wellbeing has been less available. However, recently the release of Te Rau Hinengaro, the New Zealand Mental Health Survey, has provided information on mental health at a population level (Oakley Browne et al 2006a). The following is a summary of some key findings from a range of sources.

Health sector data

Analyses of hospitalisation data for psychiatric disorder

In the 1990s there were several reports describing Māori mental health based on hospital data. *Hauora: Māori Standards of Health III* (Pōmare et al 1995) found Māori rates of admission for psychiatric disorder increased markedly from 1970 to 1991. Alcohol disorders were the leading reason for mental health admission for Māori and non-Māori men and the second leading cause for Māori women. Authors noted Māori were likely to access mental health services at a later stage and were more seriously ill when help was obtained than non-Māori.

Two reports released by Te Puni Kōkiri (1993, 1996), the most recent spanning 1984 to 1993, described patterns of mental disorder hospitalisation by ethnicity and trends across time. An increase in the rate of Māori hospitalisation (both first admission and readmission) was also found while rates of hospitalisations for non-Māori fell (Te Puni Kōkiri 1996). Rates of hospitalisation were greater for both Māori men and women when compared with Pākehā men and women and for both first and subsequent re-admissions. This picture was more marked for psychotic illness. Māori were more likely to enter hospital via court and justice means and also to be hospitalised within forensic or secure units than Pākehā.

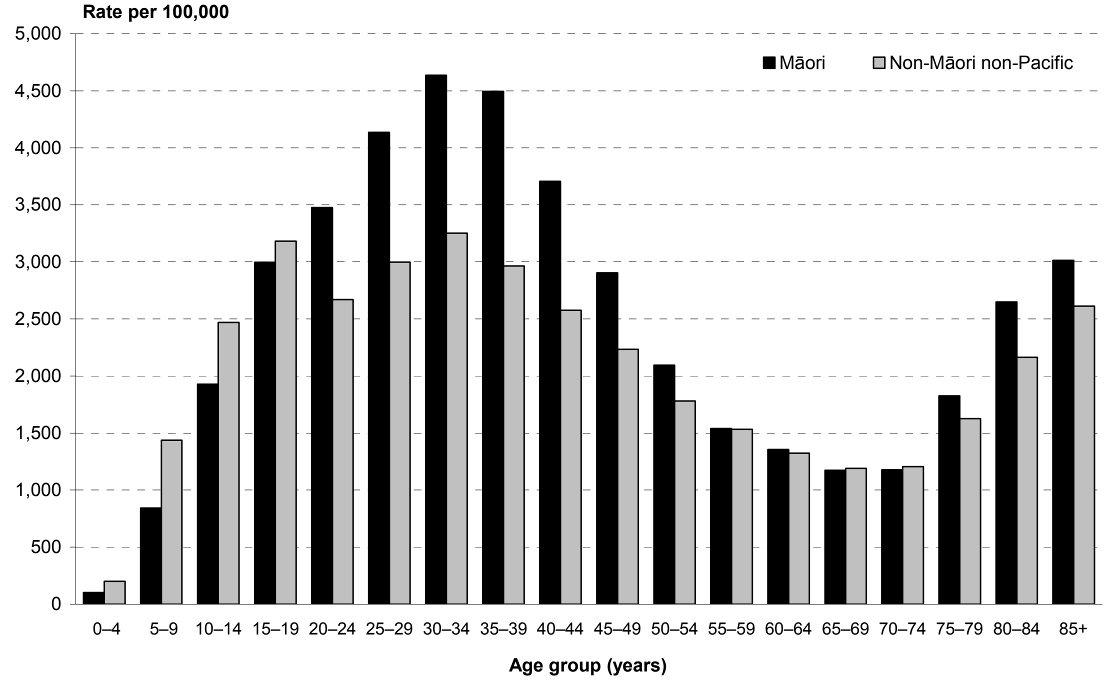
In summary, analyses of mental disorder hospitalisations over the 1980s and early 1990s show an increasing rate of hospitalisation in Māori, particularly for psychotic illness. Findings indicate growing disparities between Māori and non-Māori.

Other secondary care data – the Mental Health Information National Collection

More recently (since 2001), the Mental Health Information National Collection (MHINC) has reported on data collected from District Health Board (DHB) Mental Health Services. MHINC includes not only hospitalisation data but also data from outpatient settings, alcohol and drug services, early intervention services, child and youth specialty services, and kaupapa Māori services. MHINC does not include primary care or non-governmental organisations.

In the publication of MHINC data for 2003 there were a total of 14,909 Māori individuals seen within DHB mental health services, comprising 17.2% of the clients (New Zealand Health Information Service 2006).

Figure 7.1: Māori/non-Māori age-specific rates of clients seen within DHB secondary care mental health services, 2003



Source: MHINC data from New Zealand Health Information Service 2006

Figure 7.1 shows the age-specific rates of service contact among Māori and non-Māori individuals across DHB services. Māori rates of service contact are higher among adults aged 20 to 54 years and 75 years and older. However, Māori rates of service contact are lower in those aged under 20 years and in other adult ages (New Zealand Health Information Service 2006). In the ages between 25 and 39 years age-specific rates for Māori were greater than 4,000 per 100,000, i.e., over 1 in every 25 Māori people in these ages had contact with DHB mental health services.

Mental health in primary care settings

The Mental Health and General Practice Investigation study (MaGPIe) measured mental disorders in people attending primary health care. Researchers found Māori, and particularly Māori women general practice attendees, had higher rates of mental disorder than non-Māori. Māori had higher rates of anxiety, depression, and substance abuse. Symptoms among Māori were also considered more severe. Findings were not explained by Māori/non-Māori differences in age and socioeconomic status (MaGPIe Research Group 2001, 2003, 2005).

Mental health from a community setting

Hospitalisation data is not an accurate measure of mental disorders within a population, and levels of hospitalisation are impacted upon not just by the prevalence of mental disorders but also by access to health services including primary care services and early detection services, and by the effectiveness of those services. There are a number of surveys and research projects that provide some indication of Māori mental health from a population perspective.

Te Rau Hinengaro, the New Zealand Mental Health Survey

Te Rau Hinengaro, the New Zealand Mental Health Survey, was undertaken in 2003/2004 by a team of researchers, including Māori researchers. The survey studied over 12,000 New Zealanders including 2,595 Māori and had a number of objectives, including to describe the prevalence of mental disorders and patterns of health service use for adults (16 years and over) among the total New Zealand population, among Māori, and among Pacific people (Baxter et al 2006a, 2006b; Beautrais et al 2006; Oakley Browne et al 2006a, 2006b; Wells et al 2006). The survey report includes a chapter on Māori (Baxter et al 2006c) and published papers also present findings related to Māori (Baxter et al 2006a, 2006b). A selection of findings is described here and the survey report contains fuller findings (Oakley Browne et al 2006a).

The survey found that mental disorders were common among Māori and had been experienced by just over half of Māori (50.7%) in their lives until the time of interview, and by just under one in three Māori (29.5%) in the past 12 months. The most common mental disorders experienced by Māori over their lifetime were anxiety disorders, experienced by in one in three (31.3%). Substance disorders (alcohol or drug disorders) and mood disorders had been experienced by one in four Māori (26.5% and 24.3% respectively).

Co-morbidity (having two or more disorders) was common and among Māori with any disorder in the past 12 months just under half (44.5%) had two or more disorders. In addition, many Māori with disorders in the past 12 months were considered to have serious disorders (29.6%) or disorders of moderate severity (42.6%).

The prevalence of mental disorders differed by gender and by age. One in four Māori males (24.8%) and one in three Māori females (33.6%) experienced at least one disorder in the previous 12 months. With regards to age, disorders were most common in those aged 16 to 24 years (33.2%) and 25 to 44 years (32.9%). Older Māori were less likely to experience disorders, with 23.7% of those aged 45 to 64 years and 7.9% of Māori aged 65 years and older with a 12-month disorder. Rates differed also by socioeconomic status, with higher rates of disorder among those living in low income households and those living in areas of higher deprivation. Rates did not differ by geography, with no significant differences between Māori based on whether they lived in rural and urban areas, or between geographical region of home.

Despite high prevalence found, contact with services for mental health needs was low. Of those Māori with a mental disorder in the previous 12 months, fewer than one in three had any contact with services to meet mental health needs. Of those Māori who had a serious disorder (12 months), only half had any contact with services to meet mental health needs. General practice was the service seen most by Māori with mental disorders.

Ethnic disparities were evident and Māori had higher rates of disorder overall, higher rates of specific disorders and of serious disorders when compared with Pacific people and when compared with non-Māori non-Pacific people.

The New Zealand Health Survey

The New Zealand Health Survey 2002/03 (Ministry of Health 2004) interviewed 12,929 New Zealanders aged 15 years and over. It included 4,369 Māori. The study found 2.2% of Māori males had a known mental disorder and this was very similar to the total male rate in the survey (2.1%). Among Māori females, rates of known mental disorder (1.8%) were lower than for females overall (3.2%). Within the same survey Māori females scored lower than non-Māori females on many measures of self-reported health using the SF-36, including dimensions of emotional and mental health. These findings indicate that Māori women self-reported poorer mental health. However, this was not reflected in the likelihood of their having had a mental health problem recognised within a health care setting.

Other research

The Christchurch Health and Development Study (CHDS), a Christchurch based birth cohort study, found 55% of Māori at age 18 years experienced at least one mental disorder within the previous three years, compared with 41% of non-Māori (Horwood and Fergusson 1998).

The New Zealand National Prison Study 1997/98 measured mental disorders among over 12,000 inmates, almost half of whom (48.4%) were Māori. The study found high levels of mental disorders among all inmates, Māori and non-Māori (Brinded et al 2001; Simpson et al 2003). Most inmates had a mental disorder diagnosis and 6–8% had a schizophrenic disorder in their lifetime. When Māori were compared with Pacific and European/Other ethnicities no differences in the prevalences of individual mental disorders was found (Simpson et al 2003). Researchers did find that Māori and Pacific inmates with mental disorders were less likely to have received treatment (past or current) than European/Other inmates.

Suicide

Considerable concern was raised in the 1980s and 1990s about increasing rates of suicide among the young and Māori. Before the 1980s Māori suicide rates were lower than those for non-Māori. However, Māori rates increased markedly over the 1980s and 1990s, and disparities between Māori and non-Māori have emerged, particularly among the young. Analysis of the 2002/03 New Zealand Child and Youth Mortality Database showed Māori mortality for suicide in those aged 15–24 years as twice the rate for non-Māori in this age group (31.8 per 100,000 population compared with 14.4 per 100,000) (Sargent and Baxter 2005).

Mental Health: Psychiatric Disorder and Suicide

Summary

Analyses of hospitalisation data over recent decades indicate an increase in hospitalisation for mental disorder among Māori, and analyses of mortality data shows increased rates of Māori suicide, particularly among young adults, over the past decades. Disparities between Māori and non-Māori in both hospitalisation for mental disorders and death due to suicide have become apparent.

Recent population-based research indicates that the more common mental health problems such as anxiety, mood and substance disorders are also common among Māori, with disparities evident when compared with non-Māori, including for levels of co-morbidity and serious disorder. Despite this, evidence suggests that there is low Māori service contact for mental health need at a community level.

In putting the two together, it appears Māori have high levels of hospitalisation but relatively low contact with community and primary care services for mental health needs.

Mental disorder hospitalisations

What this analysis shows

Data sources and methods for overall data analysis are reported in Appendix 1. The section below briefly describes issues particular to this chapter on mental health.

Analysis of hospitalisation data for diagnoses of mental disorders is one indicator of mental health need. This analysis describes rates and patterns of hospitalisation for mental disorders based on ICD-10 coded diagnoses on discharge from hospital. The findings are presented for the years 2003 to 2005. The following analyses have been undertaken:

a) Within Māori analysis: Rates of hospitalisation for mental disorder overall, trends over time, rates by gender and age-group, and rates by cause by gender.

b) Māori and non-Māori comparisons describing disparities.

Hospitalisation for mental disorders – ‘within Māori’ analysis

Mental disorders constitute an important reason for hospitalisation for Māori. Over the period of analysis (2003–2005), there were 12,376 hospitalisations among Māori for diagnoses of mental disorders.

The following tables show findings for analysis of data for mental disorder hospitalisations for the time period from 2003–2005, firstly for total diagnosis (age-sex-standardised), and then by gender (age-standardised) for diagnoses. Age-specific rates for combined diagnoses are also provided.

Table 7.1: Māori hospitalisations for mental disorders by sex and by age group, 2003–2005

		Total number of hospitalisations	Rate (95% CI)
Total		12,376	658.1 (645.9–670.5)
Age group	5–14 years	274	62.7 (55.4–70.9)
	15–24 years	3,053	913.1 (878.4–949.2)
	25–44 years	6,542	1,241.0 (1208.8–1274.1)
	45–64 years	2,019	751.1 (717.5–786.3)
	65 years and over	457	642.9 (582.9–709.1)

Notes: Rates are calculated per 100,000; rates for total and 65 years and over were age-sex-standardised to the 2001 Māori population.

Table 7.2: Māori mental disorder hospitalisations by sex and by age group, 2003–2005

Age group	Māori females		Māori males	
	Total number of hospitalisations	Rate (95% CI)	Total number of hospitalisations	Rate (95% CI)
All ages	5,630	570.8 (555.3–586.7)	6,746	745.4 (726.8–764.5)
5–14 years	131	61.8 (51.8–73.8)	143	63.5 (53.6–75.3)
15–24 years	1,080	644.4 (605.3–686.1)	1,973	1,182.9 (1,128.4–1,240.2)
25–44 years	2,985	1,080.7 (1,040.7–1,122.3)	3,557	1,417.4 (1,368.9–1,467.6)
45–64 years	1,141	820.9 (772.8–871.9)	877	675.5 (630.7–723.5)
65 years and over	283	726.1 (641.5–821.8)	173	559.7 (478.1–655.3)

Notes: Rates are calculated per 100,000; rates for 'all ages' and ages 65 years and over were age-standardised to the 2001 Māori population.

Among age groups the highest rate of hospitalisation among Māori was in those aged 25–44 years, where findings show an average hospitalisation rate equivalent to 1.2 in every 100 Māori (1,241/100,000). This is followed by Māori aged 15–24 years, with an average hospitalisation rate for mental disorder of just under 1 in every 100 (Table 7.1).

Table 7.2 shows that rates of hospitalisation for Māori men were 30% higher than for Māori women. When comparing Māori males with Māori females, Māori males had higher rates in each age-group up until 44 years. However, Māori female rates were higher than Māori males among those aged 45 onwards. For both Māori males and females, rates were highest among the 25–44 year age group, with just over 1 hospitalisation for every 100 Māori females and just under 1.5 hospitalisations for every 100 Māori males in this age-group.

Table 7.3: Leading causes of Māori hospitalisations for mental disorders, 2003–2005

Disorder	Number of hospitalisations	Rate (95% CI)
Schizophrenia, schizotypal and delusional disorders	5,924	319.6 (311.1–328.2)
Manic episode and bipolar affective disorder	1,996	103.5 (98.9–108.3)
Substance use disorders	1,309	70.2 (66.3–74.2)
Anxiety and stress-related disorders	1,126	59.3 (55.8 – 63.0)
Depressive episode, persistent mood disorders	933	48.9 (45.7–52.2)
Organic disorders	532	26.9 (24.6–29.4)
Personality and behavioural disorders	262	13.9 (12.2–15.7)

Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population.

Table 7.4: Māori hospitalisations for mental disorders by sex and cause of hospitalisation, 2003–2005

Disorder	Female Rate (95% CI)	Male Rate (95% CI)
Schizophrenia, schizotypal and delusional disorders	222.4 (212.9–232.3)	416.7 (402.9–430.9)
Manic episode and bipolar affective disorder	121.3 (114.4–128.5)	85.7 (79.8–92.2)
Substance use disorders	58.7 (53.9–63.9)	81.7 (75.8–88.0)
Anxiety and stress-related disorders	62.5 (57.6–67.8)	56.1 (51.3–61.3)
Depressive episode, persistent mood disorders	56.8 (52.1–61.8)	41.0 (36.9–45.5)
Organic disorders	21.3 (18.6–24.4)	32.6 (29.0–36.7)
Personality and behavioural disorders	17.0 (14.5–19.9)	10.7 (8.7–13.1)

Note: Rates are calculated per 100,000 and were age-standardised to the 2001 Māori population.

Table 7.3 shows the seven leading causes of hospitalisation in Māori. Other causes not shown on this table include eating disorders and intellectual disability, where numbers and rates were lower. These are presented in the Māori/non-Māori tables below.

The leading causes of mental disorder hospitalisations were for schizophrenia followed by bipolar disorder. Hospitalisations for these causes comprised well over half of all mental disorder hospitalisations among Māori.

Table 7.4 shows causes of hospitalisation in Māori males and Māori females. For both males and females the leading causes of hospitalisation are schizophrenia followed by bipolar disorders. The pattern of disorders differs between Māori males and Māori females. Māori female rates are higher than Māori male for bipolar disorders, mood disorders, anxiety and stress related disorders, and for personality disorders. Māori male hospitalisation rates are higher for schizophrenia, substance use disorders, and organic disorders.

Hospitalisations for mental disorder – Māori and non-Māori

Figure 7.2: Māori and non-Māori hospitalisations for mental disorders (age-sex-standardised rates), 2000–2005

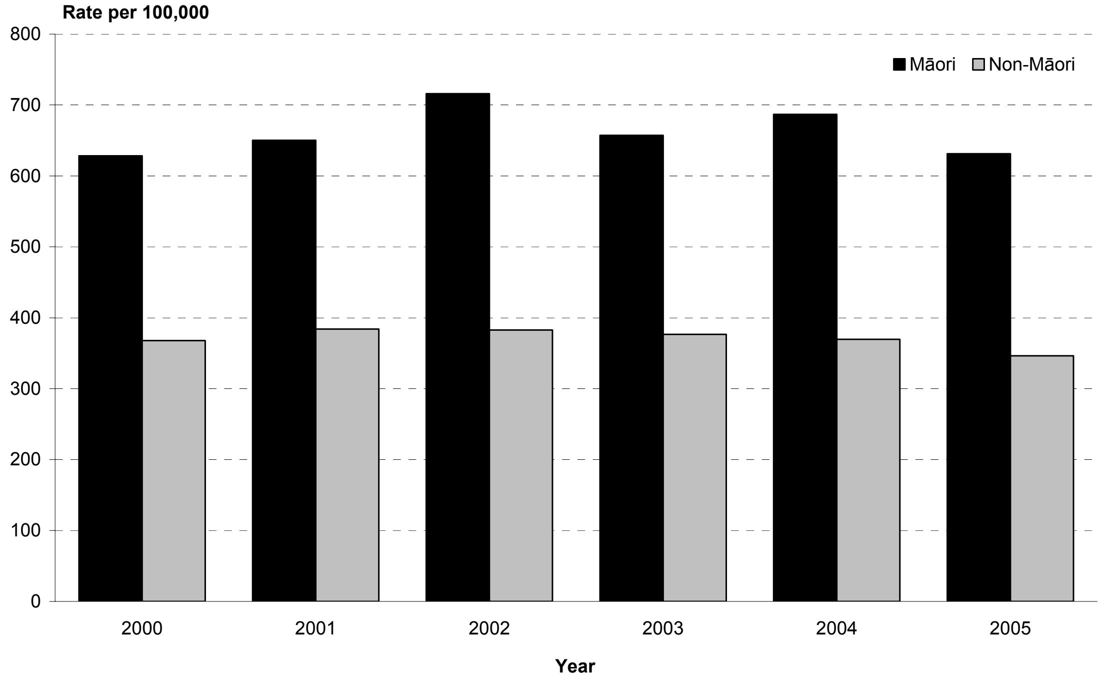


Figure 7.2 shows that for Māori and non-Māori there was very little change in overall hospitalisation rates for mental disorders between 2000 and 2005, with persistent disparity between rates of hospitalisation for Māori when compared with non-Māori.

Table 7.5: Māori and non-Māori hospitalisations for mental disorders by sex and by age-group, 2003–2005

	Māori		Non-Māori		Rate ratio (95% CI)
	Total number of hospital admissions	Rate (95% CI)	Total number of hospital admissions	Rate (95% CI)	
Total	12,376	658.1 (645.9–670.5)	49,373	364.0 (359.1–368.9)	1.81 (1.77–1.85)
Sex					
Female	5,630	570.8 (555.3–586.7)	27,062	379.2 (372.5–386.0)	1.51 (1.46–1.56)
Male	6,746	745.4 (726.8–764.5)	22,311	348.7 (341.7–356.0)	2.14 (2.07–2.21)
Age group					
5–14 years	274	62.7 (55.4–70.9)	1,049	76.6 (71.1–82.6)	0.82 (0.71–0.95)
15–24 years	3,053	913.1 (878.4–949.2)	6,881	483.8 (468.0–500.2)	1.89 (1.79–1.99)
25–44 years	6,542	1241.0 (1208.8–1274.1)	17,955	605.5 (593.8–617.5)	2.05 (1.98–2.12)
45–64 years	2,019	751.1 (717.5–786.3)	12,014	472.9 (463.2–482.8)	1.59 (1.51–1.67)
65 years and over	457	642.9 (582.9–709.1)	11,349	625.2 (611.1–639.8)	1.03 (0.93–1.14)

Notes: Rates are calculated per 100,000; rates for 'all-ages' and ages 65 years and over were age-sex-standardised to the 2001 Māori population.

This table shows that overall Māori rates of hospitalisation for mental disorder between 2003 and 2005 were 1.8 times higher than for non-Māori. Other findings include:

- for gender:
  - overall, Māori males had the highest rates of hospitalisations
  - Māori male rates were 2.2 times non-Māori male rates and Māori female rates were 1.5 times higher than non-Māori females
  - patterns differed between Māori and non-Māori – whereas Māori males had higher rates than Māori females, non-Māori females had rates that were slightly higher than non-Māori males
- for age group:
  - Māori rates were higher than non-Māori rates, apart from those aged 5 to 14 years, where Māori rates were lower, and 65 years and over, where Māori rates were similar
  - the age group of greatest disparity was 25–44 years, with Māori rates double those of non-Māori
  - rates for Māori aged 15–24 years were 90% higher than for non-Māori in this age group and rates for Māori aged 45–64 years were 60% higher

Table 7.6: Māori and non-Māori hospitalisations for mental disorder diagnostic groups, 2003–2005

Disorder	Māori rate (95% CI)		Non-Māori rate (95% CI)		Rate ratio (95% CI)	
Schizophrenia, schizotypal and delusional disorder	319.6	(311.1–328.2)	91.0	(88.2–94.0)	3.51	(3.37–3.66)
Manic episode and bipolar affective disorder	103.5	(98.9–108.3)	42.9	(41.3–44.6)	2.41	(2.27–2.56)
Substance use disorders	70.2	(66.3–74.2)	55.0	(53.2–56.9)	1.28	(1.20–1.36)
Anxiety and stress related disorders	59.3	(55.8–63.0)	50.1	(48.4–51.8)	1.18	(1.11–1.27)
Depressive episode, persistent mood disorders	48.9	(45.7–52.2)	61.9	(60.2–63.6)	0.79	(0.73–0.85)
Organic disorders	26.9	(24.6–29.4)	19.2	(18.4–20.1)	1.40	(1.27–1.55)
Personality disorders	13.9	(12.2–15.7)	21.8	(20.8–22.9)	0.64	(0.56–0.73)
Other mental and behavioural disorders	9.4	(8.1–11.0)	9.8	(8.9–10.8)	0.96	(0.80–1.15)
Intellectual disability	3.3	(2.5–4.2)	2.5	(2.1–2.9)	1.32	(0.97–1.78)
Other mood (affective) disorders	2.0	(1.4–2.8)	1.4	(1.1–1.7)	1.44	(0.97–2.13)
Eating disorders	1.2	(0.8–1.9)	8.3	(7.6–9.1)	0.15	(0.10–0.23)

Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population.

Table 7.6 shows that:

- Māori rates of hospitalisation were higher than non-Māori for all causes apart from depressive disorders, personality disorders and eating disorders, where Māori rates were lower, and for 'Other' disorders, where rates were similar
- disparities were greatest for schizophrenia and bipolar disorder. Māori were over 3.5 times more likely to be hospitalised for schizophrenia and related illness, and

2.4 times more likely to be hospitalised for bipolar disorder when compared with non-Māori.

Table 7.7: Māori and non-Māori hospitalisations for mental disorder diagnostic groups, 2003–2005, females

Disorder	Māori rate (95% CI)	Non-Māori rate (95% CI)	Rate ratio (95% CI)
Schizophrenia, schizotypal and delusional disorder	222.4 (212.9–232.3)	62.3 (59.1–65.7)	3.57 (3.33–3.82)
Manic episode and bipolar affective disorder	121.3 (114.4–128.5)	48.7 (46.3–51.1)	2.49 (2.31–2.69)
Anxiety and stress related disorders	62.5 (57.6–67.8)	62.8 (60.2–65.5)	1.00 (0.91–1.09)
Substance use disorders	58.7 (53.9–63.9)	45.8 (43.4–48.3)	1.28 (1.16–1.42)
Depressive episode, persistent mood disorders	56.8 (52.1–61.8)	81.3 (78.6–84.1)	0.70 (0.64–0.77)
Organic disorders	21.3 (18.6–24.4)	16.8 (15.7–18.0)	1.27 (1.09–1.47)
Personality disorders	17.0 (14.5–19.9)	36.7 (34.9–38.6)	0.46 (0.39–0.55)
Other mental and behavioural disorders	5.0 (3.7–6.8)	5.5 (4.6–6.6)	0.91 (0.65–1.30)
Intellectual disability	1.2 (0.7–2.2)	1.8 (1.4–2.3)	0.68 (0.36–1.29)
Other mood (affective) disorders	2.3 (1.5–3.5)	1.6 (1.2–2.1)	1.40 (0.84–2.34)
Eating disorders	2.4 (1.5–3.7)	15.9 (14.6–17.4)	0.15 (0.09–0.23)

Note: Rates are calculated per 100,000 and were age-standardised to the 2001 Māori population.

Table 7.7 shows:

- for Māori women the three most common reasons for hospitalisation were schizophrenia, bipolar disorder, and anxiety and stress related disorders. For non-Māori women the pattern is different, with depressive episodes being the most common diagnosis.
- Māori women were significantly more likely to be hospitalised for many diagnoses, however rates of hospitalisation among Māori women were lower for depressive disorders, personality disorders, and eating disorders. Rates were similar for substance use disorders.
- Māori women were almost 3.6 times more likely to be hospitalised for schizophrenia and related illness, and 2.5 times more likely to be hospitalised for bipolar disorder than non-Māori women.

Table 7.8: Māori and non-Māori hospitalisations for mental disorder diagnostic groups, 2003–2005, males

Disorder	Māori rate (95% CI)	Non-Māori rate (95% CI)	Rate ratio (95% CI)
Schizophrenia, schizotypal and delusional disorder	416.7 (402.9–430.9)	119.7 (115.0–124.6)	3.48 (3.30–3.67)
Manic episode and bipolar affective disorder	85.7 (79.8–92.2)	37.2 (35.1–39.5)	2.30 (2.10–2.53)
Substance use disorders	81.7 (75.8–88.0)	64.2 (61.4–67.0)	1.27 (1.17–1.39)
Anxiety and stress related disorders	56.1 (51.3–61.3)	37.4 (35.2–39.6)	1.50 (1.35–1.67)
Depressive episode, persistent mood disorders	41.0 (36.9–45.5)	42.5 (40.5–44.6)	0.96 (0.86–1.08)
Organic disorders	32.6 (29.0–36.7)	21.6 (20.3–23.0)	1.51 (1.32–1.72)
Personality disorders	10.7 (8.7–13.1)	6.9 (6.1–8.0)	1.54 (1.21–1.97)
Other mental and behavioural disorders	13.8 (11.6–16.5)	14.1 (12.6–15.8)	0.98 (0.79–1.21)
Intellectual disability	5.3 (4.0–7.1)	3.2 (2.6–3.9)	1.68 (1.18–2.39)
Other mood (affective) disorders	1.7 (1.0–2.9)	1.2 (0.8–1.6)	1.50 (0.82–2.72)
Eating disorders	0.1 (0.0–0.8)	0.7 (0.5–1.1)	0.16 (0.02–1.22)

Note: Rates are calculated per 100,000 and were age-standardised to the 2001 Māori population.

This table shows:

- for Māori men, the two most common reasons for hospitalisation were schizophrenia, and bipolar disorders. For non-Māori men they were schizophrenia and substance use disorders. Substance use disorders was the third most common reason for hospitalisation for Māori men, compared with depressive disorders for non-Māori men
- Māori men were significantly more likely to be diagnosed for most diagnoses. In particular, Māori men were 3.5 times more likely to be hospitalised for schizophrenia and related illness, and 2.3 times more likely to be hospitalised for bipolar disorder than non-Māori men. Māori men were around 1.5 times more likely to be hospitalised for personality disorders, stress related disorders, intellectual disability, and other mood disorders.

Suicide mortality in Māori and non-Māori

The following table (Table 7.9) shows findings for suicides from 2000–2004 in Māori and non-Māori and presented by gender and by age group. The table shows that overall Māori suicide rates were 1.5 times higher than non-Māori.

With regards to gender:

- Māori males had the highest suicide rates followed by non-Māori males, Māori females, and non-Māori females
- Māori males and Māori females were around 1.5 times more likely to die by suicide than their non-Māori counterparts.

With regards to age group:

- for both Māori and non-Māori, rates of suicide are highest amongst those aged 15–24 and 25–44 years

- although numbers are small among those aged 5–14 years, this is the age of greatest disparity between Māori and non-Māori with Māori children being four times more likely to die due to suicide than non-Māori children
- Māori aged 15–24 years are two times more likely to die by suicide and Māori aged 25–44 years are 1.5 times more likely to die by suicide than non-Māori in corresponding age groups
- suicide rates among Māori in older age groups are lower than rates for non-Māori in corresponding age groups
- there are variations in the relative differences in suicide mortality by age-group when Māori and non-Māori are compared. Whereas young Māori (15 to 24 years) are 5.6 times more likely to die due to suicide than Māori aged over 65 years this contrasts with non-Māori, where those aged 15–24 years are 1.3 times more likely to die by suicide compared with non-Māori older adults (65 years +).

Table 7.9: Māori and non-Māori deaths from suicide by sex and by age-group, 2000–2004

	Māori		Non-Māori		Rate ratio (95% CI)
	Number	Rate (95% CI)	Number	Rate (95% CI)	
Both sexes					
Total	**437**	**14.8 (13.5–16.2)**	**2,004**	**10.0 (9.5–10.4)**	**1.49 (1.34–1.65)**
5–14 years	10	1.4 (0.8–2.6)	8	0.4 (0.2–0.7)	4.00 (1.58–10.13)
15–24 years	162	30.5 (26.2–35.6)	348	15.5 (14.0–17.2)	1.97 (1.63–2.37)
25–44 years	223	26.1 (22.9–29.7)	849	17.2 (16.1–18.4)	1.52 (1.31–1.76)
45–64 years	37	9.0 (6.6–12.5)	525	13.1 (12.0–14.3)	0.69 (0.50–0.96)
65 years and over	5	5.3 (2.2–12.7)	274	12.3 (10.8–14.0)	0.44 (0.18–1.04)
Female					
Total	**101**	**6.5 (5.4–7.9)**	**467**	**4.5 (4.1–5.0)**	**1.44 (1.16–1.79)**
5–14 years	3	0.9 (0.3–2.7)	3	0.3 (0.1–0.8)	3.19 (0.64–15.79)
15–24 years	47	17.6 (13.2–23.4)	82	7.5 (6.0–9.3)	2.36 (1.65–3.37)
25–44 years	45	10.0 (7.5–13.4)	184	7.2 (6.3–8.4)	1.39 (1.00–1.92)
45–64 years	6	2.8 (1.3–6.3)	135	6.7 (5.6–7.9)	0.43 (0.19–0.97)
65 years and over	0	–	63	4.8 (3.7-6.5)	–
Male					
Total	**336**	**23.0 (20.7–25.6)**	**1,537**	**15.4 (14.6–16.2)**	**1.50 (1.33–1.69)**
5–14 years	7	1.9 (0.9–4.0)	5	0.4 (0.2–1.0)	4.49 (1.43–14.15)
15–24 years	115	43.6 (36.3–52.3)	266	23.2 (20.6–26.2)	1.88 (1.51–2.33)
25–44 years	178	43.8 (37.8–50.7)	665	27.7 (25.7–29.9)	1.58 (1.34–1.87)
45–64 years	31	15.6 (11.0–22.2)	390	19.6 (17.7–21.6)	0.80 (0.55–1.15)
65 years and over	5	10.6 (4.4–25.5)	211	19.8 (17.1–22.9)	0.54 (0.22–1.30)

Notes: Rates are calculated per 100,000; rates for 'all ages' and for 65 years and over were age-sex-standardised to the 2001 Maori population.

Summary

This updated analysis of recent rates of hospitalisation (from 2003 to 2005) and mortality due to suicide (from 2000 to 2004) reinforces concerns raised in previous analyses. Hospitalisation analysis continues to show high rates of hospitalisation for schizophrenia and bipolar disorder, in particular among both Māori men and women. There is considerable disparity evident in males and females and across most age-groups but particularly among those aged 25–44 years and those aged 15–24 years. Analysis of suicide data is consistent with these patterns, with high relative rates in those aged under 45 years andparticularly in children and Māori aged 15 to 24 years.

Discussion

Commentary, data analyses, and research describing mental health, mental disorders, and suicide among Māori highlight the increasing level of concern about Māori mental health over recent decades. The need to remain concerned is reinforced by recent research and data analyses. Findings from Te Rau Hinengaro, the first survey to measure the prevalence of mental disorders within the Māori adult population, are consistent with concerns raised about mental health in other sources. Mental disorders were found to be common, particularly among rangatahi (15 to 24 years) and in young adults (25–44 years), and in both Māori men and women. Findings highlight the importance of considering mental health from public health and primary care perspectives alongside those services focussed on meeting the needs of Māori with long term and serious mental illness. General practice was the leading source of service contact for mental health needs among Māori and the findings reinforce the importance of ensuring primary care services are well equipped to meet Māori mental health need.

The analyses within *Hauora IV* contribute an updated picture of hospitalisation trends for Māori for mental disorder. The previous *Hauora* publication (*Hauora III)* very clearly identifies, however, that "psychiatric hospital admissions alone do not give a true indication of the degree of mental illness and mental distress within a population." (Pōmare et al 1995, p. 121). As such, findings in the analysis of hospitalisation data provide only part of the picture. However, the picture that they provide is also one of considerable concern.

Rates of hospitalisation are high among Māori aged 15–24 years and 25–44 years for both males and females. Schizophrenia and bipolar disorder in particular are leading reasons for hospitalisation among Māori men and women. There are significant disparities evident between Māori and non-Māori across all years of the data analysis and no improvement across years. Overall, Māori are 1.8 times more likely to be hospitalised for a mental disorder than non-Māori. In particular, the rate of hospitalisation for diagnoses of schizophrenia is over three times higher in Māori.

Despite these differences and their persistence across years, there remains little published research or analysis to better inform on why these disparities are evident or how best to address them. Speculation has included increased risk of psychotic episodes due to poorer outcomes from and management within mental health services among Māori with psychoses, increased acuity and severity of disorder among Māori, poorer access to early intervention, preventive or primary care services leading to late presentation, and increased levels of co-morbidity. There is an urgent need for more information to eliminate these significant disparities in outcomes with psychosis and with bipolar disorder.

In addition, there is a persistent finding of Māori over-representation in forensic psychiatric services with justice entry points to mental health service being more likely for Māori than via primary care. This is a further issue, where significant inequities in service provision are occurring with little research available with which to understand inequities and to address them.

It is interesting to view hospitalisation rates alongside those from other research and from Te Rau Hinengaro, the New Zealand Mental Health Survey. The MaGPIe study found increased risk of depression, anxiety, and substance disorders among Māori (MaGPIe Research Group 2001, 2003, 2005). Te Rau Hinengaro found rates of depression were slightly higher among Māori following age-sex adjustment. However this is not reflected in hospitalisation rates for depression, where rates are lower in Māori. Hospitalisation rates for substance disorders also do not reflect disparities found within Te Rau Hinengaro where Māori men and Māori women had significantly higher rates of substance disorders than Others within the study. Analysis of hospitalisation data, however, found Māori men and Māori women have hospitalisation rates for substance disorders that are only 30% higher than their non-Māori counterparts. A further area where there is mismatch between community prevalence and relative levels of hospitalisation is in eating disorders. Within Te Rau Hinengaro, Māori women had the highest prevalence of eating disorders. However, this is not reflected in hospitalisations, where rates are much lower for Māori women. Again this is an area where there is very little information to aid in understanding how best to understand and meet the needs of Māori.

