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This Issue of the Journal

Mortality rates according to occupation in New Zealand males: 2001–2005

Erin Holmes, Anna Davies, Craig Wright, Neil Pearce, Barry Borman

The paper uses records of New Zealand males that died between 2001 and 2005 to investigate variations in overall and disease-specific mortality for different occupation groups. The occupation categories are based on the New Zealand Standard Classification of Occupation 1999 (NZSCO 1999), while the disease categories follow the International Classification of Disease (ICD10-AM). The paper shows that there continues to be marked differences in mortality between occupations in New Zealand and that many of these differences remain once the effect of socioeconomic deprivation has been taken into account.

Understanding the role of culture in pain: Māori practitioner perspectives of pain descriptors

Jane E Magnusson, Joyce A Fennell

There is growing interest in the role of cultural diversity within healthcare settings yet minority ethnic groups are underrepresented in the healthcare literature, including the literature on pain. To better assess and treat pain in different cultures the perspectives of that culture must be taken into consideration and therefore the study described in this paper was undertaken to better understand Māori perspectives of pain. In the study, Kaumātua and Māori health providers completed questionnaires pertaining to the experience of pain in order to determine their appropriateness for use with Māori pain patients. We found that commonly used and widely accepted descriptors and phrases relating to pain were appropriate to use when assessing Māori pain patients. Additionally, we found that it would be of considerable benefit to include the additional words and phrases provided by participants this study when developing a questionnaire to be given to Māori pain patients as they capture aspects of the pain experience that may be specific to that culture thereby enhancing the appropriateness and usefulness of the questionnaire.

Understanding the role of culture in pain: Māori practitioner perspectives relating to the experience of pain

Jane E Magnusson, Joyce A Fennell

There is growing interest in the role of cultural factors within healthcare settings yet minority ethnic groups are underrepresented in the healthcare literature, including the literature on pain. To better assess and treat pain within different cultures, the perspectives of that culture must be taken into consideration and therefore the study described in this paper was undertaken to better understand Māori perspectives of pain. In this study, Kaumātua and Māori healthcare providers were interviewed to better understand how pain was perceived and expressed by Māori with whom they

had health-related interactions. We found that, as in many cultures, Māori perceive pain as a multidimensional experience impacting them physically, psychologically, socially and spiritually. In addition to finding that there is a commonality between cultures with regard to the experience of pain, our results showed the importance of taking into account factors related to Māori culture (e.g. the role of the whānau/family and the development of relationships with healthcare providers) when assessing and/or treating Māori patients with pain.

Changing response rates from Māori and non-Māori in national sleep health surveys

Jo W Fink, Sarah-Jane Paine, Philippa H Gander, Ricci B Harris, Gordon Purdie

National sleep health surveys in Aotearoa/New Zealand have been designed to achieve equal responses from Maori and non-Maori adults. Four postal surveys were undertaken between 1999-2008 to investigate the prevalence of and risk factors for common sleeping problems and the electoral rolls were used a sampling frame in each study. Response rates to these surveys have declined over time. The reasons for this are likely to be due to a number of factors, including changes to the research design but also factors such as inaccuracies on the electoral rolls, and an increase in mobile phone use compared with landline telephones making it harder to track non-responders. Achieving adequate response rates from Maori and non-Maori is important for sleep health surveys to ensure that the research findings are relevant for Maori and non-Maori.

The utility of routine conjunctival swabs in management of conjunctivitis

Richard J Everts, Tony Barnett, Ben R Lahood

Our results show that General Practitioners and Specialists who care for patients with conjunctivitis ('sticky eye infections') can choose to take swabs from patients' eyes and use the results in an algorithm that accurately guides the use of the right treatment for the right patients.

Can general practitioners provide effective cardiovascular disease (CVD) prevention? Dreams and realities of CVD prevention

Emily Gill, Dee Mangin

Cardiovascular disease is one of the main causes of death in NZ so preventing this before people become unwell (primary prevention) is a health target for the government. NZ's population experiences these efforts mainly through two funded approaches. Unfortunately, this study found that both approaches have significant limitations. With scarce health resources, the challenge is to advocate for a new approach that is more effective.

Transfers from rural hospitals in New Zealand

Trevor Lloyd, Katharina Blattner, Garry Nixon

Ten rural hospital doctors were required to write an assignment on patient transfer as part of their assessment for a postgraduate diploma. The experience of this group of doctors is consistent with the available published information. Transfer of patients is an inevitable part of rural hospital practice. The outcome for patients could be improved through better resourcing of rural hospitals and education for staff, improved communication with transport services and with base hospital specialists, and involvement in the development of regionalised transport protocols.

Serious ski and snowboard injuries in southern New Zealand requiring acute orthopaedic admission and treatment during winter 2009

A Gordon Burgess, Ridzwan Namazie

This is the first published article in New Zealand to look at all ski and snowboard injuries across one season that were severe enough to require acute in-patient orthopaedic treatment. It summarises the patterns of injuries between skiing and snowboarding, transfer to hospital, investigation and the treatment required, whether an operation or not. The article touches on the demographics of the injuries covered and an estimate of the costs involved in treating them. Important points are that both skiing and snowboarding carry a risk of severe injury. Secondly, there is a broad demographic of patients. Thirdly, the author proposes that the costs based on generic ACC codes for given injuries may underestimate the actual cost of treating these injuries in certain patients due to high costs of surgical equipment and resources, but this has not been adequately assessed in this article and may be a good area for further research and cost analyses.

Patterns of trust in sources of health information

Rob Lawson, Sarah Forbes, John Williams

Most studies of trust in health information have looked at either doctor/patient relationships or more recently the internet. In this study data is analysed on a wide range of official and non-official sources. Based on a nationwide survey of New Zealanders we identify that systematic variations exist in the trust that people report with respect to different sources of health information. Six major groupings of source types were identified and the levels of trust assigned to some of these groupings varied according to sex, age, income and ethnicity. Understanding these variations may assist policymakers and other agencies which are responsible for planning the dissemination of health information.



CPR for all? Ethical and medicolegal considerations

Ross Freebairn

To be maximally effective, cardiopulmonary resuscitation (CPR) should be initiated immediately that it is indicated and continued uninterrupted until spontaneous circulation is restored.

In the acute setting of a cardiac arrest it is impractical for clinicians to resort to reference material to ascertain their legal and ethical obligations in respect to provision of CPR to their patients. Therefore, it is essential that clinicians engaged in acute medicine develop a working understanding of issues relevant to the provision of CPR.

In this issue of *NZMJ* McLennan and colleagues provide a comprehensive review of the legality of both the provision and non-provision of CPR.¹ It should be mandatory reading for any medical practitioner ever likely to be confronted with a cardiac arrest—I guess that covers nearly all of us.

Some aspects of CPR practice are peculiar when compared to other treatments, and therefore are worthy of careful consideration. Firstly, as McLennan and colleagues highlight, current custom and practice in some hospitals is to provide CPR for all unless “consent” or a medical DNR order has been documented.

CPR is possibly unique in medical practice that consent is most commonly sought to not provide a service, in direct contradistinction to every other therapy provided where good medical practice requires that the risk and benefits of treatment is considered and consent obtained before implementation.²

While it is widely accepted that initiating emergency actions such as CPR without consent to preserve life is good medical practice, desisting from treatment that will either not influence outcome, or is not in the patients best interest is also good medical practice.² In reality, in many settings CPR may be initiated before any reliable information is available.

During CPR further more dependable information often emerges. If this reveals that resuscitation will be unsuccessful or has been refused previously by the patient while competent, then withholding further treatment is entirely appropriate. Indeed, McLennan suggests it would be unlawful to do otherwise, thus raising the possibility that slavish adherence to “CPR for all” may jeopardise staff.

Secondly, CPR practice is peculiar in that either patient consent or a medical order is often preemptively sought to forgo a procedure that is not currently indicated. McLennan's review reminds us that patient advanced directives requesting or prohibiting CPR are supported by Right 7 of the Code of Rights, and may be verbal or written. Ensuring that accurate information is provided to facilitate valid “advanced directive” or “consent not to treat” decisions may not be easy as it first appears.

Questions such as “if your heart stops do you want us to restart it?” or “if your heart stopped, and you could only survive with severe life-limiting brain damage, would

you want CPR?” are typical of those asked of patients in an attempt to document their “CPR status”.

These questions invite an easy-to-document binary response but fail to convey the wide range of potential causes and prognosis that may influence a patient’s choice to reject or accept CPR or a DNR order. If we are serious about patient-initiated Not for CPR, where is the written information package that allows informed choices?

Any informed discussion about CPR should include the likely prognosis. While in hospital, mortality following CPR is typically well above 80%, the public perception is of a much rosier outcome. Such views are consistent with outcomes displayed in the greatest source of lay medical knowledge—the television medical drama.³

Unchallenged these unrealistic expectations will influence decisions invalidated the “informed” choice of the patient. An additional confounder is that prognosis may change over time, although not always for the worse. If a patient with septic shock, profound hypotension and anuria (despite very high dose vasopressor support) and with refractory hypoxemia (despite ventilatory support) suffered a cardiac arrest, then CPR would not improve the outcome. However if the arrest did not occur in the acute phase but a week later when intensive support had been successfully weaned, although the prognosis remains grave, then CPR is not necessarily futile. Even meticulously considered medical-initiated “Not for CPR” orders need to be reconsidered as patients progress or diagnosis change.

The third peculiarity is the inconsistent consent processes used. Not-for-CPR discussion are not infrequently held with family without the consent of the individual concerned. Pragmatists argue that should the patient die, the surviving family will be need to be satisfied with the treatment provided, and therefore warrant prior consultation. Planning future treatment with relatives of a competent patient, without the patient’s consent, is ethically unsound as it violates not only the patient’s autonomy but also their right to privacy.

Medically-initiated DNR orders not discussed prospectively with patients can create discord if subsequently divulged, but appear to be legally defensible if they follow good medical practice.⁴ Discord may initially arise from erroneous assumptions that CPR is always indicated, but is quite possibly exacerbated by our largely unnecessary negative terminology.

We are not obliged to offer an ineffective antibacterial treatment for a viral illness, to document our “Not-for-Antibiotics” decision nor follow a Not-for-Antibiotics policy? Therefore why is it that we document “Not-for-CPR” orders when CPR is contraindicated, and develop “Not-for-CPR” or “Do Not Resuscitate” policies?

McLennan’s concern—that current policy does not direct clinicians to consider whether CPR is justified—is warranted. A potential solution is to abandon our current in-hospital “CPR for all, unless Not-for-CPR” policies to develop more informed definitive “For CPR” policy. Then an active request or medical order for CPR becomes the norm for mandated CPR treatment at a cardiac arrest.

If consistently applied at admission, all potentially resuscitatable patients would be prospectively identified. To achieve this admitting clinicians would need to be better informed about the likely prognosis from CPR in a wide variety of circumstances.⁵

Whatever changes we do or do not make, all clinicians need to be cognisant of their obligations outlined in the “The use of CPR in New Zealand” article.

Competing interests: None.

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Assessing the assessment: cultural competence and understandings of pain

Suzanne Pitama, Tania Huria, Lutz Beckert, Cameron Lacey

The burden of disease within Māori communities is well documented.¹⁻³ Research identifies that inadequate cultural competency contributes to health disparities between Māori and non-Māori New Zealanders.^{4,5} The development and implementation of cultural competence training provides pathways for clinicians, to work more effectively with Māori as well as further opportunity for clinicians to engage in improving Māori health status.⁶⁻⁸

This issue of the *New Zealand Medical Journal* presents two papers by Magnusson and Fennell.^{9,10} These papers provide a starting point to consider how the standardised assessment tools we work with can potentially lead to discounting Māori realities. Magnusson and Fennell used questionnaires and semi-structured interviews to evaluate the tools they use to explore and define the experience of pain. Although both studies featured small sample groups possessing high health literacy, they were comprised of participants who were able to comment from the perspective of a Māori patient as well as a Māori health stakeholder.

Magnusson and Fennell's research identifies and contributes several key understandings as to how we as clinicians can develop specific strategies to enhance our cultural competency practice.

Firstly, although the authors recognise the role of cultural differences in the expression of health, the acknowledgment of Māori as the indigenous peoples of New Zealand—rather than a minority ethnic group—would have strengthened their papers. Indigeneity and the experience of colonisation has moulded and influenced the culture of being 'Māori' in New Zealand, and has therefore fundamentally influenced Māori health. This acknowledgment would have assisted placing the findings within the context of Māori realities.

When exploring Māori health models the authors identified that like other cultures, health (and pain) is defined within a multi-dimensional framework. A holistic framework encompasses areas that are not included within a biomedical approach to exploring pain. They also identified that when using a Māori health model *Te Whare Tapa Wha* it is essential to establish and build a relationship of trust, use clear communication strategies and involve whānau (extended family) prior to utilising the standardised assessment tool.

Secondly, whilst clinicians may report that they understand what whānau means, unfortunately the strength of the collective community is seldom utilised in either the assessment or management of a patient.¹¹ Magnusson and Fennell's work adds to a growing body of literature^{12,13} highlighting the importance of working alongside whānau to secure optimal clinical results for Māori.

Thirdly, the authors comment that when exploring the relevance of using the tools with Māori participants, very little te reo (Māori language) was offered as alternative phrases by participants. Readers should be cautious not to interpret these findings to mean that the use of te reo is not valued by Māori.

In our recent work¹⁴ Māori participants clearly articulated the benefit of clinicians using te reo when it was initiated by the patient, and saw the use of te reo as a validation of them being accepted as Māori by the clinician.

Lastly, the differences between the standardised assessment tool did not highlight a difference between the way Māori and Pakeha (New Zealand European) express themselves, but showed a difference between how Māori and the biomedical community utilise words to describe pain. The biomedical approach requires a high level of health literacy and is based on a non-holistic framework of how pain and health is defined. Often within New Zealand we see things as a Pakeha vs Māori perspective, as opposed to a biomedical perspective vs a Māori perspective.