With a lack of research to explain these differences, causes can only be speculated on. Whereas high hospitalisation rates for psychosis may reflect a lack of effectiveness in meeting the needs of Māori with psychosis, particularly within a community setting, the reduced rate of hospitalisation for Māori for depression for example, may also reflect service failures to identify Māori with serious depressive illness.

Analyses of suicide rates within *Hauora IV* are consistent with concerns described elsewhere regarding suicide in Māori. Overall rates of suicide among Māori are 1.5 times higher than non-Māori. The presence of suicide among the very young (those aged under 15), and the high proportion of these that are Māori, is of particular concern and has been noted in other research (Beautrais 2001; Sargent and Baxter 2005). Moves towards an 'all age' suicide strategy need to take cognisance of the patterns in Māori. Although rates have begun to reduce overall, there remains high rates of suicide among young Māori and this, in combination with the presence of suicide among Māori children, leads to a conclusion that there needs to be an ongoing focus on suicide among young Māori, alongside ensuring all ages' needs are met.

Conclusions

Analysis of *Hauora IV* data outlines persistent and concerning rates and patterns of hospitalisation for mental disorders among Māori, with no evidence of reduced hospitalisation over time where there have been increased services such as early intervention services. There remains a question as to whether high Māori hospitalisation rates reflect difference in prevalence of disorder, access to preventive early measures, or poorer outcomes leading to increased hospitalisation among Māori with mental disorders. It must be noted that most mental disorders do not reach psychiatric hospitals or hospitalisation points. Thus, analysis of other information sources such as the MHINC database, the National Mental Health Survey, and projects such as the MaGPIe project will all add information to this area.

The findings from this chapter align with those from the previous edition of *Hauora*, showing an ongoing and urgent need to review the issues identified from analysis of hospitalisation and suicide data. Implications for mental health promotion and for the primary and secondary care sectors include a need for better training and understanding of Māori mental health, better service delivery and effectiveness of services (preventive, primary, and secondary care) for Māori, more support for Māori specific services to contribute to Māori mental health outcomes, and a commitment to elimination of the significant disparities that exist.

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Hēniratapu Rangi and Pene Bush at Te Matatini 2007 *Photo by Sharon Hawke*

For those of us who've been told that we've got a bit of a heart problem, don't think it's the end of the world. Don't think it's the end of the world – it's not the end of the world. So, you've got a heart problem – so what! You live with it, and try and cope with the situation. But don't make yourself any worse by saying 'oh dear, I've got a crook heart, I can't get out there and mow the lawns', or, 'I can't shift a bed because it's too heavy'. No, no, no, no, no. You go to your doctor, your doctor says 'you've got a wheeze, you've got a weak heart, you take it easy'. Well, you take it easy, true, but don't take it too easy, crikey man. Well, here I am. I'm happy. I still can't catch my wife!

I think the big thing about it, for me anyway, is to think well. You don't think sick because if you think sick you're going to be sick. I think well. And of course, the wife and I go to the gym next door every morning at five o'clock and do half an hour's exercise every day and it just makes a difference to the day. We don't eat meat much now, we'll have chicken. Fish is our mainstay – fish and chicken. Very little in the way of steaks. Now and again we'll have a boil-up with a few ribs, but not like how we used to.

This last summer I went down to the beach diving and as I came out of the water this young fella was swimming past and I thought to myself, 'crikey, here's an old coot here in his 70s diving and there's this young fella here 25 years old'. But there you are you see, it's your whole attitude of mind.

You know, a lot of people say that when your number's up, your number's up. But a lot of us die before our number's up. It's a fact. There's no need for us to die before our number's up. I enjoy my grandchildren. One of the things about it is the fact that many of us older people that die a little early, our grandchildren don't know us, aye. And, you know, it's good to hear the kids talking about grandma and grandpa. And all our grandchildren, you know, we've enjoyed their company.

Phil Aspinall

Source: Williams Associates (producer). 2000. *Kei te mate tō manawa? Living with heart failure*. [Video] Auckland: Te Hotu Manawa Māori.

8 CARDIOVASCULAR DISEASE

Elana Curtis, Matire Harwood, Tania Riddell[1]

Cardiovascular disease (CVD) is a general term that includes all diseases of the heart and blood vessels. As a group, CVD is a leading cause of death in New Zealand causing approximately 40% of all deaths (New Zealand Guidelines Group [NZGG] 2003). The burden of CVD falls disproportionately on Māori. This chapter focuses on three conditions that are major contributors to the overall burden of CVD, namely ischaemic heart disease, stroke, and heart failure. The evidence of disparities between Māori and non-Māori is examined using existing evidence as well as data specifically analysed for this edition of *Hauora* (summarised in Table 8.4 at the end of this section along with data on hypertensive diseases and chronic rheumatic heart disease).

Ischaemic heart disease[2]

Ischaemic heart disease occurs when arteries that supply blood to the heart become blocked or narrowed. This results in a lack of oxygen being delivered to the heart, which in turn results in damage to the heart muscle. Ischaemic heart disease is the most common type of heart disease in New Zealand and can cause angina, heart attacks (myocardial infarction), and heart failure.

The impact of ischaemic heart disease

Ischaemic heart disease accounted for 18% of all Māori deaths and 23% of all non-Māori deaths during 2000–2004. Among Māori 45% of deaths occurred in people aged under 65 years compared to 11% among non-Māori. The higher proportion of younger deaths in Māori (Table 8.1) is partly due to the higher risk for Māori in younger ages but also because of the younger age structure of the Māori population compared to the non-Māori population (see chapter 2). New Zealand death rates from ischaemic heart disease have declined over the last 25 years. However, this decline has been greater for non-Māori than for Māori. Because of this, relative disparities in ischaemic heart disease death rates have increased between Māori and non-Māori (Blakely et al 2007). Mortality *rates* for ischaemic heart disease are expected to decline for both Māori and non-Māori over the next decade. However, because of population changes, the actual *number* of deaths from ischaemic heart disease is expected to increase among Māori and decrease among non-Māori (Tobias et al 2006).

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[1] The authors are listed here in alphabetical order. Elana Curtis wrote the IHD section, Matire Harwood wrote the stroke section, and Tania Riddell authored the heart failure and Cardiovascular Action Plan sections.

[2] The conditions encompassed by the term ischaemic heart disease in this chapter include angina pectoris, acute myocardial infarction, chronic ischaemic heart disease, and other ischaemic heart disease.

The 2002/03 New Zealand Health Survey estimated that 1 in 7 Māori and 1 in 10 non-Māori aged 35 years and over had been diagnosed with heart disease[3] (Ministry of Health 2006a).

Important ischaemic heart disease disparities for Māori

There are significant disparities between Māori and non-Māori in the risk of developing and dying from ischaemic heart disease. For example:

- Māori males aged 45–64 years had a rate of death from ischaemic heart disease that was 3 times that of non-Māori males during 2000–2004. Māori males aged 65 years and over had a death rate 1.63 times that of non-Māori (Table 8.1)
- Māori females aged 45–64 years had a rate of death that was 4.39 times that of non-Māori females from 2000–2004. Māori females aged 65 years and over had a death rate 1.92 times that of non-Māori (Table 8.1)
- in 2002, 30-day age-standardised case fatality rates following acute coronary syndrome were 158 per 1,000 patients for Māori compared to 112 per 1,000 patients for Europeans/Others (Bramley et al 2004)
- Māori age-sex-standardised public hospitalisation rates (2003–2005) were 1.43 times that of non-Māori while mortality rates (2000–2004) were 2.25 times that of non-Māori (Table 8.4).

Table 8.1: Ischaemic heart disease mortality rates, 2000–2004

	Age group	Māori		Non-Māori		Rate ratio (95% CI)
		Number	Rate	Number	Rate	
Female	25–44 years	28	6.2	46	1.8	3.45 (2.16–5.52)
	45–64 years	277	131.4	605	29.9	4.39 (3.81–5.06)
	65 and over	621	1,010.7	12,962	527.61	1.92 (1.76–2.08)
	All ages	926	53.3	13,613	21.8	2.45 (2.29–2.62)
Male	25–44 years	118	29.0	259	10.8	2.69 (2.17–3.35)
	45–64 years	681	343.4	2,267	113.9	3.01 (2.77–3.28)
	65 and over	724	1,570.0	12,548	965.0	1.63 (1.51–1.75)
	All ages	1,523	106.7	15,075	49.2	2.17 (2.05–2.29)

Notes: Rates are calculated per 100,000; rates for 'all ages' and 65 years and over were age-standardised to the 2001 Māori population.

It has been noted that Māori have the highest prevalence of many cardiovascular risk factors (Bramley et al 2004). For example:

- age-standardised[4] prevalences show that in 2006 40% of Māori males aged 15–64 years were smokers compared to 21% of European males. Fifty percent of Māori females were smokers compared to 20% of European females (Ministry of Health 2006b)

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[3] This figure is based on self-report and includes other conditions such as abnormal heart rhythm and heart failure.

[4] Standardised to the WHO world population.

- the age-standardised[5] prevalence of self-reported diabetes among adults (15+ years) in 2002/03 was 6.9% in Māori males and 5.1% in Māori females compared to 2.6% in non-Māori males and 2.1% in non-Māori females (Ministry of Health 2006a)
- the age-standardised[6] prevalence of self-reported high blood pressure in adults (15+ years) was 23.7% in Māori males and 23.9% in Māori females compared to 17.6% and 19.2% respectively in European New Zealanders during 2002/03 (Ministry of Health 2004). An Auckland survey in 2002/03 found 9% of Māori males aged 35–74 years had undetected high blood pressure and 5% of Māori females, compared to 3% and 1% of non-Māori/non-Pacific males and females respectively (Gentles et al 2006)
- the age-standardised[7] prevalence of obesity[8] in adults (15+ years) during 2002/03 was 26.5% in Māori males compared to 16.9% in European males, and 26.1% in Māori females compared to 19.1% in European females (Ministry of Health 2006a)
- just as ischaemic heart disease mortality is strongly associated with socioeconomic position (Blakely et al 2007), so too are cardiovascular risk factors (Howden-Chapman and Tobias 2000)
- the experience of racial discrimination was found to be associated with current smoking and with self-reported cardiovascular disease in the 2002/03 New Zealand Health Survey, independent of socioeconomic deprivation, with evidence of a dose-response (Harris et al 2006a). Differences in socioeconomic deprivation and the experience of racial discrimination together accounted for most of the disparity between Māori and Europeans in self-reported cardiovascular disease (Harris et al 2006b).

What should health care providers do to reduce the burden of ischaemic heart disease?

- *Health promotion and public health strategies* – Intersectoral action to improve social and economic environments for Māori to facilitate healthy eating and activity and, therefore, ischaemic heart disease risk factor reduction are important. This will require a health promotion focus that extends beyond activities focused solely on individual behaviour, to incorporate interventions that will reduce discrimination and advocate for policies and resources to improve socioeconomic conditions for Māori at a broader community and national level.
- *Risk assessment and management* – There are well-established interventions that prevent and treat risk factors for ischaemic heart disease. The NZGG recommends smoking cessation programmes, intensive nutritional/exercise advice and support, risk assessment and medication where risk is high (aspirin,

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[5] Standardised to the 2001 Māori population.

[6] Standardised to the WHO world population.

[7] Age-standardised to 2001 Māori population.

[8] BMI≥30 kg/m^2 in non-Māori and ≥32 kg/m^2 in Māori.

blood pressure lowering medication and lipid modifying therapy (statins)) (NZGG 2003). Electronic audit methods are being used to support clinical management of high risk patients in general practice (Sinclair & Kerr 2006). Such systems hold promise for Māori health gain but will need to be used in conjunction with other strategies to reduce barriers to care (such as full-cost funding of drug therapies and increased attention at the whānau level) (Riddell et al 2007).

- *Diagnosis of coronary artery disease* – Given the higher prevalence of risk factors and higher mortality from IHD, providers should increase the level of exercise testing and other diagnostic tests provided to Māori patients. A more vigilant approach is required. Once a diagnosis of coronary artery disease has been made it is also important to communicate to patients the best practice treatment pathway rather than expecting patients to raise treatment options themselves (Penney et al 2006).
- *Identification and management of acute coronary syndromes* – New ways of diagnosing heart attacks and managing acute coronary syndromes (heart attacks and unstable angina) have resulted in more effective treatment in recent years,[9] but best practice guidelines have yet to be fully implemented in New Zealand hospitals (Ellis et al 2004). Efforts to increase provider compliance with evidence-based guidelines should specifically address issues of equitable access to high quality care for Māori.

  Early recognition of symptoms, early access to emergency services, early cardiac resuscitation, early defibrillation, and early advanced cardiac life support are recognised as independent key links in the chain of survival from a heart attack outside of hospital (Tanner et al 2006). Increased availability of emergency equipment (e.g., automated external defibrillation) and training for advanced life support in rural areas may also improve outcomes (Penney et al 2006). Interviews with Māori who had experienced heart disease identified that many described symptoms other than the classic severe chest pain. This made recognition of a heart attack more difficult. Revision of the messages communicated by the media and health services was recommended (Penney et al 2006).

  Pre-hospital fibrinolytic therapy is recommended for patients experiencing heart attacks who are more than an hour from hospital (Pre-Hospital Fibrinolysis Guidelines Working Party [PHFGWP] 2004). Increasing the availability of such therapy is likely to improve outcomes for Māori, given the higher proportion living in rural or isolated areas.
- *Coronary revascularisation* – invasive revascularisation procedures such as angioplasty and coronary artery bypass and graft can decrease the risk of heart attacks and relieve symptoms of angina and chest pain. Substantial disparities in

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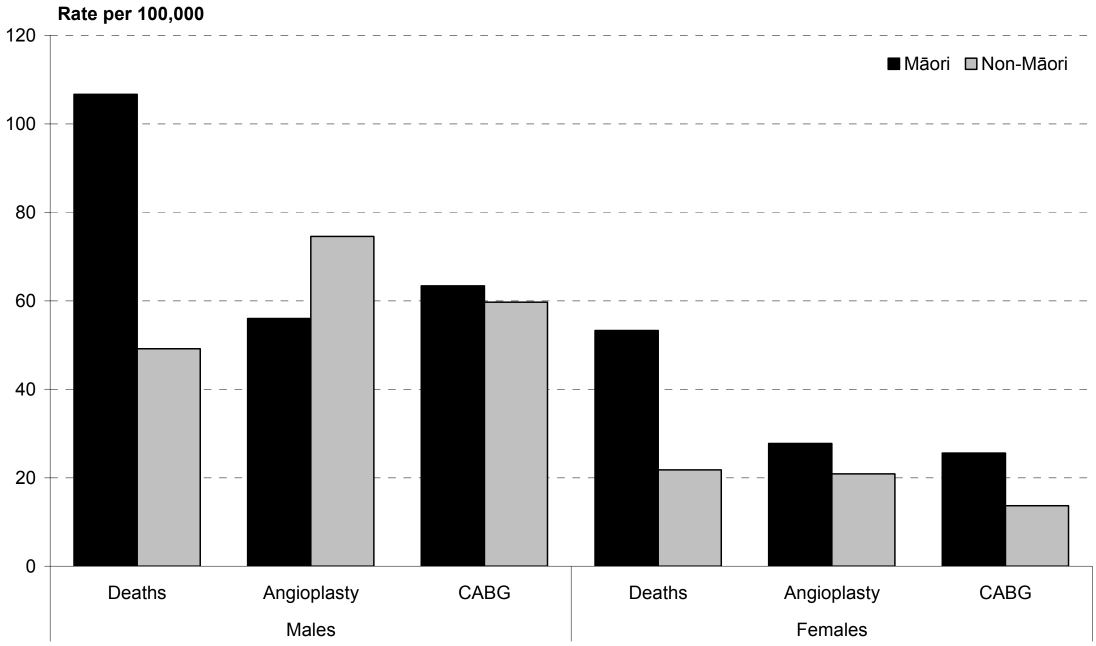
[9] See ST-Elevation Myocardial Infarction Guidelines Group and the New Zealand Branch of the Cardiac Society of Australia and New Zealand (2005) and Non ST-Elevation Acute Coronary Syndrome Guidelines Group and the New Zealand Branch of the Cardiac Society of Australia and New Zealand (2005).

the receipt of procedures between Māori and Pākehā persisted through the 1980s (Pomare & de Boer 1988) and 1990s (Tukuitonga & Bindman 2002) even after controlling for differences in age, sex, and socioeconomic deprivation (Westbrooke et al 2001). In recent years Māori revascularisation rates have increased (as have non-Māori rates) but are still considerably less than might be expected given the much higher mortality rates (Figure 8.1). Furthermore, if private hospital procedures were included the gap between Māori and non-Māori would likely be larger. Lower receipt of revascularisation procedures among Māori was also found in a subgroup of patients in primary care with known ischaemic heart disease, suggesting a need to revise the clinical priority scoring system (Riddell et al 2007). Alongside system-level barriers, health practitioners in Northland have talked of differential referral practices for Māori patients that depart from best practice pathways (Penney et al 2006). Professional development for clinicians at primary, secondary, and tertiary services may be needed to support appropriate decision making.

Figure 8.1: Ischaemic heart disease mortality 2000–04 and revascularisation procedures 2003-05, by gender



Note: Rates were age-standardised to the 2001 Māori population.

- *Rehabilitation* – rehabilitation and chronic disease management programmes after acute coronary syndromes (heart attack and unstable angina) and revascularisation have been shown to reduce the risk of further heart attacks and to improve quality of life (NZGG 2002). A national audit in 2002 found deprivation and lack of transport were associated with reduced likelihood of referral to and attendance at cardiac rehabilitation programmes (Doolan-Noble et al 2004). Heart Guide Aotearoa, a home-based cardiac rehabilitation programme currently being trialled, aims to provide access to those who would not otherwise receive hospital-based services. If successful, Māori communities should be prioritised in the roll-out of the programme.

Research into ethnic disparities in receipt of ischaemic heart disease procedures

There is international evidence for the existence of ethnic disparities in invasive cardiovascular procedure use (Smedley et al 2003). In the United States, for example, 'Blacks' are significantly less likely than 'Whites' to receive cardiovascular procedures despite controlling for multiple factors including socioeconomic status, service location and type, and co-morbidities (Curtis 2002; Kressin and Peterson 2001). Less well researched are the areas of physician or institution bias (Smedley et al 2003). Explanations for ethnic inequalities in the receipt of cardiovascular procedures in New Zealand requires further investigation and should consider these factors.

Stroke

What is stroke?

A stroke is like a 'brain attack' – a sudden interruption of blood flow to a part of the brain, causing damage to the brain cells.[10] The interruption to blood flow can occur through two different mechanisms:

1. Ischaemic stroke – an artery bringing blood to part of the brain is blocked by narrowing of the artery or by a clot that has travelled there. The brain cells do not receive enough oxygen and then become damaged. Ischaemic stroke is the most common type of stroke.
2. Haemorrhagic stroke – the wall of an artery bursts and blood leaks into the brain.

Different regions of the brain control various movements, senses, and intellectual functions. If a stroke damages one of these regions the different functions that they control may be affected. Some effects of a stroke include weakness, paralysis, loss of vision, and problems understanding or saying words.

The impact of stroke

Stroke is a common disease that can have considerable consequences for the individual and their whānau. On average nearly 800 Māori are admitted to hospital each year with a stroke and 140 per year die from stroke (Table 8.4).

As well as being a major cause of mortality, stroke is a leading cause of disability in New Zealand (Bonita 1996; Ministry of Health 2002). In 2003, of the 32,000 people living in New Zealand after having a stroke more than 50% had some form of disability and only 30% said that they were independent in all activities of daily living.[10]

Age is a major risk factor for stroke and therefore as the Māori population gets older the number of Māori having a stroke is expected to increase over the next 50 years (Ministry of Health 2002). However, it is possible to 'reverse' this expected trend. The ARCOS

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[10] Taken, with permission, from the Stroke Foundation of New Zealand website (www.stroke.org.nz).

study group recently showed that stroke incidence and case fatality rates have reduced for New Zealand Europeans in Auckland over the past 20 years through prompt and effective management of modifiable stroke risk factors (such as high blood pressure and smoking) and acute stroke care (by admission to a stroke unit) (Anderson et al 2005). A similar commitment from health services is required for Māori with stroke.

Important stroke disparities for Māori

As is the case internationally (Alter 1994; Hajat et al 2001) there are significant ethnic stroke disparities in Aotearoa/New Zealand. Differences in stroke rates and outcomes between Māori and non-Māori include the following:

1. Māori have higher age-sex-standardised rates of hospitalisation for stroke than non-Māori (116.1/100,000 compared to 63.3/100,000 in 2003–05) (Table 8.4).
2. Age-sex-standardised death rates from stroke are higher for Māori than non-Māori (21.7/100,000 compared with 13.5/100,000) (Table 8.4), a difference which is largely explained by the higher incidence rate. Stroke case fatality rates (the proportion of people having a stroke who die from the stroke) are similar across ethnic groups (Carter et al 2006).
3. Māori are younger on average at the time of first stroke than New Zealand Europeans (mean age of 60.7 years compared with 75.6 years) (Carter et al 2006). The age difference reflects the younger age of the Māori population as a whole when compared with the New Zealand European population. However, we note that stroke at a young age can create additional burdens on family/whānau and support systems, particularly when earning capacity is lost (Moewaka-Barnes and Tunks 1996; Harwood 2005). In addition, funding for and access to rehabilitation services in New Zealand is much more restricted for patients under 65 years of age than those 65 years of age or older (Fink 2006). One stroke physician suggests this is evidence "that there is institutionalised bias against Māori and Pacific Island stroke patients in our public health system [which] requires redress with urgency" (Fink 2006).
4. Compared with New Zealand Europeans, Māori are at two to three times greater risk of ischaemic stroke and intracerebral haemorrhage (Feigin et al 2006) due to ethnic differences in risk factor profiles (see below).
5. Other important differences in stroke outcomes:
   - Māori are more likely to be living at home with others/whānau at the time of their first stroke and are more likely to be discharged back home to live with their whānau after hospitalisation for stroke than non-Māori (McNaughton et al 2002a). Non-Māori are more likely to be living alone at the time of their first stroke and are discharged home with extra support, to a private hospital, or to residential care.
   - Māori and Pacific people report being more dependent, disabled, and dissatisfied with their quality of life after stroke than non-Māori-non-Pacific people (McNaughton et al 2002a).

6. Given the likelihood of having a stroke and of being discharged from hospital after stroke to their own home is higher for Māori than non-Māori, we would expect Māori to receive more rehabilitation in the community than non-Māori. However, there is no significant difference in the utilisation of community rehabilitation between Māori and non-Māori non-Pacific people (McNaughton et al 2002b).
7. Māori have higher rates of stroke risk factors including:
   - *Hypertension*. Raised blood pressure is a well known risk factor for stroke. Average blood pressure levels and the prevalence of raised blood pressure were shown to be higher in Māori compared to non-Māori non-Pacific people (Gentles et al 2006)
   - *Type 2 diabetes.* The prevalence of type 2 diabetes in Auckland is 2.8 times greater for Māori than for New Zealand Europeans (Sundborn et al 2007)
   - *Smoking.* Five studies that examined the prevalence of cardiovascular risk factors in the community by ethnicity were reviewed by Bramley and others (2006) who found that 44.1% of Māori respondents reported being current smokers compared with 21.4% of non-Māori respondents.

What should health care providers do to reduce the burden of stroke?

Service providers need to recognise that differences in the timeliness, quality, and appropriateness of stroke care may contribute to ethnic disparities in stroke rates and outcomes. There is growing evidence that ethnic inequalities in stroke care occur along the entire stroke care pathway. Health services can, therefore, play an important role in addressing ethnic inequalities in stroke. Examples are presented here.

Prevention

Prompt identification and effective management of stroke risk factors has led to reduced stroke incidence rates both here in New Zealand (Carter et al 2006) and overseas (Rothwell et al 2004). Lifestyle risk factors include a diet high in saturated fat, a diet high in salt, a diet low in fruit and vegetables, heavy alcohol consumption, physical inactivity, cigarette consumption and obesity (Stroke Foundation of New Zealand 2003). Modifying just one of these risk factors can reduce risk for stroke. However, total population approaches to lifestyle and behavioural risk factors such as smoking have the potential to increase inequalities (Jarvis and Wardle 1999) and may not be as effective for Māori. The effectiveness of such programmes for Māori must be monitored and services could also consider new evidence based initiatives (Bramley et al 2005) to reduce the risk of stroke for Māori.

The management of medical risk factors (such as hypertension, atrial fibrillation, diabetes, and dyslipidaemia) is also extremely important. Raised blood pressure or hypertension is considered to be *the* most important medical risk factor for stroke, and treatment of high blood pressure reduces the risk of having a stroke. A previous study found that Māori with hypertension were less likely to receive treatment than non-Māori and non-Pacific people (OR 0.33, 95%CI 0.19–0.58) (Scragg et al 1993). Screening for medical stroke risk factors in Māori has improved with the implementation of the 'New Zealand guidelines for management of cardiovascular risk factors' and primary care based programmes such as PREDICT (Riddell et al 2007).

> "He had a lot of things going on. His blood pressure was high every time he went to the GP but they never gave him medicine and it never got better. So when we found out he had little [strokes] before the major one we weren't surprised"
>
> – 25 year old woman (Ngāpuhi) talking about her father[11]

Diagnosis, acute management and rehabilitation

Best practice and evidence-based guidelines for the assessment, management and rehabilitation of stroke were developed for New Zealand (Stroke Foundation of New Zealand 2003). The guidelines include high level strategies to improve the quality of stroke care alongside steps for best practice. Within each strategy / step there are important issues for services to consider with regard to Māori with stroke.

People with stroke should have an initial assessment (including clinical diagnosis, CT scan of head, level of consciousness, swallow, mobility) completed with minimal delay (Stroke Foundation of New Zealand 2003). A delay in access to stroke assessment for Māori can occur when frontline services (e.g., general practices, ambulance staff, emergency departments) do not recognise the symptoms and signs of stroke (Harwood 2005). One solution is to develop local protocols for 'first contact' providers in conjunction with educational programmes to raise awareness about the signs and symptoms of stroke for the community.

> "The ambulance came and told me it wasn't a stroke. [It wasn't until] my friend told him it was probably a stroke that he took me to hospital."
>
> – 56 year old woman (Ngāti Porou)

Once stroke is diagnosed, the guideline recommends organised stroke care. Organised stroke care, especially early and coordinated rehabilitation in a stroke unit, reduces both mortality and morbidity following stroke when compared with rehabilitation in general wards (Stroke Unit Trialists' Collaboration 2001). In general, organised stroke care includes a geographically defined stroke unit, a coordinated multidisciplinary team, staff with specialist expertise in stroke and rehabilitation, educational programmes for staff, patients and carers and agreed protocols for common problems (Stroke Foundation of New Zealand 2003).

Two studies of stroke management in New Zealand identified major deficiencies and found that most New Zealanders do not have access to stroke specific, organised, acute inpatient care and rehabilitation (Barber et al 2002; Gommans et al 2003). Access to rehabilitation services for younger people (aged under 65 years) with stroke was not available in all centres and rural/smaller hospitals in particular did not provide stroke specific services such as community/home rehabilitation (Gommans et al 2003). Given the younger age and rural location of Māori, inequalities in stroke care are likely.

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[11] Quotes in this section are taken from an unpublished PhD thesis by Matire Harwood: *Stroke Recovery for Māori and their Whānau,* used with permission of the participants.

Importantly, patients and their carers/whānau recognise the importance of having an organised stroke service.

> "Everything was fine and I really thought that would continue when he was transferred ... from one hospital to another ... but it wasn't organised ...and it was upsetting."
>
> – 52 year old woman (Ngāti Maniapoto) talking about her whānau

> "The hospital mainly, they told us most of what was going to happen, especially about my talking and how that was going to go. And [community rehabilitation] came to do the things to the house, put in the rails and there was a ramp at the front. So ... they told us most of what we know."
>
> – 72 year old woman (Tainui)

Secondary prevention

Significant narrowing or stenosis of the carotid artery in the neck is a risk factor for cerebral ischaemia. The narrowing is diagnosed and its severity is measured by ultrasound or other radiological imaging of the neck arteries. A procedure known as 'carotid endarterectomy' improves blood flow by removing or bypassing the narrowing, and this procedure can prevent further ischaemic strokes. Between 2003 and 2005 age-sex-standardised hospital admission rates due to cerebral ischaemic stroke were significantly higher for Māori than non-Māori (rate ratio 1.98, 95% CI 1.84–2.14). However rates of carotid endarterectomy were similar for Māori and non-Māori (rate ratio of 1.01, 95% CI 0.81–1.26) (Table 8.4), suggesting inequitable access to the procedure.

Whānau ora

International research has shown that caregivers (such as a family member or spouse) for a person with stroke frequently report adverse effects on emotional health, social activities and family relationships. Qualitative research has confirmed that these themes are experienced by Māori with stroke and their whānau (Moewaka Barnes and Tunks 1996; Gentles et al 2006) along with increased financial strain. Socioeconomic disadvantage and evidence suggesting that Māori are less likely to receive their full entitlement to financial assistance (Howell and Hackwell 2003) further impacts on whānau ora.

> "No-one seems to understand what you go through caring for a stroke person. Especially the relationship and how that changed. I mean it couldn't be any other way but sometimes ... I need to be awhi'ed."
>
> – 58 year old woman (Tainui) talking about caring for her husband

To support whānau ora, family doctors should assess the wellbeing of carers/whānau of a person with stroke by using an appropriate assessment tool such as the Caregiver Strain Index or similar. In order to address inequities in financial assistance for Māori, a number of health providers have included 'right to financial assistance' in their 'well health checks' and many community health workers and social workers provide advocacy and support to people with stroke for visits to their primary care centre, local Work and Income New Zealand office or Housing New Zealand.

> "Having whānau there helps ... but sometimes you might need a break. The social worker and Stroke Foundation helped us ...."
>
> – 52 year old woman (Ngāpuhi)

Conclusion

The priority for Māori with stroke is to ensure evidence-based decision making is an integral part of stroke care delivery. Stroke guidelines based on established research and best practices have been developed to assist with this. The New Zealand Stroke Guidelines, available from the Stroke Foundation of New Zealand (2003) (www.stroke.org.nz), are relevant to both stroke clinicians and Māori with stroke and their whānau as a way to monitor their own stroke care.

Strategies for quality improvement are required and should include regular audit of clinical practice, development of practical ways to eliminate ethnic disparities and a kaupapa Māori research framework for stroke research. A broad framework for achieving cardiovascular health gain for Māori in New Zealand is outlined in the Māori Cardiovascular Action Plan, which is discussed later in this chapter.

Heart failure

Many definitions for heart failure exist but, because it is a complex syndrome, none is entirely satisfactory. Put simply, heart failure occurs when the heart fails to pump enough blood, leading to fluid retention, shortness of breath, and congestion. The diagnosis of heart failure relies on clinical judgement based on a patient's history, a physical examination, and an echocardiogram. Heart failure can result from a number of different causes (for example, previous heart attack or coronary heart disease, hypertension, diabetes, smoking, excess alcohol consumption, rheumatic heart disease, unknown cause). It is a debilitating and costly disease that leads to high hospitalisation and death rates. Importantly, heart failure is a chronic condition that is highly responsive to appropriate medical care. Relatively simple pharmacological (i.e., medication) and health service interventions improve patient functioning, decrease hospitalisations, and reduce deaths.

Why is heart failure important?

Heart failure is of growing public health concern and has an increasing prevalence (Mair et al 1997). Both national (Westbrooke 2001; Riddell 2001; Carr et al 2002; Riddell 2005) and international evidence (Ayanian 1999; Goldberg 1999) have shown that ethnic disparities in heart failure morbidity and mortality rates exist. Approximately 3,600 Māori men and women were admitted to hospital with heart failure between 2003 and 2005, corresponding to an age-standardised rate over four times that of non-Māori (Table 8.4). Disparities in hospital admissions for heart failure are highest in the 45–64 year age group, where rates for Māori men and Māori women are more than seven times that of non-Māori (Table 8.2). Congruent with these figures, heart failure death rates for Māori, over the period 2000–2004, were approximately 2.3 times the age-sex-standardised death rates of non-Māori (Table 8.4). Most of these deaths occurred among kuia and kaumatua (Table 8.3) although again disparities were highest in the 45–64 year age group (Table 8.3). The number of Māori having, or dying from, heart failure is expected to increase over the next 30 years as the Māori population ages.

Despite such disconcerting statistics, cardiovascular care provision for Māori in New Zealand (Curtis 2002; Tukuitonga and Bindman 2002; Westbrooke et al 2001) demonstrates the inverse care law whereby the availability of care is inversely proportional to the need of the population served, i.e., those who need healthcare the most, receive it the least.

Table 8.2: Heart failure hospitalisations, 2003–2005

Sex	Age group	Māori		Non-Māori		Rate ratio (95% CI)
		Number	Rate	Number	Rate	
Female	0–14	14	4.3	41	4.3	1.00 (0.51–1.96)
	15–24	8	5.0	11	1.5	3.29 (0.99–10.92)
	25–44	105	37.9	100	6.6	5.76 (3.87–8.58)
	45–64	559	402.2	656	51.2	7.85 (6.74–9.16)
	65 and over	837	2,078.4	7,827	602.9	3.45 (3.18–3.73)
Male	0–14	19	5.6	50	4.9	1.14 (0.63–2.06)
	15–24	23	13.9	21	2.9	4.88 (2.01–11.80)
	25–44	206	82.2	173	12.0	6.86 (5.03–9.36)
	45–64	1,009	777.0	1,260	100.1	7.77 (6.95–8.67)
	65 and over	897	2,865.8	7,415	918.1	3.12 (2.89–3.37)

Notes: Rates are calculated per 100,000; rates for ages 65 years and over were age-standardised to the 2001 Māori population.

Table 8.3: Heart failure mortality, 2000-2004

Sex	Age group	Māori		Non-Māori		Rate ratio (95% CI)
		Number	Rate	Number	Rate	
Female	45–64	4	1.9	8	0.4	4.80 (1.44–15.93)
	65 and over	55	81.2	1,238	35.2	2.30 (1.75–3.03)
Male	45–64	7	3.5	7	0.4	10.04 (3.52–28.61)
	65 and over	29	65.4	558	34.5	1.89 (1.30–2.76)

Notes: Rates are calculated per 100,000; rates for ages 65 years and over were age-standardised to the 2001 Māori population.

Improving heart failure outcomes for Māori is an important and urgent priority. It is unacceptable that there are such large ethnic inequalities in heart failure in New Zealand. A broad approach that considers interventions at a social policy level is required to address inequalities in the determinants of health, strategies to support early detection and treatment of predisposing conditions, high quality evidence-based treatment of people with heart failure, and the elimination of barriers to health care (Carr et al 2002).

The Māori Cardiovascular Action Plan

Disparities in cardiovascular health outcomes in Aotearoa/New Zealand continue to negatively impact on the health of Māori individuals and whānau. The Māori

Cardiovascular Action Plan (Bramley et al 2004) was developed to improve the responsiveness of the health sector to Māori, with an aim to improve Māori cardiovascular health and remove inequalities in CVD outcomes between Māori and non-Māori. The plan has six categories, recognising that a multi-level/multi-sector approach is required. In summary, the categories are:

1. **Policy development** – the need for prioritisation of Māori health gain in all health policy directives, in explicit recognition of the Treaty of Waitangi.
2. **Information systems** – most importantly, the need for complete and consistent collection of ethnicity data in order to monitor CVD inequalities. Additionally, the requirement for provider information on funding and expenditure, and provision of systematic care for Māori who have, or who are at risk of developing, CVD.
3. **Needs assessment** – cardiovascular health needs assessments for Māori communities are required to identify the level of met and unmet need. In addition, barriers for Māori to cardiovascular preventive, primary, secondary, and tertiary health services should be identified and strategies to address them developed, tested, and progressed.
4. **Quality standards** – it is strongly recommended that Māori-specific and equity-based performance indicators are applied across the heart healthcare continuum. Revision of coronary scoring and surgical prioritisation methods for Māori is required. Furthermore, a culture shift among all healthcare providers toward equity and quality improvement, ongoing evaluation, and practice audit is needed.
5. **Workforce development** – a critical shortage of Māori cardiovascular health workers exists. Priority areas for Māori recruitment, training, and retention include cardiovascular doctors, nurses, health researchers, and public health workers. A benchmark audit should be undertaken and forward planning and budgeting for a robust Māori cardiovascular workforce planned. At the wider health sector level, service-wide recognition of the Treaty of Waitangi is essential.
6. **Research** – both quantitative and qualitative research pertaining to access and equity of healthcare for Māori with CVD is needed. All cardiovascular research in New Zealand should be weighted to relevance and need and aimed at improving Māori cardiovascular disparities. Kaupapa Māori health research should be given precedence for funding.

Conclusion

Improving all CVD outcomes for Māori and removing inequalities between Māori and non-Māori is an important and urgent health priority. As outlined in the Māori Cardiovascular Action Plan, there is substantial scope to effectively achieve cardiovascular health gain for Māori in New Zealand.

Table 8.4: Cardiovascular disease deaths (2000–2004), public hospitalisations and procedures (2003–2005)

Cardiovascular disease		Māori		Non-Māori		Rate ratio (95% CI)
		Number	Rate	Number	Rate	
Cardiovascular disease						
Total	Deaths	4,316	139.8	51,805	61.2	2.29 (2.21–2.36)
	Hospitalisations	22,326	1,119.9	183,516	643.2	1.74 (1.71–1.77)
Males	Deaths	2,420	170.0	24,462	78.2	2.18 (2.08–2.27)
	Hospitalisations	11,820	1,252.9	103,206	805.5	1.56 (1.52–1.59)
Females	Deaths	1,896	109.7	27,343	44.2	2.48 (2.37–2.61)
	Hospitalisations	10,506	986.8	80,310	480.9	2.05 (2.00–2.10)
Ischaemic heart disease						
Total	Deaths	2,449	80.0	28,688	35.5	2.25 (2.16–2.35)
	Hospitalisations	6,870	342.5	72,337	239.0	1.43 (1.40–1.47)
	Angiography	5,029	253.9	44,084	186.0	1.36 (1.32–1.41)
	Angioplasty	826	41.9	11,577	47.7	0.88 (0.82–0.95)
	CABG	876	44.5	9,591	36.7	1.21 (1.13–1.30)
Males	Deaths	1,523	106.7	15,075	49.2	2.17 (2.05–2.29)
	Hospitalisations	3,822	401.8	45,194	337.1	1.19 (1.15–1.23)
	Angiography	2,860	299.8	29,498	258.4	1.16 (1.11–1.21)
	Angioplasty	534	56.0	8,498	74.6	0.75 (0.69–0.82)
	CABG	606	63.4	7,525	59.7	1.06 (0.97–1.16)
Females	Deaths	926	53.3	13,613	21.8	2.45 (2.29–2.62)
	Hospitalisations	3,048	283.2	27,143	140.8	2.01 (1.93–2.10)
	Angiography	2,169	208.0	14,586	113.7	1.83 (1.74–1.92)
	Angioplasty	292	27.8	3,079	20.9	1.33 (1.17–1.52)
	CABG	270	25.6	2,065	13.7	1.87 (1.63–2.14)
Stroke						
Total	Deaths	685	21.7	13,092	13.5	1.61 (1.49–1.74)
	Hospitalisations	2,367	116.1	22,227	63.3	1.84 (1.75–1.92)
	• subarachnoid haemorrhage	322	15.9	1,422	7.9	2.17 (1.90–2.49)
	• intracerebral haemorrhage	422	21.3	3,470	11.8	1.90 (1.70–2.14)
	• ischaemic stroke	925	45.5	8,566	23.7	1.98 (1.84–2.14)
	• undetermined type	523	24.9	6,221	14.0	1.85 (1.68–2.04)
	Endarterectomy	91	4.5	1,508	4.4	1.01 (0.81–1.26)
Males	Deaths	277	19.9	4,904	14.0	1.41 (1.25–1.60)
	Hospitalisations	1,030	109.1	10,933	71.1	1.54 (1.43–1.65)
	Endarterectomy	40	4.1	959	6.1	0.68 (0.49–0.95)
Females	Deaths	408	23.6	8,188	12.9	1.83 (1.65–2.03)
	Hospitalisations	1,337	123.0	11,294	55.4	2.22 (2.08–2.37)
	Endarterectomy	51	4.8	549	2.8	1.71 (1.26–2.33)
Heart failure						
Total	Deaths	95	2.8	1,816	1.2	2.27 (1.83–2.81)
	Hospitalisations	3,677	182.7	17,554	39.4	4.64 (4.43–4.86)
Males	Deaths	36	2.7	569	1.2	2.14 (1.52–3.01)
	Hospitalisations	2,154	228.4	8,919	48.5	4.71 (4.44–4.99)
Females	Deaths	59	3.0	1,247	1.2	2.40 (1.84–3.13)
	Hospitalisations	1,523	136.9	8,635	30.2	4.53 (4.22–4.86)

Cardiovascular disease		Māori		Non-Māori		Rate ratio (95% CI)
		Number	Rate	Number	Rate	
Hypertensive diseases						
Total	Deaths	160	5.1	1,039	1.1	4.87 (4.08–5.81)
	Hospitalisations	455	22.9	2,099	9.3	2.48 (2.20–2.80)
Males	Deaths	82	5.8	368	1.1	5.30 (4.14–6.79)
	Hospitalisations	182	19.5	801	8.7	2.25 (1.87–2.70)
Females	Deaths	78	4.5	671	1.0	4.41 (3.44–5.65)
	Hospitalisations	272	26.4	1,299	9.8	2.68 (2.29–3.15)
Chronic rheumatic heart disease						
Total	Deaths	186	6.0	545	0.8	7.46 (6.19–9.00)
	Hospitalisations	496	25.2	1,004	5.5	4.62 (3.95–5.39)
	Valve replacements	375	19.2	2,015	9.2	2.10 (1.85–2.38)
Males	Deaths	73	5.0	193	0.7	6.76 (5.04–9.07)
	Hospitalisations	195	20.9	419	4.8	4.34 (3.39–5.55)
	Valve replacements	193	20.5	1,223	11.7	1.75 (1.48–2.08)
Females	Deaths	113	7.0	352	0.9	8.06 (6.34–10.26)
	Hospitalisations	301	29.5	585	6.1	4.84 (3.96–5.90)
	Valve replacements	183	18.0	791	6.7	2.70 (2.22–3.28)

Note: Rates are calculated per 100,000 and were age-sex-standardised to the 2001 Māori population.

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Tarquin and Greenstone Flavell *Photo by Sharon Hawke*

I went to see the diabetic nurse at the hospital for my own blood count thing so I can learn how to prick my finger and test your own blood. So I want to do it myself instead of every time I've got to go the doctor. Then I've got to pay $20 ... and sometimes I'm going there just for him to prick my finger. I read somewhere what you apply for and you get it for nothing. And they would have to teach me how to do my own blood count.

I had to wait for three weeks and I got it. The only thing is no-one has time to come out to teach me. So I haven't yet learnt how to ... I've only been shown once.

So I like to study it anyway. Because I feel as if I should know when I'm eating the right things. Whether sometimes it's high, sometimes it's low. It all depends on if I've just had a meal. I wanted to learn so I could balance it.

Kuia, Hawke's Bay

9 DIABETES

Matire Harwood, David Tipene-Leach

Diabetes is an area where there are huge disparities in prevalence and outcome. If it is found early and managed well, through exercise, diet, regular checks and sometimes medications, people with diabetes can lead full and healthy lives. It is also preventable. However, diabetes can have potentially serious complications and therefore good quality diabetes care is especially important. While there is huge scope to reduce inequalities, the complex nature of diabetes means a comprehensive and sustained approach that tackles all levels of health determinants (including causes, management and complications) is required.

There are three types of diabetes – type 1, type 2, and gestational diabetes (see box below). This chapter focuses mainly on type 2 diabetes because the majority of Māori with diabetes have type 2.

What is diabetes mellitus?

To understand diabetes we need to understand the normal process for getting energy from food. When we eat a sugar called glucose is absorbed from the intestine into our bloodstream. An organ called the pancreas sits near the intestine and makes insulin, which helps to move the glucose from the bloodstream into cells of our body– specifically our muscle, fat, and liver cells. These cells use the glucose for energy or store it for later use. So think of insulin as a key to unlock the door and move glucose from the bloodstream into cells.

In diabetes either:

- the pancreas doesn't make enough insulin and/or
- the muscle, fat and liver cells don't let insulin in to store the glucose.

Type 1 diabetes occurs when the pancreas makes little or no insulin, and type 2 diabetes is a combination of these problems. The result is a build up of glucose in the bloodstream and not enough of it in the cells to help them work properly. A long-term consequence of high blood glucose is damage to small blood vessels (microvascular disease) causing eye problems (cataracts, blindness), kidney disease (including renal failure requiring dialysis), and leg and foot problems (ulcers, reduced feeling). Narrowing of blood vessels (macrovascular disease) causes heart attacks, strokes, or gangrene.

Type 2 Diabetes Mellitus (DM)
The most common diabetes in the world (more than 90% of all diabetes) and the most common diabetes for Māori. Usually diagnosed in middle age, but increasingly occurring in young adulthood and adolescence or older people too. It is diagnosed by blood test. This blood test should be offered to all Māori and Pacific people aged 35 years and older. Diabetes is often associated with obesity, high blood pressure, gout, high cholesterol, and heart disease. People may experience effects of high blood glucose long before diabetes is diagnosed, although often there are no symptoms at all. Some common symptoms include increased thirst, increased need to mimi, short-term weight loss, blurred vision, or more infections than usual (e.g., skin or bladder infections and vaginal thrush). Weight loss and increased physical activity can halt or reverse early type 2 diabetes, but there is no cure as such. When it is diagnosed the immediate goals are to stabilise blood sugar and eliminate the symptoms of high blood sugar. In the long term, the aim is to prevent and/or manage complications.
Gestational diabetes (GDM)
A type of diabetes that occurs for the first time during pregnancy. It is more common in Māori and Pacific women than Pākehā women. Gestational diabetes goes away at delivery, but the baby and mother are at much higher risk than others of getting type 2 diabetes later in life.
Type 1 Diabetes Mellitus
Also known as IDDM or juvenile onset diabetes. More common in Pākehā than Māori. Usually starts in childhood or in teenage years (7–12 years) but can occur at any age. An autoimmune condition meaning that the body sets up an attack against the cells in the pancreas that make insulin. Is treated with insulin injections.

The impact of diabetes

For no other disease are significant health inequalities more obvious than when we look at diabetes. Diabetes is almost three times more common in Māori than non-Māori. In addition, for Māori aged 45–64 years death rates due to diabetes are nine times higher than for non Māori New Zealanders of the same age. Māori are diagnosed younger and are more likely to develop diabetic complications such as eye disease, kidney failure, strokes and heart disease.

Prevalence estimates for diabetes in New Zealand are complicated by the issue of undiagnosed diabetes mellitus in the community. Some commentators estimate that there is one undiagnosed diabetic for every one known. The management of pre-diabetes and those with the insulin resistance-obesity related complex of diseases is also coming to the fore. The issue of population screening for impaired carbohydrate metabolism is a complex public health issue, the policy implications of which are predicated upon how much resources can be devoted to this area of health endeavour.

Incidence and mortality rates for type 2 diabetes are expected to significantly increase over the next 20 years (along with pre-diabetes, insulin resistance, and obesity) with the biggest impact being on Māori, Pacific people, and those living in deprived neighbourhoods.

Diabetes

Important diabetes disparities for Māori

Ethnic inequalities exist in rates of type 2 diabetes, including prevalence, age at onset, mortality, and hospitalisation.

- The estimated average age at diagnosis of type 2 diabetes for Māori was 47.8 years in 1996, six years younger than New Zealand Europeans (54.2 years) (Ministry of Health 2002).
- The self-reported prevalence of diabetes in 2002/03 was 2.5 times higher among Māori than among non-Māori (Ministry of Health 2006).
- The estimated lifetime risk of being diagnosed with diabetes for Māori in 1996 was more than twice that for New Zealand Europeans (Ministry of Health 2002).
- Mortality rates for Māori with type 2 diabetes are seven times higher than for non-Māori with type 2 diabetes (see Table 9.1).
- The disparity in mortality rates is highest in the 45–64 age group, where Māori women die from type 2 diabetes at 13 times the rate of non-Māori women and Māori men at 10 times the rate of non-Māori men.
- The risk for hospitalisation because of type 2 diabetes is 4 times higher for Māori than non-Māori (see Table 9.1).

Table 9.1: Type 2 diabetes mellitus, deaths (2000–2004) and hospitalisations (2003–2005) by ethnicity and sex

	Māori		Non–Māori		Rate ratio (95% CI)
	Number	Rate (95%CI)	Number	Rate (95%CI)	
Total					
Deaths	825	27.0 (25.2–28.9)	2,738	3.6 (3.5–3.8)	7.40 (6.81–8.03)
Hospitalisations	3,854	193.4 (187.1–199.9)	13,389	44.4 (43.1–45.7)	4.36 (4.17–4.55)
Females					
Deaths	369	22.0 (19.9–24.4)	1,351	2.8 (2.7–3.0)	7.76 (6.86–8.78)
Hospitalisations	1,743	164.1 (156.2–172.4)	6,145	37.2 (35.5–38.8)	4.42 (4.13–4.72)
Males					
Deaths	456	31.9 (29.1–35.0)	1,387	4.5 (4.2–4.7)	7.17 (6.42–8.00)
Hospitalisations	2,110	222.8 (213.0–232.9)	7,245	51.6 (49.7–53.6)	4.32 (4.07–4.58)

Note: Rates are calculated per 100,000; rates for ages 65 years and over were age-standardised to the 2001 Māori population.

Higher complication rates

Ethnic disparities for diabetic complications (renal failure, lower limb amputation, eye problems, and heart disease) are disproportionately higher than for prevalence. This suggests that Māori are much more likely to suffer complications from diabetes than non-Māori.

- The proportion of Māori on dialysis for whom diabetes was the cause of end-stage renal failure is much higher than for New Zealand Europeans (55% versus 14%) (New Zealand Guidelines Group [NZGG] 2003).

- In a prevalence survey in South Auckland, Māori with diabetes compared to New Zealand Europeans were two to three times more likely to report blindness, laser treatment, or cataracts in one or both eyes (Simmons et al 1996).
- Māori with diabetes are twice as likely to have a major lesion in the lower limb, requiring amputation, than New Zealand Europeans (Simmons et al 1995).
- Māori admitted to hospital with ischaemic heart disease (IHD) are twice as likely to have type 2 diabetes as non-Māori with IHD (based on secondary diagnosis on index IHD admission) (NZGG 2003).

Unequal access to and quality of diabetes care

Although there may be many reasons to explain disparities in rates of death and complications from type 2 diabetes, there is evidence that ethnic inequalities in access to and quality of care may play a role. Steps in the type 2 diabetes care pathway and examples of unequal treatment for each step are presented here.

1 Prevention

Prevention of diabetes at a community level is predicated upon promotion of healthy diet, exercise and, therefore, weight control. Presently, however, policy and practice relies mostly upon behaviour change at the individual level. It is unlikely that this will address the diabetic epidemic, and structural change at the level of advertising, food regulation, and taxation incentives for healthy changes in manufacturing will be needed – in much the same way as the public health approach to cigarette smoking.

Ngāti Porou Hauora (NPH) on the East Coast is implementing a programme called Ngāti and Healthy, aimed at reducing the risk of type 2 diabetes mellitus by promoting a lifestyle characterised by healthy eating and regular exercise (Tipene-Leach et al 2004; Ngāti Porou Hauora 2007). The programme also aims to increase awareness of diabetes and pre-diabetic conditions both amongst those at high risk of developing diabetes and the community at large. In particular, the programme aims to reduce the prevalence of insulin resistance before it progresses to impaired glucose tolerance or impaired fasting glycaemia. A prevalence survey of carbohydrate metabolism was conducted in 2003, preceding the intervention, and it will be repeated again after the intervention has been in place for two, five, and ten years to provide an evaluation of the programme. Further information can be found on www.otago.ac.nz/diabetes/pdf/ngati_and_healthy.pdf.

2 Screening and early diagnosis

Screening and early diagnosis are essential in order to start effective management and prevent complications in the long term. Most screening is carried out in primary care. Current guidelines recommend that Māori over the age of 35 years have a blood test to check for diabetes. This blood test is free in many areas. However in 2002 80% of New Zealand Europeans thought to have diabetes had a free check whereas only 35% of Māori thought to have diabetes received a free check (Ministry of Health 2006). Many Māori providers have now committed to ensuring early testing as part of well health checks at enrolment, undertaking comprehensive follow-up, and opportunistic tests.

3 Maintain normal glycaemia

Maintaining normal glycaemia is achieved through appropriate nutrition, exercise and, in some cases, medicines (tablets or insulin). Effective information and support is essential for the maintenance of normal blood sugar levels.

Projects to improve the quality of diabetes care have been developed overseas, with significant improvements in HbA1c values (also called the glycosylated haemoglobin level) and the number of people achieving HbA1c less than 8 (National Diabetes Education Program 2006).

Other activities include diabetes support groups and diabetes action groups such as the Porirua group including clinicians, educators, and town planners.

4 Screen for and aggressively treat complications

Screening for complications should be done each year, including tests for eyes, kidney (blood and urine tests), feet, and heart. If any problems are identified, referrals to a specialist should be made. The Get Checked Programme launched in June 2000 aims to improve the health of people with diabetes through regular free checks of the person's physical health, lifestyle, and disease management. Access to the Get Checked Programme was lower for Māori than non-Māori with diabetes (37% Māori, 66% non-Māori – estimated by modelling) (Ministry of Health 2006). Once in the programme, Māori received similar access to the recommended tests for people with diabetes including blood tests, retinal screening, and blood pressure checks (Ministry of Health 2006). However the programme may not be as effective for managing diabetes among Māori as among non-Māori. Effectiveness may be measured by an HbA1c equal to or less than 8; 77% of New Zealand European had an HbA1c less than 8 compared with only 57.8% of Māori (Ministry of Health 2006). Māori admitted to hospital with diabetes appear to have more severe disease than non-Māori, suggesting less than adequate management in the community and differential treatment in primary care (Jeffreys et al 2005).

Tackling root causes

Type 2 diabetes is not a sudden illness. The disease reflects complex and reciprocal interactions between our body and our environment, including the social determinants of health. Low socioeconomic status, stress, and racism are associated with the development of Type 2 diabetes (Pickup 2004; Stumvoll et al 2005; Paradies 2006). These root causes need to be tackled in efforts to eliminate disparities.

To what extent genes contribute to the development of type 2 diabetes is unknown. A family history of type 2 diabetes is one of the strongest risk factors for the disease. Familial and twin studies confirm an increased risk of a person developing it if a parent or twin has the disease. However, genetic explanations for type 2 diabetes in groups disproportionately affected by the disease can lead to the misinterpretation of ethnic health disparities as geneticised and, therefore, natural in origin, rather than recognising such disparities as being due, largely or solely, to social disadvantage. (Paradies 2006). Therefore, a broad public health approach to the disease is required.

Summary

In summary, type 2 diabetes is a *major* health issue for Māori. Māori experience higher rates, are more likely to die from type 2 diabetes, and more likely to carry the burden of its complications than non-Māori. Its impact on quality of life for Māori is huge. Urgent action is required at all levels. Effective strategies to address ethnic disparities in diabetes and diabetes care require a global view, innovative models, partnerships, and accountability to all stakeholders (Centers for Disease Control and Prevention 2007). Interventions need to have a multi-factor, multi-system, and multi-level approach.

The first step to improving diabetes care to Māori is to ensure primary prevention and early detection of diabetes in Māori. Secondly, regional and local services could undertake analyses of access and quality issues in their service delivery to Māori, develop strategies to improve service delivery, and then monitor the effectiveness of those changes. Broader, contextual issues including structural barriers and socioeconomic barriers must also be addressed (Baxter 2002).

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My mother, Whaea, was an articulate professional Māori woman from Te Aupouri, Te Rarawa. She had participated with distinction in team sports at school and regionally. She was also very articulate in both the English and Māori languages, with Māori being her ‘default setting’. During her professional career she had been head of the Māori Department at a secondary school for girls in Auckland City and had lectured at St John’s Theological College.

She said that she had suffered with a chest infection in her early childhood. And then in her mid- to late-40s she developed a worsening cough. She was a non-smoker and, despite repeated courses of antibiotics from her GP, her cough did not get better. Eventually she had a chest x-ray which was not followed up even though it was abnormal. Only at my insistence did she ask to have further investigation and this resulted in a diagnosis of bronchiectasis. She had bilateral disease; that is, the disease in both lungs. She was in her early 50s and this diagnosis came after three to four years of a worsening and persistent cough.

This diagnosis began a journey of nearly 15 years of repeated hospital admissions, countless courses of oral and intravenous antibiotics, and numerous admissions for physiotherapy. During this time my mother insisted on maintaining her many roles, with these often involving travel and attendance at hui. She knew how unwell she was but would brush off people’s comments about her cough, and charm them with her sense of humour.

Whānau continued to be central in her life, with grandchildren staying with her and Dad or going away on trips with them. When she needed to go into hospital for treatment it was almost ‘enforced rest’, with whānau supporting her all the way.

And then almost overnight she became worse and the hospital stays became longer. She lost appetite and weight and found that she could no longer continue in her work. My Dad looked after her at home and then my sister moved in with them and helped out. My sister was able to help them host whānau and visitors, and to also be strict about when visiting time was over. The whānau also gathered around to make decisions about the ongoing care of both my father and my mother.

Toward the end of her life my mother had very limited mobility and was on continuous oxygen. Her personal care, such as bathing and dressing, was undertaken by her immediate family. And then in 1998, when she was just 66 years of age, my mother died of bronchiectasis in Auckland Greenlane Hospital. She is remembered with love, and greatly missed.

Ramon Pink

10 RESPIRATORY DISEASE

Sue Crengle, Ramon Pink, Suzanne Pitama[1]

In 2000–2004, respiratory diseases were one of the five leading causes of death and hospitalisation for Māori, with significant inequalities compared with non-Māori. This chapter focuses on two respiratory diseases: bronchiectasis and asthma. The evidence of disparities between Māori and non-Māori is examined using existing evidence as well as data specifically analysed for this edition of *Hauora* (summarised in Table 10.3 at the end of this section along with data on chronic obstructive pulmonary disease (COPD) and pneumonia).

Bronchiectasis

Bronchiectasis is a chronic respiratory illness contributing to morbidity and mortality disparities between Māori and non-Māori (National Health Committee 1998). The term is derived from the Greek '*bronkos*' meaning bronchial or airway and '*ektasis*' meaning stretching or extension. Bronchiectasis is defined as an abnormal irreversible dilatation of one or more bronchi of the lungs (Cole 1990). It can be regarded as the common outcome of a number of conditions such as unknown (idiopathic) causes or, the most common and important cause, repeated or severe infection of the lung from pneumonia, tuberculosis or whooping cough (Whitwell 1952; Kolbe & Wells 1996).

People with bronchiectasis will typically have a persistent cough with copious amounts of sputum. The cough can be associated with wheeze and blood in the sputum. The cough tends to be worse in the mornings and is often brought on by changes in posture.

The mainstay of the management of bronchiectasis is antibiotic therapy and regular postural drainage.[2] Antibiotics are used for acute exacerbations, with some patients requiring long term treatment. Yearly influenza vaccinations and 5 to 10-yearly pneumococcal vaccinations are also important for the management of bronchiectasis. Infant vaccination against diseases such as whooping cough and the timely treatment of acute chest infection is crucial in preventing bronchiectasis from occurring. Surgical removal of affected lung occurs rarely. There are varying degrees of severity of the disease and prognosis is poorly understood (Keistinen et al 1997).

Prevalence and inequalities

Bronchiectasis is a disease more commonly found in developing and underdeveloped nations that lack access to antibiotics, vaccination, and diagnostic technology. The prevalence of bronchiectasis is difficult to estimate as diagnosis is usually made by radiological investigation, but has been estimated at 1.3 per 1,000 in developed

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[1] The authors are listed here in alphabetical order. Sue Crengle wrote the asthma section. Ramon Pink and Suzanne Pitama authored the bronchiectasis section

[2] Postural drainage refers to the bringing up of excess sputum by lying in various prone positions while firmly patting the chest, thereby loosening secretions, particularly from the base of the lungs

countries (Cole 1990). However, bronchiectasis remains a serious health issue in the indigenous populations of New Zealand, the United States, and Australia (Edwards et al 2002; Singleton et al 2000; Chang et al 2002).

Almost half a century ago a study of patients at the Auckland Greenlane Hospital Chest Unit showed that the proportion of Māori patients admitted to hospital suffering from bronchiectasis was considerably higher than the non-Māori group (Hinds 1958). More recent evidence at both Paediatric and Adult Chest Clinics in Auckland show that Māori and Pacific peoples continue to be affected by bronchiectasis significantly more than non-Māori and non-Pacific in the Auckland region (Edwards et al 2002; Kolbe & Wells 1996).

Māori and Pacific children with bronchiectasis experienced more socioeconomic deprivation and had lower immunisation rates. In an Auckland based paediatric study the estimated prevalence of bronchiectasis was approximately 1 per 6,000 and was found to be more common in Pacific and Māori children (Edwards et al 2003). In a cross-sectional survey of patients admitted to Greenlane Hospital Respiratory Service in 1992/1993 with acute infective exacerbation of bronchiectasis, Māori and Pacific peoples were markedly over represented (Kolbe and Wells 1996). The authors concluded that their results indicated the likelihood of a much higher prevalence of bronchiectasis in Māori and Pacific peoples.

Some researchers have suggested that Primary Ciliary Dyskinesia[3] causing bronchiectasis among Māori may have a genetic origin (Wakefield and Waite 1980). However, there is no strong evidence for this and more recently it has been suggested that cilia abnormalities found in Māori with bronchiectasis may well be the result of chronic infection (Kolbe and Wells 1996).

Ethnic inequalities have also been identified in the United States of America, with the prevalence in Alaskan Native American peoples being higher than any other populations of children in the United States (Singleton et al 2000). Socioeconomic disadvantage including poverty, substandard housing, malnutrition, barriers to medical care, and inadequate education, are all likely to have a major impact on the prevalence and outcome of bronchiectasis (Kolbe and Wells 1996; Edwards et al 2003).

Table 10.1 shows the marked disparity between Māori and non-Māori hospitalisation rates for bronchiectasis during the years 2003–2005. Age-sex-standardised rates were 3.6 times higher for Māori than non-Māori. Rates for Māori children were twice those for non-Māori children. The inequalities in hospital admissions tended to increase with age, with Māori rates nearly 6 times higher than non-Māori rates at ages 45–64 years.

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[3] Primary Ciliary Dyskinesia (PCD), also known as Immotile Cilia Syndrome, is a rare genetic birth defect where patients have abnormal or absent ciliary motion. Cilia are tiny hair-like structures that move mucus out of the bronchi. During infections more mucus is produced and because the abnormal cilia can't move, or move ineffectively, mucus becomes stuck and blocks the airways, causing complications. Bronchiectasis is one of those complications. The only definitive way to diagnose PCD is with a biopsy.

Table 10.1: Bronchiectasis hospitalisations, 2003–2005

Age group	Māori	Non-Māori	Rate ratio (95% CI)
	Rate (95% CI)	Rate (95% CI)	
All ages	41.7 (38.8-44.8)	11.6 (10.5-12.8)	3.60 (3.19-4.08)
0-14 years	29.1 (25.2-33.7)	14.2 (11.8-17.0)	2.05 (1.62-2.59)
15–24 years	17.1 (13.1-22.3)	3.6 (2.2-5.9)	4.76 (2.70-8.38)
25–44 years	28.4 (24.1-33.5)	5.8 (4,5-7.5)	4.89 (3.63-6.60)
45–64 years	102.4 (90.6-115.6)	17.3 (15.0-19.9)	5.91 (4.91-7.13)
65+ years	187.8 (157.0-224.7)	54.1 (49.3-59.5)	3.47 (2.83-4.25)

Notes: Rates are calculated per 100,000; rates for 'all ages' and ages 65 years and over were age-sex-standardised to the 2001 Māori population.

Table 10.2 reflects the disparity in mortality from bronchiectasis between Māori and non-Māori and shows that mortality rates from bronchiectasis are 5 to 11 times higher for Māori than for non-Māori. Disparities in mortality rates appear to be disproportionately higher than disparities in hospitalisation rates for bronchiectasis.

Table 10.2: Bronchiectasis mortality rates, 2000–2004

Age group	Māori	Non-Māori	Rate ratio (95% CI)
	Rate (95% CI)	Rate (95% CI)	
All ages	2.1 (1.6–2.7)	0.3 (0.3–0.4)	6.70 (4.88–9.21)
15–24 years	0.2 (0.0–1.3)		
25–44 years	1.6 (1.0–2.8)	0.1 (0.1–0.3)	11.57 (4.67–28.66)
45–64 years	4.6 (3.0–7.3)	0.6 (0.4–1.0)	7.17 (3.97–12.95)
65+ years	28.0 (19.5–40.2)	5.0 (4.2–6.0)	5.63 (3.76–8.44)

Notes: Rates are calculated per 100,000; rates for 'all ages' and ages 65 years and over were age-sex-standardised to the 2001 Māori population.

Addressing prevention, diagnosis, and treatment disparities for bronchiectasis

Māori are disproportionately affected by bronchiectasis. Risk factors for bronchiectasis include early (young age) and repeated chest infections, and low socioeconomic status. Some chest infections, such as pneumonia, tuberculosis, and whooping cough, are the most common events preceding the establishment of bronchiectasis in patients. Therefore, infant vaccinations and the timely use of antibiotics for chest infections are important, particularly in infancy and childhood. High rates of socioeconomic deprivation for Māori are likely to result in reduced access to health care, in particular to antibiotics for acute chest infection. Māori are also significantly less likely to be immunised at age two years (69%) than European/Other children (80%) (Ministry of Health 2006). Targeted support to increase immunisation rates are a critical element in reducing the incidence of diseases contributing to the development of bronchiectasis.

In addition, interviews with clinicians have indicated a low index of suspicion for bronchiectasis amongst primary care and even secondary care physicians (Pink 2004). Bronchiectasis needs to be excluded when Māori with less access to socioeconomic resources present with significant respiratory infection or repeated chest infection. It is imperative that Māori be able to access a high performing health service that provides timely immunisation to all populations, early diagnosis of the conditions that cause bronchiectasisis, and effective management strategies.

Asthma

Asthma is a respiratory problem caused by reversible narrowing of the airways. The narrowing is caused by tightening of the muscle in the wall of the airway, inflammation and swelling of the mucosa (lining) of the airways, and excess production of mucus within the airways. The narrowing of the airways and excess mucus production result in a range of symptoms including wheezing, cough, and shortness of breath. In addition to these symptoms, signs of difficulty breathing may be seen.

Although the symptoms and signs of asthma are shared by everyone with asthma, a small proportion of people only experience asthma symptoms when exercising ('exercise-induced asthma'), while in other people asthma is strongly associated with allergies (atopy). The 'course' of asthma also varies from person to person. Some children 'grow out' of asthma as they get older while others will have asthma their whole life, and some people will develop asthma at a later age.

Acute asthma is an episode where there is sudden worsening of asthma symptoms. The severity of acute asthma can vary from mild to life-threatening. Chronic asthma occurs when asthma symptoms occur without an asthma attack. Chronic asthma symptoms may occur occasionally (intermittent chronic asthma) or continuously (chronic persistent asthma).

In 1991 *He Mate Huangō: Māori Asthma Review* reported the findings of a comprehensive inquiry about asthma among Māori people (Pōmare et al 1991). The review was commissioned by the then Minister of Māori Affairs, Hon. Koro Wetere, because of rising concerns about the number of Māori who died or were admitted to hospital for asthma. The review team concluded that improving outcomes from asthma among Māori required activities in a range of areas including:

- involving Māori in the planning and delivery of asthma services
- improved access to care ('mainstream' services, marae-based (or similar) services, Māori asthma workforce development)
- increased education about all aspects of asthma and its management, with information provided in ways that are appropriate, acceptable and effective for Māori
- improved cultural safety among the non-Māori workforce involved in asthma education and/or management
- ongoing research into Māori asthma, including the development and evaluation of new service delivery programmes
- reduction of smoking in Māori communities; and
- the availability of user-friendly asthma action plans for the Māori community.

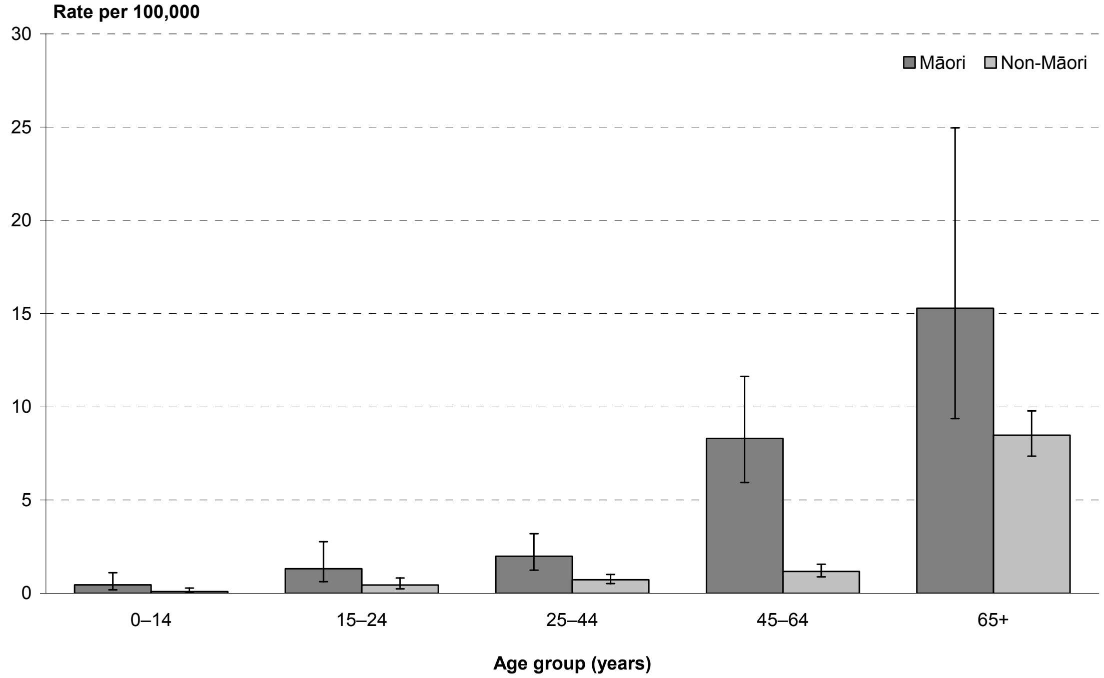
This section provides an update and brief overview of asthma among Māori and disparities in asthma care, along with recommendations for health service providers.

Māori asthma prevalence and health outcomes

Asthma can affect people of any age, but is more common in children than adults. About 25% of 6–7 year olds and 30% of 13–14 year olds experience asthma symptoms in a 12 month period (Asher et al 2001). Studies have shown the prevalence of asthma symptoms in Māori children is about the same (Barry et al 1991; Moyes et al 1995) or slightly higher (Pattemore et al 1989; Pattemore et al 2004) than that in non-Māori children.