It is important for clinicians to eliminate jargon to ensure clarity when utilising standard assessment tools. A brief additional exploration of the patient's experience using a narrative approach may further clarify the experience of the patient. Participants recommended more common/colloquial terms to explore Māori patients' experiences of pain. This would ensure that both the clinician and patient were clear on what was being asked and communicated.

It would be of interest if the authors were to repeat their research with Pakeha and other ethnic groups to explore the differences between these ethnic groups and the biomedical cultural perspective.

The authors should be applauded for including the need to examine our standardised tools to the field of cultural competence, in addition to identifying what other approaches we may use that potentially contribute to ongoing health disparities between Māori and non-Māori New Zealanders.

Competing interests: None.

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The workplace: a missing link in occupational medicine?

David McBride

When peer reviewing the occupational mortality paper¹ in this issue of the *NZMJ* I remarked that it was well overdue because there is, still, despite many reviews of the problem, no valid system for monitoring of occupational mortality or morbidity in New Zealand. This hard data “showing marked differences between occupational groups...not accounted for by socioeconomic deprivation” may indicate that there is something wrong in the workplace. It might be occupational exposures, it might not.

On the other hand, Dame Carol Black, in a report to the United Kingdom Government, looked at the problem from a different perspective, that work can be good for health, which it undoubtedly is.²

The three objectives underlying her vision “working for a healthier tomorrow”, were prevention of illness; promotion of health and well-being; early intervention for those who develop a health condition; and an improvement in the health of those out of work. Proofs which, one supposes, should be self evident.

Medical practitioners need to be involved in health at work, with, arguably, occupational medicine taking the lead. The discipline has always had a strong profile in New Zealand. Academically, a postgraduate Diploma in Industrial Health has been taught for at least 30 years.³ A number of research centres and groups, including the group who wrote this paper, have been, and are, very active. There are initiatives to increase academic networking⁴ and also to translate that evidence into action.⁵

In view of changing priorities it is often useful, as a profession, to participate in a little critical reflection. As a reflective framework I therefore propose to examine where we have been, where we are now, where we need to be and how to get there.

In 2003, Bill Glass, a senior member of our profession, wrote about Dr Thomas Ownsworth Garland as “the father of occupational health in New Zealand”.⁶ Tom Garland was trained in Public Health, and in 1932 commenced his industrial career as “factory doctor” to the tobacco manufacturer Carreras. He then emigrated to New Zealand, and in 1947 was appointed as “Industrial Hygienist” within the Department of Health. At the time, we were an agricultural economy with many small industries employing less than 10 employees. During the 11-month period after his appointment he visited and inspected no less than 220 factories, this work having a significant impact upon our development as a profession.

For the next 40 odd years the home of industrial medicine was within the Department of Health. Doctors also developed their skills part-time within industry, many being general practitioners. In 1984, the Australasian College of Occupational Medicine was formed, a significant step in raising the standing of the “industrial doctor” to the registered specialist level.

The tension between advisory and enforcement roles between the Departments of Health and Labour, along with the piecemeal nature of the legislation, led to statutory

change through the *Health and Safety in Employment Act 1992*. The Department of Labour (DoL) took over responsibility for the medical role, appointing Departmental Medical Practitioners (DMPs). Which is largely where we are today as a small-employer, agriculturally-driven economy. At a strategic medical level we have part-time, 2 hours-a-week DMPs available in major centres to give advice to employers, employees and the public.

The major Government agency now either employing or contracting specialist occupational physicians is the Accident Insurance and Compensation Corporation (ACC). Some District Health Boards (DHBs) also do so. Many independent specialists and general practitioners with appropriate training provide a service, on either an ad-hoc basis or to a specific employer.

In my view where we need to be is, like Dr Garland, in the workplace, using our professional strengths to gain influence. The “factory doctor” has always had a fascinating role, the “double agent” responsibilities to both employer and “patient” requiring careful positioning, the ethical issues, being, at times, challenging. This is where negotiating and political skills are developed, where leadership qualities are nurtured and where influence is born. The problem is that training posts in occupational medicine, by and large, have to be created by trainees themselves. The largest consumer of services is ACC, which is where they end up trying to learn their specialist skills.. With the best will in the world, compensation medicine does not provide an ideal training environment, there is not enough workplace contact .

Dame Carol recognised where we need to be going. In the United Kingdom, occupational health had become detached from mainstream healthcare. The professional bodies also recognised that the major barrier to extending the scope of practice was a historical exclusion of occupational medicine from the “open access” National Health Service. The need was for “working-age health”, approached by a multidisciplinary team, to be brought back into the mainstream of health care.

The other challenges identified for occupational health were a limited remit (in terms of helping only those in employment); an uneven provision of services; inconsistent quality; a diminishing workforce; the shrinking academic base; a lack of good quality data and a poor “image and perception” of occupational medicine as an single minded agency focussed on the needs of the employer.

These barriers need to be breached, we need a sense of direction and we all have our roles.

In 2004, Professor David Coggon, a leading occupational physician in the UK, wrote about “occupational medicine at a turning point”. He argued that occupational research strategies needed to change, because “...much of the illness and disability which currently is attributed to injurious occupational exposures does not arise from underlying disease with detectable organic pathology, but rather is a psychologically mediated response to an external trigger that is conditioned by a combination of individual characteristics and cultural circumstances”.⁷ A provocative statement, but a theory endorsed by Dame Carol through promotion of the “biopsychosocial” model of health, the biological (health condition), psychological (impact or perceived impact on wellbeing) and the social (wider determinants of health, including work, home and family).

We are striving to understand this model, but more active research collaboration and a change of focus from the “exposure” model to something more inclusive is sorely needed.

We then need to get there by putting the evidence into practice, and it is the executive function that is missing. Unless we can persuade employers and government about our potential to contribute we will never gain real traction. In the words used in the Black Report “Improving the health of the working age population is critically important for everyone, in order to secure both higher economic growth and increased social justice”. This idea is important and it is imperative that we act upon it.

We need an occupational medicine training scheme strongly grounded in both public health and clinical medicine, with a focus on the workplace and available to small employers. Training within outward-looking DHBs could fulfil that function, were funding available to facilitate it.

Occupational medicine is like this venerable journal, it has to move on to survive. I would therefore commend, along with the other initiatives that are being promoted, personal action by us all, specialist or generalist occupational medicine practitioner alike. We simply cannot do this vicariously: like Dr Garland our presence in the workplace is sorely needed.

Competing interests: None.

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Mortality rates according to occupation in New Zealand males: 2001–2005

Erin Holmes, Anna Davies, Craig Wright, Neil Pearce, Barry Borman

Abstract

Aim To estimate occupational mortality rates in New Zealand males for the period 2001–2005.

Method Occupation information noted in the free text of death records of males aged 15–64 years during 2001–2005 was classified to the New Zealand Standard Classification of Occupation 1999 and age and deprivation standardised mortality rates and ratios were calculated for the major ICD10-AM categories of disease and different occupational groups.

Results A total of 12,713 male deaths were included in the study. There were marked differences in mortality between occupations. Plant and machine operators and assemblers and agriculture and fishery workers had the overall highest rates. The former had the highest rates for ischemic heart disease, other diseases of the circulatory system, diseases of the respiratory system, and endocrine, nutritional and metabolic diseases, while the latter had the highest rate for external causes.

Conclusions The last published study investigating occupational disease mortality in New Zealand is now over 20 years old and currently no regular monitoring of occupation-related mortality is occurring in New Zealand. This paper shows that there continues to be marked differences in mortality between occupations in New Zealand and that many of these differences persist following adjustment for socioeconomic deprivation.

Differences in mortality rates among different occupation groups have been well documented throughout the past century. The determinants of these disparities include not only the hazards inherent to the workplace, but also external factors such as diet, age, ethnicity and lifestyle which can also vary by occupation.¹

In the past, coded occupation in routinely collected health information in New Zealand was used to investigate, and contribute to the evolution of knowledge on, the occupational health and safety risk factors in the New Zealand workforce.² However, the coding of this field on many of the key datasets has since been discontinued, and this is one of the key issues limiting the effectiveness of New Zealand's occupational disease and injury surveillance system.^{2,3} In particular, around 1997/1998 Statistics New Zealand (SNZ) stopped routinely coding the free text occupation field recorded on the Notification of Death Registration Form (BDM 28),² and admission clerks stopped coding the free text occupation field on hospital discharges.

Following the discontinuation of coding, the high cost of ad hoc coding of routine data confronting researchers has discouraged many occupational health studies; the

last published study investigating occupational mortality in New Zealand was for the period 1974–1978, and is now over 20 years old.¹

Currently no regular monitoring of occupation-related mortality is occurring in New Zealand. This has resulted in major gaps in evidence and subsequent neglect by policy makers. Historical efforts to address this lack of evidence and reignite interest in this area have encountered various hurdles, delaying subsequent action.³

We have therefore conducted our own coding of the occupation free text field in the New Zealand death registration data for the period 2001–2005 and calculated age- and deprivation- standardised mortality rates and ratios per 100,000 person-years-at-risk for each disease and occupational group, in order to provide more current data on occupational differences in mortality in New Zealand.

Methods

We obtained the denominator data from the New Zealand Census 2006 (Statistics New Zealand (SNZ)) and the numerator data from the mortality collection held by the Ministry of Health. All deaths registered in New Zealand during 2001–2005 are included in the analyses. In each instance, we classified people into occupations, at their time of death, using the codes of the New Zealand Standard Classification of Occupations 1999 (NZSCO99)⁴ which is based on the International Standard Classification of Occupations (ISCO-88),⁵ a publication of the International Labour Office (ILO).

The Statistics New Zealand (SNZ) classification coder for occupation data was run over the data first, coding 60% of the data. The rest of the data was manually coded as per the coding manual. All coders had previous experience in occupational coding and were blinded to the diagnoses. The majority of the data was independently coded twice (two people).

Death data was further restricted to those records able to be mapped to valid deprivation quintiles based on the NZDep2006 Index of Deprivation.⁶ This index combines nine variables from the New Zealand 2006 Census which reflect eight dimensions of deprivation, including income, education and housing.

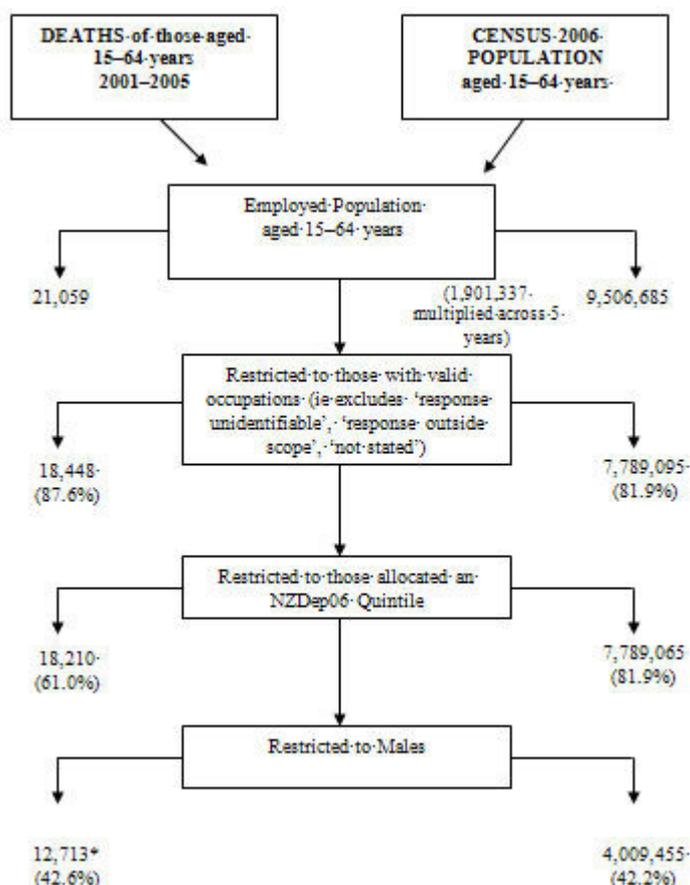
In this study it has been used as a method of controlling differences in mortality that might be attributed to socio-economic deprivation (based on area of residence), rather than those that may be associated with occupational group. We only included male deaths, as more than half of the female deaths were housewives, students, invalids and retired women who we could not assign to an occupational group using the limited death certificate information.

We restricted the occupation data to those aged 15–64 years for two reasons. Firstly, older age groups contained a high proportion of retired people and invalids which could not be assigned to an occupation, and secondly, to enable comparisons to be made with previous research.

The cause of death was determined from the 3-digit disease codes of the International Classification of Diseases (ICD-10-AM)⁷ and the data were grouped in to the major disease categories previously used in studies of social class and mortality in New Zealand.¹ These were the same groupings as used in the ICD-10-AM manual, except that the grouping of diseases of the circulatory system was split into three categories: ischemic heart disease; cerebrovascular disease; and other diseases of the circulatory system.

Deaths from the following ICD-10-AM codes were excluded O00–O99, P00–P96, R00–R99, Z00–Z99 and U00–U99 (36 deaths were excluded in total). These codes cover pregnancy, childbirth, and the puerperium; certain conditions originating in the perinatal period; symptoms signs and abnormal clinical and laboratory findings; factors influencing health status and contact with health services; and codes for special purposes. This process of restriction and the final number of death records included in the analysis is illustrated in Figure 1. The calculations described below are based on a final numerator of 12,713 deaths and a denominator of 4,009,455 people.

Figure 1. Restriction of numerator and denominator data prior to analysis



* This also excludes 36 deaths from the following ICD-10-AM codes: O00-O99, P00-P96, R00-R99, Z00-Z99 and U00-U99 (see text for further detail).

Directly age-standardised mortality rates per 100,000 person-years at risk and 95% confidence intervals (based on Ulm's method)⁸ were calculated for each occupational order using Statistical Analysis Software (SAS).⁹ Five-year age-strata were weighted using the World Health Organization (WHO) World Standard Population. Indirectly age-standardised ratios (also known as standardised mortality ratios) were calculated for the occupational group analyses due to the small denominator numbers for many groups, along with 95% confidence intervals.