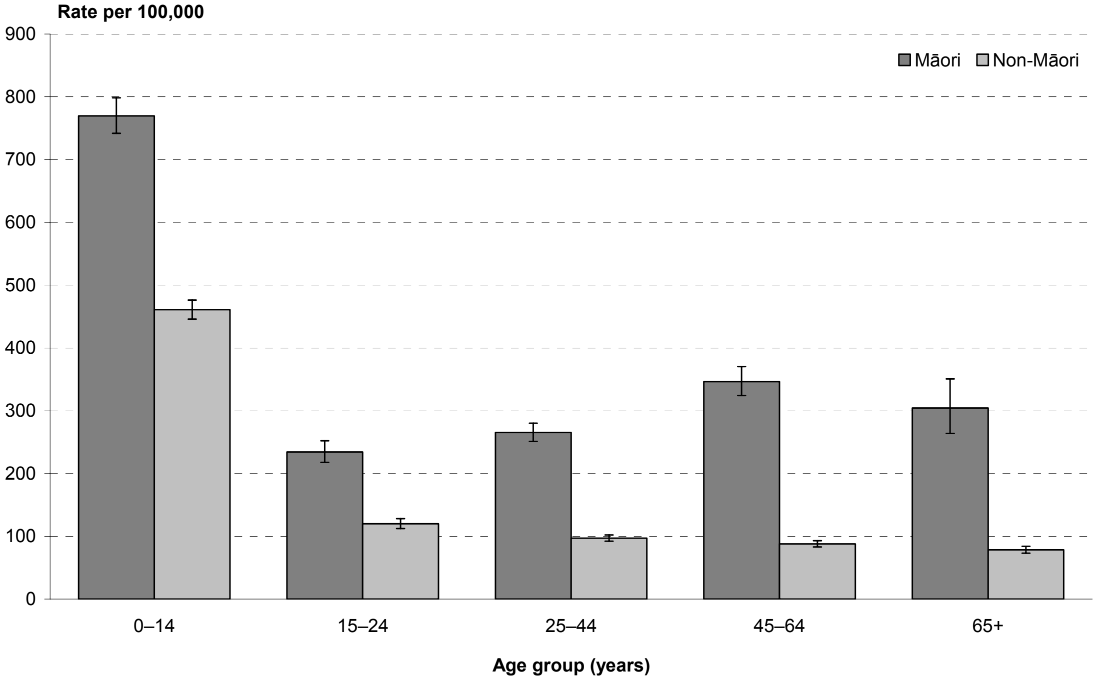
Deaths from asthma are relatively uncommon. Māori and non-Māori death rates in specific age groups are shown in Figure 10.1. In both the Māori and non-Māori populations the asthma mortality rates increase with age and the highest mortality rates are seen in people aged 65 years and over. Māori mortality rates are significantly higher than non-Māori rates in the four age groups from 15 years onwards. There were very few deaths from asthma in children under 15 years of age. The higher mortality rates in people over 45 years of age may, in part, be explained by misclassification, with deaths from COPD being attributed to asthma.

Figure 10.1: Age-specific asthma death rates, 2000–2004



Although most people with asthma are successfully cared for in the community, some people require hospitalisation for asthma management. Māori and non-Māori hospitalisation rates for specific age groups during 2003–2005 are shown in Figure 10.2. Hospitalisation rates are highest in the 0–14 year age group for both ethnic groups. In all age groups, Māori hospitalisation rates are higher than non-Māori. These disparities in hospitalisation rates have been documented for many years (Mitchell and Cutler 1984; Mitchell 1991; Ellison-Loschman et al 2004). Any observed differences in the prevalence of asthma between Māori and non-Māori are relatively small and do not explain the more marked difference in hospitalisation rates. This suggests that ethnic differences in the management and control of asthma in the community may be an important factor in the disparities in hospitalisation rates.

Figure 10.2: Age-specific asthma hospital discharge rates, 2003–2005



Ethnic disparities in asthma management

Most asthma is managed at home by the person with asthma (or their parent/caregiver), and in the primary care (general practice) setting (Kljakovic and Salmond 1996). Evidence-based guidelines for the diagnosis and management of asthma are available for both adults (New Zealand Guidelines Group 2002) and children (Paediatric Society of New Zealand 2005). Both can be accessed via the New Zealand Guidelines Group website (www.nzgg.org.nz).

There are two main areas in asthma management:

- asthma education, self-management (by the person with asthma, or by the caregivers of children with asthma), and action plans; and
- management with medication.

Asthma education and information about asthma should be given to everyone with asthma. This should be reviewed with the patient, and updated regularly. All adults (over 16 years) and all children who need preventer medication to control their asthma should have a written self-management (action) plan (New Zealand Guidelines Group 2002; Paediatric Society of New Zealand 2005). The management of asthma with medications varies according to the type (acute or chronic) and the severity (mild, moderate, severe, life-threatening) of asthma, and the age of the person with asthma. Medications can be used to treat the symptoms of asthma when they occur ('treater medication') or to prevent asthma occurring ('preventer medication'). Everyone who uses medications to control and prevent asthma should have their medications reviewed regularly.

Since the late 1980s a number of studies have documented ethnic differences in aspects of asthma management including:

- Asthma education, knowledge, and self-management
  - A trial of a community-based asthma education clinic reported greater improvements in asthma knowledge among European participants than Māori or Pacific participants (Garrett et al 1994).
  - Garrett et al (1989) reported that Māori and Pacific participants in their 1989 study were significantly less likely to have a PEFR (peak expiratory flow rate) meter, and Pacific people were less likely to have an action plan than New Zealand European participants. Garrett et al (1994) also reported that significantly lower proportions of Pacific and Māori participants had a PEFR meter when they were enrolled into the community-based asthma education clinic randomised control trial.
- Medication
  - Some studies have found that fewer Māori and/or Pacific peoples were taking medication ('treater' and/or 'preventer' medicines) than European people (Mitchell and Quested 1988; Mitchell 1991).

These studies have not been able to identify the cause(s) of these disparities because they have not looked at all the factors that might contribute to the disparities.

A more recent study was undertaken in 1999–2001 with a community-based sample of children aged 2–14 years. This study found significant differences in the provision of asthma education, parental asthma knowledge, and medication between Māori and/or Pacific children compared with European/Other children, even when the effects of a wide range of factors that potentially affect asthma management were taken into account. The results strongly suggest that there are ethnic differences in the quality of primary care received by children with asthma (Crengle 2005).

An asthma management programme designed to improve asthma in the Māori community

After the Māori asthma review (Pōmare et al 1991) a trial of a credit card sized asthma action plan was undertaken with Māori from Wairarapa. Over a six month period, Māori with asthma were seen at marae-based asthma clinics, participated in asthma education, and were provided with asthma action plans. Information about medication use, asthma symptoms and its effect on daily life, and doctor and hospital use was collected. The initial results showed a successful partnership between the community and university researchers, a high participation rate by Māori with asthma, a high level of use of the action plan, and a significant improvement in asthma control (Beasley et al 1993).

Further information on asthma morbidity, health service use, and self-management of asthma was collected two and six years after the programme ended. At follow-up fewer people had severe asthma morbidity and emergency use of health services (especially emergency GP visits) remained lower than that seen before the programme. However, the percentage of nights woken due to asthma and the proportion of participants taking prescribed regular inhaled steroids had decreased to the levels seen before the programme. The researchers concluded that there were on-going benefits from the programme six years later, but the reinforcement of self-management skills was necessary to maintain the benefits that were initially seen. They also noted the importance of on-going prescription and use of inhaled steroid (preventer) medications (D'Souza et al 2000).

The six-year follow-up also found that the programme had other benefits, in particular cultural affirmation, improved access to other health services, a greater sense of control for participants, and positive impacts on the extended family (Ratima et al 1999).

What should healthcare providers do to reduce the burden of asthma for Māori?

Health professionals and health services that deliver services to people with asthma have a very important role in the delivery of high quality, effective asthma care. To achieve this, health professionals and services should:

- Ensure their own knowledge of asthma and clinical practice is up-to-date and consistent with the current, evidence-based guidelines.
- Ensure that ethnicity data in patient records is complete, accurate, and collected and used in accordance with the Ministry of Health's ethnicity data protocols.
- Regularly undertake clinical audits to determine the consistency of the care they have delivered with current, evidence-based guidelines, and to identify disparities in care between Māori, Pacific, and European/Other ethnic groups. Strategies to improve asthma care and reduce ethnic disparities should be developed, implemented, and assessed by a follow-up clinical audit.
- Be aware of, and refer people to, the asthma services such as asthma educators and non-governmental organisations (e.g., Asthma Society/Foundation) that are available in their area. Māori health providers that have asthma programmes or Māori staff in 'mainstream' asthma services should be offered to Māori patients.
- Primary health organisations and other services should consider developing and implementing asthma information and asthma management programmes that will improve access to asthma care and the quality of asthma care they deliver, and will reduce the effects of poorly controlled asthma on patients and their whānau.

Conclusion

Bronchiectasis and asthma continue to be significant health issues for many Māori along with other respiratory diseases such as COPD and pneumonia. Recent research continues to show disparities in prevention strategies, diagnosis and care between Māori and non-Māori for respiratory diseases. Research in the context of asthma also demonstrates that appropriately designed and delivered health programmes improve Māori health outcomes.

Table 10.3: Respiratory disease deaths (2000–2004) and public hospital discharges (2003–2005)

		Māori		Non-Māori		Rate ratio (95% CI)
		Number	Rate	Number	Rate	
Respiratory diseases						
Total	Deaths	1,037	33.8	10,658	13.1	2.59 (2.42–2.76)
	Hospitalisations	42,182	2,249.8	138,034	1,367.2	1.65 (1.62–1.68)
Females	Deaths	546	32.5	5,234	10.6	3.06 (2.79–3.36)
	Hospitalisations	20,967	2,204.7	66,250	1,263.7	1.74 (1.70–1.79)
Males	Deaths	491	35.2	5,424	15.6	2.26 (2.06–2.48)
	Hospitalisations	21,215	2,294.9	71,784	1,470.7	1.56 (1.52–1.60)
Chronic obstructive pulmonary disease						
Total	Deaths	759	24.7	7,453	9.3	2.65 (2.45–2.86)
	Hospitalisations	5,331	261.1	25,791	73.7	3.54 (3.42–3.67)
Females	Deaths	403	23.9	3,323	7.2	3.31 (2.98–3.69)
	Hospitalisations	3,167	293.1	12,413	69.6	4.21 (4.01–4.42)
Males	Deaths	356	25.5	4,130	11.5	2.23 (2.00–2.48)
	Hospitalisations	2,164	229.0	13,378	77.8	2.94 (2.80–3.10)
Pneumonia						
Total	Deaths	98	3.3	1,940	1.8	1.86 (1.50–2.31)
	Hospitalisations	6,934	366.5	28,640	222.0	1.65 (1.59–1.71)
Females	Deaths	45	2.6	1,233	1.7	1.60 (1.16–2.20)
	Hospitalisations	3,397	351.2	13,517	203.4	1.73 (1.64–1.82)
Males	Deaths	53	3.9	707	1.9	2.09 (1.56–2.80)
	Hospitalisations	3,537	381.9	15,123	240.5	1.59 (1.51–1.66)
Asthma						
Total	Deaths	79	2.6	286	0.6	4.10 (3.12–5.40)
	Hospitalisations	8,459	457.3	17,054	245.2	1.86 (1.80–1.93)
Females	Deaths	49	3.0	188	0.7	4.43 (3.12–6.29)
	Hospitalisations	4,408	474.0	9,120	235.7	2.01 (1.92–2.11)
Males	Deaths	30	2.1	98	0.6	3.70 (2.39–5.74)
	Hospitalisations	4,052	440.5	7,933	254.8	1.73 (1.64–1.82)
Bronchiectasis						
Total	Deaths	64	2.1	193	0.3	6.70 (4.88–9.21)
	Hospitalisations	812	41.7	1,722	11.6	3.60 (3.19–4.08)
Females	Deaths	31	1.8	123	0.3	5.85 (3.84–8.91)
	Hospitalisations	431	42.7	1,146	13.5	3.16 (2.69–3.70)
Males	Deaths	33	2.3	70	0.3	7.59 (4.72–12.19)
	Hospitalisations	380	40.7	577	9.6	4.23 (3.48–5.16)

Note: Rates are calculated per 100,000 and were age-standardised to the 2001 Māori population.

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My son Jayden attends the local kura kaupapa. At six years of age and feeling pleased with himself because of his 'new teeth that had come through at the back of his mouth' Jayden went off for his visit with the dental therapist at the mobile dental health clinic. I asked Jayden when he came home 'What did the dental therapist do?' My son replied 'Oh she counted my teeth and cleaned them and told me that I had good teeth'. 'Did she do anything else?' 'No', was the response.

I rang the dental therapist and asked why no preventive work like fissure sealant (protective coating put on molars) was undertaken. She told me that Jayden did not need preventive work and that sealants were rationed. I asked her if she was aware of the oral health inequalities that existed between Māori and Pākehā children. Her reply was that management was responsible for the policy limiting sealant treatments. When asked about delivering services in less deprived areas, and whether the parents would expect preventive services for their children, she said 'yes', the parents would expect that service as of 'right'.

In the end the dental therapist agreed with my request for Jayden to have fissure sealants. But I shouldn't have needed to ask. Jayden at six years of age has the **'right'** to receive equitable access to high quality dental health services every time he accesses a dental heath provider.

Vera Keefe-Ormsby

11 ORAL HEALTH – ORANGA NIHO

Pauline Koopu, Vera Keefe-Ormsby

Oranga Niho (oral health) is about the health of our gums and teeth. Oral diseases are among the most common health problems, and can impact on nutrition, sleeping, rest, and social roles, including self-image (Gift et al 1992; Dennison et al 1996; Hay et al 1992). Oral diseases are relatively easy to detect with regular dental checkups. Prevention is based on maintaining good oral hygiene (brushing teeth every day with a fluoridated toothpaste) and minimising the intake of sweet foods and liquids. Yet the impact of untreated dental disease on children is substantial, and disadvantaged children are disproportionately affected (Gift et al 1992). Improving oral health is one of the 13 health priorities specified in the New Zealand Health Strategy, and one of 12 priorities for Māori health.

This chapter focuses on Māori oral health, examining disparities in oral health outcomes between Māori and non-Māori, differential access to oral health determinants (e.g., fluoride, income); and access discrepancies to oral health services along the continuum of care.

Oral health outcomes

There is a considerable amount of evidence that Māori do not have the same oral health status as non-Māori across all age groups (Brown and Tresure 1992; Treasure and Whyman 1995). In 2003 substantial ethnic inequalities in oral health among New Zealand children were reported (National Health Committee 2003). These ethnic inequalities are not a new phenomenon. Māori children were described as having a higher prevalence and severity of dental caries than other New Zealand children over a decade ago (Thomson 1993). Similarly, Māori five-year-old children have been found to be twice as likely as non-Māori five-year olds to experience dental decay severe enough to require dental treatment under general anaesthetic (Thomson 1994). Recent regional and national School Dental Service (SDS) data confirms that ethnic inequalities in oral health persist (Ministry of Health 2004). In 2005 the severity of dental caries was highest for Māori compared with non-Māori non-Pacific five-year olds, and disparities also existed within Year 8[1] children. The mean number of decayed, missing or filled teeth (DMF/dmf)[2] was 3.8 compared with 1.6 for five-year olds, and 2.5 compared with 1.4 for Year 8 children. Māori children at five-years (30% versus 61%) and Year 8 (33% versus 48%) were less likely to be caries free (Ministry of Health 2004).

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[1] Year 8 refers to the eighth year of formal schooling. The majority of children would be 11–13 years of age at this stage.

[2] The DMF/dmf index counts decayed, missing and filled teeth.

While there are quality issues[3] with ethnicity data collection and the use of DMF/dmf data as a measure of dental disease, these would not entirely account for the inequalities in oral health seen between Māori and non-Māori.

There is very little information on the oral health status of rangatahi (youth), pakeke (adults) and kaumatua (elderly) in Aotearoa/New Zealand. There have been only two national oral health studies to date that provide information on the oral health of New Zealand adolescents and adults. The first, in 1976, randomly sampled adults aged 15 years and over (Cutress et al 1979). In the 15–34 and 35–54 years age groups, Māori were more likely to have decayed and missing teeth and less likely to have filled teeth than Europeans. The second, in 1988, randomly sampled participants in three adult age groups: 20–24 years olds, 35–44 years, and 65–74 years (Hunter et al 1992). While authors noted an improvement in oral health from previous surveys for the total population, ethnic inequalities remained. When comparing Māori to European adults, Māori had similar or higher mean DMF teeth scores, were more likely to have teeth extracted than restored and the periodontal (gum disease) process appeared to have started earlier and was more severe (Hunter et al 1992). Both national surveys had relatively small numbers of Māori participants, limiting data analysis and further information gain for Māori.

Fluoridation

The most effective preventive method for dental caries is the appropriate use of fluoride (World Health Organization 1994; Ministry of Health 2004) with water fluoridation described as the most cost-effective preventive method in medicine (Centres for Disease Control and Prevention 1999). Of the 15 studies of water fluoridation in New Zealand published since 1980, only two failed to report significant benefits from fluoridation (Public Health Commission 1994). People with fewer socioeconomic resources benefit to a much greater extent from water fluoridation than those with more socioeconomic resources (Thomson et al 2000). Therefore, water fluoridation of community water supplies may be an effective means of reducing inequalities in oral health between Māori and non-Māori (Lee and Dennison 2004).

However, despite these widely reported benefits, Māori have not benefited equally from water fluoridation because of differential access to fluoridated community water supplies, as a higher proportion of Māori live outside of main centres compared to other populations (Te Puni Kōkiri 1999) and they are consequently less likely to live in areas with a community water supply. Therefore, continuing to focus solely on water fluoridation as the only means of providing appropriate levels of fluoride may not address oral health inequalities for Māori (Keefe-Ormsby 2003).

Water fluoridation is currently the best-proven method of reducing dental decay, but it is not the only method of providing fluoride at a population level; fluoridated salt and fluoridated milk (Ellwood & O'Mullane 1996; Meyer 2003) are other options. While fluoridation by means other than water may be more costly (Canterbury District

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[3] Inconsistency of ethnicity data collection has been identified in the SDS (DHBNZ 2006), which is likely to undercount Māori children. The DMF/dmf index does not include gum disease or reasons for missing teeth.

Health Board 2003, p. 5), all Māori communities living in areas without reticulated water supplies, or who live in a non-fluoridated community water supply area, would benefit from the availability of subsidised fluoridated salt and fluoridated milk products. Government policies should reflect this need for alternative access for Māori to subsidised fluoride.

Oral health services

The School Dental Service

Since 1921 one of the key interventions in childhood oral disease has been the School Dental Service (SDS). This institution is charged with delivering universal dental health services to preschool and primary school children in New Zealand (DHBNZ 2006). The SDS provides preventive and restorative services for preschoolers, primary, and intermediate school children. This is available to all children from one year to about 13 years of age (i.e., end of Year 8 of schooling). Parents can access the SDS for those children younger than one year of age if required. They may also choose to use a 'pay as you go' private dentist for services for their children. Treatment required that is outside of the scope of practise of the school dental therapist is referred out to dentists under the Special Dental Services Agreement.

After over 80 years of practice, the SDS has only recently been reviewed. The review noted that, while dental care is largely free to New Zealand children, differential access and utilisation play a substantial role in oral health inequalities (DHBNZ 2006, p. 14). The SDS appears to be more accessible for children of upper socioeconomic families. There is a high utilisation by primary and intermediate school children and enrolment is high in the preschool years, but it is not evenly distributed across the community (Ministry of Health 2004; DHBNZ 2006). Findings from the Christchurch Health and Development Study showed that enrolment in the SDS was significantly higher for preschool children of upper socioeconomic families (Fergusson and Horwood 1986).

An example of a service barrier is the usage of cellphones to contact the SDS in some regions. Cellphones may be beneficial to the SDS because of the mobility of therapists. However, because of cost, families with limited resources may not communicate with the service for enrolments, appointments, changing addresses, and even to make general enquiries. A recommendation from the SDS review was that unique Māori education programmes be developed, alongside population-wide education programmes for children and their families/whānau (DHBNZ 2006). Further, the SDS has a predominantly Pākehā workforce (Hannah 1998). The need for Māori oral health workforce development was identified in the SDS review as another strategy to address inequalities (DHBNZ 2006).

Other oral health services

Rangatahi

From age 13–18 years, the Adolescent Oral Health Service Agreement provides funding to dentists to deliver some dental services free of charge. This agreement, together with the Special Dental Services Agreement for children, makes up the

Combined Dental Services Agreement. Not all services are free and not all dentists hold these contracts (Ministry of Health 2004). There is little formal data collection on the oral health status of rangatahi in Aotearoa/New Zealand. However, the information that is available paints a picture of a system that fails to provide care for rangatahi (Broughton and Koopu 1996). A 1980s cohort study of New Zealand adolescents reported a dental services utilisation rate of just 45% for non-Europeans (described in the study as predominantly Māori) compared to 78% for Europeans (de Liefde 1988). In the 1990s, Midland Health reported that approximately 50% of Māori adolescents in that region dropped out or did not utilise the General Dental Benefit Scheme[4] (Te Puni Kōkiri 1996). In order to improve the uptake of enrolments of adolescents with private dentists, adolescent co-ordinators have been introduced (Ministry of Health 2002). While this initiative aims to improve access to dental care for adolescents, the emphasis here is to enrol the patient in the system, rather than emphasising the need for the system to re-configure in order to provide oral health services responsive to Māori. There are also Māori health providers who hold oral health contracts specifically to improve enrolment through the Combined Dental Services Agreement, as well as providing oral health treatment (Mauri Ora Associates 2004).

Only a limited number of dentists hold contracts for publicly funded adolescent dental services. This results in limited availability of services generally, the effects of which are likely to be more detrimental for Māori given the already poor service response to high Māori need.

Pakeke and kaumātua

For adults and the elderly there are virtually no free dental services. There are contracts for low-income adults (community service card (CSC) holders) where dental services are heavily subsidised, and these are held with either individual dentists or through hospital dental services. The Accident Compensation Corporation (ACC) provides subsidies for most dental accidents (ACC 2007).

There is evidence of a high level of unmet need for dental services among adults in New Zealand, as well as disparities in access to care between Māori and non-Māori. The 2002/03 New Zealand Health Survey showed that Māori adults (15+ years) were less likely than non-Māori adults to have visited a dentist in the previous year (28% compared to 43%) (Ministry of Health 2006a). In addition, New Zealand results from The Commonwealth Fund 2001 International Health Policy Survey showed that 56% of Māori adults reported going without needed dental care in the past year due to cost, compared with 37% of European adults (Schoen et al 2002).

Hospital services

Tertiary hospitals offer some dental treatment to inpatients free of charge. Some hospitals also offer relief of pain or essential dental services to CSC holders and a part-charge is met by the CSC holder. Some hospitals also provide dental treatment under

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[4] The General Dental Benefit Scheme is now the Combined Dental Services Agreement.

general anaesthetic for those children and adults who are not able to have their treatment under local anaesthetic.

Māori health providers

One response by Māori to oral health disparities has been the development of oral health services by Māori health providers. A review of 16 Māori health providers with oral health contracts showed that Māori providers deliver contracts addressing oral health at a number of levels including enrolment, attendance, and treatment (Mauri Ora Associates 2004).

The Māori Child Oral Health Service review identified that Māori providers take a whānau ora approach to health care with the kaupapa of these providers being to treat any member of the whānau who needs to be seen. As such, Māori providers are well situated to provide dental health services to all age groups and meet the vision of community-based services and life-long oral health (Ministry of Health 2006b). Māori providers were also found to combine oranga niho services with other health services in an integrated approach that supports whānau ora (Mauri Ora Associates 2004). Other strengths of Māori providers in delivering oral health services included: providing a kaupapa Māori service that makes Māori more comfortable in receiving oral health treatment; delivering additional but related services to overcome barriers to oral health care such as transport, follow-up of missed appointments, and advocacy for Māori clients; location in high need areas such as low decile schools and highly deprived areas; and, a predominantly Māori workforce (Mauri Ora Associates 2004).

In order to meet the needs of their populations, a common theme of Māori providers was the provision of services beyond their contractual obligations. Contracts with limited funding that did not recognise these additional services were identified as a barrier by Māori providers and inhibit the further development of Māori oral health services. The need for flexible oral health service contracts that are funded appropriately, to ensure that they can provide necessary services to Māori by adopting a whānau ora approach, was identified and recommended by the review (Mauri Ora Associates 2004).

The Ministry of Health recently published *Good Oral Health for All, for Life,* a document that outlines the seven key action areas that will be the focus of the Ministry's oral health policy work over the next 10 years (Ministry of Health 2006b). Māori are named as one of four priority groups in this new vision. Opportunities exist for Māori providers to develop oral health services within this new strategic direction that requires the reorientation of oral health services and for DHBs to support Māori health provider development as part of this reorientation (Ministry of Health 2006b).

Conclusion

As Māori, we have increased our scrutiny of the responsiveness of dental health services to meet Māori needs. During the last decade, some Māori providers have tried to improve access to dental health services for Māori. Within currently available publicly funded services for children and adolescents, improvements are needed to address Māori health needs. However, there is also a need to improve access to dental services for all Māori.

Given the likely higher need for services among Māori and inequalities in socioeconomic status, increased publicly funded oral health services are required to meet such needs and to reduce disparities across all ages. For the full potential to be realised in the new oral health vision for New Zealand, Māori must be involved at every level of the oral health decision making process from governance and monitoring through to the delivery of dental health services.

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12 MĀORI EXPERIENCE OF DISABILITY AND DISABILITY SUPPORT SERVICES

Keri Ratima, Mihi Ratima

The New Zealand Disability Strategy (Minister for Disability Issues 2001) distinguishes between disability and impairments. Individuals do not have disabilities. Rather, they may have physical, sensory, neurological, psychiatric, intellectual, or other impairments. According to the Strategy, "Disability is the process which happens when one group of people create barriers by designing a world only for their way of living, taking no account of the impairments other people have" (Minister for Disability Issues 2001, p. 3).

Both Māori and non-Māori are impacted on by disability and much work is required to provide support for both groups. However, there are wide disparities between the Māori and non-Māori experience of impairments and disability, the impact on Māori being more severe. The consequences of disability extend beyond the individual to whānau (extended family), who have limited resources and capacity to provide necessary care and support. In this context, high quality disability support services for Māori are critical in minimising inequitable impacts on Māori individuals, whānau, and communities.

This chapter briefly outlines Māori understandings of disability and disability support, Māori impairment data issues, and the Māori impairment profile. Issues concerning disability support services for Māori are discussed, with reference to Te Roopu Taurima o Manukau Trust – a disability support service provider for adults with intellectual impairment. While prevention of impairments causing disability is acknowledged by the authors as a critical area that must be addressed, it is beyond the scope of this chapter.

Māori understandings of disability and disability support

Until recently, concepts of disability have tended to emphasise physical, sensory, psychiatric/psychological, learning or intellectual impairments, and reduced functioning. This is consistent with an underlying concept of health that focuses on physical and mental dimensions of wellbeing and the value of independence. In contrast, Māori concepts of health are holistic in nature, locating individuals within the whānau context and, therefore, emphasising interdependence, recognising determinants of health (including cultural and spiritual determinants), incorporating a focus on continuity between the past and the present, and viewing good health as a balance between interacting variables (Ratima 2001).

Inherent to Māori concepts of health is concern for ensuring access to cultural resources, and the notion that a secure Māori cultural identity is central to good health (Durie 1998). Disabled Māori have expressed the value they place on their identity as

Māori (National Health Committee 2004), and Māori concepts of health are concerned with being healthy as Māori and therefore maintaining a secure Māori identity.

More recent concepts of disability, as expressed in *The New Zealand Disability Strategy*, are centred on the interaction between the individual with the impairment and the environment. Māori concepts of disability and disability support are likewise broad and will emphasise the creation of environments conducive to attainment of balance, spiritual and emotional wellbeing, maximum functioning, strengthening positive interdependence (whānau will be central), and maintaining and reinforcing a secure cultural identity.

Data issues

Data quality issues continue to undermine disability support service planning, purchasing, development and delivery for Māori. There are definitional and data collection problems which include inconsistencies in definitions of ethnicity, variable collection methods, and a limited range of data being collected. Further, while conventional measures of impairment and functioning will continue to be useful there are other indicators that may be equally important in understanding Māori impairment and disability, such as outcome measures that capture positive functioning and culturally specific measures. Work has been carried out in areas such as mental health on the development of indicators that are meaningful for Māori (Durie et al 2002; Kingi and Durie 1998, 2000).

A framework for Māori disability information (Potaka et al 1994) recommended that Māori-specific data collection should include not only ethnic data but also cultural data such as hapū and iwi affiliation, access to Māori networks, whānau support, and other information related to those factors that strengthen Māori identity and may reflect positive functioning within Māori cultural contexts. Information about Māori understandings of disability and support service preferences could also be collected. This broader cultural data would inform the development of disability support services tailored to the specific needs of Māori.

Impairment among Māori

Despite data limitations, it is possible to get some indication of the extent of impairment among Māori. The New Zealand 2001 Household Disability Survey and the Disability Survey of Residential Facilities provide the most comprehensive Māori impairment profile (Ministry of Health 2004).

According to the Household Disability Survey, 106,500 Māori living in households have an impairment (this equates to 21% of Māori). Māori experience higher rates of age-standardised impairment (24,000 per 100,000 or 24%) than non-Māori (16,700 per 100,000 or 16.7%). Māori age-standardised rates of both single and multiple impairment were higher than those of non-Māori (9,900 per 100,000 compared to 7,500 per 100,000, and 14,100 per 100,000 compared to 9,200 per 100,000 respectively). The most common cause of impairment for both Māori and non-Māori was disease/illness.

With the exception of learning impairment, Māori adults are over-represented in each major impairment category. The most common types of impairment experienced by Māori adults are mobility, hearing, and agility impairments. Māori also experience more severe impairment than non-Māori. Māori age-standardised rates of severe impairment (requiring daily assistance) were more than twice that of non-Māori (4,100 per 100,000 compared to 1,900 per 100,000). Further, approximately 13% of Māori males and 14% of Māori females living in households had an impairment leading to dependency, compared to 9% of non-Māori males and non-Māori females (Ministry of Health 2004).

Māori impairment prevalence increased with age, from 13% for those aged 15–24 years, to 22% for the 25–44 year age group, to 34% for those aged 45–64, and 61% for kaumātua aged 65 years and over. Ethnic disparities exist for each age group. For Māori children impairment requiring special education services was common. Of particular concern in this age group was the wide disparity between the rates of hearing (4,100 per 100,000 compared to 1,600 per 100,000) and speaking (3,100 per 100,000 compared to 1,700 per 100,000) impairment between Māori and non-Māori children, given that these impairments are strongly linked to learning, education, and employment opportunities (Ministry of Health 2002).

There are distinct issues of concern for older Māori. Māori experience an earlier onset of age-related disease and impairment. For example, Māori women aged 45 years and over have a significantly higher rate of impairment caused by disease/illness than non-Māori, similar to the profile expected for the non-Māori 65 and over age group (Ministry of Health 2004). As well, Māori have a shorter life expectancy than non-Māori and therefore fewer Māori survive to old age (Ajwani et al 2003). The implication is that disability support service funding criteria based on age (e.g., eligibility restricted to those aged 65 years and over) discriminate against Māori and advantage non-Māori due to their longer life expectancy. Criteria that make good sense when funding services for non-Māori are not necessarily transferable to Māori if equity is a central goal. Further, older Māori report poor access to disability support services, and cost as a barrier to access to medical services (Durie et al 1996).

Inequalities in the socioeconomic status of Māori and non-Māori are implicated as a major contributor to ethnic impairment disparities and, as well, disabled Māori experience more severe socioeconomic living conditions than non-Māori. In 2001, disabled Māori living in households were approximately two and a half times more likely (43% compared to 17%) to live in the areas of greatest deprivation (NZDep2001 deciles 9–10) than disabled non-Māori (Ministry of Health 2004). Therefore, disabled Māori live in households that are among the most marginalised and have fewer financial resources. The implication here is that where the burden of providing necessary care and support to disabled Māori falls on whānau, the capacity of whānau to fulfil this role is compromised.

There are indications that, based on need, Māori receive lower levels of income support and health and disability services (Robson 2003). Māori children in beneficiary households are less likely to receive the Disability Allowance (a means tested allowance for those with an impairment or chronic illness of at least six months duration) than non-Māori children in beneficiary households (3.2% compared to 7.4%). Further, the average dollar value received by Māori children is less than that of non-Māori ($11.05 per week compared to $15.46 per week) (Hackwell and Howell 2002). There are also indications that there are disparities in access to the Disability Allowance for Māori adults (Hackwell and Howell 2002). Further, Māori have expressed concern that policy that provides lower rates of remuneration for caregivers who are whānau is inequitable given a Māori preference for whānau care (Macdonald et al 2002).

Disabled Māori living in households have indicated higher levels of unmet need for health services (23% compared to 14% for non-Māori) and transport costs (17% compared to 7%). Māori reported less usage of disability-related equipment (23% used equipment compared to 31% of non-Māori), despite more severe Māori disability. Māori also indicated a greater unmet need for special equipment (15% compared to 11% for non-Māori) (Ministry of Health 2004). This is consistent with Māori concerns that there are insufficient assessment, treatment, and rehabilitation services to meet Māori needs (Macdonald et al 2002).

There are both quantitative and qualitative differences between the Māori and non-Māori experience of impairment and disability that reflect wide inequalities. Māori experience higher rates of single and multiple impairment in all age groups and more severe impairment at younger ages and overall. Further, disabled Māori are more deprived socioeconomically and have higher unmet needs for disability support services and special equipment. Despite compelling evidence of wide inequalities, there has not yet been a comprehensive effort to identify distinctive Māori disability support needs nationally and to action a strategy to address those needs in a co-ordinated way.

The evolution of disability support services for Māori

Historically, disability support services have not only been unresponsive to Māori – they have been destructive. Services consistently dismissed Māori cultural preferences. Some of the most striking examples relate to the impact of institutionalisation on Māori with intellectual disabilities and their whānau (National Health Committee 2004). One Māori woman related her experience of being taken, as a child, from her ailing koro (grandfather) upon the death of her kuia (grandmother). She had always lived with them, and in those days children with an intellectual disability did not go to school, so she had spent her days with her kuia whom she described as the centre of her life. The staff in the institution she was placed in spoke no Māori and she spoke no English. Staff promptly renamed her an English name for their convenience. Over the years she was moved from one institution to another and her original notes and files were lost. No-one remembers who she really is. She has lost her identity, and efforts to try and locate family have failed. She has also lost the ability to speak Māori.[1]

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[1] Personal communication to authors.

The 1980s signalled a change in policy, and a move to deinstitutionalisation. At a philosophical level the change was embraced as a mechanism to enable disabled people to more fully participate in New Zealand society. The implementation, however, was strongly criticised for inadequate planning and resourcing to facilitate a reasonable and supported transition to the community, particularly for those who had been institutionalised for many years.

Changes in the philosophy and configuration of disability support services generally coincided with the increasing prominence of the concept of Māori development. The Māori development ideology fostered the emergence of a range of Māori-specific health providers across health issues. However, the area of disability support competed alongside the range of other priorities and lacked the strength of advocacy of other areas such as child health and mental health. Relative to other health areas, it seems that Māori development had lesser impact. For example, despite a Government policy focus on Māori provider development in the last four years few Māori disability support services have emerged.

Generally disability support services were characterised by a lack of specific attention to Māori needs and there are indications that disabled Māori may not have had the same access to Māori development initiatives as other Māori. However, increasing emphasis and recognition of the value of Māori development approaches within the health sector provides a positive context for a strengthened focus on Māori disability support.

Addressing Māori disability support needs

The starting point for identifying Māori disability support needs is recognition that, while Māori and non-Māori will have some disability support needs in common relating to the actual impairment, for Māori there are other distinctive needs. The needs-based case for distinctive strategies is clear in light of the wide inequalities between Māori and non-Māori in the disability sector that have not been addressed by homogenous approaches. Key points of difference in addressing Māori needs will relate to the disadvantaged position of Māori within New Zealand society and cultural requirements.

That Māori do not equitably enjoy the benefits of New Zealand society is well documented (Te Puni Kōkiri 2000a, 2000b). The socioeconomic marginalisation of Māori is strongly implicated as one of the causative factors in the disparities between Māori and non-Māori impairment profiles (Ministry of Health 2004). As well, there are indications that wider societal factors, such as discrimination (Robson 2003), and disability support service inadequacies, contribute to inequalities (Cunningham 2000; Ministry of Health 2004). The Ministry of Health's Intervention Framework to Improve Health and Reduce Inequalities (Ministry of Health 2002) provides a sensible structure to guide action to address, at a variety of levels, the range of factors (such as structural factors and disability support service factors) that largely determine the inequitable Māori experience of disability.