Two sets of expected values were calculated. The first was based on mortality rates for all employed persons, whereas the second was standardised for socioeconomic deprivation using the 2006 New Zealand Index of Deprivation.⁶

Results

Table 1A shows mortality by major occupational order. The lowest overall mortality rate was for legislators/administrators/managers (1, includes corporate managers). The highest overall rate was for plant and machine operators and assemblers (8, includes industrial plant operators; stationary machine operators and assemblers; drivers and mobile machinery operators; and building and related workers), followed by agriculture and fishery workers (6, includes crop growers, animal producers, forestry workers, hunters and trappers).

Table 1A. New Zealand 2001–2005 age-standardised male mortality aged 15–64 per 100,000 person-years at risk, by major disease groupings and occupational order

Disease grouping	Occupational order*									
	1		2		3		4		5	
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Certain infectious & parasitic diseases	15	1.5 (0.8 - 2.5)	15	2.3 (1.3 - 3.9)	11	2.3 (1.1 - 4.0)	6	3.6 (1.3 - 7.9)	5	1.3 (0.4 - 2.9)
Neoplasms/Cancer ♦	694	67.1 (62.2 - 72.3)	502	83.4 (76.2 - 91.0)	414	88.1 (79.8 - 97.0)	154	85.9 (72.9 - 100.6)	264	87.3 (77.1 - 98.5)
Endocrine, nutritional & metabolic diseases	46	4.4 (3.2 - 5.9)	42	7.4 (5.3 - 10.0)	48	9.7 (7.2 - 12.9)	30	16.7 (11.3 - 23.9)	35	11.3 (7.9 - 15.7)
Mental & behavioural disorders	2	N/A	6	1.0 (0.4 - 2.2)	9	1.9 (0.9 - 3.6)	4	N/A	4	N/A
Diseases of the nervous system	29	2.8 (1.9 - 4.0)	30	4.9 (3.3 - 6.9)	27	5.8 (3.8 - 8.5)	8	4.7 (2.0 - 9.2)	17	5.1 (3.0 - 8.1)
Coronary heart/Ischaemic heart diseases	353	33.4 (30.0 - 37.1)	206	34.0 (29.5 - 39.0)	192	39.6 (34.2 - 45.6)	109	60.2 (49.4 - 72.6)	183	60.2 (51.8 - 69.6)
Cerebrovascular diseases	45	4.2 (3.1 - 5.6)	34	5.9 (4.1 - 8.2)	36	7.9 (5.5 - 11.0)	28	15.7 (10.4 - 22.7)	31	10.5 (7.1 - 14.9)
Other diseases of the circulatory system	70	6.8 (5.3 - 8.6)	53	16.5 (12.3 - 21.5)	60	12.7 (9.7 - 16.3)	40	22.4 (16.0 - 30.5)	55	16.9 (12.8 - 22.1)
Diseases of the respiratory system	32	3.3 (2.3 - 4.7)	21	3.6 (2.2 - 5.5)	30	6.4 (4.3 - 9.2)	24	13.3 (8.5 - 19.9)	20	6.8 (4.2 - 10.5)
Diseases of the digestive system	25	2.4 (1.6 - 3.6)	20	3.2 (1.9 - 4.9)	23	4.4 (2.8 - 6.6)	9	4.9 (2.3 - 9.4)	18	5.6 (3.3 - 8.8)
Diseases of the genitourinary systems	5	0.5 (0.2 - 1.2)	5	0.8 (0.3 - 1.9)	2	N/A	1	N/A	5	1.8 (0.6 - 4.3)
Congenital malformations, deformations & chromosomal abnormalities	6	0.7 (0.2 - 1.4)	5	0.8 (0.3 - 1.8)	9	1.8 (0.8 - 3.5)	7	3.9 (1.6 - 8.1)	1	N/A
External causes of mortality (incl accidents, self-harm, assault etc)	217	40.0 (34.9 - 45.7)	207	97.7 (84.9 - 112.0)	259	60.0 (52.9 - 67.8)	83	47.1 (37.5 - 58.4)	238	61.8 (54.2 - 70.2)
Other	9	1.0 (0.5 - 1.9)	7	1.1 (0.4 - 2.3)	8	1.8 (0.8 - 3.6)	5	2.8 (0.9 - 6.6)	8	2.8 (1.2 - 5.5)
Total	1548	168.5 (160.2 - 177.1)	1153	262.6 (247.6 - 278.2)	1128	242.9 (228.9 - 257.5)	508	284.1 (260.0 - 310.0)	884	272.7 (255.0 - 291.3)

Disease grouping	Occupational order*								All Employed	
	6		7		8		9		n	Rate
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Certain infectious & parasitic diseases	16	3.5 (2.0 - 5.6)	15	2.1 (1.2 - 3.5)	10	2.2 (1.1 - 4.0)	10	3.1 (1.5 - 5.7)	103	2.3 (1.9 - 2.8)
Neoplasms/Cancer ♦	526	105.6 (96.7 - 115.0)	924	140.4 (131.5 - 149.8)	696	132.1 (122.4 - 142.3)	383	109.3 (98.6 - 120.8)	4557	98.3 (95.5 - 101.2)
Endocrine, nutritional & metabolic diseases	51	10.4 (7.7 - 13.7)	64	9.7 (7.5 - 12.4)	120	22.2 (18.4 - 26.5)	62	18.1 (13.9 - 23.2)	498	10.7 (9.8 - 11.7)
Mental & behavioural disorders	7	1.8 (0.7 - 3.6)	17	2.5 (1.4 - 4.0)	9	1.9 (0.9 - 3.7)	9	2.9 (1.3 - 5.5)	67	1.5 (1.2 - 1.9)
Diseases of the nervous system	27	6.1 (4.0 - 8.8)	39	5.6 (4.0 - 7.7)	29	6.1 (4.1 - 8.8)	21	6.6 (4.1 - 10.1)	227	5.1 (4.4 - 5.8)
Coronary heart/Ischaemic heart diseases	270	52.4 (46.4 - 59.1)	410	60.7 (55.0 - 66.9)	456	83.5 (76.0 - 91.6)	248	70.6 (62.1 - 80.0)	2427	51.3 (49.2 - 53.3)
Cerebrovascular diseases	53	10.7 (8.0 - 14.0)	80	12.1 (9.6 - 15.0)	74	14.1 (11.1 - 17.7)	41	11.7 (8.4 - 15.9)	422	9.2 (8.3 - 10.1)
Other diseases of the circulatory system	92	19.1 (15.4 - 23.4)	137	20.8 (17.4 - 24.6)	131	26.1 (21.8 - 30.9)	67	19.6 (15.2 - 24.9)	705	15.6 (14.5 - 16.8)
Diseases of the respiratory system	46	9.1 (6.6 - 12.1)	69	11.2 (8.7 - 14.2)	74	14.7 (11.5 - 18.4)	36	10.4 (7.3 - 14.4)	352	7.9 (7.1 - 8.8)
Diseases of the digestive system	31	6.2 (4.2 - 8.8)	57	8.1 (6.2 - 10.5)	31	5.8 (4.0 - 8.3)	25	7.0 (4.5 - 10.3)	239	5.0 (4.4 - 5.6)
Diseases of the genitourinary systems	5	1.0 (0.3 - 2.4)	4	N/A	7	1.5 (0.6 - 3.0)	9	2.8 (1.3 - 5.2)	43	1.0 (0.7 - 1.3)
Congenital malformations, deformations & chromosomal abnormalities	10	2.6 (1.2 - 4.7)	8	1.3 (0.5 - 2.5)	7	1.4 (0.6 - 3.0)	6	2.0 (0.7 - 4.3)	59	1.4 (1.1 - 1.8)
External causes of mortality (incl accidents, self-harm, assault etc)	519	160.9 (147.3 - 175.3)	570	89.2 (82.1 - 96.9)	551	139.7 (128.3 - 151.9)	289	94.5 (84.0 - 106.1)	2933	76.7 (74.0 - 79.6)
Other	12	2.5 (1.3 - 4.3)	19	2.7 (1.6 - 4.3)	11	2.1 (1.0 - 3.7)	2	N/A	81	1.8 (1.4 - 2.2)
Total	1665	391.7 (373.1 - 411.0)	2413	367.1 (352.6 - 382.1)	2206	453.4 (434.7 - 472.7)	1208	359.1 (339.1 - 379.9)	12713	287.7 (282.7 - 292.7)

* (1= Legislators, administrators and managers; 2= Professionals; 3= Associate professionalas and technicians; 4=Clerks; 5=Service ansd sales workers; 6=Agriculture and fishery workers; 7=Trades workers; 8=Plant and machine operators and assemblers; 9=Elementary occupations (excluding residual categories)
♦ A breakdown by cancer type is available in Appendix 1

Table 1B. New Zealand 2001–2005 age and deprivation standardised male mortality aged 15–64 per 100,000 person-years at risk, by major disease groupings and occupational order

Disease grouping	Occupational order*									
	1		2		3		4		5	
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Certain infectious & parasitic diseases	15	2.2 (1.2 - 3.6)	15	3.5 (2.0 - 5.8)	11	2.7 (1.4 - 4.8)	6	3.9 (1.4 - 8.5)	5	1.4 (0.4 - 3.2)
Neoplasms/Cancer ♦	694	74.2 (68.8 - 79.9)	502	109.7 (100.3 - 119.7)	414	102.5 (92.8 - 112.8)	154	91.5 (77.6 - 107.1)	264	89.4 (79.0 - 100.9)
Endocrine, nutritional & metabolic diseases	46	6.6 (4.8 - 8.8)	42	12.9 (9.3 - 17.5)	48	13.6 (10.0 - 18.0)	30	19.0 (12.8 - 27.2)	35	12.5 (8.7 - 17.4)
Mental & behavioural disorders	2	N/A	6	0.9 (0.3 - 2.0)	9	2.0 (0.9 - 3.8)	4	N/A	4	N/A
Diseases of the nervous system	29	3.1 (2.1 - 4.5)	30	5.7 (3.8 - 8.1)	27	6.7 (4.4 - 9.7)	8	4.3 (1.9 - 8.5)	17	5.2 (3.1 - 8.4)
Coronary heart/Ischaemic heart diseases	353	40.4 (36.3 - 44.8)	206	49.8 (43.2 - 57.1)	192	47.7 (41.2 - 54.9)	109	62.5 (51.3 - 75.4)	183	65.3 (56.2 - 75.5)
Cerebrovascular diseases	45	5.3 (3.8 - 7.0)	34	8.5 (5.9 - 11.9)	36	11.4 (8.0 - 15.7)	28	17.2 (11.5 - 24.9)	31	11.3 (7.7 - 16.0)
Other diseases of the circulatory system	70	8.1 (6.3 - 10.2)	53	19.3 (14.4 - 25.2)	60	16.1 (12.3 - 20.7)	40	23.5 (16.8 - 32.0)	55	17.8 (13.4 - 23.2)
Diseases of the respiratory system	32	3.8 (2.6 - 5.4)	21	6.8 (4.2 - 10.4)	30	7.9 (5.3 - 11.3)	24	13.1 (8.4 - 19.5)	20	7.3 (4.5 - 11.3)
Diseases of the digestive system	25	3.1 (2.0 - 4.6)	20	4.1 (2.5 - 6.3)	23	4.9 (3.1 - 7.4)	9	5.7 (2.6 - 10.8)	18	6.0 (3.6 - 9.5)
Diseases of the genitourinary systems	5	0.5 (0.2 - 1.2)	5	1.9 (0.6 - 4.4)	2	N/A	1	N/A	5	1.8 (0.6 - 4.2)
Congenital malformations, deformations & chromosomal abnormalities	6	0.8 (0.3 - 1.7)	5	0.7 (0.2 - 1.7)	9	1.8 (0.8 - 3.4)	7	3.7 (1.5 - 7.6)	1	N/A
External causes of mortality (incl accidents, self-harm, assault etc)	217	43.2 (37.7 - 49.4)	207	142.4 (123.7 - 163.2)	259	65.1 (57.4 - 73.5)	83	45.3 (36.1 - 56.2)	238	62.8 (55.1 - 71.3)
Other	9	1.1 (0.5 - 2.1)	7	1.5 (0.6 - 3.0)	8	2.8 (1.2 - 5.5)	5	2.7 (0.9 - 6.3)	8	2.9 (1.3 - 5.7)
Total	1548	192.5 (183.0 - 202.3)	1153	367.7 (346.8 - 389.6)	1128	285.9 (269.4 - 303.1)	508	295.3 (270.2 - 322.2)	884	285.1 (266.6 - 304.5)