Using Māori concepts of health as a foundation for assessing Māori disability support needs enables the identification of a clear goal for disability support services for Māori – that is, for Māori to have maximum functioning and wellness as Māori. Disabled Māori and their whānau are a diverse group. However, all need to have access to a disability support needs assessment process and support services that address Māori cultural preferences and thereby enable individual choice. This approach would support the ongoing development and strengthening of Māori-specific assessment processes and disability support services, and of culturally safe mainstream disability support services that do not require clients to compromise their values and preferences as Māori. It is important to bear in mind that most disabled Māori and their whānau will access their support through mainstream services. Mainstream services receive the vast majority of disability support service funding and are required to meet the needs of both Māori and non-Māori. Therefore, if disability support services are to equitably meet the needs of Māori, mainstream services in particular will need to be enhanced. Close working relationships between Māori and mainstream providers, strengthened Māori advisory functions, and close monitoring and accountability for responsiveness to Māori would contribute to meeting this aim.

There is a very limited evidence-base to inform the development of disability support services that are responsive to Māori. *He Anga Whakamana, a framework for the delivery of disability support services to Māori* (Ratima et al 1995) was developed in 1995 based largely on interviews with disabled Māori. The framework recommended an approach to the delivery of disability support services for Māori that remains relevant. Key features of the approach are that services need to be based on Māori concepts of health (therefore service goals and measures would be reflective of Māori notions of health), reflect client, caregiver, and whānau participation and preferences, and be linked to wider Māori development initiatives (and therefore have relationships with Māori institutions). It was recommended that enhanced function and client participation in the community should be primary drivers of disability support services for Māori, and that services need to meet high professional and cultural standards. In order to meet these standards, a technically and culturally competent workforce would be necessary. This will be particularly important for carrying out assessments, and disabled Māori have indicated a preference for Māori specific needs assessment criteria and cultural expertise and input as part of a team approach to assessment (Ratima et al 1995).

Improving disability support services' responsiveness to Māori will be important, but must be contextualised within efforts to address broader socioeconomic determinants of Māori health.

Māori specific service provision – Te Roopu Taurima o Manukau Trust

Te Roopu Taurima o Manukau (TRTM) is a kaupapa Māori support service for adults with an intellectual impairment and their whānau. TRTM's vision is "to develop Māori services that will provide and manage services encompassing tikanga Māori (Māori custom and process) and that will determine positive outcomes for Māori people with disabilities and their families demonstrating self-determination for all Māori people" (Christensen 1997, p. 57). The vision identifies Māori values as underpinning service activities (and therefore a Māori concept of health is embraced). It makes explicit the central role of whānau, and through reference to self-determination locates the service within a Māori development framework.

Korowai Aroha Whānau, one of the service teams, is comprised of kaumātua (elders) who have Māori cultural expertise and provide support to all clients, their whānau, and other staff, particularly in relation to the Māori language, Māori process and custom, and other Māori cultural issues. Korowai Aroha has been described as the 'backbone' of the service.

Distinctive qualities of the service are the recognition that cultural identity, including participation in whānau and wider Māori communities, is central to enhanced functioning for Māori with intellectual impairment. One of the implications for the service is that work to strengthen cultural identity and reinstating or maintaining contact between clients and their whānau, hapū, and iwi is prioritised. As an example, the Korowai Aroha Team oversees the reconnection process whereby links between clients and their whānau may be reinitiated and/or strengthened. It is a complex process that requires acknowledgement of the difficulties of tracing families and the diverse realities of those whānau, including dysfunctional whānau. Links to Māori institutions, extensive Māori community networks, and the ability to work within Māori contexts are prerequisites to facilitating reconnection.

Some whānau are shocked to learn of a disconnected whānau member with an intellectual impairment. TRTM report that it is not unusual that surviving members of the whānau lack any memory of an older sibling or whānau member who was taken from the family at a young age. In some cases, the hurt suffered from the removal of their family member has meant that families never spoke about them again. For other whānau there has been an awareness that someone from the whānau had been taken away (Tui Tenari, Chief Executive Officer of Te Roopu Taurima o Manukau Trust, Personal communication, 2002). Like the client, whānau too require support to best ensure a positive reconnection process and outcome.

The range of culturally specific service components provided by TRTM is broad. They include group activities such as gathering of traditional foods (e.g., pūhā, pipi, cockles) and other resources (e.g., flax for weaving), Māori arts and crafts, kapa haka (Māori performing arts), and Māori language learning. Clients are supported to participate in whānau and Māori community events such as tangihanga (bereavement ceremonies), hura kōhatu (a ceremony to unveil a headstone, often 12 months after a burial), and hui (Māori gatherings). Individual clients and whānau also have access to traditional healing services and more general cultural support (National Health Committee 2004).

There are real costs in providing these services that are additional to 'standard' disability support services. TRTM estimated that 45% of the costs of the cultural services that they provide are not funded. Effective disability support services for Māori will rely upon adequate types and levels of resources – that is, access to cultural resources such as the expertise of kaumātua and funding levels that realistically reflect the additional costs of delivering culturally responsive disability support services for Māori.

Conclusion

For years Māori have been calling for standardised ethnicity data collection. However, this remains an area requiring further work in the disability sector. Accurate ethnicity data is necessary for planning Māori disability services, and therefore improvements in ethnic data collection are urgently required.

With the data that is available it is obvious that the Māori experience of disability is characterised by both quantitative and qualitative inequalities relative to non-Māori. If equity is to be a central goal, action will be required at both the structural level to reduce socioeconomic inequalities that cause and replicate disparities, and in the disability sector to ensure quality Māori-specific and mainstream disability support services that meet high professional and cultural standards. These services will acknowledge that disabled Māori have needs related to impairment and to being Māori, and should aim to facilitate maximum functioning and wellness as Māori. Among other things, this will require greater attention to culturally appropriate needs-assessment and service co-ordination, areas that have long been neglected for Māori. Levels of service funding should reflect the additional resources required to meet cultural needs. More generally, an intensive effort is required to ensure all disabled Māori receive their entitlements to disability support services and related income support.

While increasing the numbers and capacity of Māori-specific providers will be very important, at least of equal significance will be the strengthening of mainstream providers to meet their responsibilities to provide services that are accessible and deliver equitable benefits to Māori. This will require partnerships between Māori and mainstream services, increased Māori participation in a decision-making capacity, and continual strengthening of the Māori disability workforce.

Attention will also need to be given to the varied needs of different age groups, and the implications of the Māori impairment profile and changing population patterns. The disproportionate impact of hearing and speaking disabilities on young Māori leads to educational and employment disadvantage that limits the potential contribution of Māori to society. For older Māori, with increasing numbers reaching old age and disproportionately experiencing disability, it will become even more important that disability support services are geared to meet their needs. For example, residential facilities that are accessible and positive environments for older Māori and their whānau will be required.

There is huge potential to make positive change in the Māori disability sector. Immediate steps can be taken to enable the collection of accurate ethnicity data, to provide a clear picture of the state of Māori impairment and disability that is required to conduct strategic planning around the needs of Māori. Strengthening the Māori disability workforce, funding of research focussed on disabled Māori and their whānau, including the development of appropriate needs assessment and service co-ordination tools, and factoring into funding formulas the additional costs of culturally responsive disability support services, are all necessary precursors to a responsive disability sector. There is much to be learnt from the ways in which Māori development approaches have been implemented in other health areas and in other sectors.

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13 SLEEP PROBLEMS

Sarah-Jane Paine, Ricci Harris, Kara Mihaere

Key points

- Not getting enough sleep or getting poor quality sleep affects how we feel and function during the day.
- Two of the most common sleeping problems are insomnia and obstructive sleep apnoea syndrome (OSAS).
- Māori are more likely to suffer from insomnia and OSAS than non-Māori.
- Māori have more risk factors for the development of sleep problems than non-Māori.
- Disparities in sleep problems between Māori and non-Māori may impact on disparities in other health outcomes.
- Māori needs should be prioritised in the development, planning, and purchase of sleep services. Services need to be appropriate and accessible to Māori.
- Sleeping problems contribute to the overall health status inequalities between Māori and non-Māori in New Zealand. Fundamental approaches to addressing disparities in health between Māori and non-Māori are also likely to contribute to reducing disparities in sleep disorders.

In 2001, 33% of Māori aged 20–59 years reported having a current sleeping problem and 29% reported a sleeping problem lasting 6 months or more (Paine et al 2005).

"Good sleep is vital to our waking function and to our health" (Gander 2003 p. 81). Insufficient sleep, or poor quality sleep, can impair the way a person feels and functions (Dinges and Kribbs 1991; National Commission on Sleep Disorders 1993; Dinges et al 1997). It has also been linked to an increased risk of accidents and illness, and decreased quality of life (Mitler et al 1988; National Commission on Sleep Disorders 1993; Mitler et al 2000; Pollmacher et al 2000). There is a growing recognition that inadequate sleep is a major public health issue.

The study of sleep and sleep disorders is a relatively new discipline. In Aotearoa/New Zealand there are limited services for the diagnosis and treatment of sleep related problems. There are a wide range of causes for inadequate sleep, ranging from problems with the body's sleep clock and other illnesses to social pressures and demands (e.g., having to work non–standard hours (Mitler et al 2000)). Currently, more than 80 different sleep disorders have been identified (American Sleep Disorders Association 1997).

Māori are disproportionately affected by a number of risk factors and negative health consequences associated with sleep problems. A recent series of studies undertaken by Te Rōpū Rangahau Hauora a Eru Pōmare and the Sleep/Wake Research Centre were designed to assess how many people were affected by common sleep problems in

Aotearoa/New Zealand (Paine et al 2004, 2005; Harris 2003; Mihaere et al 2003; Mihaere 2004).

- The first was a national survey of 10,000 adults (5,500 of Māori descent and 4,500 non-Māori) aged 30–59, to estimate the prevalence of obstructive sleep apnoea syndrome (OSAS) symptoms and risk factors, carried out in 1999 (Harris 2003; Gander et al 2005a,b).
- The second was a community study of 364 adults (169 Māori and 195 non-Māori) aged 30–59 that included overnight monitoring of participants to objectively measure the prevalence of breathing disturbances during sleep, carried out in 2000 (Mihaere et al 2003, Mihaere 2004).
- The third was another national survey of 4,000 adults (2,100 of Māori descent and 1,900 non-Māori) aged 20–59 years to estimate the prevalence of chronic sleep problems and insomnia symptoms, carried out in 2001 (Paine et al 2004, 2005).

These studies specifically sought to prioritise the needs of Māori and utilised the kaupapa Māori research principle of equal explanatory power (Robson 2002; Harris 2003).

Insomnia

In 1996 the World Health Organization recognised insomnia as a significant public health issue with potentially serious consequences for health, safety, quality of life, and high human and economic costs (Costa e Silva 1999). Insomnia is a set of symptoms and commonly includes having trouble falling asleep, repeatedly waking up, having trouble getting back to sleep, waking up too early in the morning, and waking in the morning not feeling refreshed (American Sleep Disorders Association 1997).

Insomnia can have wide ranging and sometimes multiple causes such as: physical/psychological factors (chronic pain, physical or mental illness, dependence on alcohol or other drugs, genetically-inherited sleep disorders); social/psychological factors (having a new baby, losing your job, bereavement); and environmental factors (excessive heat, noisy neighbours, food allergies, high altitude) (Gander 2003). Since insomnia has many causes it is vital that these are identified before suitable treatment can be provided (American Psychiatric Association 1993; Langer et al 1999). The most common medical response is the prescription of sleeping tablets, and often other measures are not considered. The adverse effects of sleeping tablet use are well documented (Langer et al 1999) and there is a consensus among sleep specialists that efforts should be made to limit the duration of their use (Walsh and Ustan 1999). Alternative therapies may include relaxation techniques, sleep hygiene education, and cognitive–behavioural therapy (see Langer et al 1999).

Results of the national New Zealand insomnia survey (response rate 72.5%) showed that the prevalence of insomnia symptoms was significantly higher for Māori than non-Māori (Paine et al 2004, 2005). Table 13.1 summarises the results. Insomnia symptoms were commonly reported by study participants although all symptoms were significantly higher among Māori than non-Māori. The most frequently reported sleep complaint for both groups was never or rarely waking refreshed (59.1% among Māori and 53.8% among non-Māori). Māori were also more likely to report chronic sleep problems (lasting more than six months) than non-Māori (28.6% versus 24.6%, p=0.033).

Table 13.1: New Zealand population prevalences of insomnia symptoms for 20–59 year olds by ethnicity, 2001

Insomnia symptom	Māori % (95% CI)	Non-Māori % (95% CI)
Often/always have difficulty falling asleep	36.5 (33.2–39.8)	28.7 (26.4–30.9)
Wake three or more times during the night	28.4 (25.3–31.4)	20.8 (18.8–22.8)
Difficulty falling back to sleep	53.0 (49.6–56.4)	48.6 (46.2–51.1)
Often/always wake too early in the morning	48.8 (45.3–52.2)	38.0 (35.6–40.4)
Never/rarely wake refreshed	59.1 (55.9–62.4)	53.8 (51.4–56.3)

Source: National New Zealand Insomnia Survey (Paine et al 2004, 2005)

The insomnia prevalence study also found that people who had symptoms of insomnia or a chronic sleeping problem were more likely to report that their general health, quality of life, concentration, and memory were only fair or poor, that their ability to cope with minor problems, or to accomplish daily tasks was impaired, and that they had difficulty with interpersonal relationships (Paine et al 2004, 2005). These findings remained significant after taking into account demographic and socioeconomic factors.

Socioeconomic deprivation, unemployment, and nightwork were also associated with reporting insomnia symptoms and sleeping problems. These factors are disproportionately higher among Māori (Paine et al 2004; Ministry of Health 2006) and may contribute to inequalities in insomnia and sleep problems.

Other New Zealand evidence has found relationships between measures of inadequate sleep or sleep disorders and motor vehicle accidents and work injury (Gander et al 2005a, Connor et al 2002, Fransen et al 2006), both of which are higher among Māori (Ministry of Social Development 2006; Driscoll et al 2004).

Obstructive sleep apnoea syndrome

Obstructive sleep apnoea syndrome is common in adults and is associated with significant morbidity and mortality. It is characterised by repeated pauses in breathing during sleep when the upper airway collapses as people relax into sleep. The brain then wakes the person up to make them start breathing again. However, as soon as they relax back into sleep the whole process repeats itself and may occur many times during the night. The most common symptoms of OSAS are snoring (usually loudly), excessive daytime sleepiness, and stopping breathing during sleep. People with severe OSAS are often very sleepy, because the quality of their sleep is disturbed by the brief awakenings through the night to start breathing again.

Obstructive sleep apnoea (OSA) is defined by the number of upper airway obstructions per hour of sleep. When these are combined with symptoms such as daytime sleepiness the term OSAS is used to indicate a clinical entity. Sometimes OSA and OSAS are used interchangeably. OSAS has been linked to increased risk of high blood pressure, heart disease and stroke, excessive daytime sleepiness, and motor vehicle accidents (Young et al 2002) all of which disproportionately affect Māori (Paine et al 2005; Ministry of Health 2006; Gentles et al 2006; Ministry of Social Development 2006).

The best test for the diagnosis of OSAS is polysomnography (PSG).[1] There are a variety of treatment options available for OSAS (Kryger 2000), with the most common being nasal Continuous Positive Airway Pressure (nCPAP), which delivers pressurised air through a small nasal mask to keep the upper airway open during sleep. In select cases other methods of treatment may be indicated such as dental devices, surgery, or drug therapy. General management may also include weight loss, sleep hygiene advice, and smoking cessation.

OSAS can occur at any age but most patients present between 40–65 years. The prevalence of OSAS is commonly quoted to be approximately 4% in men and 2% in women (Young et al 1993; Partinen and Hublin 2000). New Zealand evidence indicates that Māori have a higher prevalence of OSAS than non-Māori. Sleep clinics in New Zealand have reported that Māori patients often present with more severe OSAS (Baldwin et al 1998; Frith and Cant 1985). The prevalence of obesity, one of the strongest risk factors for OSAS, is higher in Māori than non-Māori (Ministry of Health 2006). Māori/non-Māori disparities in OSAS symptoms, risk factors, and breathing disturbances have also been demonstrated in population–based studies as described below.

Results of the national survey on OSAS symptoms and risk factors (response rate 70.5%), showed that Māori had significantly higher prevalences than non-Māori (Harris 2003). Amongst both men and women, Māori had significantly higher prevalences of OSAS symptoms, snoring always, observed apnoeas (being told they had stopped breathing during sleep), and excessive daytime sleepiness[2] than non-Māori (Table 13.2). Māori men had a significantly larger mean neck size than non-Māori men (41.98 cm versus 40.15 cm, p<0.0001), as did Māori women compared with non-Māori women (36.16 cm versus 34.34 cm, p<0.0001). Neck size, as an indicator of central obesity, is a risk factor that has been shown to correlate more closely to OSAS than Body Mass Index (Bassiri and Guilleminault 2000).

Table 13.2: New Zealand population prevalences of OSAS symptoms for 30–59 year olds by ethnicity and sex, 1999

Variable		Māori % (95% CI)	Non-Māori % (95% CI)	Relative risk (95% CI)
Snore always (%)	Men	16.2 (14.2–18.3)	10.1 (8.7–11.6)	1.60 (1.32–1.94)
	Women	6.9 (5.7–8.1)	4.1 (3.2–4.9)	1.70 (1.29–2.26)
Observed apnoeas (%)	Men	30.3 (27.7–32.8)	18.3 (16.4–50.2)	1.65 (1.45–1.89)
	Women	11.5 (9.9–13.1)	6.2 (5.1–7.3)	1.85 (1.48–2.30)
Excessive daytime sleepiness (%)	Men	24.6 (22.2–27.0)	15.6 (13.8–17.3)	1.58 (1.36–1.83)
	Women	22.2 (20.0–24.3)	12.1 (10.6–13.5)	1.84 (1.57–2.15)

Source: National OSAS symptom and risk factor survey (Harris 2003)

In another study, a sample of adults in the Wellington region were monitored overnight in their own homes, using recording equipment to assess breathing disturbances during sleep (Mihaere et al 2003; Mihaere 2004). Breathing disturbances

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[1] Polysomnography is a diagnostic test for sleep disorders. It involves monitoring a number of variables during sleep. These include brain activity and stage of sleep, breathing effort and airflow, blood oxygen levels, body movement, eye movement, muscle tone and heart activity.

[2] Defined as an Epworth Sleepiness Score > 10 (Johns 1991,1993; Johns and Hocking 1997).

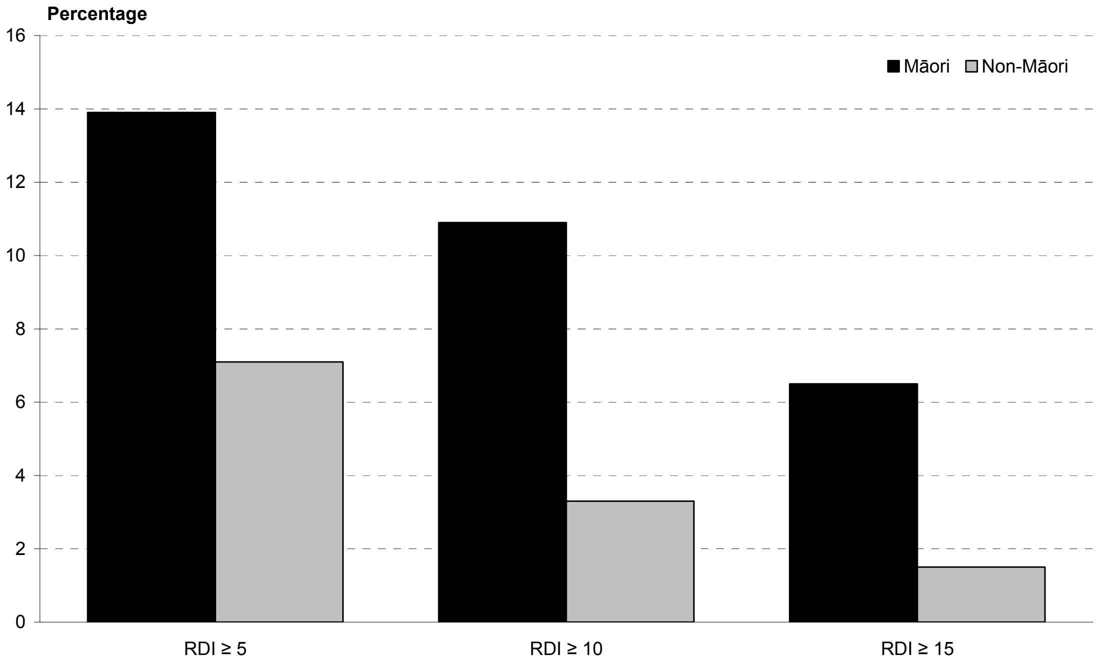
were defined here as different thresholds of the respiratory disturbance index (RDI) which measures the number of breathing disturbances[3] during sleep per hour. The prevalence of all RDI thresholds were higher in Māori than non-Māori (Table 13.3, Figure 13.1). In particular, Māori were significantly more likely to have more severe respiratory disturbances. Māori were three times more likely to have more than 10 breathing disturbances per hour of sleep and four times more likely to have more than 15 breathing disturbances per hour of sleep than non-Māori (Table 13.3). In this study, the higher risk among Māori appeared to be due to well-recognised risk factors such as increased body mass index and large neck size.

Table 13.3: New Zealand population prevalences of RDI thresholds for 30–59 year olds by ethnicity, 2000

RDI	Māori	Non-Māori	Relative risk (95% CI)	p-value
	% (95% CI)	% (95% CI)		
RDI ≥ 5	13.9 (7.3–20.4)	7.1 (3.4–10.9)	1.94 (0.96–3.92)	0.079
RDI ≥10	10.9 (5.1–16.6)	3.3 (0.7–6.0)	3.25 (1.25–8.43)	0.02
RDI ≥15	6.5 (2.3–10.8)	1.5 (0.0–3.1)	4.36 (1.28–14.91)	0.03

Source: OSA community study (Mihaere et al 2003; Mihaere 2004)

Figure 13.1: New Zealand population prevalences of RDI thresholds for 30–59 year olds by ethnicity, 2000



Source: OSA community study (Mihaere et al 2003; Mihaere 2004)

Sleep problems in New Zealand are a significant public health issue because of their high prevalence and inequitable distribution, and their potentially serious consequences for health, safety, and quality of life. Disparities between Māori and non-Māori in the prevalence of sleep problems and common sleep disorders have

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[3] Involving at least a 4% drop in oxygen desaturation.

implications for the development of sleep health services, with the need for these services being greater among Māori. Disparities in sleep problems may also impact on other health inequalities between Māori and non-Māori such as motor vehicle accidents, work place injuries, cardiovascular disease, and general health and quality of life.

Health service implications

Health services can play an important role in addressing ethnic inequalities in health across the continuum of care from prevention through to diagnosis and management.

There are currently very few specialist diagnostic and treatment services for sleep problems in New Zealand. These are hospital-based and focus primarily on sleep-related breathing disorders such as OSAS. More recently there has also been the development of some sleep services in primary care (Sparks et al 2002). In general however, there is a high level of unmet need for sleep services with demand greatly exceeding available resources (Gander 2003, Neill et al 2000).

Accessibility of specialist services to Māori is of concern. Disproportionate numbers of Māori patients seen in clinics with more severe OSAS raises questions about why Māori are not gaining access at the same level of severity. In addition, a number of clinics are private services, which may result in financial barriers.

Current services are unable to meet the needs of the population, which are expected to worsen, as increases in risk factors such as obesity (Ministry of Health 2004) lead to increases in sleep disorders such as OSAS. Disparities in the distribution of disease are important to consider in the planning and development of sleep services. In particular, the development of services designed to meet Māori needs are required in order to address inequalities and population needs.

In addition to a lack of services, other health sector issues include the under-recognition of sleep disorders by health professionals (Young et al 1997) and the need for further education on sleep and its impact on health (Gander 2003). This should include information on ethnic inequalities in New Zealand and the greater risk among Māori.

Finally, the prevention of sleep problems and their consequences also has public health implications. These include the need for measures to reduce health-related risk factors such as obesity, smoking, and inequalities in wider determinants of health, as well as the need to mitigate societal impacts on sleep such as shiftwork. This has implications not only for the health sector but also for other sectors and industry groups.

An integrated approach to the prevention and management of sleep problems in New Zealand is needed. The higher risk among Māori of the development of sleep problems and their negative consequences indicates Māori needs should be prioritised.

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Lisa is a 34-year-old New Zealand Māori woman who was employed as payments officer in a large multinational company. While employed there she developed an occupational overuse syndrome.

“It was pains in fingers, in the wrist and in the forearms. It was getting a lot tighter. It was no longer just [the elbow], it was more the whole arm right through the fingers”.

The main impact for Lisa was the effect of the pain. She chose not to let this interfere with her day-to-day life, her studies or social activities. Lisa had to come to terms with her condition and accept that it would be ongoing. She was putting in a lot of effort at work to do her exercises, take her breaks (as prompted by a software programme) to make sure that the problem did not recur.

“I’m trying to get this in a manageable state because I know that it’s not going to clear up in a few months. It’s going to take longer… The problem was that [I thought] okay, I’m healed, and I stopped doing all of that. I slowed down and I didn’t realise that that was the worst thing to do. So I’ve had to kind of come back again and start doing that…”

Source: excerpt from Adams M, Burton J, Butcher F, Graham S, McLeod A, Rajan R, Whatman R, Bridge M, Hill R & Johri R. 2002. *Aftermath: The social and economic consequence of workplace injury and illness.* Wellington: Department of Labour & Accident Compensation Corporation. p.95-97.

14 OCCUPATIONAL SAFETY AND HEALTH

Fiona Cram

Full-time paid employment can take up more than a third of each working day and this is not counting the additional hours that many people put in outside a ‘normal’ working day caring for whānau, keeping house, and tending to tasks in our communities. Those in part-time paid employment and people not in officially recognised employment also often spend many hours each day doing work of one kind or another. The conditions under which work is carried out are, therefore, important for people’s health and wellbeing.

Occupational safety and health (OSH) is a topic as wide as there are different occupations. Essentially OSH is about keeping people safe and healthy within their (paid and voluntary) work environment. Or, more formally, “OSH is identified as the discipline dealing with the prevention of work-related diseases and injuries as well as the protection and promotion of the health of workers” (Kendall 2005, p. 125). This is an important issue for Māori because Māori workers make up around 10% of this country’s paid workforce (Department of Labour 2004), with them and many others also doing unpaid work for their whānau, hapū, iwi, marae and/or their community. These workers have a right to expect that the workplaces they go to, the work they do, and the people they work with and for, are not compromising their health.

Some work and occupations are hazardous because of the materials used, the tasks undertaken, and/or the work environment. Workers can be exposed to these hazards when they do not comply with safety regulations (e.g., wearing safety equipment and following recommended procedures), and/or employers are remiss in attending to safety issues (e.g., not supplying equipment, not monitoring procedures). Employers may also not provide employees with training in identifying and managing workplace hazards. Workers’ health and safety can also be compromised when, for example, their lack of collective bargaining power and/or their need for paid employment mean that they have little choice but to work in hazardous conditions.

For this last reason, in particular, Iunes (2002) calls for the recognition that OSH issues both cause and are affected by social and economic development. In other words, OSH issues extend beyond workplace illness, injury, and death “to other areas such as the labour market and labour productivity, household income and poverty, the social security system, international trade, and even the environment” (Iunes 2002, p. 2). While this is too wide a brief for this chapter to attempt to capture, it is important to keep these broader issues in mind, and some of Iunes’ work has been used to frame the present discussion of OSH issues for Māori workers in Aotearoa New Zealand by looking at workplace ‘risks’ such as shift work, precarious work, and occupational segregation. These risks arise because of social and economic development and, for Māori, a history of colonisation and racialisation within their own land.

It is noted that, like Iunes’ critique of OSH issues in Latin America and the Caribbean, the awareness and monitoring of OSH issues for Māori in this country is sorely lacking (Driscoll et al 2004). Even so, this chapter examines Māori OSH because when Māori enter the workforce they are legally entitled to be kept healthy and safe. When this does not happen Māori workers can end up injured, diseased, ill, or even killed because of the work they do. This, in turn, impacts on their lives and the lives of their whānau; sometimes severely and irreconcilably (Adams et al 2002). In addition, there are costs to the health system and the country as a whole through the loss of worker potential and the costs of supporting that person and their whānau in the health and welfare system. So aside from the monitoring of OSH, a context for discussing OSH issues is needed to inform the interpretation of the numbers and rates in a way that gives voice to what it is to be a Māori worker.

This chapter therefore begins with a brief overview of Māori and work, including unpaid work. This gives some insight into Māori workforce participation. The three workplace 'risks' are then canvassed, each linked to OSH: occupational segregation, shift work, and precarious employment. Māori are particularly affected by each of these risks and this, in turn, means that Māori workers are more vulnerable to workplace injury and disease. An overview of these risks helps set the context for the next section on occupational injury and disease. This is followed by a brief discussion.

Māori and work

This section provides an overview of Māori participation in both unpaid and paid work. Unpaid work, especially domestic work, has been described as women's 'second shift', as women have entered the paid workforce in increasing numbers and yet retained childcare and housework responsibilities (Baker 2001). However, when men's and women's 'productive hours' are added up (i.e., unpaid work both inside and outside the household, self education, and paid employment), men and women, Māori and non-Māori, come out very similarly at an average of between 52 and 56 productive hours per week (Ministry of Women's Affairs 2001).

Unpaid work

Unpaid work includes both the formal and informal work that people undertake both inside and outside their home (Statistics New Zealand and Ministry of Women's Affairs 2001). The New Zealand Time Use Survey 1998–99 identified four categories of unpaid work: household work, care-giving for household members, purchasing goods or services for one's own household, and unpaid work for people outside the home. Both Māori and non-Māori women spend more hours per day doing unpaid work than their male counterparts. On average women spend 4.8 hours a day on unpaid work compared to men's average of 2.8 hours a day. This only decreases for women when they are in full-time paid employment.

Paid work

Over the past 20 years the participation rate of Māori in paid employment (i.e., at least one hour of paid employment per week) has fluctuated in response to market reforms (Hui Taumata 2005). According to the Department of Labour, participation rates dipped in 1992 and then steadily rose to 66.8% in 2005 (Table 14.1). Participation rates in the general population were similar in 2005 (66.8%). The Māori unemployment rate of 8.6% in 2005 was also the lowest it had been in over 10 years, although still not as low as the 2005 non-Māori unemployment rate of 2.6%.[1]

Table 14.1: Māori labour market outcomes, 1986–2005

Calendar years	1986	1992	1999	2005
Employment[a]	134,400	108,900	144,100	186,500
Participation rate[b]	67.0	59.6	62.4	66.8
Unemployment rate[c]	11.3	25.4	16.6	8.6

Notes:
a Number of people employed, annual average.
b Percentage of the working age population, annual average.
c Unemployed as a percentage of labour force, annual average.

Source: Department of Labour 2005

Over the period 1999–2005 the number of Māori unemployed dropped by 38%, from 28,500 to 17,500. A similar drop (39%) was experienced by non-Māori over the same time period. However, compared with the Māori share of the labour force (9%) and of the working age population (10%), the Māori share of total unemployment in 2005 (22%) remained disproportionately high. Māori continue to be disadvantaged in this respect. The Department of Labour relates this disadvantage to "standard indicators of unemployment likelihood such as age, experience, education and location" (Department of Labour 2006).

The differences between Māori and non-Māori 'productivity characteristics' (e.g., education, experience, etc) might also explain the income disparity experienced by Māori. In 2003 the average weekly income from paid employment in this country was $702. For Māori the average was $599 compared to the European/Pākehā average of $726. This average varied across age groups and, on the whole, men earned more than women (Statistics New Zealand 2007). As Alexander et al (2001) have found, however, the disadvantages that non-European ethnic groups in Aotearoa/New Zealand face in getting employment, as well as wage discrimination, cannot be accounted for by productivity characteristics.

Similarly, Sutherland and Alexander (2002) report that, when productivity characteristics (e.g., age, experience, qualifications) were controlled for, Māori were segregated into lower occupational classes to a greater extent than expected from 1997-2000. The authors "estimate that discrimination of some form accounts for between 30% to 48% of the Pākehā /Māori wage differential" (Sutherland and Alexander 2002, p. 1). Results from the 2002/03 New Zealand Health Survey found that Māori were more likely to report having 'ever' been treated unfairly at work or been refused a job because of their ethnicity than European New Zealanders (5.6% versus 2.1%) (Harris et al 2006).

Discrimination is therefore impacting upon the ability of Māori to both find work and to earn an equitable income from that work. Another way of looking at this finding is

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[1] The Statistics New Zealand *Household Labour Force Survey* defines 'unemployed' as 'all persons in the working-age population who during their reference week were without a paid job and were available for work; and (a) had actively sought work in the past four weeks (a person whose only job search method in the previous four weeks has been to look at job advertisements in newspapers is not considered to be actively seeking work) or (b) had a new job to start within four weeks'.

to ask why whiteness is privileged within the New Zealand labour market, with Pākehā workers finding work in higher occupational classes and receiving higher incomes than Māori. As will be seen below, this privileging also means that Pākehā are safer within the workplace than Māori.

Occupational risks

In this section three occupational risks are described: occupational segregation, shift work, and precarious employment. They are described as risks as each puts workers at more risk of workplace injury and/or disease.

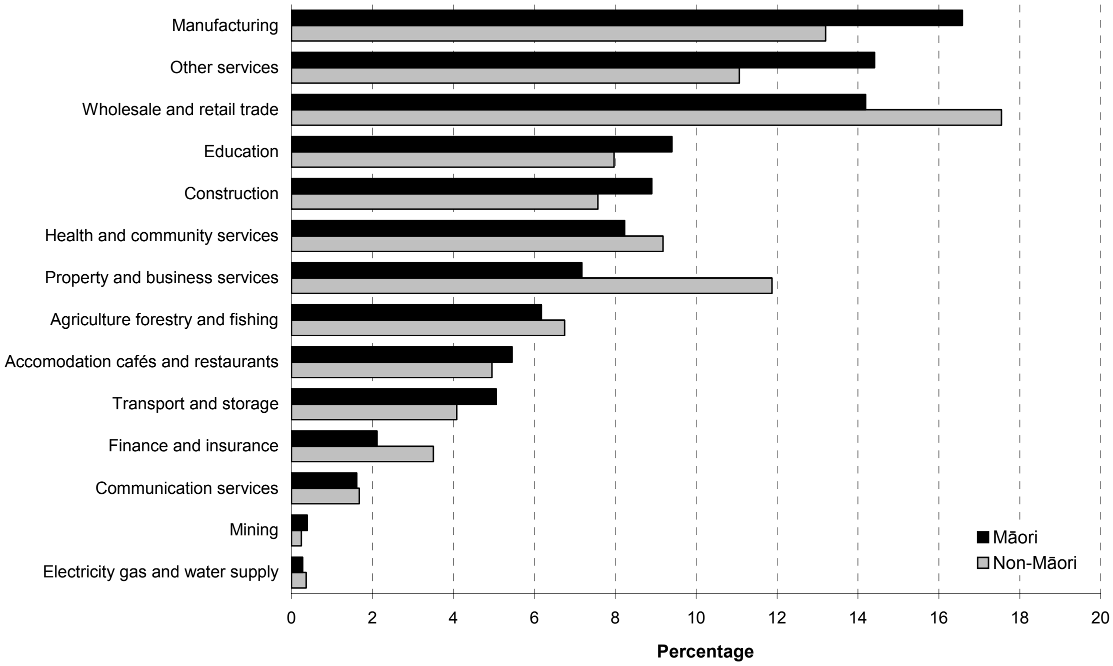
Occupational segregation

Occupational segregation is a term more commonly used in relation to differences in the occupational and industry distribution of male and female workers. Östlin (2000) also distinguishes between horizontal and vertical segregation. In this chapter the phrase horizontal occupational segregation is used to refer to the majority of Māori and the majority of non-Māori typically working in quite different jobs. Vertical segregation describes the distribution of power within the same occupation whereby non-Māori are more often in higher managerial positions and Māori in lower positions.

In the years 1991-2003 there was a growth in the skill level of the Māori workforce. This has been explained by Māori moving to higher levels of education over this same time period. Even so, Māori with a qualification do not have the same employment prospects as similarly qualified non-Māori and are less likely to work in a highly skilled occupation (Department of Labour 2005). This finding, along with the work of Sutherland and Alexander (2002), suggests that both horizontal and vertical segregation operate to maintain occupational segregation between Māori and non-Māori.

Horizontal occupational segregation can also be seen in the distribution of the Māori paid workforce by industry (Figure 14.1). Māori are over-represented in industries such as manufacturing, construction, transport and storage, and education; and under-represented in other industries such as property and business services, wholesale and retail trade, and finance and insurance. How then does this horizontal segregation impact on occupational safety and health? In 2003 four main industries had high rates of new workplace injury claims (after hunting and fishing, and mining): agriculture, manufacturing, construction, and forestry (Table 14.2). Māori workers are over-represented in two of these industries: manufacturing and construction (Figure 14.1). Only Māori over-representation in education seems to work in their favour, with a low rate of workplace injury claims compared to other occupational groups.

Figure 14.1: Employed Māori and non-Māori by industry, June 2005 quarter



Source: Statistics New Zealand 2005

Table 14.2: New workplace injury claims, by industry, 2003

Industry	Number of claims	Rate per 1,000 FTE
Hunting and fishing	1,000	257
Mining	1,000	235
Agriculture	24,200	197
Manufacturing	52,100	196
Construction	23,700	181
Forestry	1,800	176
Electricity, gas, and water supply	1,100	136
Transport and storage	9,300	126
Communication services	2,700	94
Wholesale and retail trade	27,400	92
Health and community services	10,700	75
Property and business services	12,400	71
Education	7,700	61
Accommodation, cafes, and restaurants	4,500	60
Finance and insurance	1,600	32

Source: Statistics New Zealand 2004

Shift work

Many occupations in this country require workers to work shifts. The 1998–99 Time-Use Survey found that Māori and Pacific workers had a higher incidence of night work that did not appear to be related to skill or education (Callister and Dixon 2001). This study discussed the potential benefits of working non-standard hours, including: greater flexibility for combining work and family time, reduced travel time, and higher pay if penal rates are paid. The 2004 National Occupational Health and Safety Advisory Committee (NOHSAC) (Driscoll et al 2004), on the other hand, notes the range of work-related disorders that are associated with shift work, including: sleep disturbance, peptic ulceration, ischaemic heart disease, obesity, hypertension, diabetes mellitus, female reproductive disorders, disorders of the immune system, as well as psychological and relationship disorders.

One New Zealand study cited in the NOHSAC report provides evidence of a link between shift work and sleep disorders (Paine et al 2004). Paine and colleagues (2004) investigated self-reported symptoms of insomnia and found that "being involved in night work increased the risk of reporting often/always having difficulty falling asleep, having a sleeping problem, and having a chronic sleep problem" (p. 1166). The authors also estimated that more Māori than non-Māori work nights (15.8% versus 10.5%). A recent publication from the Blood Donors' Health Study also reported that when occupation, lifestyle factors, and excessive sleepiness are controlled for, there is an almost two-fold increase in the risk of work-related injury for workers working rotating shifts (with or without night shift) (Fransen et al 2006). Shift work can, therefore, lead to health issues of its own accord, and/or may result in workplace injury.

Precarious employment

The deregulation of the workplace (e.g., the Employment Contracts Act 1991), and the undermining of the unions may have put some workers at increased risk of workplace injury and disease (Baker 2001). Over the past 10–20 years the nature of paid work has changed from the standard of secure, full-time, long-term employment. Those most likely to have 'careers', namely white middle-class men, have the best chance of still experiencing this work standard. Others, who have 'jobs', have been impacted dramatically by these changes to the workplace. There is now a polarisation of work in to 'good' jobs and 'bad', or precarious, jobs (Baker 2001).

Tucker (2002) argues that 'non-standard' employment (that is, not full-time and permanent) is more likely to be precarious than standard employment. 'Precarious' employment is, in turn, "employment that is low quality and which puts workers at risk of injury, illness, and/or poverty (from low pay and little opportunity for training and career progression)" (Tucker 2002, p. 2). From her review of the literature, Tucker (2002) reports that "precarious workers are more exposed to physical work hazards, may experience stress from insecurity, and may be more difficult to reach to provide OSH services than permanent workers" (p. 9). These workers may also be given the worst (e.g., dirtiest, dangerous, monotonous) work to do. In addition, they are also most likely to be low paid.

Indigenous workers, including Māori, are bearing the brunt of workplace changes that see more workers in precarious employment. According to Baker (2001), compared to non-indigenous workers, indigenous workers experience: higher rates of unemployment (see above); more casual employment; work that requires less training and education; and work that pays less. In Aotearoa/New Zealand those most likely to be involuntary part-time workers (i.e., working more than one and less than 30 hours per week) are women and, in particular, Māori women (Ministry of Women's Affairs 2001). This kind of underemployment often means that workers are unable to meet their financial needs. Even when work is full-time, workers who have undertaken unskilled or low status work in the past are finding themselves increasingly marginalised in the current work climate (Baker 2001).

In 1991 and 1995, 11% of the workforce were in casual, temporary, and fixed-term employment (Brosnan and Walsh 1996 as cited in Tucker 2002). A third or more of these workers were in service sector employment. Māori employment in this sector has grown by over 70% in the past 20 years (Department of Labour, 2005). It seems reasonable, therefore, to assume that many Māori workers in the service sector industry are in some form of precarious employment. While employment in the service sector has been described as a buffer against economic downturn (Department of Labour 2005), the risk now is that those in precarious employment within the sector are having their health and safety compromised.

In summary, the occupational segregation of Māori into industries that are more likely to suffer from workplace injury, alongside the larger proportion of the Māori workforce engaging in shift work and in precarious employment, places Māori workers at higher risk of workplace injury and disease. While this jigsaw puzzle has been fitted together to provide a picture of Māori occupational risk, it is still reasonably tentative and in need of further investigation. As Wren (2002) notes, our understanding of OSH in this country needs to gain theoretical traction for a greater understanding of the issues impacting on workers. The next section looks at the data on occupational injury and disease for Māori workers in Aotearoa/New Zealand and looks to the context provided above for possible explanations.

Occupational injury and disease

A 2004 NOHSAC report on occupational injury and disease in this country highlights the lack of information on Māori work-related mortality and morbidity (Driscoll et al 2004). The authors attribute this to the undercounting and/or small numbers of Māori cases; and the inconsistent classification of ethnicity over time and across government agencies. This overview of occupational injury and disease is largely drawn from the NOHSAC report.

Injury – mortality

- Each year there are about 100 work-related fatal injuries in this country. Ninety-four percent of those who die are men, with more than one third of all deaths occurring in the agriculture, forestry, and fishing industry (39%) (Anonymous 1999, 2003).
- In the 10-year period 1975-1984 there were 986 work-related fatal injuries. The death rate for Māori workers (12 per 100,000 person years) was higher than the average rate (7.2 deaths per 100,000 person-years) (Cryer and Fleming 1987).
- In the 10-year period 1985–1994 there were 741 work-related fatal injuries, including 89 Māori deaths (12%) (age adjusted relative risk (RR) =1.56, 95% CI 1.22–1.98). The adjustment of the rates for industry (RR=1.19, 95% CI 0.95–1.50) and occupation (RR=1.10, 95% CI 0.86–1.41) reduced the difference between Māori and non-Māori to non-significant levels. However this controlling for

- industry and occupation may hide the impact of occupational segregation on Māori workplace fatalities (MacCracken et al 2001).
- In 2003/04, 101 people died as a result of workplace injuries (Accident Compensation Corporation 2004). Previous research (above) suggests that approximately 12 would have been Māori.

Injury – morbidity

- In 2003 Māori workers had the highest workplace injury claim rate (190 per 1,000 FTEs) (Table 14.3) (Statistics New Zealand 2004). This was attributed to the high representation of Māori workers in industries and occupations that have high injury rates (for example, manufacturing). Occupational segregation, therefore, places Māori at more risk of workplace injury and death. In addition the ACC acknowledges that Māori injury claims in 2003–04 were significantly lower than for the general population, so the rate for Māori in Table 14.3 is likely to be an underestimate (Accident Compensation Corporation 2005).

Table 14.3: New workplace injury claims, by ethnicity, 2003

Ethnic group	Number of claims	Rate per 1,000 FTE
Māori	31,200	190
Pacific	12,300	157
European	177,700	134
Other (including Asian)	13,900	112
Total	247,500	146

Source: Statistics New Zealand 2004

- Working on data from the 2001/02 financial year, the NOHSAC report shows that the crude relative risk rate for Māori (1.37) was reduced when occupational distribution was controlled for (1.11). The authors concluded that differences in occupation explained more than 70% of the Māori/non-Māori disparity in non-fatal injury rates.

Disease

There is limited data on Māori workplace-related disease. Overall, NOHSAC estimates that 700–1,000 New Zealanders die each year as a result of work-related disease. They also estimate that each year there are “17,000–20,000 new cases of work-related disease and 2,500–5,500 new severe cases of work-related disease” (Driscoll et al 2004, p. 154). These diseases mostly occur in men, with the most common thought to be musculoskeletal disease. Again, occupational segregation may mean Māori workers are at more risk of work-related disease than non-Māori workers.

Discussion

This chapter has presented a brief overview of Māori and OSH. Three workplace risks– occupational segregation, shift work, and precarious employment– were described to set a context for the discussion of workplace injury and disease. While the links between shift work and workplace disease were clear, those between precarious employment and workplace injury and disease have received little research attention. At the 2005 Hui Taumata, the increase of Māori working in the service industries was seen as in some way ‘future proofing’ Māori employment from the type of economic downturn in the late 1980s that saw Māori employment in primary industries so drastically curtailed. However, is this ‘future proofing’ putting the Māori workforce at risk because workers are now heavily engaged in service industries and most likely precarious, non-standard employment? More research is needed to find out about the experiences of Māori workers, including the hazards they are facing in their workplace because of their work circumstances.

Within OSH research the disparities between Māori and non-Māori workplace injuries have been attributed to occupational segregation. However, it is argued here that research that controls for occupational segregation, and then finds no disparity, is somehow missing the point of Māori being segregated into more risky occupations. Perhaps the ‘commonsense’ of Māori being segregated because of productivity characteristics drives this type of OSH research. The challenging of this commonsense by Sutherland and colleagues now signals the need for a finer examination of the underlying causes of segregation in order to understand Māori workplace risk. Occupational segregation signals that Māori workers are less valued than non-Māori workers. OSH in this country has therefore become a case of what Bhattacharya (2002) describes as ‘differential fates for different bodies’; that is, the experience of Pākehā workers in this country is fundamentally different from the experience of Māori workers. What is needed to counter this is a policy response that reduces discrimination in the labour market and advocates for Māori workers (cf. Iunes 2002).

There is also ample rationale within the data on workplace injury and disease for workplaces to be made safer for workers. Wren (2002), however, argues that as a general rule employer organisations around the world oppose the introduction of OSH legislation that contains statements about workers’ rights. The bottom-line for employers is invariably the economic viability of their business and this may result in less protection for workers if this protection is seen as ‘unaffordable’ in economic terms. This ignores the fact that no-one should be injured, let alone die, because of work they do. Bhattacharya (2002) describes such death as legally sanctioned murder. So while the disparity between Māori and non-Māori can be discussed in academic terms, it needs to be remembered that each person injured, made sick, or killed because of the work they do is an individual with a family or whānau that is left without a breadwinner, and sometimes without a loved one altogether. Any such loss should therefore be seen as unacceptable.

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15 PRISON HEALTH

Julia Carr

Effective interventions at the interface between the criminal justice system and health systems have the potential to make a significant impact on hauora Māori. Any discussion of this interface must acknowledge as a starting point the colonial origins of the New Zealand criminal justice system and correctional systems. These systems have been transported to and transplanted in Aotearoa/New Zealand, with a British methodology for punishment and rehabilitation of individuals convicted of offences deemed significant and serious. Into this framework, kaupapa Māori initiatives have been added in an effort to bring elements of Māori methodology into the institutional arrangements. Despite these concessions, the courts and prisons represent important mechanisms reinforcing the dominant culture's institutional power, with significant potential to alter the life course of those managed through their processes. The topic of prisoner health and imprisonment is included in *Hauora: Māori standards of health IV* to keep this health setting visible and to highlight the peculiarly stigmatising and potentially harmful outcome that can occur for Māori as a result of systemic failures in health and other sectors.

New Zealand has a high rate of incarceration (189/100,000 in 2006) compared to other OECD countries and Māori experience imprisonment at an alarmingly high rate (568 per 100,000 for Māori compared to 98 per 100,000 for non-Māori in 2006) (OECD 2007; Ministry of Justice 2007).

Table 15.1, based on Department of Corrections data for sentenced prisoners, demonstrates that Māori imprisonment rates, adjusted for population size and age structure, are more than five and seven times the rates of non-Māori for males and females respectively. A marked disparity is also seen in remand rates with Māori eleven times more likely to be remanded in custody than Europeans awaiting Court appearance or sentence (Ministry of Justice 2007).

Table 15.1: Sentenced prisoners 2003 by sex, total numbers and age-standardised rates per 1,000 population

Sex	Māori		Non-Māori		Rate ratio
	Number	Rate per 1,000	Number	Rate per 1,000	
Males	2,335	11.86	2,498	2.14	5.54
Females	148	0.70	114	0.10	7.20

Rates age-standardised to 2003 total Māori population aged 14 years and over.

Prison inmates not only lose their freedom but also lose the ability to influence matters affecting their health, including sanitation, diet, level and type of physical activity, social environment, communicable disease exposure, and health care. Internationally and in New Zealand, prison health systems are increasingly under scrutiny as formal evidence of the high levels of morbidity, disability, and mortality in inmate populations is recognised (Simpson et al 1999; Sattar 2001; Wobeser et al 2002; Correctional Services Canada 2004; Ministry of Health 2006; Møller et al 2007).

The state has a 'duty of care' and inmates have a right to health care 'equivalent' to that available outside prison (New Zealand Corrections Act 2004). As Māori make up a high percentage of the prison population, issues of access and quality of care within prison health systems are of particular interest. Current services are of variable quality, often depending more on local relationships with providers or the competence and motivation of particular health professionals than consistent systems supporting professionals to deliver high quality care in this specialised setting. Facilities, access, privacy, information systems, professional standards and clinical best practice, screening and surveillance, mental health, alcohol and drug treatment, public health and primary care are all areas requiring further development to meet a standard of 'equivalence' with community health services.

Prisons can act as a reservoir of communicable disease, affecting not only inmates and staff but the wider community. A tuberculosis outbreak associated with Rangipo Prison was linked to seven prison-associated cases and affected at least 54 in the non-prison community, with 86% of those affected Māori (De Zoysa et al 2001). Inmates and prison staff are entitled to expect protection from infectious disease, and prison-acquired communicable disease represents a significant potential compensation risk.

The prison environment itself is harsh, physically and psychologically, and the negative health effects are beginning to be documented in a more systematic way than previously. Incarceration may reduce life expectancy. The effect on amenable mortality of restricted access to adequate nutrition and physical activity, (the 'enforced idleness' described by the Office of the Ombudsmen) (Ministry of Justice 2005), additional exposures to carcinogens and infectious agents, and barriers to health care interventions that are shown to improve outcomes may compound in a way that can be measured at a population level. Our ability to quantify the effects for individuals on cardiovascular risk, for example, is rapidly becoming more sophisticated. Imprisonment removes freedom but at what point do we acknowledge and quantify the additional risks of incarceration for Māori by imposing conditions that are known, in a community context, to increase the risk of premature morbidity and mortality?

Prisons offer the opportunity, on the other hand, to intervene in ways that reduce barriers to health care and ensure excellence in the care offered (Møller et al 2007). There has been considerable work between the Ministry of Health and Department of Corrections, since a Memorandum of Understanding was signed in 2003, to improve health services and information about the health of prisoners. The least we should aim for is a high standard of prison health service, a population level surveillance system of the health of prisoners and informed responses to the results, specialised and supported health professionals, and an optimum prison building and programme design, to minimise the harm of incarceration.

A public health approach to Māori imprisonment, however, would concentrate on 'upstream' measures to reduce the high rate of criminal conviction and imprisonment of Māori. Income inequality, educational system failure, lack of early and intensive interventions to address the needs of rangatahi 'at risk' or early in their contact with the criminal justice system require a serious shift in resource allocation. The current frameworks within the Department of Corrections focus on 'criminogenic' factors for individuals, with limited acknowledgment of structural, environmental, or social determinants of crime. Nor is there consistent support for early intervention across the health and criminal justice systems.

Intergenerational deprivation, compounded by imprisonment and alienation, is unlikely to produce improved outcomes. There is ample evidence of the failure of imprisonment in reducing recidivism and good evidence for alternative approaches for people with underlying drug and alcohol issues and those involved in less serious crime (Ministry of Health 2007). Although prison overcrowding and the burgeoning associated costs, compensation claims by prisoners, and the Ombudsmen's Investigation of the Department of Corrections have prompted a policy re-think, barriers to change in the Health and Corrections systems and relatively uninformed public debate allow more young Māori to be processed into prisons every day.

The National Health Committee's Public Health Advisory Committee has recently released their document supporting Health Impact Assessment as "a formal process that aims to ensure public policies, programmes and plans enhance the potentially beneficial effects on health and wellbeing and reduce or mitigate the potential harm with innovative solutions" (National Advisory Committee on Health and Disability 2007, p.2). The case for Health Impact Assessment, as policy options for effective interventions in criminal justice are explored, has never been stronger.

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16 PRIMARY CARE AND MĀORI: FINDINGS FROM THE NATIONAL PRIMARY MEDICAL CARE SURVEY

Sue Crengle

This chapter describes key findings from the National Primary Medical Care Survey (NatMedCa) as they relate to Māori health and inequalities.

The National Primary Medical Care Survey was undertaken in 2001/2002 with the aim of describing primary medical care in New Zealand, including the characteristics of primary care provider practices and the staff that work in them, the patients they see, and the problems managed, investigations ordered and treatment offered during visits by patients. The study included private general practices, community governed[1] providers, Māori providers[2], accident and medical centres and emergency departments. Two reports specifically relating to Māori have been produced: NatMedCa Report 3 described Māori provider organisations and the patients who attended those providers (Crengle et al 2004), and NatMedCa Report 6 provided a comparison of the experience of Māori and non-Māori patients in the primary medical care setting (Crengle et al 2005). Previous publications on this topic have been largely qualitative and focused on differences in the paradigm and processes that differentiated Māori from other providers, or narrative with little information on outcomes of care (see, for example Crengle 1997, 2000; Maniapoto and Gribben 2003). Detailed information on NatMedCa design, and the strengths and limitations of the survey can be found in other reports (Crengle et al 2004; Crengle et al 2005).

In brief, data was collected from a total of 244 general practitioners (GPs) across the country. The practices that these practitioners worked in were divided into three types: Māori providers, community-governed providers and private practices. A range of information was collected about every patient visit during the data collection period (6,384 Māori patient consultations and 33,805 non-Māori consultations). More detailed information about visits (for example the problems seen, tests and investigations ordered and referrals made) was collected from one in every four consultations (1,447 Māori and 7,677 non-Māori consultations).

About 21% of Māori visits were to Māori providers, 73% were to private general practices, and the remaining 6% were to community-governed providers. Māori

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[1] Community governed primary care providers: a full definition of community governed may be found in Crampton P et al (2004). *Primary Health Care in Community-governed Non-profits: The work of doctors and nurses: The National Primary Medical Care Survey (NatMedCa): 2001/02. Report 2*. Wellington: Ministry of Health. URL: http://www.moh.govt.nz/moh.nsf/wpg_Index/Publications-Primary+Health+Care+in+Community-governed+Non-profits+NatMedCa+Report+Two

[2] Māori provider was defined as a provider who met the four Ministry of Health criteria for Māori provider status. These are: is the practice an independent Māori health provider; are your services targeted towards Māori; does the provider have a Māori management structure; and does the practice have a Māori governance structure?

patients accounted for about 12% of all visits to GPs – disproportionately low compared to the percentage of Māori in the population. Known disparities in socioeconomic status were evident: a greater percentage of Māori had community service cards and a higher proportion lived in high deprivation geographic areas. Māori patients were younger than non-Māori patients. Over 90% of Māori patients considered the provider they attended during the survey to be their usual source of care. This is similar to the percentage seen in non-Māori patients. Fourteen Māori providers participated in NatMedCa. Within these providers 28 staff (21 doctors and seven nurses) participated.

This section summarises some of the findings presented in the NatMedCa reports 3 and 6 (Crengle et al 2004; Crengle et al 2005). It is important to state that these reports only present the results of an initial, simple data analysis. More detailed analysis of the data, including tests of statistical significance, is necessary to confirm the findings suggested by the initial analysis. This work is ongoing.

A number of differences in organisation, governance and management between Māori, community-governed, and private providers were identified in the survey. The majority of Māori and community-governed providers were trusts or incorporated societies; however, the majority of private practices were sole trader, partnership or limited liability companies. All Māori provider practices had separate or external governance or management committees and the majority had community representation in governance and/or management. This finding was similar to that for the community-governed providers but markedly higher than that observed in private practices. A higher percentage of Māori provider practices used computerised patient records, had undertaken formal community needs assessments, and used locality service planning and intersectoral case management than private practices. A higher percentage of Māori providers had written policies on complaints and quality management than private practices. Fees were lower for Māori providers than for private GPs. The number of full-time equivalent medical and nursing staff in Māori providers was lower than that in community-governed and higher than that in private practices. However, employment of community health workers was much more common with Māori providers. Doctors working in Māori providers tended to be female, younger, relatively new to both general practice and to the specific provider organisation. A higher (but still relatively low) proportion were Māori, and a higher proportion had qualified outside New Zealand.

Patients attending Māori providers came from a range of ethnic groups but were predominately Māori (58.9%). About one-third of problems identified in the visit were new problems. A higher proportion of adults aged 25–44 years attending Māori providers had three or more problems managed during the visit than those attending private GPs. Just under one-third (27.1%) of visits resulted in an investigation of any type. More specifically, laboratory tests were requested in 16% of visits and imaging (for example x-rays) were requested in 4% of visits. Over 60% of visits resulted in a prescription being written, and referrals were made in about 18% of consultations.

The findings concerning Māori providers suggest that they are increasing access to care for Māori and support the historical government and funding agency policies relating to Māori provider development. The higher percentage of Māori working within Māori providers also lends support to policies regarding Māori workforce development.

For Māori attending general practitioners:

- Māori had slightly fewer visits in the previous year (mean = 6.1) than non-Māori (mean = 6.7)
- visits for Māori patients were shorter
- doctors reported lower levels of rapport with Māori patients
- a higher proportion of Māori visits were deemed by the GP to have high urgency
- while the mean number of problems managed in each visit were similar for Māori and non-Māori, age- and gender-specific rates of new problems managed tended to be higher in the younger age groups, and lower in the older age groups
- tests and investigations were requested in a slightly lower percentage of Māori visits, and slightly more Māori visits resulted in the writing of a prescription.

Several findings raised questions about quality of care. For example, cardiovascular disease (New Zealand Guidelines Group 2003a) and diabetes (New Zealand Guidelines Group 2003b) are more common in the Māori population. The most recent guideline regarding the assessment and management of cardiovascular disease risk recommends that screening (including blood lipid and glucose measurement) begin at age 35 for Māori males and 45 for Māori females (New Zealand Guidelines Group 2003a). Therefore, higher rates of lipid and glucose blood test investigations would be expected in Māori. However rates of requesting lipid and glucose blood tests were lower for Māori in the 35–44, 45-54, and 55–64 year age groups than non-Māori. As a further example, 9.5% of Māori patients who received a new diagnosis of chronic obstructive respiratory disease during the visit were given a prescription for a respiratory drug compared to 77.8% of non-Māori.

Other findings are concerning when one considers the excess burden of disease that Māori experience. For example, the lower mean duration of consultation in all age groups, similarities in the rate of new problem identification in age groups between 35 and 74 years, and the similar or lower rates of tests/investigations in adults (particularly 25–64 year age groups) might all be considered inconsistent with known information about burden of disease and the associated expected findings from a primary care survey such as this.

More detailed analyses, taking into account differences such as age and the number of problems managed in a visit, are required to confirm and understand the findings more fully.

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APPENDIX 1: METHODS

Bridget Robson, Gordon Purdie

Introduction

This appendix provides an overview of the methods and data sources used in the analysis of hospitalisation, cancer registration, and mortality data for *Hauora IV*. It relates to data presented in the mortality, hospitalisations, cancer, and parts of the mental health, cardiovascular disease, diabetes, and respiratory, chapters.

General statistical methods are described, followed by specific details of deaths, hospitalisation and cancer data analysis.

Ethnicity classification

Hauora IV presents statistics on disparities in health between Māori and non-Māori. Accurate ethnicity data is important to enable this comparison. Previously however, official health data have been shown to undercount Māori. This leads to a mismatch between numerators and denominators that can bias results when population census denominator data are used to calculate rates.

For this edition of *Hauora*, population rates for deaths were calculated between 2000–2004 using ethnicity as recorded on death registrations. Anyone recorded as Māori (either alone or in combination with another ethnic group or groups) were classified as Māori. Everyone else was classified as non-Māori. Recording of Māori on death registrations appears to have improved. The latest NZCMS for the period 2001–2004 shows no net undercount of Māori deaths on mortality records compared with matched census numbers (Fawcett et al, in press).

Hospitalisations and cancer registrations continue to undercount Māori. This undercount was estimated by linkage to other datasets with more reliable ethnicity data. From these estimates, Māori adjusters were created and applied to hospital and 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 hospital discharges and cancer registrations (as recorded on these data sets) to estimate Māori numbers. Non-Māori numbers were estimated as the difference between the total number of hospitalisations or 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. Hospitalisation rates were calculated for 2003–2005, and cancer incidence for 2000–2004.

Where modelling was used to analyse data (e.g., cancer survival, deprivation modelling) ethnicity data was not adjusted.

Data sources

Numerators

Details on the data obtained, their sources and time periods along with the chapters in which the data are presented are listed in Table A1.1.

Table A1.1: Sources of numerator data

Source (agency or collection)	Data	Period	Chapter/s data presented in
New Zealand Health Information Service	Mortality	2000–2004	mortality, cancer, mental health CVD, diabetes, respiratory diseases
	Public hospital discharges	2000–2005	hospitalisations, mental health CVD, diabetes, respiratory diseases
New Zealand Cancer Registry	Cancer registrations	2000–2004	cancer
Statistics New Zealand	Population census	2001, 2006	population, socioeconomic indicators

The mortality, hospital discharge and cancer registration datasets were coded according to the International Classifications of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) classification and the Tenth Revision of the International Classifications of Diseases, Australian Modification (ICD-10-AM). These classifications organise causes of death or hospital admission into chapters, subgroups and specific causes. For example, Circulatory System disease is a chapter heading, and ischaemic heart disease is a subgroup of this chapter. Appendix 2 lists all ICD-9-CM and ICD-10-AM codes used in Section II. The diseases were grouped according to the ICD-10-AM classification scheme.

Denominators

Age-sex-ethnicity-specific population estimates for each year from 2000 to 2005 served as denominators for mortality, hospitalisation or cancer registration rates. They were obtained from Statistics New Zealand's revised estimates of the mid-year resident Māori ethnic group population[1] and 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.

Area deprivation

NZDep2001 is an area-based index of socioeconomic 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 table A1.2), 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

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[1] These estimates include adjustments for: missing responses to the ethnicity question; the estimated net undercount at the 2001 Census as measured by the 2001 Post-enumeration Survey; the estimated number of Māori residents temporarily overseas on census night; and estimated external migration, births and deaths.

containing a median of 90 people (approximately 60 households). Each proportion is age-standardised and where necessary adjusted for household composition.

Table A1.2: Variables included in NZDep2001 index

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

Source: Salmond & Crampton 2002

A deprivation score for census area units, rather than meshblocks, was used. The score, from 1, which is the least deprived, to 10 the most deprived, is derived from the distribution of the population weighted average NZDep2001 meshblock first principal component scores. Where the 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 area that were in use in the 2001 Census.

Mortality rate

The mortality rate is the number of deaths in a specified population during a year, usually expressed as the number of deaths per 100,000 per year. That is:

$$\textbf{mortality rate} = \textbf{(deaths/population)} \times \textbf{100,000}$$

For example, a Māori mortality rate of 27 per 100,000 for 2000–2004 represents the yearly risk of death in the Māori population each year, i.e., out of 100,000 Māori, on average, we would expect 27 to die each year.

The *numerator* of the mortality rate is the number of deaths. The *denominator* of the mortality rate is the size of the population. Because the mortality rate is a rate, and not a proportion, the population size is the estimated mid-year population (Beaglehole et al 1993).

Incidence rate

The cancer incidence rate (for example) is the number of newly diagnosed cancers of a specific site/type registered in a specified population during a year, usually expressed as the number of cancers (registrations) per 100,000 per year. That is:

$$\textbf{incidence rate} = \textbf{(new cancers/population)} \times \textbf{100,000}$$

The *numerator* of the incidence rate is the number of new cancers; the *denominator* of the incidence rate is the size of the population. As for the mortality rate, the mid-year population is used for the denominator. The population used depends on the rate to be calculated. For example, for cancer sites that occur in only one sex (e.g., cervical cancer), the sex-specific population is used (i.e., females). The number of new cancers may include multiple primary cancers occurring in one patient.

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 have been age-standardised using direct standardisation, which applies age-specific rates 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 persons 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 the main body of *Hauora IV* 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. Use of a Māori population 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. Mortality rates standardised to Segi's world population or the World Health Organization (WHO) population are generally higher (because these standard populations are older and place greater weight on events at older ages). In some instances the rate ratios also differ (Robson et al 2007). Tables of mortality, hospital discharge and cancer registration rates age-standardised to Segi's world and WHO world populations, will be available on the *Hauora IV* website (www.hauora.maori.nz). Details of the standard populations can be found in Appendix 4.

There were a very small number of records with missing values where sex was not recorded. Therefore, numbers used in crude and age-sex standardised rates may not correspond exactly.

Crude rates are reported within each age group presented in tables except for the 65+ age group. Because this group includes all ages 65 and above, there is a marked discrepancy in ages within this group between Māori and non-Māori, with Māori being mainly in the early part of this age range. Therefore, results for this age group were age-standardised as described above.

Appendix One

Rate ratios

Rate ratios (or relative risks) are used as a measure of disparities between Māori and non-Māori. In this book rate ratios were calculated by dividing the Māori rate by the non-Māori rate:

Rate ratio = Māori rate per 100,000/non-Māori rate per 100,000

A rate ratio higher than 1 signifies that Māori have a higher risk than non-Māori. If the rate is less than 1, the risk is lower among Māori than non-Māori. For example, if the rate ratio for deaths from cancer was 1.80, Māori would have an 80% (or 1.8 times) higher chance of dying from cancer than non-Māori. If it was 0.90, Māori would be 10% less likely than non-Māori to die from the disease.

Rate differences (absolute differences)

Rate differences (sometimes called absolute differences) are another measure of disparities. They measure how many deaths (or cases of cancer, for example) per 100,000 population (or person-years) would need to be prevented to eliminate the disparity. In this book, they were calculated by subtracting the non-Māori rate from the Māori rate:

Rate difference =
(Māori mortality rate per 100,000) – (non-Māori mortality rate per 100,000)

For example, if the Māori death rate from cancer was 120 per 100,000 and the non-Māori rate was 80 per 100,000, the rate difference would be 40 deaths per 100,000.

If rate differences are calculated from age-standardised rates, the population standard used to calculate the rate will make a difference to the rate difference. In this book we have standardised rates to the Māori population, which generally produces smaller rates than Segi's or the WHO standard, and thus smaller rate differences.

Rate differences provide information on the size of the problem, as well as the inequality. A rate ratio, on the other hand, may be very large but only involve a few deaths. We have used rate differences to estimate the contribution of specific causes to the overall disparity between Māori and non-Māori in mortality or hospitalisations. For example, the rate difference for a specific cause was divided by the rate difference for all-cause mortality or hospitalisations, and expressed as a percentage.

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.

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 book, p-values are used to test for significant differences between groups as well as significant trends in data.

In this book, 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).

Time trends

Poisson regression (Dobson 1990) was used to model trends in rates over time (2000–2004 for deaths and cancers; 2000–2005 for hospitalisations), using the GENMOD procedure of SAS version 9. Males and females were modelled separately for sex specific variables, otherwise they were combined. The log of the rates were modelled as a function of ethnicity (Māori or non-Māori); gender (where appropriate); age (five-year age groups and age 85 years and above as a categorical variable); year (as a continuous variable); and an interaction term (ethnicity x year). The poisson errors in the model were assumed to have autoregressive correlations between years, within ethnic-sex-age groups. We report on selected statistically significant time trends in deaths and cancers.

Deaths data

The mortality chapter presents the number and rate of Māori and non-Māori deaths registered in the years 2000–2004. The number of Māori deaths registered each year is comparatively small when presented by age-group and specific causes. To overcome the yearly fluctuation in rates that can occur when numbers are small, all deaths in the five-year period were combined. The numbers of deaths shown in tables are, therefore, the total number of deaths for the five-year period 2000–2004. The rates are the number of deaths per 100,000 person-years.

Analysis by deprivation

Poisson regression (Dobson 1990) was used to model the association between mortality and area deprivation, using the GENMOD procedure of SAS version 9. Males and females were modelled separately. The log of the mortality rate was modelled as a function of ethnicity (Māori or non-Māori); age (five-year age groups and age 85 years and above as a categorical variable); 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 deaths, they were grouped with adjacent age groups.

Two estimates were used: the first adjusted for age alone and the second adjusted for age and deprivation combined. The difference between the two estimates indicates the proportion of the mortality disparity that could be attributed to the higher proportion of Māori living in more deprived areas.

To test if the deprivation gradient was different for Māori and non-Māori and to estimate these gradients, 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 mortality and area deprivation is multiplicative, not linear, and hence we report the ratio of the gradients to express the interaction.

Hospital data

The chapter on hospitalisations includes data on publicly-funded hospital discharges only. Privately funded hospital data was not available. Public hospital discharges were summed for the three years (2003–2005) and divided by the sum of the three years of population data (2003–2005).

These data report rates of admissions per 100,000 person years, not rates of individuals admitted. With the exception of external causes, rates of hospitalisation are reported for principal diagnosis of admission only. Secondary diagnoses are not included. The unit of analysis is the number of discharges (episodes of care). Therefore, each readmission of a patient for the same condition is counted as a separate episode of care and patients transferred to another public hospital are counted twice. A smaller proportion of Māori admissions were coded as transfers from another hospital than non-Māori patients (4.47% compared to 6.71%) during our period of analysis. Patients dying in hospital are also included.

In some instances we calculated the number and rate of Māori and non-Māori individuals admitted to hospital one or more times during the 3 year period or during the year 2005. These rates were calculated using the encrypted NHI identifier.

Hospital procedures

Hospital procedures are recorded in a different way from principal and secondary diagnoses. There can be multiple procedures reported for one admission. We report rates of procedure per 100,000 person years, not rates of individuals admitted for a procedure, nor rates of admission for a procedure. The ICD codes for procedures are listed in Appendix 2.

External causes and injury data

The ICD classification includes injury codes which record the type of injury (e.g., head injury, burns), and codes for external causes (e-codes) which record the cause of the injury (e.g., falls, poisoning, motor vehicle accidents). E-codes are classified as intentional (e.g., assault, intentional self-harm), unintentional, or undetermined.

E-codes were analysed for admissions where injury was the principle diagnosis. Hospital discharge records can include multiple e-codes.

When death is the result of an injury, mortality data records the e-code (external cause) as the cause of death. Rates of death from external causes were calculated from the underlying cause of death coded on the death registration.

The ICD codes for injuries and external causes are listed in Appendix 2.

Cancer data

New Zealand has a national cancer registry, the New Zealand Cancer Registry (NZCR), which collects information on all new primary malignant cancer cases. The NZCR includes information on each cancer registration (such as site, stage and pathology), as well as demographic information such as age, gender and ethnicity. This information is gathered from laboratory reports, discharge reports from public and private hospitals, death certificates and autopsy reports (Ministry of Health 2002).

We calculated Māori and non-Māori cancer incidence (from adjusted cancer registrations) and cancer mortality (from death registrations). We also present data on stage at diagnosis (see below) and on cancer survival (see below). Only incidence rates were adjusted for undercounting of Māori in cancer registrations to minimise the numerator / denominator mismatch when using population data to calculate incidence rates. Stage of disease and survival analyses used ethnicity as coded on the NZCR.

Data inclusions and exclusions

Data on cancer registrations in *Hauora IV* were obtained from the NZCR and 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. Data on cancer deaths were obtained from the NZHIS mortality data set.