Disease grouping	Occupational order*									
	6		7		8		9		All Employed	
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Certain infectious & parasitic diseases	16	4.7 (2.7 - 7.6)	15	2.1 (1.2 - 3.5)	10	1.8 (0.9 - 3.4)	10	2.7 (1.3 - 5.0)	103	2.5 (2.1 - 3.1)
Neoplasms/Cancer ♦	526	134.5 (123.3 - 146.5)	924	146.3 (137.1 - 156.1)	696	123.5 (114.5 - 133.0)	383	103.5 (93.4 - 114.4)	4557	107.8 (104.7 - 111.0)
Endocrine, nutritional & metabolic diseases	51	15.9 (11.8 - 20.9)	64	10.7 (8.2 - 13.7)	120	20.0 (16.6 - 24.0)	62	16.2 (12.4 - 20.7)	498	13.2 (12.0 - 14.4)
Mental & behavioural disorders	7	1.8 (0.7 - 3.8)	17	2.5 (1.5 - 4.0)	9	1.7 (0.8 - 3.3)	9	2.2 (1.0 - 4.2)	67	1.6 (1.2 - 2.0)
Diseases of the nervous system	27	8.0 (5.3 - 11.6)	39	5.6 (4.0 - 7.6)	29	5.4 (3.6 - 7.8)	21	6.4 (4.0 - 9.8)	227	5.4 (4.8 - 6.2)
Coronary heart/Ischaemic heart diseases	270	70.5 (62.3 - 79.4)	410	64.5 (58.4 - 71.1)	456	75.7 (68.9 - 83.0)	248	63.8 (56.1 - 72.3)	2427	58.3 (56.0 - 60.7)
Cerebrovascular diseases	53	14.3 (10.7 - 18.7)	80	12.9 (10.2 - 16.0)	74	12.8 (10.0 - 16.1)	41	10.7 (7.7 - 14.5)	422	10.5 (9.5 - 11.5)
Other diseases of the circulatory system	92	27.3 (22.0 - 33.5)	137	21.9 (18.4 - 25.9)	131	24.2 (20.2 - 28.7)	67	17.1 (13.3 - 21.8)	705	17.7 (16.4 - 19.1)
Diseases of the respiratory system	46	11.4 (8.3 - 15.2)	69	12.2 (9.5 - 15.4)	74	13.5 (10.6 - 16.9)	36	10.0 (7.0 - 13.9)	352	9.1 (8.2 - 10.1)
Diseases of the digestive system	31	8.8 (6.0 - 12.4)	57	9.0 (6.8 - 11.6)	31	5.3 (3.6 - 7.5)	25	6.6 (4.3 - 9.8)	239	5.7 (5.0 - 6.5)
Diseases of the genitourinary systems	5	1.7 (0.6 - 4.0)	4	N/A	7	1.4 (0.5 - 2.8)	9	2.2 (1.0 - 4.3)	43	1.1 (0.8 - 1.5)
Congenital malformations, deformations & chromosomal abnormalities	10	3.2 (1.5 - 5.9)	8	1.3 (0.6 - 2.5)	7	1.6 (0.7 - 3.3)	6	2.2 (0.8 - 4.8)	59	1.4 (1.1 - 1.8)
External causes of mortality (incl accidents, self-harm, assault etc)	519	182.3 (166.9 - 198.7)	570	88.9 (81.8 - 96.5)	551	134.0 (123.0 - 145.7)	289	91.7 (81.4 - 102.9)	2933	78.8 (75.9 - 81.7)
Other	12	3.3 (1.7 - 5.7)	19	3.1 (1.8 - 4.8)	11	1.9 (1.0 - 3.4)	2	N/A	81	2.0 (1.6 - 2.5)
Total	1665	487.7 (464.5 - 511.7)	2413	381.8 (366.7 - 397.3)	2206	422.8 (405.3 - 440.8)	1208	335.9 (317.3 - 355.4)	12713	315.2 (309.7 - 320.7)

*(1= Legislators, administrators and managers; 2= Professionals; 3= Associate professionalas and technicians; 4=Clerks; 5=Service ansd sales workers; 6=Agriculture and fishery workers; 7=Trades workers; 8=Plant and machine operators and assemblers; 9=Elementary occupations (excluding residual categories)
♦ A breakdown by cancer type is available in Appendix 1

Both these occupation categories continued to have the highest overall mortality rates after standardising for socioeconomic deprivation, with the rate for agriculture and fishery workers becoming higher than that of plant and machine operators and assemblers. Clerks (4, includes office and customer service workers) and service and sales workers (5, includes personal and protective services workers, and sales persons and demonstrators) were the only group whose rate was close to that for all employed persons.

Plant and machine operators and assemblers had the highest rates of mortality for coronary heart/ischemic heart disease, other diseases of the circulatory system, diseases of the respiratory system, and endocrine, nutritional and metabolic diseases. Agriculture and fishery workers had the highest mortality rate for external causes, while Trades workers (7, includes printing, tailors, electricians, metal and machinery, and crafts workers) had the highest mortality rates for cancer and diseases of the digestive system.

Elementary occupations (9, including labourers, caretakers, cleaners and refuse collectors) had the highest mortality rate for diseases of the nervous and genitourinary systems, and mental and behavioural disorders, although only the rate for genitourinary disease was significantly different to that experienced by 'all employed persons'.

Clerks had the highest mortality rate for cerebrovascular diseases, certain infectious and parasitic diseases and congenital malformations, deformations and chromosomal abnormalities, although only the rate for cerebrovascular disease was significantly different to 'all employed persons'.

Service and sales workers had the highest mortality rate for 'other' diseases (including diseases of the eye, skin, ears, blood and musculoskeletal system and connective tissue), but this was not significantly different to the rate for 'all employed persons'.

These trends remained following standardisation for socioeconomic deprivation, with the exception of 'other diseases of the circulatory system', for which the highest rate was observed for agriculture and fishery workers rather than plant and machine operators, and 'mental and behavioural disorders' which the rate was highest for trades workers rather than elementary workers (Table 1B).

Table 2 examines overall mortality for occupational groups by sub-major occupation (23 groups). There were seven groups with significantly low mortality and 10 with significantly high mortality, whereas only one group would be expected by chance alone.

Life science and health associate professionals (i.e. technicians and assistants); personal and protective service workers; market orientated agriculture and fishery workers; all trades workers; all plant and machine operators and assemblers; and labourers and related elementary service workers, had significantly higher mortality rates than expected. Standardising for socioeconomic deprivation only affected the significance of the result for building trades workers; drivers and mobile machinery operators; and labourers and related elementary service workers. This means that the elevated mortality experienced by these occupational groups, compared with all employed people, may be attributed to socioeconomic factors rather than occupational factors.

In contrast, after standardising for socioeconomic deprivation, life science and health professionals—includes life science professionals (i.e. biological scientists) and health professionals (i.e. doctors, nurses, vets, dentists and pharmacists)—experienced significantly higher mortality than expected.

Table 2. Observed mortality in New Zealand males aged 15–64 during 2001–2005 compared to that expected on the basis of all employed males and males in the same deprivation quintile, by occupational group

Occupational group (submajor)	Observed deaths	Relative risk vs all employed*	Relative risk vs deprivation quintile*
1 Legislators, administrators and managers			
11 Legislators and Administrators	145	0.67 (0.56–0.79)	0.89 (0.75–1.04)
12 Corporate Managers	1403	0.57 (0.54–0.60)	0.62 (0.59–0.65)
2 Professionals			
21 Physical, Mathematical and Engineering Science Professionals	334	0.61 (0.55–0.68)	0.70 (0.62–0.78)
22 Life Science and Health Professionals	196	0.99 (0.86–1.14)	1.23 (1.07–1.42)¥
23 Teaching Professionals	241	0.76 (0.67–0.87)	0.83 (0.73–0.94)
24 Other Professionals	382	0.69 (0.62–0.76)	0.82 (0.74–0.90)
3 Technicians and Associate Professionals			
31 Physical Science and Engineering Associate Professionals	364	0.96 (0.86–1.06)	1.02 (0.92–1.13)
32 Life Science and Health Associate Professionals	34	2.04 (1.41–2.85)¥	2.50 (1.73–3.49)¥
33 Other Associate Professionals	730	0.79 (0.74–0.85)	0.86 (0.79–0.92)
4 Clerks			
41 Office Clerks	453	1.01 (0.92–1.11)	0.95 (0.86–1.04)
42 Customer Services Clerks	55	0.88 (0.67–1.15)	0.95 (0.71–1.24)
5 Service and Sales Workers			
51 Personal and Protective Services Workers	647	1.33 (1.23–1.44)¥	1.26 (1.17–1.37)¥
52 Salespersons, Demonstrators and Models	237	0.49 (0.43–0.56)	0.48 (0.42–0.54)
6 Agriculture and Fishery Workers			
61 Market Oriented Agricultural and Fishery Workers	1665	1.26 (1.20–1.32)¥	1.37 (1.31–1.44)¥
7 Trades Workers			
71 Building Trades Workers	1275	1.10 (1.04–1.17)¥	1.06 (1.00–1.12)
72 Metal and Machinery Trades Workers	706	1.25 (1.16–1.35)¥	1.15 (1.06–1.23)¥
73 Precision Trades Workers	135	1.72 (1.44–2.03)¥	1.67 (1.40–1.97)¥
74 Other Craft and Related Trades Workers	297	2.86 (2.55–3.21)¥	2.69 (2.39–3.01)¥
8 Plant and Machine Operators and Assemblers			
81 Industrial Plant Operators	272	4.08 (3.61–4.59)¥	2.91 (2.58–3.28)¥
82 Stationary Machine Operators and Assemblers	821	1.95 (1.82–2.08)¥	1.58 (1.47–1.69)¥
83 Drivers and Mobile Machinery Operators	986	1.13 (1.06–1.20)¥	0.95 (0.89–1.01)
84 Building and Related Workers	127	1.94 (1.61–2.30)¥	1.76 (1.47–2.10)¥
9 Elementary Occupations (excluding residuals)			
91 Labourers and Related Elementary Service Workers	1208	1.23 (1.16–1.30)¥	1.03 (0.98–1.09)
Total Employed	12713	1.0	1.0

* Relative risk= Observed deaths/Expected deaths (see text); ¥ Significantly greater than expected.

Discussion

This analysis has highlighted potential associations between different occupations and cause of death in males aged 15–64 years through the analysis of New Zealand mortality data for 2001–2005. Many of these findings are consistent with those

observed in most developed countries, with lower mortality rates apparent in professional and non-manual occupations, and significantly elevated mortality rates in manual occupations.¹¹⁻¹⁶

In particular, the finding that agriculture and fishery workers (including forestry, hunters and trappers), and plant and machine operators and assemblers (including mining, power generation, metal processing, glass, wood and chemical processing plant operators) experience significantly higher mortality ratios than expected, is also evident in other New Zealand¹ studies and studies conducted in the United States.¹⁷⁻¹⁹

In most cases, differences in overall mortality by occupational group remained or were enhanced following adjustment for socioeconomic deprivation. There was a similar finding in previous research conducted in New Zealand¹ and Britain.^{11,15} This provides further evidence that differences in mortality for selected occupations may be attributed to factors other than social status, income and education.

Many of the results for major disease groupings were also comparable with existing research, with significantly elevated mortality observed for the following disease groupings and occupational groups: *Cancer* in industrial plant operators²⁰⁻²¹ and in other craft and related trades workers.²²⁻²⁴ Elevated risk for cancer has also been observed among meat workers in Australia and New Zealand^{25,26}; *Ischemic heart disease* in industrial plant operators²⁷; and *Other diseases of the circulatory system*, particularly among industrial factory workers.^{28,29} This is consistent with the findings of Tamosiūnas et al (2005) that the risk of death from cardiovascular diseases is greater among manual than non-manual workers.¹²

The elevated risk of death from *respiratory diseases* among industrial plant operators has also been noted elsewhere, particularly asthma, emphysema and chronic bronchitis among aluminium plant workers³⁰ and silicon carbide smelter workers.³¹

Higher mortality from *external causes* among market orientated agriculture and fishery workers²⁴ and industrial plant operators, is evident from other studies, particularly from motor vehicle crashes,¹⁸ falling objects,³² machinery, falls,^{33,34} suicide,^{16,35} and drowning (among maritime workers).³⁶

Limitations—The limitations of this type of study have been discussed in depth by numerous authors.^{1,37-39}

Firstly, there are problems associated with selection into and survival in particular occupations. The ‘healthy worker effect’ means that anyone who is unemployed due to illness or disability at the time of their death may not be allocated an ‘occupation’.

A further limitation of using occupation at time of death is that the long incubation periods for many conditions mean that the cause(s) of death could be associated with exposure in a previous occupation, rather than that at the time of death.⁴⁰ Actual exposures and measures of exposure— such as duration and intensity have also not been considered in this study.

Secondly, the occupation data reported on the death registration could be biased (e.g. surviving relatives reporting more prestigious occupations) and/or incomplete, resulting in misclassification. Therefore, some of the findings of this study may underestimate the true relative risks for the most ‘at risk’ populations. Najman et al

show through imputation that estimates of inequalities in mortality can change when missing data are accounted for.³⁷

Thirdly, death registrations have not been directly linked with census data which means that there is no guarantee that the individuals enumerated in each occupational group on the census are the same individuals identified with that occupation on their death certificates.⁴¹ Biddle et al found that numerator-denominator bias can affect the accuracy of traumatic occupational fatality incidence.³⁸

Furthermore, the use of 2006 denominator data for the analysis of deaths occurring between 2001 and 2005 also has implications. Between 2001 and 2006 the population of males aged 15–64 years, in the labour force, increased by approximately 11.1% (Statistics New Zealand). This means that it is likely that the denominator used (Census 2006) will have overestimated the population from which the deaths were drawn (2001–2005). The implications of this limitation are that the mortality rates and relative risks reported in this paper are likely to be much higher in reality.

While these are currently unavoidable limitations of death registration-based studies in New Zealand, in the future, this could be remedied through the linking of individual mortality records (numerator) to the National Health Index (NHI) population (denominator). The NHI is an administrative dataset comprising all individuals that have accessed health services in New Zealand.

While we have adjusted the analyses for socioeconomic deprivation, confounding by extrinsic factors such as smoking, diet and general lifestyle was not directly considered (although some of these factors may be partially controlled for because of their association with deprivation).

Finally, the categories of occupation and cause of death used were broad and may have masked important increases in risk in specific subgroups of occupation and disease and/or diseases. Similarly, while the broad occupational groupings in NZSCO provide a framework for discussing occupational statistics, our findings cannot be generalised to infer causation, particularly given the heterogeneous exposures that occur within these broad groups.

In spite of these limitations, the value of register-based studies in revealing new occupational risks and monitoring older ones is well-established. This approach has recently been used in a comparison of occupational mortality between the Nordic Countries and Japan,⁴¹ and remains the most feasible method for monitoring occupational mortality at a national level in New Zealand.

Conclusion—While register-based studies have many limitations if used as the sole basis for decision making and the formulation of intervention policies, they can nevertheless provide useful information on occupational differences in mortality rates, and can form an important component of occupational health.^{3,24}

This paper shows that there continues to be marked differences in mortality between occupations in New Zealand and that many of these differences persist following adjustment for socioeconomic deprivation.

These trends have persisted in New Zealand for over two decades, a testament to the importance of continuing to monitor the situation through the routine coding of occupation on administrative datasets such as mortality, hospitalisations and cancer

registrations. To routinely code this free-text field in a similar way to the routine coding of disease, at a centralised point, will ensure a consistent and comprehensive dataset.

Furthermore, the centralised coding of this field will enable the automation of this process, resulting in improvements in accuracy and efficiency over time. Such a resource would allow continued monitoring and encourage exposure studies of occupations with significantly elevated relative risks.

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(See Appendix 1 on the following page)

Appendix 1: New Zealand 2001-2005 age-standardised male mortality aged 15–64 per 100,000 person-years at risk by cancer type and occupational order.

Table 1a: New Zealand 2001-2005 age-standardised male mortality aged 15-64 per 100,000 person-years at risk, by cancer type and occupational order

Disease grouping	Occupational order*									
	1		2		3		4		5	
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Colorectal cancer	66	6.4 (4.9 - 8.1)	51	8.2 (6.1 - 10.8)	33	7.2 (4.9 - 10.1)	7	4.0 (1.6 - 8.2)	14	4.6 (2.5 - 7.6)
Lung cancer	95	9.3 (7.5 - 11.3)	66	11.2 (8.7 - 14.2)	69	14.3 (11.1 - 18.1)	34	18.8 (13.0 - 26.3)	52	17.6 (13.2 - 23.1)
Breast cancer	1	N/A	0	N/A	0	N/A	1	N/A	0	N/A
Prostate cancer	29	2.9 (1.9 - 4.1)	27	4.7 (3.1 - 6.8)	14	3.3 (1.8 - 5.5)	3	N/A	10	3.8 (1.8 - 6.9)
Lymphoma	81	7.8 (6.2 - 9.7)	56	9.3 (7.0 - 12.0)	55	11.4 (8.6 - 14.8)	17	9.4 (5.5 - 15.1)	27	9.3 (6.2 - 13.6)
Other cancer	422	40.8 (37.0 - 44.8)	302	50.0 (44.5 - 56.0)	243	52.0 (45.7 - 58.9)	92	51.6 (41.6 - 63.3)	161	52.0 (44.3 - 60.7)

Disease grouping	Occupational order*								All Employed	
	6		7		8		9		n	Rate
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Colorectal cancer	45	8.7 (6.3 - 11.6)	66	10.6 (8.2 - 13.5)	48	9.0 (6.7 - 12.0)	26	7.1 (4.6 - 10.4)	356	7.7 (6.9 - 8.6)
Lung cancer	97	18.6 (15.1 - 22.7)	175	26.6 (22.8 - 30.8)	169	32.6 (27.9 - 38.0)	120	33.9 (28.1 - 40.5)	877	18.9 (17.7 - 20.2)
Breast cancer	0	N/A	1	N/A	0	N/A	1	N/A	4	N/A
Prostate cancer	26	4.9 (3.2 - 7.2)	35	5.7 (3.9 - 7.9)	31	6.5 (4.4 - 9.2)	12	3.3 (1.7 - 5.8)	187	4.2 (3.6 - 4.9)
Lymphoma	55	11.6 (8.7 - 15.1)	96	14.6 (11.8 - 17.8)	64	12.4 (9.6 - 15.9)	30	8.6 (5.8 - 12.3)	481	10.5 (9.5 - 11.4)
Other cancer	303	61.8 (55.0 - 69.1)	551	82.9 (76.1 - 90.1)	384	71.5 (64.5 - 79.0)	194	56.1 (48.5 - 64.6)	2652	57.0 (54.8 - 59.2)

* (1= Legislators, administrators and managers; 2= Professionals; 3= Associate professionalas and technicians; 4=Clerks; 5=Service ansd sales workers; 6=Agriculture and fishery workers; 7=Trades workers; 8=Plant and machine operators and assemblers; 9=Elementary occupations (excluding residual categories)

Table 1b: New Zealand 2001-2005 age and deprivation standardised male mortality aged 15-64 per 100,000 person-years at risk, by cancer type and occupational order

Disease grouping	Occupational order*									
	1		2		3		4		5	
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Colorectal cancer	66	6.9 (5.3 - 8.7)	51	8.7 (6.5 - 11.5)	33	7.2 (4.9 - 10.0)	7	3.8 (1.5 - 7.9)	14	4.9 (2.7 - 8.3)
Lung cancer	95	12.1 (9.8 - 14.8)	66	19.4 (15.0 - 24.7)	69	19.5 (15.2 - 24.7)	34	20.1 (14.0 - 28.2)	52	18.5 (13.8 - 24.3)
Breast cancer	1	N/A	0	N/A	0	N/A	1	N/A	0	N/A
Prostate cancer	29	2.8 (1.9 - 4.1)	27	4.8 (3.1 - 6.9)	14	3.4 (1.8 - 5.6)	3	N/A	10	3.5 (1.7 - 6.5)
Lymphoma	81	8.1 (6.4 - 10.1)	56	11.4 (8.6 - 14.8)	55	12.4 (9.3 - 16.1)	17	9.9 (5.8 - 15.9)	27	9.0 (5.9 - 13.1)
Other cancer	422	44.2 (40.1 - 48.6)	302	65.4 (58.2 - 73.2)	243	60.0 (52.7 - 68.1)	92	54.9 (44.2 - 67.3)	161	53.5 (45.5 - 62.4)

Disease grouping	Occupational order*								All Employed	
	6		7		8		9		n	Rate
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate
Colorectal cancer	45	10.1 (7.4 - 13.5)	66	11.0 (8.5 - 14.0)	48	8.4 (6.2 - 11.1)	26	6.8 (4.4 - 10.0)	356	8.1 (7.3 - 9.0)
Lung cancer	97	26.9 (21.8 - 32.8)	175	27.9 (24.0 - 32.4)	169	30.0 (25.6 - 34.8)	120	31.3 (25.9 - 37.4)	877	22.1 (20.6 - 23.6)
Breast cancer	0	N/A	1	N/A	0	N/A	1	N/A	4	N/A
Prostate cancer	26	6.0 (3.9 - 8.7)	35	6.3 (4.4 - 8.7)	31	6.1 (4.1 - 8.6)	12	3.0 (1.6 - 5.3)	187	4.6 (3.9 - 5.3)
Lymphoma	55	15.7 (11.8 - 20.4)	96	14.7 (11.9 - 17.9)	64	12.0 (9.2 - 15.3)	30	7.9 (5.3 - 11.2)	481	11.1 (10.2 - 12.2)
Other cancer	303	75.9 (67.6 - 85.0)	551	86.3 (79.3 - 93.8)	384	67.1 (60.5 - 74.1)	194	54.3 (46.9 - 62.5)	2652	61.9 (59.6 - 64.3)

* (1= Legislators, administrators and managers; 2= Professionals; 3= Associate professionalas and technicians; 4=Clerks; 5=Service ansd sales workers; 6=Agriculture and fishery workers; 7=Trades workers; 8=Plant and machine operators and assemblers; 9=Elementary occupations (excluding residual categories)

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Understanding the role of culture in pain: Māori practitioner perspectives of pain descriptors

Jane E Magnusson, Joyce A Fennell

Abstract

Aims There is growing interest in the role of cultural diversity within healthcare settings yet minority ethnic groups are underrepresented in the healthcare literature, including the literature on pain. To better assess and treat pain in different cultures the perspectives and experiences of that culture must be taken into consideration and therefore the present study was undertaken to better understand Māori perspectives of pain.

Methods Māori healthcare providers and kaumātua (tribal leaders/elders) completed questionnaires relating to the experience of pain and were asked to provide feedback regarding the suitability of words and phrases typically used to describe symptoms of pain and pain-related disability. Participants were also asked to provide words, or phrases (in te reo Māori or English) representing characteristics of pain which had not been provided but would be useful in the assessment of pain in a Māori population.

Results All of the pain descriptors, and 92% of the phrases regarding the experience of pain, provided were endorsed by the majority of participants demonstrating that, as in many cultures, Māori perceive pain as a multidimensional experience impacting them on physiological, psychological, and social dimensions and that the terms and phrases of measures commonly used to assess pain appropriately capture their pain experiences.

Conclusions The implications of these findings are that established measures can be used when assessing pain in Māori. However, it is beneficial to confirm that the descriptors used in those measures accurately capture the experiences being measured.

Pain presents with considerable difficulties and complexities for those who experience it, as well as for those who treat it. Recognising that physiological mechanisms cannot account for all aspects of pain, and that physiological or pharmacological treatments cannot relieve all pain, the complex and multidimensional nature of pain necessitates investigation of numerous factors that contribute to the experience of pain and the impact it has on patients' lives.

Commonly recognised elements of the pain experience include sensory, emotional, motivational, and social factors^{1,2} and within each of these factors there are many subtle and complex aspects that contribute to the perception and experience of pain. For example, culture could be considered an additional aspect of how social factors influence pain as studies have shown that a person's culture can play an essential role in how they perceive and respond to pain.^{3,4} While there has been interest in the role of culture and ethnicity related to healthcare issues over the years, as stated by

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Edwards, Fillingim and Keefe⁵ there is growing interest in understanding the influence of race and ethnicity on the experience of pain.⁶

Culture is shaped by the values, beliefs, norms, and practices that are shared by members of the same cultural group, and represents a significant force in shaping beliefs and behaviours³ including those related to health issues such as pain.⁷ As reported by Lasch⁸ classic studies on pain and group membership have described how ethnic norms for appropriate pain behaviour influence pain perception, interpretation and response.⁹⁻¹¹ Similarly, Bates, Edwards and Anderson¹² discuss the role that cultural affiliation plays in pain perception and response in that while intense pain affects attitudes and emotions, it is also very likely that attitudes and emotions (which can be influenced by one's culture) can influence reported perceptions of pain intensity.

In addition to influencing the experience of pain, it should be noted that some studies have indicated that culture can also affect the assessment and management of pain.⁷ As presented in a review by Lasch,⁸ studies have reported that minorities are at risk for inadequate pain control. Although it is difficult to interpret whether the findings of these studies relate to variations in the experience of pain, in pain behaviour, or in staff perception and treatment of patients' pain⁸ they do highlight the importance of taking into account the influence that culture can have in relation to the person's pain experience, their reporting of their pain and the impact that pain has had on their life (i.e. their own life and as well as their wider family/social group).

While not all differences in pain experiences are due to culture,³ its influence on a person's perception and expression of pain should be considered when assessing and treating their pain.

Assessing pain—Although pain is an experience found amongst persons of all ages, cultures and socioeconomic status,¹³ assessment of pain has yet to adequately consider the diversity that may exist regarding this experience. For example, to understand cultural differences pertaining to complex health issues such as pain, suffering, or wellness, one approach has been to use translated versions of well-established measures. This practice assumes cross-cultural equivalence of the construct being assessed which may not be appropriate. For example, the Short Form-36 (SF-36)¹⁴ is one of the most widely used health outcome measures, yet it was found to be unsuitable for Pacific people and older Māori in New Zealand as it did not adequately measure the construct of quality of life within these cultures.¹⁵ There is therefore a need to take cultural differences into account when assessing experiences such as illness, disability, health and wellness, and pain.

Māori perspectives of health—In a manner consistent with the widely accepted biopsychosocial view of health and wellness, the traditional Māori view of health is multidimensional, incorporating a balance between: spiritual, emotional/mental, physical, and family/community. The most widely recognised Māori model of health, *te whare tapa wha*,^{16,17} likens these dimensions to the four supporting walls of a house in that the integrity of all four dimensions is required for a sound whole.

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With regard to the experience of pain, while there is a growing body of literature pertaining to the influence of culture on pain, little has been published about Māori perspectives on pain. Currently there are no measures designed specifically to assess pain within the Māori culture, and therefore there are no data on the experience of pain, the prevalence of pain, or the impact of pain on Māori. As chronic pain is one of the most disabling and costly afflictions in North America, Europe and Australia¹⁰ the burden of this condition is likely to also greatly impact New Zealand.

Relatively little is known about the frequency of musculoskeletal pain and pain-related disability in New Zealand¹⁹ as few large scale studies have been undertaken. What studies have shown is that 15% of general practice consultations in New Zealand were for musculoskeletal disorders^{19,20} but it was considered that this number represented a fraction of the New Zealand general population who actually had such disorders as not everyone who has pain seeks treatment for it.

The 2002/2003 New Zealand Health Survey data on the prevalence of self-reported doctor-diagnosed arthritis, osteoarthritis, rheumatoid arthritis, or spinal disorders indicated that 13.9% of men and 17.3% of women reported arthritis.²¹ Similar statistics were found in the report on the Economic Cost of Arthritis in New Zealand²² which found that 16.2% of New Zealanders aged 15 or over were living with at least one type of arthritis (i.e. one in six people). Financially this was estimated to cost \$2.35 billion (i.e. 1.6% of GDP) and more broadly the cost in terms of the years of healthy life lost because of arthritis was estimated to be 19,121 Disability Adjusted Life Years (DALYs).

More recently the Portrait of Health published by the Ministry of Health (2008) provided some idea as to the burden that chronic pain represents in New Zealand as the 2006/07 New Zealand Health Survey revealed that the prevalence of pain (chronic pain for adults, by ethnic group (unadjusted) was 18.1 for European/Other, 17.3 for Māori, 12.0 for Pacific and 9.6 for Asian.²³

When adjusted for age, the Portrait of Health showed that “Māori men had a significantly increased prevalence of chronic pain compared to men in the total population” and additionally that “Asian men and Asian women were significantly less likely to report chronic pain.”²³

While some studies have assessed pain in the general population, there is little information about culturally-specific aspects of the pain experience. As culture can influence the experience and reporting of pain, it would be of considerable value to determine the most appropriate means of assessing pain experienced by Māori. By taking into account the distinct elements of the Māori culture with regard to the experience of pain, the present study was designed to be in accordance with the Treaty of Waitangi by holding to the principles of partnership, participation, and protection.