For the cancer survival analysis (see section on survival analysis below), 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.

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). Information on the extent of disease up to four months after diagnosis is 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.

- ***In situ* cancer** is early cancer that is present only in the layer of cells in which it began.
- **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 A1.3 presents the staging classification used by NZCR (prior to 1999 and from 1999 on) and how we have classified stage of cancer disease in *Hauora IV*. Data are presented on invasive neoplasms only. *In situ* tumours are not included. The staging classification is not applicable to lymphomas (Hodgkin's disease and non-Hodgkin's lymphoma), myeloma or leukaemias.

Table A1.3: Stage classification (extent of disease)

New Zealand Cancer Registry prior to 1999	New Zealand Cancer Registry 1999 onwards	Hauora IV
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

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 stage at diagnosis for Māori compared with non-Māori, adjusted for age at diagnosis as a continuous variable. The odds of being diagnosed at localised or distant stage among Māori and non-Māori staged cancers were compared, adjusted for age at diagnosis. Odds ratios were calculated using the logistic procedure of SAS version 9.1 (SAS Institute Inc, Cary, NC).

Survival analyses

There are several techniques for conducting survival analyses. Each can produce slightly different results, and each has its own strengths and limitations (Platel & Semmens 2004). In *Hauora IV* we calculated hazard ratios (see below) for the years 2000–2004 to estimate the relative risk of cancer-specific death after diagnosis, for Māori compared with non-Māori, adjusted for sex and age. To estimate the contribution of differential stage at diagnosis to differences in survival, hazard ratios were also calculated adjusted for sex, age and stage at diagnosis. The percentage change in hazard ratios after adjusting for stage indicates potential reductions in disparities if both populations had the same distribution of disease spread at diagnosis.

The hazard function estimates for each time interval following cancer diagnosis (in this case days), the risk of death among those who have survived up to the start of that time (Lee 1980). Proportional hazards regression (Bland 1995) 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.

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 as of the date of death. This was under the assumption that any misclassification of cause of death was non-differential between Māori and non-Māori. Those with no death record were assumed alive and were censored at 31 December 2004. This allowed us to compare Māori and non-Māori survival without regard to competing causes of death.

Cancer-specific 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 remains constant over time. The assumption of proportionality and linear relationship with age were checked using the graphical and numerical methods of Lin et al (1993).

Māori to non-Māori hazard ratios were calculated for selected cancer 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 categories 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.

To estimate the contribution of stage at diagnosis to the disparities in survival outcomes between Māori and non-Māori, we calculated hazard ratios also adjusted for stage at diagnosis. These were calculated in two ways: first, including registrations with unknown stage at diagnosis as a stage category, and secondly, restricted to staged cancers only. The estimates for each gender and each stage were estimated from models with interaction terms.

Appendix One

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APPENDIX 2: ICD CODES

Table A2.1: ICD codes for diseases and health-related problems

Description	ICD-10-AM codes used	ICD-9-CM codes used
I: Certain infectious and parasitic diseases	**A00–B99**	**001–139, 771.3 790.7, 790.8, V09 excluding 034.0, 040.2, 099.3, 099.40, 099.49, 135, 136.0, 136.1**
Intestinal infectious diseases	A00–A09	001–009
Tuberculosis (including late effects)	A15–A19, B90	010–018, 137
Meningococcal infection	A39	036
Infections, sexual transmission	A50–A64	054.1, 078.11, 090–099, 131 excluding 099.3, 099.56
Viral hepatitis	B15–B19	070
HIV	B20–B24	042, 079.53
Viral infection, unspecified, of unspecified site	B34.9	079.99, 790.8
II: Neoplasms (cancer)	**C00–D48**	**140–239, 258.0, 273.1, 273.3 excluding 237.7**
Malignant neoplasms	C00–C97	140–208, 238.6, 273.3
Lip, oral cavity and pharynx	C00–C14	140–149
Digestive organs	C15–C26	150–157, 159
• Oesophagus	C15	150 excluding 150.8
• Cancer of stomach	C16	151
• Colorectal	C18–C21	153–154
• Cancer of colon	C18	153
• Rectum, rectosigmoid junction and anus	C19–C21	154
• Liver and intrahepatic bile ducts	C22	155
• Gallbladder, other and unspecified parts of biliary tract	C23–C24	156
• Pancreas	C25	157
• Other digestive organs	C17, C26	150.8, 152, 159
Respiratory and intrathoracic organs	C30–C39	160–162, 163,[1]* 164–165
• Larynx	C32	161
• Trachea, bronchus and lung	C33–C34	162
• Other respiratory and intrathoracic organs	C30–C31, C37–C39	160, 163,* 164–165
Bone and articular cartilage	C40–C41	170
Skin	C43–C44	172–173
• Melanoma of skin	C43	172
• Other malignant neoplasms of skin	C44	173
Mesothelial and soft tissue	C45–C49	158, 163,* 171, 176
Breast: female	C50 & female	174
Breast: male	C50 & male	175
Female genital organs	C51–C58	179–184
• Cervix uteri	C53	180
• Uterus	C54–C55	179, 182
• Ovary	C56	183.0
• Other female genital organs	C51–C52, C57–C58	181, 183.2–183.9, 184

Note: * If the cancer registration is coded as C45.0, then deaths and hospitalisations are coded as mesothelial and soft tissue cancers. Otherwise they are coded as respiratory and intrathoracic organ cancers.

Appendix Two

Description	**ICD-10-AM codes used**	**ICD-9-CM codes used**
Male genital organs	C60–C63	185–187
• Prostate	C61	185
• Testis	C62	186
• Other male genital organs	C60, C63	187
Urinary tract	C64–C68	188–189
• Kidney, except renal pelvis	C64	189.0
• Bladder	C67	188
• Other urinary tract	C65–C66, C68	189.1–189.9
Eye and other central nervous system	C69–C72	190–192
• Brain	C71	191
• Other central nervous system	C69–C70, C72	190, 192
Thyroid and other endocrine glands	C73–C75	193–194
• Thyroid gland	C73	193
• Other endocrine glands	C74–C75	194
Malignant neoplasm of ill-defined, secondary and unspecified sites	C76–C80	195–199
Lymphoma	C81–C85	200–202.2, 202.8
• Hodgkin's disease	C81	201
• Non-Hodgkin's lymphoma	C82–C85	200, 202.0–202.2, 202.8
Multiple myeloma and other malignant immunoproliferative diseases and malignant plasma cell neoplasms	C88, C90	203, 238.6, 273.3
Leukaemias	C91–C95	202.4, 204–208
• Lymphoid leukaemia	C91	202.4, 204
• Myeloid leukaemia	C92	205
• Acute myeloid leukaemia	C92.0, C92.4, C92.5	205.0
• Other myeloid leukaemia	C92.1–C92.3, C92.8–C92.9	205.1–205.9
• Other leukaemias	C93–C95	206–208
Other and unspecified malignant neoplasms of lymphoid, hematopoietic, and related tissue	C96	202.3, 202.5–202.6, 202.9
Malignant neoplasm of independent (primary) multiple sites	C97	
In situ neoplasms	D00–D09	230–234
• Melanoma in situ	D03	232
• Carcinoma in situ of breast	D05	233.0
• Carcinoma in situ of cervix uteri	D06	233.1
• Other in situ neoplasms	D00–D02, D04, D07–D09	230–231, 233.2–234
Benign neoplasms	D10–D36	210–229
Neoplasms of uncertain or unknown behaviour	D37–D48	235–239, 258.0, 273.1 excluding 237.7, 238.6
III: Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	**D50–D89**	**135, 273.0, 273.2, 279.0–279.3, 279.8–279.9, 280–289 excluding 289.1–289.3**
IV: Endocrine, nutritional and metabolic diseases	**E00–E90**	**240–278, 330.0–330.2 excluding 258.0, 268.2, 273.0–273.3, 274**
Disorders of thyroid gland	E00–E07	240–246 excluding 244.0 244.1
Diabetes mellitus	E10–E14	250
• IDDM (type 1)	E10	250 with 5th digit 1 or 3
• NIDDM (type 2)	E11–E14	250 with 5th digit 0 or 2
Obesity	E66	278.0

Description	ICD-10-AM codes used	ICD-9-CM codes used
V: Mental and behavioural disorders	**F00–F99**	**290–319, V40.1, V40.3**
Organic, including symptomatic, mental disorder	F00–F09	290, 293, 294, 310
• Dementia, vascular and unspecified	F01, F03	290
• Personality and behavioural disorders due to brain disease, damage, and dysfunction	F07	310
Mental and behavioural disorders due to psychoactive substance use	F10–F19	291, 292, 303–305.7
• Alcohol	F10	291, 303, 305.0
• Opioids	F11	304.0, 304.7, 305.5292 – with other relevant diagnosis: 304.0, 304.7, 305.5 or E850.0–E850.2, E935.0–E935.2
• Cannabinoids	F12	304.3, 305.2, 292 – with other relevant diagnosis: 304.3, 305.2
Schizophrenia, schizotypal and delusional disorders	F20–F29	295, 297, 298.3–298.9, 301.22
• Schizophrenia	F20	295.0–295.3, 295.6, 295.8–295.9
• Schizoaffective disorders	F25	295.7
Mood (affective) disorders	F30–F39	296, 298.0–298.1, 300.4, 301.1, 311
• Manic episode and bipolar affective disorder	F30–F31	296.0–296.1, 296.4–296.81, 296.89, 298.1
• Manic episode	F30	296.0–296.1, 298.1
• Bipolar affective disorder	F31	296.4–296.81, 296.89
• Depressive episode and recurrent, and persistent mood [affective] disorders	F32–F34	296.2, 296.3, 296.82, 298.0, 300.4, 301.1, 311
• Depressive episode	F32	296.2, 296.82, 298.0, 311
• Recurrent depressive disorder	F33	296.3
• Persistent mood [affective] disorders	F34	300.4, 301.1
Neurotic, stress-related and somatoform disorders	F40–F48	298.2, 300, 306, 307.53, 307.8, 308, 309 excluding 300.4, 306.3, 306.51, 306.6, 309.21, 309.22
Eating disorders	F50	307.1, 307.5 excluding 307.53
Disorders of adult personality and behaviour	F60–F69	301, 302, 312.3 excluding 301.1, 301.22, 302.7, 302.89
Mental retardation	F70–F79	317–319
VI: Diseases of the nervous system	**G00–G99**	**320–359, 388.61, 435, 437.7, 780.5, 997.0 excluding 330.0–330.2, 337.2, 349.1**
Bacterial meningitis, not elsewhere classified	G00	320
Parkinson's disease, secondary Parkinsonism	G20–G21	332, 333.92
Alzheimer's disease	G30	331.0
Epilepsy, status epilepticus	G40–G41	345
Migraine	G43	346
Transient cerebral ischemic attacks and related syndromes	G45	435, 437.7
Mononeuropathies of upper limb	G56	354 excluding 354.5
Infantile cerebral palsy	G80	343
VII: Diseases of the eye and adnexa	**H00–H59**	**360–379, V41.0, V41.1 excluding 377.23, 365.14, 376.41**
Disorders of lens	H25–H28	366, 379.3
Glaucoma	H40–H42	364.22, 365 excluding 365.14

Appendix Two

Description	ICD-10-AM codes used	ICD-9-CM codes used
VIII: Diseases of the ear and mastoid process	**H60–H95**	**380–389, V41.2, V41.3 excluding 388.61**
Diseases of middle ear and mastoid	H65–H75	381–385 excluding 383.3
• Non-suppurative otitis media	H65	381.0–381.4
• Suppurative and unspecified otitis media	H66	382 excluding 382.02
• Perforation of tympanic membrane	H72	384.2
Hearing loss	H90–H91	388.01, 388.2, 389, V41.2
IX: Diseases of the circulatory system	**I00–I99**	**289.1–289.3, 390–459, 997.1, 997.2, 997.91 excluding 435, 437.7, 446, 459.0**
Acute rheumatic fever	I00–I02	390–392
• Acute rheumatic heart disease	I01, I02.0	391, 392.0
Chronic rheumatic heart disease	I05–I09	393–398
Hypertensive diseases	I10–I15	401–405
Ischemic heart disease	I20–I25	410–414, 429.2, 429.7
• Angina pectoris	I20	411.1, 413
• Acute myocardial infarction	I21	410
• Chronic ischemic heart disease	I25	412, 414, 429.2
Pulmonary circulation	I26–I28	415–417
Other forms of heart disease	I30–I52	420–429.1, 429.3, 429.5, 429.6, 429.8, 429.9
• Atrial fibrillation and flutter	I48	427.3
• Heart failure	I50	428
Cerebrovascular diseases	I60–I69	430–434, 436–437.6, 437.8–438
• Subarachnoid haemorrhage	I60	430
• Intracerebral haemorrhage, other nontraumatic intracranial haemorrhage	I61–I62	431–432
• Cerebral infarction, stroke, not specified as haemorrhage or infarction	I63–I64	433 or 434, with 5th digit 1, 436
Other diseases of the circulatory system	I70–I99	289.1–289.3, 429.4, 440–444, 447–458, 459.1–459.9, 997.1, 997.2, 997.91
• Atherosclerosis	I70	440
• Varicose veins of lower extremities	I83	454
X: Diseases of the respiratory system	**J00–J99**	**034.0, 460–519, 997.3 excluding 511.0, 518.82**
Acute upper respiratory infections	J00–J06	034.0, 460–465
Pneumonia	J12–J18	480–486
Acute bronchitis and bronchiolitis	J20–J22	466
Chronic diseases of tonsils and adenoids	*J35*	*474*
Chronic obstructive respiratory disease	J40–J44	490–492, 496
Asthma	J45–J46	493
Bronchiectasis	J47	494
XI: Diseases of the digestive system	**K00–K93**	**040.2, 520–579, 997.4 excluding 536.2, 568.82**
Teeth and gums	K00–K08	520–525
• Disorders of tooth development and eruption, embedded and impacted teeth	K00–K01	520
• Dental caries	K02	521.0
• Diseases of pulp and periapical tissues	K04	522
• Periodontal diseases	K05–K06	523, excluding 523.6

Description	ICD-10-AM codes used	ICD-9-CM codes used
Diseases of oesophagus, stomach and duodenum	K20–K31	530–537 excluding 536.2
• Diseases of oesophagus	K20–K22	530
• Gastric, duodenal, peptic gastrojejunal ulcers, gastritis duodenitis	K25–K29	531–535
Diseases of appendix	K35–K38	540–543
Hernia	K40–K46	550–553
• Inguinal hernia	K40	550
Non-infective gastroenteritis and colitis	K50–K52	555–556, 558
Other diseases of intestines and diseases of peritoneum	K55–K67	557, 560–569 excluding 564.2–564.4, 568.82
Diseases of liver	K70–K77	570–573
• Alcoholic liver disease	K70	571.0–571.3
Diseases of gallbladder, biliary tract and pancreas	K80–K87	574–577 excluding 576.0
• Cholelithiasis	K80	574
• Acute pancreatitis	K85	577.0
• Other diseases of pancreas	K86	577.1–577.9
Haematemesis, melaena and gastrointestinal haemorrhage, unspecified	K92.0–K92.2	578
XII: Diseases of the skin and subcutaneous tissue	**L00–L99**	**136.0, 680–709 excluding 706.3**
Infections of skin and subcutaneous tissue	L00–L08	680–686.0, 686.8–686.9, 695.81
XIII: Diseases of the musculoskeletal system and connective tissue	**M00–M99**	**099.3, 136.1, 268.2, 274, 279.4, 337.2, 446, 710–739, V48.6, V48.7 excluding 728.85, 729.82, 719.7**
Gout	M10	274
Arthrosis (osteoarthritis)	M15–M19	715
Other dorsopathies	M50–M54	722–724 excluding 723.0, 723.5, 724.0, 722.8
XIV: Diseases of the genitourinary system	**N00–N99**	**099.40, 099.49, 580–629, 788.0, 788.31–788.35, 788.37, 788.39, 997.5 excluding 599.7**
Glomerular diseases	N00–N08	580–583
Tubulo-interstitial nephritis	N10–N12	590.0, 590.1, 590.8
Renal failure	N17–N19	584–586
Urolithiasis	N20–N23	592, 594, 788.0
Urinary tract infection, site not specified	N39.0	599.0
Stress incontinence and other specified urinary incontinence	N39.3, N39.4	625.6, 788.31–788.35, 788.37, 788.39
• Stress incontinence	N39.3	625.6
Disorders of male genital organs	N40–N51	600–608
• Hyperplasia of prostate	N40	600
Inflammatory disorders of breast	N61	611.0
Inflammatory diseases of female pelvic organs	N70–N77	614–616
Non-inflammatory disorders of female genital tract	N80–N98	617–629 excluding 618.5, 625.6
• Endometriosis	N80	617
• Female genital prolapse	N81	618 excluding 618.5
• Dysplasia of cervix uteri	N87	622.1
• Excessive and frequent menstruation	N92.0, N92.1	626.2, 626.6
• Menopausal and other perimenopausal disorders	N95	627.1–627.9

Description	ICD-10-AM codes used	ICD-9-CM codes used
XV: Pregnancy, childbirth and the puerperium	**O00–O99**	**630–677, 792.3, V23.6 excluding 659.4–659.6**
Abscess of breast associated with childbirth	O91.1	675.1
XVI: Certain conditions originating in the perinatal period	**P00–P96**	**760–779 excluding 771.3**
Slow fetal growth and fetal malnutrition and premature	P05–P07	764–765
• Slow fetal growth and fetal malnutrition	P05	764
• Premature	P07.2–P07.3	765
Birth trauma	P10–P15	767
Respiratory and cardiovascular disorders specific to the perinatal period	P20–P29	768.2–770
• Birth asphyxia	P21	768.5–768.9
• Respiratory distress of newborn	P22	769, 770.6
Infection specific to the perinatal period	P35–P39	771 excluding 771.3
XVII: Congenital malformations, deformations, and chromosomal abnormalities	**Q00–Q99**	**237.7, 365.14, 376.41, 377.23, 740–759**
XVIII: Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified[1]	**R00–R99**	**459.0, 511.0, 518.82, 536.2, 568.82, 599.7, 706.3, 719.7, 728.85, 729.82, 780–799, V41.4–V41.6 excluding 780.5, 788.0, 788.31–788.35, 788.37, 788.39, 790.7, 790.8, 792.3**
Symptoms and signs involving the circulatory and respiratory systems	R00–R09	511.0, 518.82, 784.1, 784.7–784.9, 785.0–785.4, 785.9, 786, 796.2–796.3, 799.0–799.1
Symptoms and signs involving the digestive system and abdomen	R10–R19	536.2, 568.82, 782.4, 787, 789, 792.1, V41.6
Symptoms and signs involving the urinary system	R30–R39	599.7, 788 excluding 788.0, 788.31–788.35, 788.37, 788.39
General symptoms and signs	R50–R69	459.0, 780.2–780.3, 780.6–780.9, 781.5, 782.3, 783, 784.0, 785.5–785.6, 797, 799.3–799.4, 799.8–799.9 if not a death
Ill-defined and unknown causes of mortality	R95–R99	798, 799.8–799.9
• Sudden infant death syndrome	R95	798.0

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[1] The conditions and signs or symptoms included in categories R00–R99 consist of:

a. cases for which no more specific diagnosis can be made even after all the facts bearing on the case have been investigated;

b. signs or symptoms existing at the time of initial encounter that proved to be transient and whose causes could not be determined;

c. provisional diagnoses in a patient who failed to return for further investigation or care;

d. cases referred elsewhere for investigation or treatment before the diagnosis was made;

e. cases in which a more precise diagnosis was not available for any other reason;

f. certain symptoms, for which supplementary information is provided, that represent important problems in medical care in their own right. (ICD-10 version 7; see http://www.who.int/classifications/apps/icd/icd10online/).

Description	ICD-10-AM codes used	ICD-9-CM codes used
XIX: Injury, poisoning and certain other consequences of external causes	**S00–T98**	**349.1, 800–999, excluding 997.0–997.5, 997.91**
Injuries to the head	S00–S09	800–804, 830, 848.0, 848.1, 850–854, 870–873, 910, 918, 920–921, 925.1, 950–951, 957.0
Other injuries	S10–T14	805–829, 831–847, 848.2–848.9, 860–869, 874–904, 911–917, 919, 922–924, 925.2–929, 952–956, 957.1–957.9, 959
Burns	T20–T31	940–949
Poisoning by drugs, medicaments and biological substances	T36–T50	960–979, excluding 961.2
Complications of surgical and medical care, not elsewhere classified	T80–T88	349.1, 995.2, 995.4, 996–999, excluding 997.0–997.5, 997.91
XX: External causes of morbidity and mortality	**V01–Y98**	**E800–E999**
Accidents	V01-V99, W00-X59, Y85, Y86	E800-E848, E850-E869, E880-E929 excluding E904.0
Transport accidents	V01–V99, Y85	E800–E848, E929.0, E929.1
• Pedestrian	V01–V09	E800–E807 with 4th digit 2, E810–E825 with 4th digit 7, E826–E829 with 4th digit 0
• Pedal cyclist	V10–V19	E800–E807 with 4th digit 3, E810–E825 with 4th digit 6, E826–E829 with 4th digit 1
• Other land transport (occupant of motorcycle, three-wheeled motor vehicle, car, pickup truck or van)	V20–V59, Y85.0	E800-E807 with 4th digit not 2 or 3, E810-E825 with 4th digit not 6 or 7, E826-E829 with 4th digit not 0 or 1, E929.0
• Other transport	V90-V99, Y85.1	E830-E848, E929.1
Other external causes of accidental injury	W00–X59, Y86	E850–E869, E880–E928, E929.2–E929.9 excluding E904.0
• Falls	W00–W19	E880–E888, E929.3
• Exposure to mechanical forces	W20-W64	E906, E914-E923, E928.1, E928.2
• Exposure to inanimate mechanical forces	W20–W49	E914–E923, E928.1, E928.2 excluding E917.1
• Exposure to animate mechanical forces	W50–W64	E906, E917.1
• Drowning and submersion (non transport)	W65–W74	E910
• Fires	X00–X09	E890–E899, E929.4
• Accidental poisoning by and exposure to noxious substances	X40–X49	E850–E869, E924.1
• Accidental threats to breathing	W75-84	E9111-E913
o Accidental suffocation or strangulation in bed	W75	E913.0
Intentional self-harm (suicide)	X60–X84, Y87.0	E950–959
Assault (homicide)	X85–Y09, Y87.1	E904.0, E960–E969
Event of undetermined intent	Y10–Y34, Y87.2	E980–E989
Legal intervention	Y35, Y89.0	E970–E978
Complications of medical and surgical care	Y40–Y84, Y88	E870–E879, E930–E949
• Drugs, medicaments and biological substances causing adverse effects in therapeutic use	Y40–Y59, Y88.0	E930–E949
• Misadventure to patients during surgical and medical care	Y60–Y69, Y88.1	E870–E876
• Medical devices associated with adverse incidents, surgical and medical procedures as the cause of abnormal reaction, without mention of misadventure at the time of the procedure	Y70–Y84, Y88.2, Y88.3	E878–E879

Description	ICD-10-AM codes used	ICD-9-CM codes used
XXI: Factors influencing health status and contact with health services	**Z00–Z99**	**659.4–659.6, V01–V82 excluding V09, V23.6, V40.1, V40.3, V41.0–V41.6, V48.6, V48.7**
Persons encountering health services for examination and investigation	Z00–Z13	V20.2, V21, V29, V67, V68.0, V68.2, V68.89, V68.9, V70–V82 excluding V72.4
Persons with potential health hazards related to communicable diseases	Z20–Z29	V01–V08, V64.0 excluding V07.1
Persons encountering health services in circumstances related to reproduction	Z30–Z39	659.4–659.6, V22–V28, V30–V39, V72.4 excluding V23.6
• Outcome of delivery	Z37	V27
• Liveborn infants	Z38	V30–V39
Persons encountering health services for specific procedures and health care	Z40–Z54	V07.1, V50–V59, V62.6, V64.1–V64.3, V66
• Care involving dialysis	Z49	V56.0, V56.8
• Care involving rehabilitation	Z50	V57
Persons with potential health hazards related to socioeconomic and psychosocial circumstances	Z55–Z65	V40.0, V60–V62 excluding V60.4, V60.5, V62.6
Persons encountering health services in other circumstances	Z70–Z76	V20.0, V20.1, V41.7–V41.9, V60.4, V60.5, V63, V65, V68.1, V68.81, V69
Persons with potential health hazards related to family and personal history and certain conditions influencing health status	Z80–Z99	V10–V19, V40.2, V40.9, V42–V49 excluding V48.6, V48.7

Table A2.2: Guide to abbreviations of cancer sites

Cancer site	ICD-10-AM	Abbreviation
Bone and articular cartilage	C40-C41	Bone
Cervix uteri	C53	Cervix
Gallbladder, other and unspecified parts of biliary tract	C23-C24	Gallbladder
Kidney, except renal pelvis	C64	Kidney
Liver and intrahepatic bile ducts	C22	Liver
Trachea, bronchus and lung	C33-C34	Lung
Malignant neoplasm of ill-defined, secondary and unspecified sites	C76–C80	Ill-defined sites
Multiple myeloma and other immunoproliferative diseases and plasma cell neoplasms	C88, C90	Multiple myeloma
Lip, oral cavity and pharynx	C00-C14	Oral cancers
Rectum, rectosigmoid junction and anus	C19-C21	Rectum

Table A2.3: ICD-9-CM codes for procedures

Procedure	ICD-9-CM codes used
Myringotomy (grommets)	20.0
Myringoplasty (repair of eardrum)	19.4–19.5
Mastoidectomy	20.4
Tonsillectomy and adenoidectomy	28.2, 28.3, 28.6
Angiography	88.5
Heart valve replacement	35.2
Angioplasty	36.0
Coronary artery bypass and graft	36.1
Endarterectomy	38.1
Stripping of varicose veins	38.4
Hemodialysis	39.95
Peritoneal dialysis	54.98
Kidney transplant	55.6
Amputation of lower limb	84.1
Cataract surgery	13.1–13.6
Cholecystectomy (removal of gallbladder)	51.1
Hernia repair	53.0–53.3
Total hip replacement	81.51
Partial hip replacement	81.52
Mastectomy	85.4
Total reconstruction of breast	85.7
Prostatectomy	60.2–60.6
Diagnostic procedures on cervix	67.1
Conisation of cervix	67.2
Other excision of lesion of cervix	67.3
Diagnostic procedures on uterus	68.1
Total abdominal hysterectomy	68.4
Vaginal hysterectomy	68.5
Tubal ligation (female sterilisation)	66.2, 66.3
Insertion of intrauterine contraceptive device	69.7
Vasectomy (male sterilisation)	63.7
Caesarean section	74.0–74.2, 74.4
Pacemaker procedure	37.8

APPENDIX 3: ESTIMATING MĀORI HOSPITALISATIONS AND CANCER REGISTRATIONS

Ricci Harris, Gordon Purdie, Bridget Robson, Craig Wright, Jane Zhang, Michael Baker

Abstract

Background

Official health data have been shown to undercount Māori. This appendix reports on our estimates of the undercount of Māori in hospital discharge and cancer registration data used for this edition of *Hauora*. It also reports on the method to develop adjusters for the undercount of Māori in these datasets.

Method

Hospital discharge and cancer registration data were linked to datasets with more reliable ethnicity. These were death registrations (2000–2004) and Housing New Zealand Corporation (HNZC) tenant data (2003–2005). Among the linked records, the numbers of Māori hospitalisations (or cancer registrations) using ethnicity as recorded, were compared to the numbers using ethnicity on the linked dataset.

Adjusters were created for cancer register data and hospital discharge data by calculating a weighted average of the HNZC linkage and mortality linkage ratios in five-year age groups. These ratios were smoothed to create adjusters using local regression. We then applied these ratios to hospital and cancer registration data to 'adjust' for the undercount of Māori in these datasets.

Results

Linkage of hospital discharges and cancer registrations to both death and HNZC datasets suggested an undercount of Māori in hospital and cancer registrations that varied by age.

Adjusters for hospital and cancer registrations both showed a relatively low undercount across the younger age groups that increased in the older. These adjusters suggested that Māori hospital numbers should be approximately 5 to 15% higher depending on age, and Māori cancer registrations 2 to 15% higher.

Conclusion

There is ongoing undercounting of Māori in hospital discharge and cancer registration data. The application of adjusters attempts to minimise this undercount and allow more accurate calculation and comparability of population rates and ratios by

ethnicity. Ongoing effort to improve ethnicity data collection in these datasets is still required.

Background

Official health data have been shown to undercount Māori cancer registrations, hospital admissions and deaths (Ajwani et al 2003a,b; Te Rōpū Rangahau Hauora a Eru Pōmare 2000). Previously, the 'ever Māori' method of ethnicity classification has been used to adjust for undercounting of Māori in health data sets (Cormack et al 2005; Robson et al 2006; Ministry of Health 2006; Curtis et al 2005). This method counts as Māori anyone ever recorded as Māori in any cancer registration, hospital admission or death registration, or on the National Health Index (usually over a specified period). In analyses of earlier periods (1996–2001), the 'ever Māori' method appeared to produce reasonable estimates of deaths and cancers (Robson et al 2006; Curtis et al 2005). However, ethnicity data requires review over time as data quality may change.

This edition of *Hauora* uses more recent data: 2000–2004 deaths, 2000–2004 cancer registrations, 2003–2005 hospital discharges. The 'ever Māori' method of ethnicity classification appeared to overcount Māori when applied to these years of analysis. Potential reasons for this may have included the use of additional years of data (ie 1996 to 2004/5 to assign ethnicity) and the use of improved mortality data.

Mortality data

For the 1996–1999 period the New Zealand Census-Mortality Study (NZCMS), which probabilistically matched death registrations and census data, showed that Māori deaths were undercounted by 7% on mortality records (Ajwani et al 2003a,b). However, data from the extension of the NZCMS for the period 2001-2004, shows no net difference between census and mortality counts for Māori (using the prioritised definition) i.e., there was no net under-count of Māori deaths on mortality records compared with matched census numbers during this period (Fawcett et al in press). Similar results were found by sex and age.

Given the findings of the NZCMS for 2001–2004, death registration ethnicity was used to analyse Māori and non-Māori mortality data for *Hauora IV*.

Hospital discharges and cancer registrations

To assess the potential undercount of Māori hospital discharges and cancer registrations, these databases were linked to other datasets with more reliable ethnicity to compare the effect of using different ethnicity data sources.

Method

Estimating Māori hospitalisation and cancer registration undercounts

Hospitalisation rates for *Hauora IV* were calculated for the period 2003–2005, using New Zealand Health Information Service (NZHIS) public hospital discharge data.

Appendix Three

Cancer incidence rates were calculated for the period 2000–2004 using NZHIS cancer registration data. To estimate potential undercounting of Māori in these databases, they were linked to death registration data, Housing New Zealand Corporation (HNZC) tenant data and Ministry of Health national survey data. Among the linked records, the numbers of Māori hospitalisations (or cancer registrations) using ethnicity as recorded, were compared to the numbers using ethnicity on the linked dataset.

The linkage and comparison datasets are described below.

Linkage to death registration ethnicity

Given the latest findings of the NZCMS for 2001–2004, death registration ethnicity was assumed to be a reliable count of Māori ethnicity data.

Using encrypted NHI numbers, hospital event records were linked to death registrations among those people who had both died and had a hospital discharge between 2000 and 2004.

Using encrypted NHI numbers, cancer registrations were linked to death registrations among those people who had both died and had a cancer registration between 2000–2004.

Linkage to Housing New Zealand Corporation (HNZC) tenant ethnicity

The *Social Housing Outcomes Worth (SHOW)* study aims to investigate the relationship between housing conditions, such as crowding levels, and hospitalisation rates in a large cohort of Housing New Zealand Corporation (HNZC) applicant and tenant households. Housing tenants complete an annual Income Related Rent (IRR) application form which includes the 2001 census ethnicity question (Baker et al 2004). For this study, HNZC data were linked by the NZHIS to their encrypted national health index number (NHI) and then anonymised. The overall match rate to NHI was 92% (Baker et al 2006).

Characteristics of HNZC tenants differ from the total population. They are younger with half less than 20 years old. Māori and Pacific people make up 70.4% of HNZC tenant households, and 75% of the tenants have an income of $353 or less per week (Baker et al 2006). These characteristics made this a particularly useful comparison dataset to assess ethnicity in hospitalisation and cancer data, especially for younger age groups.

Data from the *SHOW* study was used to compare the number of Māori hospitalisations based on hospital event record ethnicity with tenant ethnicity among linked records. Tenant information and matched hospitalisation data were available for May 2003 to December 2005. Only records with a tenant ethnicity recorded were used in the analysis presented here.

Ethnicity data on the Cancer Register are primarily taken from the NHI database with some also taken from hospital discharge information and the mortality collection (S Hanna, personal communication, 10 August 2007). HNZC data was not linked to cancer registrations but was linked to NHI ethnicity on hospitalisations. As cancer registration ethnicity tends to reflect NHI ethnicity, linkage of HNZC data to NHI was used as a proxy measure to estimate undercounting of Māori on cancer registrations. The number of Māori hospitalisations using NHI ethnicity was compared to the number of Māori hospitalisations using HNZC tenant ethnicity.

Linkage to Ministry of Health national survey ethnicity

For further validation, the 2002 National Children's Nutrition Survey (Ministry of Health 2003) and the 2002/2003 New Zealand Health Survey (Ministry of Health 2004) were linked to hospital data to compare the number of Māori hospitalisations using hospital event record ethnicity and survey ethnicity.

Survey data were probabilistically[1] linked to hospital discharges between 2002–2006. The linkage rate for the CNS was 67% and 18% for the NZHS.[2] Results were used as a check against the other linkage studies and showed a net undercount of Māori across all age groups. However, because of small numbers and linkage only to hospital discharges, these data were not used to estimate the final adjusters. Therefore, the results are not presented here.

Development of ethnicity adjusters for hospitalisations and cancer registrations

The undercounting of Māori hospitalisations and cancer registrations leads to a numerator/denominator mismatch that creates a bias when rates are calculated using population census data for denominators. To minimise this bias, adjusters were created for cancer register data and hospital discharge data. This was done by calculating a weighted average of the HNZC linkage and mortality linkage ratios in five-year age groups. These 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).

Results

Undercount of Māori hospitalisations

Table A3.1 shows the results of the linkage between hospital data with both death registrations and HNZC data. The linked hospital and mortality data shows the number of hospitalisations recorded as Māori using hospital event ethnicity compared to the number of hospitalisations recorded as Māori using death record ethnicity, among linked records. Similarly, the linked hospital and HNZC data show the number of hospitalisations recorded as Māori using hospital event ethnicity compared to the number of hospitalisations recorded as Māori using self identified HNZC tenant ethnicity, among linked records.

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[1] Variables used to probabilistically link data: year of birth, gender, meshblock for NZHS 2002/03; date of birth, gender, meshblock for CNS.

[2] Linkage of NZHS 2002/03 to hospital discharge data was lower as only year of birth was available rather than date of birth in the CNS.

Ratios of hospitalisations (linked dataset ethnicity/hospital event ethnicity) by age are also provided. A ratio over 1 indicates an increase in Māori hospitalisations using the alternative ethnicity data source and suggests an undercount of Māori in the hospital data. For example, in the linked hospital and HNZC data, for the 0–4 year age group, there were 8,163 hospitalisations recorded as Māori using the ethnicity on the hospital event record compared with 8,473 using the ethnicity on the HNZC tenant database. This is a ratio of 1.038 or a 3.8% increase in Māori hospitalisations in this age group when the HNZC ethnicity is used.

Linkage to both death and HNZC datasets indicates an undercount of Māori in hospital data across all ages as represented by increased Māori hospitalisations using the linked data ethnicity. This undercount varies by age.

The mortality data linkage shows undercounting of Māori across almost all ages with higher undercounting in the younger and older age groups (as represented by higher ratios in these groups). The HNZC linkage also shows undercounting across almost all age groups that increases in the older ages. It is important to note that the mortality linkage has smaller numbers in the younger age groups and the HNZC linkage has smaller numbers in the older age groups. Ratios based on data with smaller numbers may be less reliable. However, this effect is taken into account in the calculation of adjusters for hospital data.

Table A3.1 also shows the age-specific smoothed hospital adjusters (and their standard errors) by age group. These were estimated by calculating a weighted average of the ratios from the mortality linkage and HNZC linkage and then smoothed as described above. The adjusters are therefore weighted more towards the HNZC linkage in the younger ages and the mortality linkage in the older ages where there are more numbers in each age band. As can be seen, the ratios are all above 1 and increase in the older ages where the level of Māori undercounting appeared largest.