To better understand the Māori perspective of pain, we sought the views of kaumātua and Māori healthcare providers to gain insight into how pain is perceived and expressed within the Māori culture, and to gather information on what a culturally-appropriate pain measure for Māori should include.

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Methods

Cultural consultation—An important aspect of this research involved appropriate cultural consultation. Guidance from our cultural advisors and kaumātua (tribal leaders/elders) was sought regarding Māori tikanga (customs and protocol) such as language, customary practice, rituals of encounter, perspectives on health and assessing pain in Māori.

Kaumātua are regarded as the tribal experts on most matters^{16,24} and therefore represent an essential source of information on the suitability of items for a culturally appropriate pain measure for Māori. To seek support for this study the researchers attended the regular rōpū (meetings) of the kaumātua and Māori elders. Approval for this research was obtained from the University of Auckland Human Participants Ethics Committee.

Participants—A purposeful sampling technique was used to recruit participants as it selects the most appropriate group (i.e. those involved with the topic) to provide ‘information-rich’ data on the phenomenon under study.^{25,26} For this study participants were recruited through our cultural advisors’ iwi and their Māori healthcare networks.

Participants were classified as either a kaumātua or as someone who identified their ethnicity as Māori (either wholly or partially) who served in healing, healthcare, or consulting roles, and would therefore be likely to care for Māori with pain (i.e. doctors, nurses, physiotherapists, midwives, Māori community workers). Participants were asked to provide information on their age, gender, fluency in te reo Māori (basic, conversational, or fluent), and to specify which health care role (e.g. kaumātua, nurse, physiotherapist, etc.) best described them.

Determining appropriate pain descriptors—Assessment measures for pain that enable a person to convey their experiences in a way that is meaningful to them are required if we are to understand their pain and how it impacts their life. Without such knowledge we miss out on information which could facilitate the assessment and treatment of their suffering.

The importance of language as a means to capture and convey one’s perceptions and experiences exists in all cultures. As we wanted to study the experience of pain within the Māori culture, we needed to understand pain from a Māori perspective. To accomplish this, it would not be adequate or appropriate to simply translate existing pain and disability measures into te reo Māori as we did not know how Māori perceived and expressed their pain experiences or if it would be preferential to have such a measure in English and/or te reo Māori.

We therefore developed a questionnaire which consisted of a series of words and phrases from existing validated self-report pain and pain-disability measures such as the McGill Pain Questionnaire²⁷ and the Headache Disability Inventory²⁸ as these would be a starting point from which we could determine what words/phrases would be the most appropriate to use with Māori patients.

While there are many pain measures available, these measures were chosen as they captured both descriptive words pertaining to pain as well as the impact that pain can have on the person’s life (i.e. perceived disability). Additionally, we limited our use of measures so as to not make our questionnaire too burdensome to complete.

From the measures used we devised a questionnaire that consisted of 61 phrases related to the experience of pain (e.g. pain makes me frustrated, I continue activities even though I feel pain, I feel I’m a burden on others because of my pain, my friends/family have no idea what I’m going through because of my pain) and 123 pain descriptors related to the sensory (e.g. burning, pressure, stabbing), cognitive (e.g. annoying, cruel, awful), emotional (e.g. sad, helpless, alone) and social (e.g. isolated, ignored, misunderstood) aspects of pain.

As the purpose of this study was to determine the appropriateness of commonly used pain descriptors and phrases within the Māori culture, participants were asked to provide feedback regarding the suitability of the pain descriptors and phrases within the questionnaire for use with Māori (i.e. circle yes or no to indicate if the item was useful), to provide alternative descriptors or phrases in te reo Māori or English in the space provided if appropriate, and to provide additional pain-related concepts which had not been included.

Analysis of the data consisted of tabulating the level of endorsement of individual items and noting additional and alternative items provided.

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Results

Questionnaires were completed by 12 females (80%) and 3 males (20%). The age range of participants was 32–81 years. The 15 participants indicated their fluency in te Reo Māori as being: basic (10), conversational (3) or fluent (2).

Completed questionnaires from both Māori healthcare providers (12) and kaumātua (3) were analysed as a combined group as the number of questionnaires per group was not sufficient for separate analyses. The number of people in the categories which participants selected included: kaumātua (3), nurse (3), community health worker (2), allied health professional (1), homeopath (1), physiotherapist (1), psychiatrist (1), psychology assistant (1), psychotherapist (1), and special needs paraprofessional (1).

Descriptive phrases of the experience of pain—Of the 61 phrases provided, 56 (92%) were endorsed by 65% or more of the participants (see Table 1).

Table 1. Level of endorsement of the descriptive phrases from the questionnaire

<p>Descriptive statement endorsed by 100% of participants</p> <p>I feel stressed because of my pain. My pain makes me frustrated. I avoid being around people when I'm in pain. I get tense (e.g., muscle tension) because of my pain.</p>
<p>Descriptive statement endorsed by 93% of participants</p> <p>Because of my pain I can't do things the way I want. My pain makes me angry. Because of my pain I feel isolated. I feel irritable because of my pain. My pain makes me feel frustrated. I can't think straight when I'm in pain. Because of my pain I am less likely to socialize. When I feel my pain increasing my mind starts to race and I begin to worry. I am unable to think clearly because of my pain.</p>
<p>Descriptive statement endorsed by 87% of participants</p> <p>Because of my pain I keep to myself. My pain is so bad that I feel I am going mad. I can't concentrate when I'm in a lot of pain. I can't think of other things when I'm in a lot of pain. I am aware of my pain. Because of my pain others feel I'm a burden. I avoid travelling because of my pain. I continue with activities even though I feel pain. If I really want to do something I'll do it even if I have pain. I'm concerned that my work is suffering because of my pain. I can't work because of my pain. I feel I'm a burden on others because of my pain.</p>
<p>Descriptive statement endorsed by 80% of participants</p> <p>No one understands how pain affects me. My pain makes me feel depressed. I feel desperate because of my pain. I suffer because of my pain. Because of my pain I feel bad, like I can't do anything. My friends/whānau have no idea what I am going through because of my pain. My pain makes life unbearable. I have thoughts of killing myself. I do not enjoy social gatherings because of my pain. When I'm in pain I can't think of anything else besides my pain.</p>

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<p>My pain causes stress in my relationships with family and friends. When I'm in pain I think about the pain constantly. Pain is terrifying. When I am in pain I distract myself with other things (e.g. watch TV, meditate, or daydream).</p>
<p>Descriptive statement endorsed by 73% of participants Sometimes I feel that I am going to lose control because of my pain. I am afraid to go outside when I'm in a lot of pain. I find it difficult to relax after periods of pain. I do not enjoy social gatherings with other people because of my pain. I think that I have a serious health problem which my doctor has failed to detect. My heart races when I'm in pain. As soon as I feel my pain get worse I take medication. To take my mind off my pain I drink/gamble/smoke more.</p>
<p>Descriptive statement endorsed by 67% of participants What I do in my spare time is restricted because of my pain. My partner has no idea what I am going through because of my pain. When my pain increases I stop all activities and try to stay as still as possible. I believe my pain stops me from accomplishing what I want. My pain makes me feel confused. I find it difficult to distract myself (e.g. read, watch TV) because of my pain. When I feel pain I worry that something bad is going to happen. Even though I feel pain I know I'm going to be alright. I feel tightness in my chest when I'm in pain. When I do an activity that increases my pain I know it will decrease later.</p>
<p>Descriptive statement endorsed by <65% of participants My view on the world is affected by my pain. (60%) I worry that if my pain increases it will never decrease. (60%) I am being penalized because of my pain. (53%) I seek reassurance from others when I'm in pain. (47%) I am calm when I am in pain. (27%)</p>

Participants provided 158 alternatives, using either alternative wording (e.g. "I don't like this word 'bad', perhaps 'awful', 'horrible' or 'traumatic'?"), or alternative phrases (e.g. "Doctors don't know what's wrong with me", or "I need my whānau when I'm in pain"). Table 2 presents a sample of the descriptive phrases with the alternatives provided by the participants.

Table 2. Alternative descriptive phrases provided by participants

<p>I think that I have a serious health problem which my doctor has failed to detect. Alternative: Doctors don't know what's wrong with me.</p>
<p>When I'm in pain I think about the pain constantly. Alternative: Pain totally takes over and I can't focus on anything else.</p>
<p>My partner has no idea what I am going through because of my pain. Alternative: No one knows what I'm feeling. Alternative: He/she doesn't know what's going on.</p>
<p>I am afraid to go outside when I'm in a lot of pain. Alternative: I don't go out. Alternative: I would rather stay inside because of my pain.</p>
<p>Because of my pain I feel bad, like I can't do anything. Alternative: Because of my pain I feel frustrated like I can't do anything. Alternative: I can't do anything.</p>
<p>Sometimes I feel that I am going to lose control because of my pain.</p>



Alternative: I feel I might 'lose it' or get angry.

I seek reassurance from others when I'm in pain.

Alternative: I need my whānau when I'm in pain.

Alternative: I ask for help from others when in pain.

Alternative: Most times I just want to be alone.

Alternative: I keep to myself.

Pain descriptors—Of the 123 descriptors (including category labels) provided, 123 (100%) were endorsed by 65% or more of the participants with 77 (63%) being endorsed by 100% of the participants. Tables 3 through 6 present the percentage of participants who indicated that a specific pain descriptor was appropriate for use with Māori patients as they related to the different categories of pain descriptors (e.g. sensory, emotional, cognitive, and social).

Table 3. Level of endorsement of sensory descriptors of pain

Intensity	Sharpness	Tightness	Temperature	Other
excruciating (100%)	pinching (100%)	cramping (100%)	burning (100%)	aching (100%)
mild (93%)	pricking (100%)	crushing (100%)	hot (100%)	dull (100%)
moderate (93%)	shooting (100%)	gripping (100%)	warm (100%)	heavy (100%)
severe (93%)	stabbing (100%)	pressure (100%)	scalding (93%)	hurting (100%)
	stinging (100%)	pulling (100%)	searing (87%)	sore (100%)
	drilling (93%)	tight (100%)		splitting (100%)
	radiating (93%)	tugging (100%)		tearing (100%)
	tingling (93%)	binding (93%)		tender (100%)
	cutting (87%)	wrenching (87%)		numbing (93%)
	flickering (87%)			steady (87%)
	itchy (87%)			taut (87%)
	jumping (87%)			
	tickling (87%)			
	smarting (80%)			

Table 4. Level of endorsement of emotional descriptors of pain

drained (100%)	depressed (100%)	confused (100%)	alone (100%)
exhausted (100%)	fearful (100%)	isolated (100%)	afraid (100%)
nauseated (100%)	helpless (100%)	out of control (100%)	lonely (100%)
sickened (100%)	hopeless (100%)	unsure (100%)	stressed (100%)
tired (100%)	sad (100%)	unmotivated (93%)	worried (100%)
fatigued (93%)	scared (100%)	insecure (87%)	disabled (93%)
suffocated (93%)	terrified (100%)	vulnerable (87%)	restricted (93%)
loss sense of self(80%)	dreadful (93%)	lost my identity (80%)	incapable (87%)
	punished (87%)		

Table 5. Level of endorsement of cognitive descriptors of pain

annoying (100%)	desperate (100%)	concerned (100%)	awful (100%)
bearable (100%)	intense (100%)	confused (100%)	killing (100%)

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irritating (100%)	savage (100%)	cruel (100%)	grinding (93%)
miserable (100%)	violent (100%)	frustrated (100%)	wretched (93%)
ugly (100%)	agonizing (93%)	vicious (100%)	evil (80%)
distracting (93%)	unbearable (93%)	worried (100%)	wicked (80%)
troublesome (93%)	intolerable (87%)	torturing (93%)	

Table 6. Level of endorsement of social descriptors of pain

alone (100%)	misunderstood (100%)	destructive (100%)	avoided (93%)
ignored (100%)	unsupported (93%)	lonely (100%)	disconnected (93%)
isolated (100%)	loss of role (87%)	tense (100%)	forgotten (93%)

Eight alternative descriptors (see Table 7) and 58 additional descriptors (see Table 8) were provided by participants. The majority of alternative and additional descriptors (97%) were supplied by healthcare providers. Interestingly no alternative or additional descriptors were provided in te reo Māori.

Table 7. Alternative descriptors provided

Category	Descriptor provided	Alternative given
Intensity	Moderate Severe Excruciating	Hurts Hurts like hell I feel gutted
Sharpness	Drilling Radiating Smarting	Like a drill All around Pinching
Temperature	Scalding	Hot
Social	Isolated	Alone

Table 8. Additional descriptors provided

Sensory words	Emotional words	Cognitive words	Social words
boring	angry	anxiety	anxious
bruised	anxiety	delirium	delirious
burning	broken	despair	dependent
constant	buggered	fear	despair
crawling	crappy	morose	don't care
digging	drained	quarrelsome	draining
drawing	fear of death/disease	rage	fearful
fulgurating	frustrated	restlessness	left out
gnawing	irritable	sensitiveness	morose
lancinating	shattered	suicidal	outcast
penetrating	stuffed	unconsciousness	quarrelsome
rending	useless	unthinkable	restless
rheumatic	wimpy	useless	sensitive
sprained		weeping	suicidal
stiches/ing			
sticking			
throbbing			



Discussion

The findings of this study illustrate that Māori, like other cultures, perceive pain as a multidimensional experience impacting them physiologically, psychologically, and socially and therefore assessing and treating pain from a multidimensional perspective would be appropriate within the Māori culture.

Similarities between Māori and other cultures regarding their perception and experience of pain were indicated by the participants' endorsement of well-established pain descriptors and phrases (i.e. items from established pain assessment measures) pertaining to the experience of pain.

While this finding is important in terms of understanding commonalities between cultures regarding the perception and expression of the pain experience, it was interesting to learn about differences regarding how people express their thoughts about pain. The provision of alternative wording and additional descriptors and phrases was valuable in terms of providing insight into how Māori express similar concepts in different ways.

For example, terms conveying a distressed state such as “gutted”, “buggered” and “shattered” are commonly used within New Zealand and by Māori and are therefore important to be aware of when working with this patient population as they provide a clear indication of the negative impact that pain is having on the person's life. It should however be noted that these terms would be considered contextually current in that, as with most slang terms, they may not be relevant in the future. The use of slang terms can change over time and this needs to be taken into account when using such terms.

Regarding the use of English versus te reo Māori for descriptors and phrases pertaining to pain, as participants were asked to provide words or phrases in either English or te reo Māori it was expected that more Māori words would have been provided by participants as some were conversational/fluent in te reo Māori and the majority had a basic fluency in te reo Māori. As few Māori words or phrases were provided by participants this indicates that the English ones in the questionnaire were considered to be acceptable. If these descriptors and phrases were not considered to be appropriate for Māori this would have been indicated by the participants excluding these items as well as providing us with other, more culturally appropriate ones.

Interestingly, with regard to the appropriateness of using non-Māori words, the alternative descriptors that were provided by participants were in English not te reo Māori indicating the appropriateness of using English for the assessment of pain in a Māori population. This is an important finding as it indicates that using established descriptive words and phrases, in addition to those provided by participants, would be appropriate to use in the development of a pain questionnaire for Māori.

Although our results demonstrate that the use of English words and phrases is appropriate for assessing pain in the Māori culture, it is important to consider the benefits of allowing for culturally-related or culturally-appropriate terms, phrases and

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descriptors to be encouraged and included when assessing pain in different cultures. The benefits of this approach not only enhance rapport with the person as it enables them to feel their perspective is relevant and valued, it enables the provider to learn about potentially important subtleties that could influence their assessment and treatment of a person from a different culture. This can not only influence the quality of the assessment but also the possibility of treatment being successful.

Therefore, while there are commonalities between cultures with regard to the multidimensional experience of pain, it is valuable to understand a culture's perceptions and experiences regarding pain as part of assessing and treating it.

Conclusions—Our findings demonstrate that commonly used and widely accepted descriptors and phrases relating to pain are appropriate to use when assessing Māori pain patients. Additionally, it would be of considerable benefit to include the additional items provided by this study when developing a questionnaire to be given to Māori pain patients as the additional descriptors and phrases capture aspects of the pain experience that may be specific to that culture thereby enhancing the appropriateness and usefulness of the questionnaire. Once a questionnaire has been developed, additional studies need to be undertaken with Māori pain patients to further explore the experience of pain within this cultural group.

Limitations—This study was undertaken with kaumātua and Māori healthcare providers who we had access to through our cultural advisors and is therefore not meant to be representative of all Māori.

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Understanding the role of culture in pain: Māori practitioner perspectives relating to the experience of pain

Jane E Magnusson, Joyce A Fennell

Abstract

Aims As there is growing interest in the role of cultural diversity within healthcare settings it is important to determine how culture can influence such things as pain. A person's culture can impact not only how they perceive and experience pain but also how they interact with healthcare professionals and adhere to advice provided. To better assess and treat pain in different cultures the perspectives and experiences of that culture must be taken into consideration and therefore the present study was undertaken to better understand Māori perspectives of pain.

Methods Māori healthcare providers and kaumātua (tribal leaders/elders) were interviewed in order to gain insight into how pain was perceived and expressed by Māori with whom they had health-related interactions.

Results The interviews reflected themes consistent within the greater body of literature in that as with many cultures, Māori perceive pain as a multidimensional experience impacting them physically, psychologically, socially and spiritually.

Conclusions While our findings indicate that there is a commonality between cultures with regard to the experience of pain, it is valuable to understand a culture's perceptions and experiences regarding pain before assessing and treating it as indicated in the findings from this study wherein cultural factors such as the role of the whānau (family) and the importance of the development of relationships with healthcare providers were points of emphasis in terms of ways to enhance Māori health.

It is widely accepted that pain is a multidimensional experience as it includes sensory, emotional, motivational, and social factors.^{1,2} An aspect of the social factor which can impact the experience of pain is culture as a person's culture can play an essential role in how they perceive and respond to pain.^{3,4} While there has been interest in the role of cultural diversity within healthcare settings over the years, there is also growing interest in understanding the influence of race and ethnicity on the experience of pain.^{5,6}

Culture represents a significant force in shaping the values, beliefs, norms and practices of individuals including the way the person reacts to pain.⁷ Early studies looking at pain and culture have described how ethnic norms for pain behaviour can influence pain perception, interpretation and response.⁸ In addition to influencing the experience of pain, culture can influence the assessment and management of pain.^{7,8}

As culture can influence the perception and experience of pain, and hence the reporting and potentially the treatment of pain, it is important to be aware of cultural differences when working with patients from different ethnic backgrounds.

Māori perspectives of pain

According to Durie's Māori model of health, *te whare tapa wha*,^{9,10} the dimensions of health include a spiritual aspect (te taha wairua), mental and emotional aspects (te taha hinengaro), family and community aspects (te taha whānau) and a physical aspect (te taha tinana). This is a holistic model with health dimensions represented by four supporting walls of a house.

The integrity of all four dimensions is required for a sound whole. This viewpoint is consistent with the widely accepted biopsychosocial view of health and wellness as well as with the multidimensional nature of the pain experience in that the different aspects of the person and their pain need to be taken into consideration when assessing and treating their pain.

As little has been published regarding Māori perspectives on pain it is not clear if the current measures and approaches to pain assessment and management are appropriate for this cultural group. A better understanding of Māori perspectives pertaining to the experience of pain would guide assessment and treatment approaches for this cultural group. By taking into account the distinct elements of the Māori culture with regard to the experience of pain, the present study was designed to be in accordance with the Treaty of Waitangi by holding to the principles of partnership, participation, and protection.

As a first step to understanding the Māori perspective of pain, we sought the views of Kaumātua (tribal leaders/elders) and Māori healthcare providers to gain insight into how pain is perceived and expressed within the Māori culture. Kaumātua are regarded as the tribal experts on most matters and therefore represent an essential source of information on the suitability of items for a culturally appropriate pain measure for Māori.

Methods

An important aspect of this research involved cultural consultation. Guidance from our cultural advisors and kaumātua was sought regarding Māori tikanga (customs and protocol) including issues such as language, protocol including rituals of encounter, perspectives on health, and assessing pain in Māori.

Qualitative interviews regarding Māori perspectives on pain

To investigate the experience of pain within the Māori culture, an in-depth 'semi-structured' interview format was employed as it has been shown to be useful in advancing cultural understandings of health among indigenous communities, including Māori.¹⁰⁻¹³

The interviews sought to gain insight into how pain was perceived and expressed by those Māori with whom kaumātua and Māori healthcare providers had health-related interactions. Approval for this research was obtained from the University of Auckland Human Participants Ethics Committee.

Interview procedures

A purposeful sampling technique was used to recruit participants as it selects the most appropriate group (i.e. those involved with the topic) to provide 'information-rich' data on the phenomenon under study.^{14,15} For this study participants were recruited through our cultural advisors' iwi (tribe) and their Māori healthcare networks. Participants were kaumātua and Māori healthcare providers who worked in a health-related role with Māori clients (e.g. hospitals, mental health settings and private clinics).

To take part in this study, participants were asked if they would be willing to be interviewed to explore the experience of pain within the Māori culture. On the advice of the cultural advisor, and at the request

of the elders, group-format interviews were offered to kaumātua. The group-format was viewed as a cultural preference by some as it is commonly used on the marae (meeting house) and it provides opportunities for verification or disputation of views presented.

A semi-structured interview-guide was used to ensure that the range of topics relevant to the study objectives was covered in each interview. The interview-guide aided in framing questions to elicit the participants' observations and experiences with Māori patients' perceptions and beliefs pertaining to pain. Participants were asked to comment on the manner and format of assessing pain with Māori including whether English or te reo would be recommended. Interviews were on average 60 minutes long.

It should be noted that the type of interview conducted, group or individual, did not appear to negatively influence participation or discussion as individuals were able to choose which environment they were most comfortable taking part in. All participants consented to audio-recording of the interview.

Data analysis of qualitative interview

Audio recordings of the interviews were transcribed verbatim and the written transcripts constituted the raw data for qualitative analysis. Transcripts were analysed using purposeful constant comparative methodology.¹⁶ Comparisons of data collected from the groups were made using 'data triangulation', a form of convergent validation employed in qualitative research.¹⁷ The written transcripts were compared with the audio-recordings and notes taken at the time of the interviews. In some instances, verification of wording was obtained from a Māori advisor to ensure accuracy of transcription.

The constant comparative method (CCM) of qualitative data analysis¹⁶ was used. Accordingly three stages of comparison were conducted when generating analytical themes:

- Comparison within a single interview,
- Comparison between interviews within the same group, and
- Comparison of interviews between the two groups.

In the process of 'open coding', every passage of the interview was studied to determine the underlying intent or theme. Comparison of the codes used throughout a single interview determined the consistency of a theme. Judgment about saliency of themes was based upon either frequency of occurrence, emphasis of phrasing, or word choice.

The aim of the comparisons of the interviews within the same group (e.g. text of one kaumātua compared to that of another kaumātua) was to determine whether the content or themes were similar among groups, and between groups (e.g. between kaumātua and Māori healthcare providers) to determine the saliency of themes.

Results

Interview participant demographic characteristics

Of the 33 participants 23 (70%) were female and 10 (30%) were male. As expected, the kaumātua group was older (median age 72 years) than the Māori healthcare provider group (median age 38 years). The majority of kaumātua (65%) were fluent in te reo Māori, whereas the majority of Māori healthcare providers (86%) indicated basic te reo Māori competency. The demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic characteristics of interview participants

Variables	Kaumātua		Healthcare providers
	(individual, n=6)	(group, n=20)	(n=7)
Age – median (range)	65 yrs (59–81 yrs)	72 yrs (50–87 yrs)	38 yrs (33–48 yrs)
Gender			
Female	5 (83%)	12 (60%)	6 (86%)
Male	1 (17%)	8 (40%)	1 (14%)
Fluency in te reo Māori			
Basic	1 (17%)	5 (25%)	6 (86%)
Conversational	1 (17%)	2 (10%)	1 (14%)
Fluent	4 (66%)	13 (65%)	0

Twenty kaumātua were interviewed in a group format. Six kaumātua and seven Māori healthcare providers were interviewed individually. All participants identified themselves as being involved in a health-related role with Māori (see Table 2 for the categories participants chose to describe themselves). Additionally, all of the kaumātua (100%) were actively involved in their local marae and most (96%) were regular participants at the Kaumātua Advisory Group.

Table 2. Categories of interview participants

Group affiliation	Number
Kaumātua	26
Allied health professional	1
Homeopath	1
Kaimahi (staff)	1
Nurse/midwife	1
Physiotherapist	1
Psychiatrist	1
Special needs paraprofessional	1
Total	33

Results of interviews

Several themes emerged from the interviews, with the same themes emerging from analysis of interviews from both the kaumātua and Māori healthcare providers' interviews. Themes included: experiences of pain, pain as multidimensional, pain as a private experience, spiritual dimension, coping strategies including the complex role of whānau, and specific recommendations for assessment and treatment of pain.

Experiences of pain

When asked to describe pain issues and the experience of pain (e.g. key issues for Māori, pain behaviours observed with Māori patients, how Māori cope with/manage pain), both groups recounted experiences of supporting or caring for people with pain. Most kaumātua, unlike most of the Māori healthcare providers, also described pain

they had experienced themselves, and consequently they mentioned more personal coping strategies.

This difference in reporting is likely an artifact of the older age of the kaumātua group. Some healthcare providers prefaced their answer with a caveat that their opinion was influenced by clinical experience predominantly with Māori individuals experiencing either severe pain or who were not coping with their pain.

In describing pain and the pain experience, a number of descriptors were used to convey location (e.g. “back pain”, “leg pain”), emotion (e.g. “joyous pain”, “dreaded pain”), possession (e.g. “my pain”, “his pain”), temporal qualities (e.g. “continuous pain”, “lingering pain”), intensity (e.g. “a lot of pain”, “greatest pain”), and some less specific qualifiers (e.g. “another pain”, “that same pain”).

Table 3 provides a sample of the descriptors used by the participants during the interviews.

Table 3. Pain descriptors used by interview participants

Te reo Māori terms	Other terms			
whakamā	a bit of	demon	intermittent	pervasive
ngangana	a lot of	dreaded	joyous	ripping
their wairua is sore	a really big	fluctuating	like the devil	serious
mamae	bad	gnawing	lingering	sharp
	consistent	great	little	short
	continuous	greatest	most pain	small
	darkest	horrible	pain trauma	terrible

Pain as a multidimensional human experience

Participants described mamae (i.e. Māori word for pain) in terms of being a complex multidimensional experience. Reference was made to the *te whare tapa wha* model of health^{12,13} in explaining the dimensions of pain. Differentiations between acute pain and chronic pain, as well as between physical pain and emotional or spiritual pain were made. Pain was frequently described in relation to an accompanying disease or medical condition (e.g. arthritis pain, cancer pain) and was personified as a demon (ngangana) preying upon the person’s life force.

With regard to the experience of pain, the universality of this experience was summed up by one of the kaumātua who stated: “What do you mean Māori pain? I’ve never heard of cultural pain. I thought pain was a human experience.” Similarly, a Māori healthcare provider commented that “I have worked with a number of Māori patients, and their whānau who have experienced pain, I can think of a group of words which are very much the common parlance, burning, stabbing, tearing, ripping, aching, and the pain might have a quality of being intermittent, pervasive, fluctuating or consistent in intensity, or building over certain periods, alleviated by some things and exacerbated by other things, and I can’t really think of anything particularly unusual that would differentiate Māori patients from non-Māori patients in the language that they used, and the English words that they’ve used.”