Table A3.1: Number of Māori hospitalisations and smoothed Māori hospital adjusters using linked hospital, death and HNZC data

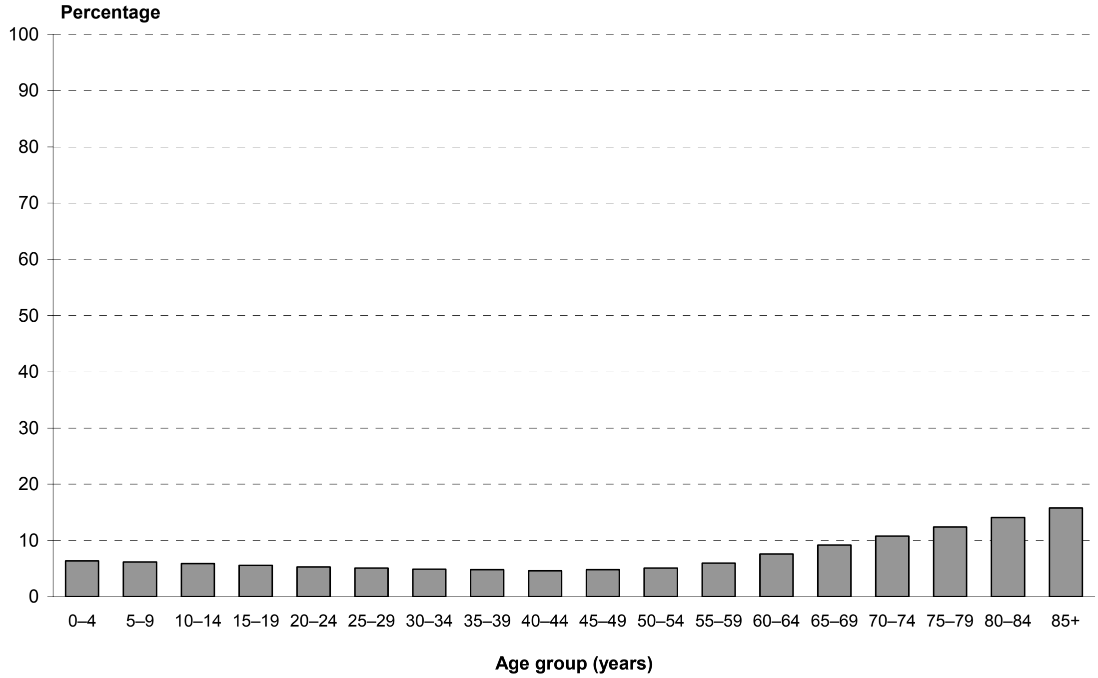
Age group (years)	Linked hospital and mortality data (2000–2004)			Linked hospital and HNZC tenant data (May 2003–December 2005)			Smoothed Māori hospital adjusters*	Standard error
	Number of Māori hospital admissions		Ratio of hospital admissions	Number of Māori hospital admissions		Ratio of hospital admissions		
	On hospital event ethnicity	On death registration ethnicity	Death/ hospital ethnicity	On hospital event ethnicity	On HNZC tenant ethnicity	HNZC/ hospital ethnicity		
0–4	1,323	1,514	1.144	8,163	8,473	1.038	1.064	0.01704
5–9	273	296	1.084	3,026	3,115	1.029	1.062	0.01451
10–14	363	475	1.309	2,281	2,406	1.055	1.059	0.01233
15–19	510	608	1.192	4,089	4,181	1.022	1.056	0.01059
20–24	931	1,054	1.132	3,712	3,921	1.056	1.053	0.00944
25-29	711	830	1.167	3,273	3,489	1.066	1.051	0.00902
30–34	1,088	1,152	1.059	3,547	3,646	1.028	1.049	0.00943
35–39	1,912	1,910	0.999	3,289	3,411	1.037	1.048	0.00915
40–44	3,448	3,478	1.009	3,566	3,478	0.975	1.046	0.00943
45–49	4,607	4,994	1.084	3,742	3,891	1.040	1.048	0.00915
50–54	5,739	6,129	1.068	4,730	4,822	1.019	1.051	0.00943
55–59	6,073	6,367	1.048	3,709	4,042	1.090	1.060	0.00943
60–64	8,732	9,136	1.046	3,363	3,671	1.092	1.076	0.00902
65–69	9,743	10,135	1.040	3,610	3,593	0.995	1.092	0.00944
70–74	6,084	6,842	1.125	1,297	1,410	1.087	1.108	0.01059
75–79	4,168	4,737	1.137	614	650	1.059	1.124	0.01233
80–84	2,181	2,515	1.153	212	261	1.231	1.141	0.01453
85+	1,556	1,807	1.161	105	134	1.276	1.158	0.01704

Sources: NZHIS public hospital discharges and death registrations; SHOW Study.

*Rounded to three decimal places.

A graphical representation of the hospital adjusters is presented in Figure A3.1, where the ratios are shown as the percentage increase in Māori hospital numbers that the adjusters represent. As can be seen, Māori hospital numbers should be increased by 6.4% in the 0–4 year age group, rising to 15.8% in the 85+ age group.

Figure A3.1: Smoothed Māori hospital adjusters (percentage increase)



Undercount of Māori cancer registrations

Table A3.2 shows the results of the linkage between cancer registrations and death registrations, and hospital data (using NHI ethnicity) and HNZC tenant data. The linked cancer registration and mortality data show the number of Māori cancer registrations using cancer register ethnicity compared to the number of Māori cancer registrations using death registration ethnicity, among linked records. Similarly, the linked hospital and HNZC data show the number of hospitalisations recorded as Māori using NHI ethnicity compared to the number of hospitalisations recorded as Māori using self identified HNZC tenant ethnicity among linked records.

Linkage of the two different ethnicity data sources on Māori cancer registrations and hospitalisations using NHI ethnicity both suggest an undercount of Māori in cancer registrations and NHI records (which are used here as a proxy measure to estimate cancer registration undercounting of Māori). This is demonstrated by increasing Māori numbers when the linked data source ethnicity is used and ratios above 1. Undercounting varies by age group.

Age specific smoothed cancer adjusters (and their standard errors) by age group are also presented in Table A3.2. The adjusters are weighted more towards the HNZC linkage where the numbers are larger, particularly in the younger age groups. As can be seen, the ratios are all above 1 and increase in the older ages, representing an undercount of Māori in cancer registrations across all ages that increases in the older age groups. This is shown graphically in Figure A3.2, where the ratios are presented as the percentage increase in Māori cancer registration numbers that the adjusters will achieve. Māori cancer registration numbers should increase by 1.6% in the 0–4 year age group to 15.8% in the 85+ age group. The cancer adjusters also suggest a relatively low undercount across the younger age groups that increases in the older.

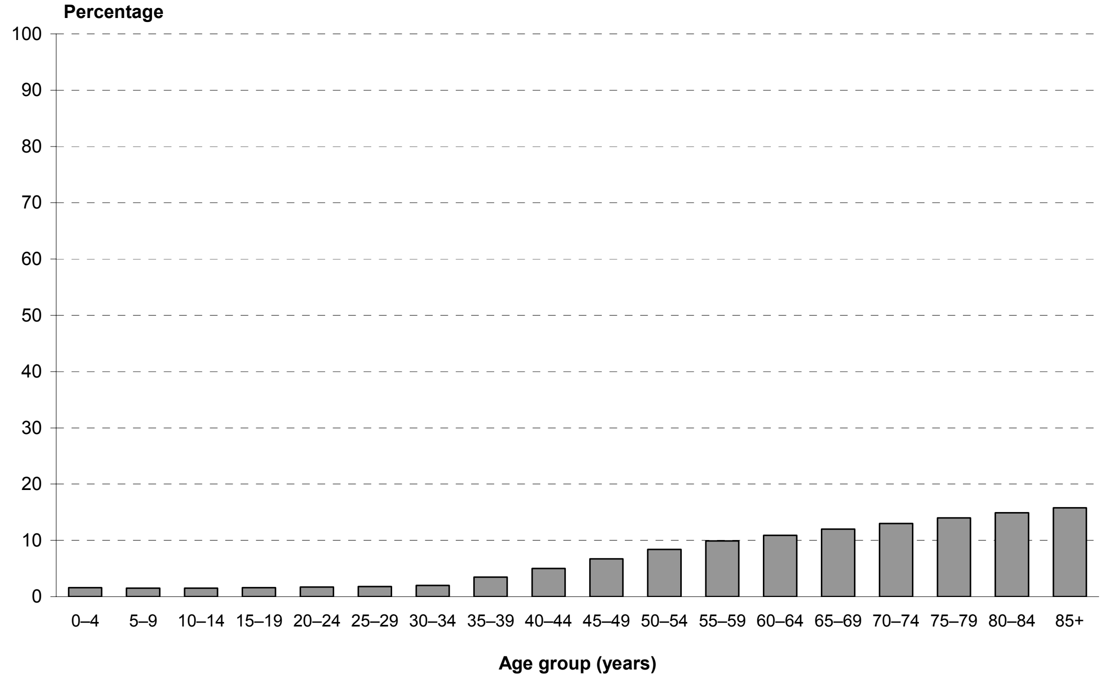
Table A3.2: Number of Māori cancer registrations using linked cancer register and death data, number of Māori hospitalisations (by NHI) using linked hospital and HNZC data

Age group (years)	Linked cancer register and mortality data (2000–2004)			Linked hospital and NZHC tenant data (May 2003–December 2005)			Smoothed Māori cancer adjusters*	Standard error
	Number of Māori cancer registrations		Ratio of cancer registrations	Number of Māori hospital admissions		Ratio of hospital admissions		
	On cancer register ethnicity	On death registration ethnicity	Death/ cancer register ethnicity	On NHI ethnicity	On HNZC tenant ethnicity	HNZC/NHI ethnicity		
0–4	8	8	1.000	8,312	8,473	1.019	1.016	0.02455
5–9	7	8	1.143	3,030	3,115	1.028	1.015	0.02063
10–14	8	10	1.250	2,353	2,406	1.023	1.015	0.01731
15–19	6	11	1.833	4,147	4,181	1.008	1.016	0.01478
20–24	20	22	1.100	3,940	3,921	0.995	1.017	0.01335
25–29	23	24	1.043	3,476	3,489	1.004	1.018	0.01311
30–34	55	60	1.091	3,586	3,646	1.017	1.020	0.01420
35–39	80	79	0.988	3,346	3,411	1.019	1.035	0.01364
40–44	148	155	1.047	3,476	3,478	1.001	1.050	0.01420
45–49	200	219	1.095	3,659	3,891	1.063	1.067	0.01364
50–54	254	277	1.091	4,519	4,822	1.067	1.084	0.01420
55–59	347	369	1.063	3,315	4,042	1.219	1.099	0.01420
60–64	443	462	1.043	3,312	3,671	1.108	1.109	0.01311
65–69	460	493	1.072	3,212	3,593	1.119	1.120	0.01335
70–74	392	430	1.097	1,181	1,410	1.194	1.130	0.01478
75–79	249	273	1.096	627	650	1.037	1.140	0.01731
80–84	114	120	1.053	213	261	1.225	1.149	0.02067
85+	83	85	1.024	104	134	1.288	1.158	0.02455

Sources: NZHIS public hospitalisations, cancer registrations, mortality; SHOW Study.

*Rounded to three decimal places.

Figure A3.2: Smoothed Māori cancer adjusters (percentage increase)



Using adjusters to estimate Māori and non-Māori hospitalisations and cancer registrations

For the calculation of population rates, the adjusters were applied to the number of Māori hospitalisations and cancer registrations (as recorded on these data sets) to take into account the undercount of Māori at each age group. Non-Māori numbers were estimated as the difference between the total number of hospitalisations or 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. Age-sex-ethnicity-specific population estimates for corresponding years served as denominators for the calculation of population rates.

Adjusters were applied to the calculation of any hospitalisation or cancer registration rates between 2000–2005, either by year or for aggregated years.

Conclusion

Latest data from the extension of the NZCMS for the period 2001–2004 show no net difference between census and mortality counts for Māori. Therefore, in this edition of *Hauora*, where mortality or death data is analysed for the period 2000–2004, death registration ethnicity has been used in the calculation of population mortality rates for Māori and non-Māori.

For hospital and cancer register data, linkage to other datasets with more reliable ethnicity shows that these datasets continue to undercount Māori and that the level of undercount varies by age, increasing in the elderly. Our results suggest that Māori hospital numbers should be approximately 5 to 15% higher depending on age, and

Māori cancer registrations 2 to 15% higher. Undercounting of Māori as estimated here is less than that found in some earlier studies where 20–25% net undercounts of Māori in hospital records have been shown (Harris et al 1997, Te Rōpū Rangahau Hauora a Eru Pōmare 1996). These findings may suggest that the quality of ethnicity data recording is improving across all of these health datasets.

The undercounting of Māori hospitalisation and cancer registrations leads to a numerator/denominator mismatch that creates a bias when rates using population census data for denominators are calculated. The application of adjusters aims to minimise this bias producing more accurate estimates of Māori hospital discharge and cancer registration numbers and the subsequent calculation of more accurate population rates by ethnicity. As these adjustors are age-specific, they also allow the calculation of more accurate age-specific and age-standardised rates. Finally, because they attempt to minimise the numerator/denominator mismatch, they also enable a better comparison of rates and, in particular, ratios across hospital, cancer and mortality data sets.

It is important to note that the adjusters were calculated using linkages close to the main time period of analysis. They are best designed for the data and time periods of linkage and may not be applicable to other time periods or datasets.

The ongoing problems with the quality of ethnicity data and the undercounting of Māori in routinely collected health data requires urgent action. It impedes our ability to monitor Māori health and inequalities, particularly over time. As data quality (hopefully) improves, the development of other adjusters may be needed but ideally adjusters should not be required at all.

Further research would be useful to investigate the reasons for the continuing undercounting of Māori in hospitalisation and cancer data. Such research could specifically investigate the process used by hospitals to assign ethnicity to the records they submit to NZHIS and also the processes used to update NHI ethnicity fields.

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Appendix Four

APPENDIX 4: STANDARD POPULATIONS

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. Direct standardisation applies age-specific rates to a standard population structure. 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 a standard population can affect the magnitude of rates and ratios, relative ranking of causes, and trends in rates and ratios.

In the main body of *Hauora IV* age-standardised rates are standardised to the 2001 Māori population.[1] On the *Hauora IV* website (www.hauora.maori.nz) we will also report rates standardised to Segi's world population and the WHO world population.

The age distributions of the three standard populations are presented in Table A4.1.

Table A4.1: Percentage of 2001 Māori, Segi's world and WHO world populations in each age group

Age group (years)	2001 Māori population	Segi's world population	WHO world population
0–4	12.84	12.00	8.86
5–9	12.56	10.00	8.69
10–14	11.93	9.00	8.60
15–19	9.41	9.00	8.47
20–24	8.00	8.00	8.22
25–29	7.63	8.00	7.93
30–34	7.46	6.00	7.61
35–39	7.28	6.00	7.15
40–44	6.24	6.00	6.59
45–49	4.77	6.00	6.04
50–54	3.70	5.00	5.37
55–59	2.63	4.00	4.55
60–64	2.19	4.00	3.72
65–69	1.51	3.00	2.96
70–74	0.96	2.00	2.21
75–79	0.51	1.00	1.52
80–84	0.23	0.50	0.91
85 +	0.14	0.50	0.63
Total	100.00	100.00	100.00

Note: The WHO standard has proportions delineated for five-year age groups up to the age of 100+, which have been grouped together.

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[1] 2001 Census usually resident population. Table 3. URL: http://www.stats.govt.nz/census/2001-census-data/2001-maori/default.htm. Accessed online 3 September 2007.

Appendix Five

APPENDIX 5: TE TIRITI O WAITANGI[1]

The Māori version

Te Tiriti o Waitangi

Ko Wikitoria te Kuini o Ingarangi i tana mahara atawai ki nga Rangatira me nga Hapu o Nu Tirani i tana hiahia hoki kia tohungia ki a ratou o ratou rangatiratanga me to ratou wenua, a kia mau tonu hoki te Rongo ki a ratou me te Atanoho hoki kua whakaaro ia he mea tika kia tukua mai tetahi Rangatira – hei kai wakarite ki nga Tangata Māori o Nu Tirani – kia whakaaetia e nga Rangatira Māori te Kawanatanga o te Kuini ki nga wahikatoa o te Wenua nei me nga Motu – na te mea hoki he tokomaha ke nga tangata o tona lwi Kua noho ki tenei wenua, a e haere mai nei.

Na ko te Kuini e hiahia ana kia wakaritea te Kawanatanga kia kaua ai nga kino e puta mai ki te tangata Māori ki te Pākehā e noho ture kore ana.

Na, kua pai te Kuini kia tukua a hau a Wiremu Hopihona he Kapitana i te Roiara Nawi hei Kawana mo nga wahi katoa o Nu Tirani e tukua aianei, amua atu ki te Kuini, e mea atu ana ia ki nga Rangatira o te wakaminenga o nga hapu o Nu Tirani me era Rangatira atu enei ture ka korerotia nei.

Ko Te Tuatahi

Ko nga Rangatira o te wakaminenga me nga Rangatira katoa hoki ki hai i uru ki taua wakaminenga ka tuku rawa atu ki te Kuini o Ingarani ake tonu atu – te Kawanatanga katoa o o ratou Wenua.

Ko Te Tuarua

Ko te Kuini o Ingarani ka wakarite ka wakaae ki nga Rangatira ki nga hapu – ki nga tangata katoa o Nu Tirani te tino rangatiratanga o o ratou wenua o ratou kainga me o ratou taonga katoa. Otiia ko nga Rangatira o te wakaminenga me nga Rangatira katoa atu ka tuku ki te Kuini te hokonga o era wahi wenua e pai ai te tangata nona te Wenua – ki te ritenga o te utu e wakaritea ai e ratou ko kai hoko e meatia nei e te Kuini hei kai hoko mona.

Ko Te Tuatoru

Hei wakaritenga mai hoki tenei mo te wakaaetanga ki te Kawanatanga o te Kuini – Ka tiakina e te Kuini o Ingarani nga tangata Māori katoa o Nu Tirani ka tukua ki a ratou nga tikanga katoa rite tahi ki ana mea ki nga tangata o Ingarani.

[Signed] William Hobson Consul and Lieutenant Governor

Na ko matou ko nga Rangatira o te Wakaminenga o nga hapu o Nu Tirani ka huihui nei ki Waitangi ko matou hoki ko nga Rangatira o Nu Tirani ka kite nei i te ritenga o

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[1] This appendix is based on the translation and notes outlined in IH Kawharu (ed), *Waitangi: Māori and Pākehā Perspectives on the Treaty of Waitangi*. Auckland: Oxford University Press, 1989.

enei kupu, ka tangohia ka wakaaetia katoatia e matou, koia ka tohungia ai o matou ingoa o matou tohu.

Ka meatia tenei ki Waitangi i te ono o nga ra o Pepueri i te tau kotahi mano, e waru rau e wa te kau o to tatou Ariki.

The English translation of the Māori version[i]

The Treaty of Waitangi

Victoria, the Queen of England, in her concern to protect the chiefs and the sub-tribes of New Zealand and in her desire to preserve their chieftainship[ii] and their lands to them and to maintain peace[iii] and good order considers it just to appoint an administrator[iv] one who will negotiate with the people of New Zealand to the end that their chiefs will agree to the Queen's Government being established over all parts of this land and (adjoining) islands[v] and also because there are many of her subjects already living on this land and others yet to come. So the Queen desires to establish a government so that no evil will come to Māori and European living in a state of lawlessness. So the Queen has appointed me, William Hobson a Captain in the Royal Navy to be Governor for all parts of New Zealand (both those) shortly to be received by the Queen and (those) to be received hereafter and presents[vi] to the chiefs of the Confederation chiefs of the subtribes of New Zealand and other chiefs these laws set out here.

The first

The Chiefs of the Confederation and all the chiefs who have not joined that Confederation give absolutely to the Queen of England for ever the complete government[vii] over their land.

The second

The Queen of England agrees to protect the chiefs, the subtribes and all the people of New Zealand in the unqualified exercise[viii] of their chieftainship over their lands, villages and all their treasures.[ix] But on the other hand the Chiefs of the Confederation and all the Chiefs will sell[x] land to the Queen at a price agreed to by the person owning it and by the person buying it (the latter being) appointed by the Queen as her purchase agent.

The third

For this agreed arrangement therefore concerning the Government of the Queen, the Queen of England will protect all the ordinary people of New Zealand and will give them the same rights and duties[xi] of citizenship as the people of England.[xii]

[Signed] William Hobson Consul and Lieutenant-Governor

So we, the Chiefs of the Confederation of the subtribes of New Zealand meeting here at Waitangi have seen the shape of these words which we accept and agree to record our names and our marks thus. Was done at Waitangi on the sixth of February in the year of our Lord 1840.

Appendix Five

The English version

The Treaty of Waitangi

Her Majesty Victoria Queen of the United Kingdom of Great Britain and Ireland regarding with Her Royal Favour the native chiefs and tribes of New Zealand and anxious to protect their just rights and property and to secure to them the enjoyment of peace and good order has deemed it necessary in consequence of the great number of Her Majesty's Subjects who have already settled in New Zealand and the rapid extension of emigration both from Europe and Australia which is still in progress to constitute and appoint a functionary properly authorised to treat with the Aborigines of New Zealand for the recognition of Her Majesty's sovereign authority over the whole or any part of those islands.

Her Majesty therefore being desirous to establish a settled form of civil Government with a view to avert the evil consequences which must result from the absence of the necessary laws and institutions alike to the native population and to Her subjects has been graciously pleased to empower and to authorise 'me William Hobson a Captain' in Her Majesty's Royal Navy Consul and Lieutenant Governor of such parts of New Zealand as may be or hereafter shall be ceded to Her Majesty to invite the confederated and independent chiefs of New Zealand to concur in the following articles and conditions.

Article the first

The Chiefs of the Confederation of the United Tribes of New Zealand and the separate and independent chiefs who have not become members of the Confederation cede to Her Majesty the Queen of England absolutely and without reservation all the rights and powers of sovereignty which the said Confederation or individual chiefs respectively exercise or possess, or may be supposed to exercise or to possess, over their respective territories as the sole sovereigns thereof.

Article the second

Her Majesty the Queen of England confirms and guarantees to the chiefs and tribes of New Zealand and to the respective families and individuals thereof the full exclusive and undisturbed possession of their lands and estates forests fisheries and other properties which they may collectively or individually possess so long as it is their wish and desire to retain the same in their possession; but the Chiefs of the United Tribes and the individual chiefs yield to Her Majesty the exclusive right of pre-emption over such lands as the proprietors thereof may be disposed to alienate at such prices as may be agreed upon between the respective proprietors and persons appointed by Her Majesty to treat with them in that behalf.

Article the third

In consideration thereof Her Majesty the Queen of England extends to the natives of New Zealand Her royal protection and imparts to them all the rights and privileges of British subjects.

[Signed] W Hobson Lieutenant Governor

Now therefore we the Chiefs of the Confederation of the united tribes of New Zealand being assembled in Congress at Victoria in Waitangi and we the separate and independent chiefs of New Zealand claiming authority over the tribes and territories which are specified after our respective names, having been made fully to understand the provisions of the foregoing Treaty, accept and enter into the same in the full spirit and meaning thereof in witness of which we have attached our signatures or marks at the places and the dates respectively specified.

Done at Waitangi this sixth day of February in the year of Our Lord one thousand eight hundred and forty.

Notes

[i] An attempt at a reconstruction of the literal translation.

[ii] 'Chieftainship': this concept has to be understood in the context of Māori social and politicalorganisation as at 1840. The accepted approximation today is 'trusteeship'; see New Zealand Māori Council Kaupapa 1983.

[iii] 'Rongo': 'Peace', seemingly a missionary usage (rongo – to hear, ie, hear the 'Word' – the 'message' of peace and goodwill, etc).

[iv] 'Chief' ('Rangatira') here is of course ambiguous. Clearly a European could not be a Māori, but the word could well have implied a trustee-like role, rather than that of a mere 'functionary'. Māori speeches at Waitangi in 1840 refer to Hobson being or becoming a 'father' for the Māori people. Certainly this attitude has been held towards the person of the Crown down to the present day – hence the continued expectations and commitments entailed in the Treaty.

[v] 'Islands', ie. neighbouring, not of the Pacific.

[vi] 'Making', ie. 'offering' or '*saying'* but *not* 'inviting to concur' (cf English version).

[vii] 'Government': 'kawanatanga'. There could be no possibility of the Māori signatories having any understanding of government in the sense of 'sovereignty', ie. any understanding on the basis of experience or cultural precedent.

[viii] 'Unqualified exercise' of the chieftainship: this would emphasise to a chief the Queen's intention to give them complete control according to *their* customs 'Tino' has the connotation of 'quinessential'.

[ix] 'Treasures': 'taonga'. As submissions to the Waitangi Tribunal concerning file Māori language have made clear, 'taonga' refers to all dimensions of a tribal group's estate, material and non-material – heirlooms and wahi tapu (sacred places), ancestral lore and whakapapa (genealogies), etc.

[x] 'Sale and purchase': 'hokonga'. Hoko means to buy or sell.

[xi] 'Rights and duties': Māori 'tikanga'. While tika means right, correct, (eg, 'e tika hoki' means 'that is right'), 'tikanga' most commonly refers to custom(s), for example of the marae (ritual forum); and custom(s) clearly includes the notion of duty and obligation.

[xii] There is, however, a more profound problem about 'tikanga'. There is a real sense here of the Queen 'protecting' (ie, allowing the preservation of) the Māori people's tikanga (ie, customs), since no Māori could have had any understanding whatever of *British* tikanga (ie, rights and duties of British subjects). This, then, reinforces the guarantees in Article 2.

NOTES ON AUTHORS

Papaarangi Reid initiated the project and developed the conceptual and analytical framework, and the book structure. Fiona Cram coordinated the project and managed the book and website production. Gordon Purdie carried out the statistical analyses. Donna Cormack contributed to the final production of the book. Bridget Robson and Ricci Harris edited the book. Individual authors are named on the chapters they wrote and are listed below.

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Dr Elana Taipapaki Curtis (Ngāti Rongomai, Ngāti Pikiao, Te Arawa) is a public health physician currently working as Senior Lecturer Medical at Te Kupenga Hauora Māori, University of Auckland. She is Kaiārahi of Hikitia Te Ora – Certificate in Health Sciences, a pre-degree programme aimed at increasing the number of Māori and Pacific students entering into Medicine, Pharmacy, Nursing and Health Sciences. In 2004–2005, Elana was a Harkness Fellow in Healthcare Policy based at the University of California – San Francisco investigating ethnic disparities in breast cancer mortality and survival. Prior to this, Elana worked at the National Screening Unit, Ministry of Health in Wellington where she investigated Māori/non-Māori disparities in breast cancer epidemiology and at Te Rōpū Rangahau Hauora a Eru Pōmare at the University of Otago investigating ethnic disparities in access to invasive cardiovascular procedures/caesarean sections and the relationship between disparities and deprivation. She is a member of the Māori Cardiovascular Advisory Group, Independent Monitoring Group for Cervical Cancer Screening and has been actively involved in developing Te Ohu Rata o Aotearoa – Māori Medical Practitioners Association (Te ORA). Her research interests include investigating ethnic inequalities in health using a Kaupapa Māori Research framework in order to eliminate existing disparities.

Dr Ricci Harris (Ngāti Kahungunu, Ngāti Raukawa, Ngāi Tahu) is a public health physician at Te Rōpū Rangahau Hauora a Eru Pōmare, Wellington School of Medicine and Health Sciences. Ricci has a particular in interest in Māori health research, epidemiology and the investigation of ethnic inequalities in Aotearoa/New Zealand. This has included research into sleep disorders, the classification of ethnicity, ethnic disparities in caesarean sections and cardiovascular procedures, the impact of socioeconomic position on ethnic inequalities in mortality, and the impact of racism on health and ethnic inequalities. Ricci is also a member of the Māori advisory group for the National Screening Unit.

Dr Matire Harwood (Ngā Puhi) studied at the Auckland School of Medicine and now works as a GP and Māori health researcher in Wellington. She is currently involved in a number of research projects including a study that aims to improve stroke recovery for Māori and their whānau and the Health Inequalities Research Project (Unequal Treatment for Māori with Ischaemic Heart Disease). She also provides commentary for the Māori Health Research Review, an e journal for providers and researchers. Other work interests include Māori and ethics, asthma management and protection of the environment (as member of Ngā Kaihautu Tikanga Taiao). Outside of work Matire is mum to Te Rangiura and a keen waka ama paddler!

Vera Keefe-Ormsby, Ngāti Pāhauwera, Ngāti Raukawa, Rongomaiwahine, is Mum to one son, Jayden. Vera worked as a school dental nurse in the Hawkes Bay region from the mid 1970s to the mid 1980s. She then moved to Wellington and worked in the Māori Health Policy section of the Department of Health. In 1993 she joined Te Pūmanawa Hauora ki Te Whanganui a Tara, later known as Te Rōpū Rangahau Hauora a Eru Pōmare. Vera was involved in a number of research projects, with one particular study, 'Mauri Tangata' investigating the effects of job loss on health amongst redundant freezing workers in the Hawkes' Bay region, being her 'baby'. Other research interests included oral health, Māori health providers, kaupapa Māori research, ethnicity data quality, and eliminating inequalities. A strong advocate for the Treaty of Waitangi and for Māori communities, Vera was also heavily involved in iwi, hapū and whānau health care including the Hawkes Bay DHB, Wairoa PHO and the Ngāti Pāhauwera Hauora Society. Sadly Vera passed away 26 August 2005, but her contribution to Māori health development continues. Tātai whetū ki te rangi, mau tonu, mau tonu; tātai tangata ki te whenua, ngaro noa, ngaro noa.

Pauline Koopu, Te Whanau-a-Apanui, Ngāti Konohi, Ngāti Kahu. Pauline graduated as a dentist in 1996 (BDS, Otago) and has worked in Wellington Hospital dental department for most of her career. In 2005, she was the first Māori woman to attain a Masters in community dentistry (MCommDent, Otago) and her thesis research looked at Māori oral health service utilisation and Māori oral health outcomes. Pauline has worked as a research fellow for Te Rōpū Rangahau Hauora a Eru Pōmare and as a senior oral health advisor for the Ministry of Health.

Dr Kara Mihaere, Rangitāne, Ngāti Kahungunu, Ngāti Maniapoto, PhD (Massey University: Public Health), is an Intern Clinical Psychologist at Rangataua Mauriora, Tu Te Wehi – Primary Mental Health Service, Porirua. Previously, Kara has worked as a Postdoctoral Research Fellow at the Sleep/Wake Research Centre, Massey University and Te Rōpū Rangahau a Eru Pōmare, Wellington School of Medicine & Health Sciences.

Dr Sarah-Jane Paine (Tūhoe) was raised in Wairoa, Hawkes Bay and is currently based at the Sleep/Wake Research Centre at Massey University in Wellington. Her PhD thesis focused on whether individual differences in the timing of human sleep are related to differences in the circadian biological clock or driven by societal demands, such as work patterns and family commitments. Sarah-Jane is also committed to carrying out research that is beneficial for Māori, and continues to develop her understanding of kaupapa Māori research methodologies and she is particularly interested in the ethical implications of genetic research for Māori communities.

Suzanne Pitama (nee Meihana), Ngati Kahungunu, co- founded and is Co-Director of the Māori/Indigenous Health Institute (MIHI), University of Otago – Christchurch. Over the last five years she has led development and evaluation of the Hauora Māori medical curriculum, both at the Christchurch School and a University level. She has previously worked clinically with ante-natal and post-natal adolescents before specialising in working with children (5–17 years) with severe and challenging behaviours. She currently practises in a part-time capacity in the Department of Paediatrics, Christchurch Hospital. Suzanne has engaged in Māori health research for more than 12 years and is currently leading a major study of cardiovascular disease in the Māori community.

Dr Ramon Pink (Te Aupouri, Te Rarawa) is a public health physician, married with three children. He is currently employed by the Canterbury District Health Board as a Medical Officer of Health. His responsibilities include Māori Health and Communicable Diseases. Previously Ramon worked as a general practitioner in Otara, South Auckland, and then for the Counties Manukau District Health Board, focusing on improved access to primary care services for Māori. His research interest in bronchiectasis is generated from the impact of this disease on whānau, and from his clinical experiences in general practice.

Gordon Purdie works as a statistician in the Department of Public Health, University of Otago, Wellington. He is part of a team providing statistical consulting to health researchers and works with Te Rōpū Rangahau Hauora a Eru Pōmare on several research projects. His concerns include discrimination and inequalities.

Dr Mihi Ratima PhD, Whakatohea and Ngāti Awa, is a Commonwealth Fund Harkness Fellow in Health Care Policy with a joint appointment at the Harvard School of Public Health and Brigham and Women's Hospital, Boston, US. In late 2007 she will return to her role as associate professor and director of Taupua Waiora Centre for Māori Health Research, AUT University. Her research interests are in the areas of health promotion, health workforce development, and reducing ethnic health disparities. She was formerly a World Health Organization analyst, a Fulbright scholar, a researcher with Te Pūmanawa Hauora and the Centre for Public Health Research, Massey University and a diplomat.

Dr Keri Huia Ratima MB ChB M Med Sci DPH FRNZCGP., Whakatohea and Ngāti Awa, is the Tumuaki Whakangungu Māori (Māori Director of Training) at the Royal New Zealand College of General Practitioners (RNZCGP). She and Mihi are sisters, and she has two wonderful sons Taako and Heremia. She has previously worked in general practice in Opotiki, in Māori health research at Massey University, and in healthcare policy in the National Health Committee in Wellington. Her research interests mirror her sister's.

Dr Papaarangi Reid, Te Rarawa, is a public health physician with a research interest in equity and monitoring Crown action to eliminate ethnic inequalities in health between Māori and non-Māori New Zealanders. A leading advocate for Māori health issues, she has worked in health promotion, tobacco control, the determinants of health, workforce development and kaupapa Māori research. Formerly director of Te Rōpū Rangahau Hauora a Eru Pōmare, she is currently the Tumuaki in the Faculty of Medical and Health Sciences, University of Auckland.

Dr Tania Te Akau Riddell, Ngāti Porou and Te Aitanga a Mahaki, Public Health Specialist and Senior Research Fellow at the School of Population Health, University of Auckland. Tania has a background as a general practitioner and lives with her whānau in Auckland. She is currently working on a cardiovascular risk assessment and management project at the Section of Epidemiology and Biostatistics, University of

Auckland. Her other research interests include the social determinants of health inequalities and the effects of racism on health.

Bridget Robson, Ngāti Raukawa, is a senior research fellow and director of Te Rōpū Rangahau Hauora a Eru Pōmare at the School of Medicine and Health Sciences, University of Otago, Wellington. Her research interests are in the areas of the social and economic determinants of health, inequitable treatment in the health system, the impact of racism on health and the development of a kaupapa Māori epidemiology. Bridget was an author on *Hauora: Standards of Health III*. She is currently working on the Mauri Tangata project on unemployment and health, is leading the Unequal Treatment research project on disparities in health care, is involved in several projects on Māori cancer outcomes, including the *Unequal Impact* series, and is active in providing Tackling Inequalities workshops for the health sector.

Carey Robson, Ngāti Raukawa, is from Wellington. She has worked at Wellington Hospital and at Te Rōpū Rangahau Hauora a Eru Pōmare, and conducted a study of discourses on Māori health in the media. She has an MA from Auckland University, in which she studied Māori health history.

Dr David Tipene-Leach is a Ngāti Kere from Porangahau in the Hawkes Bay. He is presently a GP for Te Taiwhenua o Heretaunga. With postgraduate qualifications in public health he has interests in the prevention of diabetes and the prevention of SIDS in the Māori community. He has served in the past on the Advisory Committee on Primary Care, ALAC, and the national Child and Youth Mortality Review Committee. He was Senior Lecturer in Māori Health at the University of Auckland and was the foundation Chair of Te Ora, the Māori Medical Practitioners Association before returning to general practice in 2001.

Kataraina Pipi with her namesake Tu Te Kiha Katararaina Ahorangi Penehira-Hawke *Photo by Sharon Hawke*

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