Pain is private

A common theme which emerged was that Māori were private people, who did not readily talk about their health worries. There were multiple descriptions of Māori enduring and or ignoring pain, with both positive and negative connotations. Pain and other health worries were regarded as private and only spoken of with close whānau. For some Maori there was shame (whakamā) associated with speaking of pain with outsiders.

The reasons given for the reluctance to disclose thoughts and feelings about pain were diverse. In some instances non-disclosure was seen as a positive coping strategy. Alternatively, ignoring pain was listed as a concern when it caused a delay in health-seeking behaviour. Explanations for delayed health-seeking behaviour included childhood memories and family stories of culturally insensitive healthcare, of perceived medical mismanagement, and of not wanting to be a burden. One kaumātua reported that seeing the negative consequences of such health-seeking delay was the impetus for becoming actively involved in health advocacy in the local community.

Another consequence of this reticence to talk openly about pain was the difficulty in having open debate among the community on certain sensitive topics such as euthanasia which was raised in the context of intractable pain in terminal illness. Fundamental to discussions about matters such as death, and indeed for any aspect of life according to the Māori interviewed, was the spiritual dimension.

Generational as well as gender differences in expression of pain were reported. Among the kaumātua, there was recognition that a pattern of ignoring pain was less useful with advancing age. Elderly Māori were reportedly less likely to report pain or to seek medical attention for their pain. Additionally, males were reportedly less responsive to symptoms such as pain than females.

Role of whānau (extended family)

All participants had provided care or support for Māori experiencing pain. Most participants described personal experiences of providing whānau support for close family members (e.g. spouse, sibling, cousin, niece, nephew, or grandparent) through the final stages of terminal illness involving intractable pain. Several participants recounted filling this role on two or three occasions. In addition to the importance of caring for their unwell whānau member, the importance of looking after the carer(s) was raised.

Regarding the role of whānau in relation to pain, a variety of important issues were raised. The dynamic tension of having whānau support on the one hand and of being overwhelmed with the number of visitors on the other was presented.

Another issue was the tension between the desire to be private and not burden others with one's pain or health worries (i.e. not call on whānau support) versus the value of whānau support. Most participants commented on the importance of providing whānau support, but expressed reticence in notifying whānau when unwell.

An interesting interpretation presented was that this behaviour (i.e. of not accessing whānau support or of feeling guilty about seeking whānau support) was regarded as

selfish. It was recommended that responsibility to whānau could be viewed as motivation for adherence to treatment recommendations including pain management.

There was also recognition of the disparity between the 'ideal' availability of whānau to provide support and the 'real' experience of complex family situations where actual support was not so readily available with family members living considerable distances away (including overseas).

Whānau as advocate

Several of the participants described the role of whānau as health advocate and asserted its importance for those elderly Māori who were reluctant to disclose their health worries in doctor-patient interactions as these settings were often found to be inhospitable or insensitive of cultural practices. The role of the health advocate was to negotiate these health encounters on behalf of individuals from their whānau or hapu (wider community) who were experiencing pain. It was acknowledged that those members of the community who had family members with medical training were at an advantage in negotiating such encounters.

Participants' recommendations

Pain measure—The possibility of developing a pain measure incorporating Māori perspectives was discussed and endorsed by kaumātua and Māori healthcare workers. To improve the appropriateness and usefulness of such a measure, the following recommendations were made:

- Incorporate visual aids (e.g. pictures, diagrams),
- Use clear simple language,
- Incorporate Māori models of health (e.g. te whare tapa wha model),
- Ensure the measure is valid,
- Ensure treatment matches identified target,
- Ensure the measure is sensitive to clinical change (i.e. able to measure meaningful progress), and
- Develop different versions for different settings and different populations (e.g. paediatric and adult versions).

With regard to whether such a pain measure should be in English and/or te reo participants commented that the majority of New Zealand Māori were not fluent in te reo Māori, but were fluent in English and would therefore not find a te reo Māori version helpful. However, it was suggested that incorporating Māori words on charts visible in treatment could be beneficial.

Emphasis was placed on the quality of the healthcare relationship (i.e. culturally appropriate rituals of encounter). Other recommendations from participants were for auditing current practices of pain management within health services to ensure the general standard of practice was at a high standard and to provide standardised pain management training to all medical personnel.

Trust is earned—Enhancement of Māori health in relation to the quality of the relationship between the healthcare provider and the Māori client was discussed. It

was suggested that this needs to be a negotiated encounter with rapport and trust earned through awareness of, and adherence to, cultural practices.

Recommendations for culturally-appropriate practice, which would be applicable for any health encounter not just for pain management, included:

- Taking time to listen,
- Not undermining client/whānau resourcefulness and initiative,
- Do not overwhelm,
- Involve whānau in treatment,
- Use whānau or a cultural advisor nominated by the client,
- Seek permission to express less tidy or sensitive aspects,
- Avoid barriers in seating arrangement in relation to client/whānau,
- Have transparent systems,
- Acknowledge constraints of time/place,
- Know some basic te reo Māori,
- When possible use visual aids to explain procedures,
- Engage with Māori networks,
- Know and use cultural advisors, and
- Express humble curiosity.

Discussion

The findings of this study illustrate that, as with many cultures, Māori perceive pain as a multidimensional experience impacting them physically, psychologically, socially and spiritually. These findings are consistent with those found in many other cultures, suggesting that assessing and treating pain from a multidimensional perspective would be appropriate within the Māori culture and that consideration of Māori language and cultural concepts (e.g. inclusion of whānau, developing trust in healthcare relationships, using the te whare tapa whā model) would be valuable in the assessment and treatment of Māori clients.

The presence of pain, its significance, cause, and purpose have been the basis of speculation and study in cultures over time. Cultural groups have sought meanings for pain and have incorporated their conceptualisation of pain within their language and discourse. As stated by Morris¹⁸ “Pain is as elemental as fire or ice. Like love, it belongs to the most basic human experiences that make us who we are.” As exemplified by comments in this study’s interviews, pain is a universal human experience.

While findings from qualitative studies cannot be generalised beyond the study sample, they provide useful insight into the nature of the topic under investigation. In this instance Māori perspectives of pain generated from this study’s interviews with Kaumātua and Māori healthcare providers reflect themes consistent within the greater body of literature. For example, the finding of the multidimensional experience of pain is consistent with previous studies exploring the applicability of the McGill Pain Questionnaire for use in other languages and cultures, in that the dimensions of human pain, independent of the language used, can best be described as encompassing

a range of sensory-discriminative, cognitive-evaluative, and motivational-affective dimensions.^{1,19}

Similarly, the role of whānau described in this study aligns with the body of research on the important role the family plays in the health of its members, an area which has gained prominence within pain research in terms of the role of the family in the onset and maintenance of pain.²⁰⁻²³ With regard to pain treatments, the efficacy of partner-guided or family-guided pain management protocols have been demonstrated for chronic pain due to arthritis²² and cancer.²³

In a recent overview of research on psychological aspects of persistent pain, Keefe et al.²³ regarded the social dimension as a relatively untapped area of research, and recommended more research examining how psychological factors relate to the broader social context of persistent pain.

The importance of spirituality in the conceptualisation of health and pain as found in this study was consistent with a growing body of literature on the relationship between spiritual commitments and health outcomes. In an article on the impact of spirituality on quality of life, Baker²⁴ described how spirituality as a variable in scientific study had evolved over the years, and cited research guides for the inclusion of spirituality within health research. Additionally, several articles in the *Journal of the American Medical Association* highlighted the role of the spiritual dimension in healthcare, providing evidence of its inclusion in medical training and providing guidelines for incorporating spiritual dimensions within an initial intake interview.²⁵⁻²⁹

Koenig²⁶ recommended acknowledging spirituality within health not for the purpose of addressing spiritual issues, but rather to identify how patients cope with their illness or pain, the types of support systems available to them in the community, and any strongly held beliefs which might influence medical care.

Within the context of pain, Morris²⁸ contended that religious discussions of pain and suffering provide a reference to the importance of the meaning of the suffering, an emphasis on the spiritual dimension of human experiences, and an acknowledgement that suffering is more than just a private matter but involves others in a sociocultural context.

In a recent review of spirituality in health literature, Unruh, Versnel and Kerr²⁹ found diverse definitions of spirituality which they categorised as sacred (construed in relation to a higher being), secular (without reference to a higher being), or religious (participation with an identifiable group of people that is organised around a spiritual goal). Unruh et al.²⁹ recommended clearly separating the spirituality construct from related psychological constructs, and respecting the spiritual views of a client (whether secular, sacred, or religious), while providing healthcare in a manner which does not violate the client's spiritual needs.

Conclusion—Clearly pain is a multidimensional and universal experience and while this means there is a commonality between cultures with regard to the experience of pain, it is valuable to understand a culture's perceptions and experiences regarding pain before assessing and treating it.

Our findings demonstrate that while commonly used and widely accepted approaches to the assessment and treatment of pain are appropriate to use when working with Māori pain patients, it would be beneficial to include the additional items/approaches indicated by the participants in this study (e.g. role of whānau, trust between client and provider) when working with Māori pain patients in order to improve understanding and treatment of their pain.

The findings from this study therefore provide a useful framework for exploring Māori perceptions of pain within a Māori pain population which could be explored in future research.

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Changing response rates from Māori and non-Māori in national sleep health surveys

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Abstract

Aim To understand declining response rates in New Zealand sleep health surveys by examining contextual changes and specific aspects of the questionnaires and research design that may have contributed.

Method From 1999-2008, four population surveys were undertaken, seeking to recruit equal numbers of Māori and non-Māori, consistent with the Kaupapa Māori principle of equal explanatory power; using the electoral roll as a sampling frame and including extensive follow-up.

Results In successive surveys, there were fewer respondents in all age groups. Response rates from Māori were lower in all surveys and the percentage decline was greater than for non-Māori. Between 1999 and 2008, the response rates from the initial mail-out decreased by 50% and the proportion of the sample that were uncontactable increased by 50%. Identified societal trends included decreased currency of electoral roll address information, declining use of listed landline telephone numbers, and possibly declining willingness to participate from increasing respondent burden. Contributing study design features may have included changes in Māori leadership, increasing complexity of questions and saliency of the research topic to potential participants.

Conclusions The declining response rate in sleep population surveys is likely to be due to a number of factors. The pros and cons of using the electoral roll as a sampling frame in mail surveys should be carefully considered.

The Kaupapa Māori principle of 'equal explanatory power' promotes the inclusion of equal numbers of Māori and non-Māori participants in health research. This concept has been developed to ensure Māori health needs are effectively addressed and understood at a comparable level to those of non-Māori.

Several national sleep health surveys in New Zealand have integrated equal explanatory power into their study design.¹⁻⁸ Incorporating this principle allows separate analysis of data for Māori and non-Māori with the same level of power, while also allowing Māori and non-Māori comparisons to be made.

This programme of work, undertaken in partnership by the Sleep/Wake Research Centre and Te Rōpū Rangahau Hauora a Eru Pōmare, aims to produce accurate population prevalence estimates for sleep disorders and risk factors among Māori and non-Māori adults, and to examine predictive factors for sleep problems for both groups.

Whilst the first national sleep survey in 1999 successfully achieved high response rates from both Māori and non-Māori (Table 1), the response rates for both samples

have steadily decreased in subsequent surveys, despite very similar methods being used.

In this paper we aim to identify the contextual changes and specific aspects of the questionnaires and research design that may be affecting this process.

Table 1. Response rates for Māori descent and non-Māori samples in sleep population surveys 1999-2008

Survey topic	Year	Response rates		
		Māori descent (%)	non-Māori (%)	Total (%)
Obstructive sleep apnoea syndrome	1999	70.6	78.9	74.4
Insomnia	2001	58.2	76.2	72.5
Morningness/eveningness	2003	53.4	58.2	55.7
Circadian rhythm sleep disorders	2008	48.1	61.6	54.3

Note: The denominator for calculating total response rates excluded: 'return to senders', people who had moved outside the target region and those who were identified as deceased. In addition, the 2003 survey excluded from the denominator those unable to answer the questionnaire due to physical or mental illness and in the 2008 survey, incorrect telephone numbers.

Survey method

In all surveys, the electoral roll was used as the sampling frame. Since it includes information on Māori descent and year of birth for all electors, it is possible to take a random sample of the population stratified by Māori descent and age. The electoral roll does not collect information on sex, so samples cannot be stratified by this variable, although it is presumed that samples from the electoral roll will contain approximately equal numbers of males and females.

The survey method was developed in the first national sleep survey in 1999, which investigated the prevalence of symptoms and risk factors for Obstructive Sleep Apnoea Syndrome (OSAS) among Māori and non-Māori aged 30-59 years.^{5,8} It built on a regional pilot study that sampled 300 adults of Māori descent and 300 non-Māori which achieved an overall RR of 75% (Māori descent response rate=70%, non-Māori response rate= 80%, with the denominator excluding, people identified as deceased or no longer living in the target region). In the pilot study, the number of responders that identified as being in the Māori ethnic group as a proportion of responders of Māori descent was 91%. Since ethnicity using the Māori ethnic group was to be used to classify Māori and non-Māori during data analysis, the national OSAS survey included an age stratified random sample of 5500 electors of Māori descent and 4,500 non-Māori, in order to achieve approximately equal numbers of participants by ethnicity.

The key elements of the first survey that facilitated high response rates included the use of a short questionnaire (two A4 sides), questions requiring primarily tick-box or single value answers, providing the opportunity to enter a draw to win an incentive prize, and the use of information sheets that were tailored to Māori and non-Māori samples (i.e. for the Māori sample appropriate salutations in te reo Māori, the use of

Te Rōpū Rangahau Hauora a Eru Pōmare Centre letterhead, and identification of senior Māori researchers in the signature).

The survey method also included intensive follow-up. After the initial mail-out of study packages, at approximately 2-weekly intervals a reminder postcard was sent to non-responders, and then a new study pack. Telematching was provided by a search service using name and address information provided on the electoral roll. Telephone follow-up was then undertaken where telephone numbers were available, with Māori interviewers available for Māori participants.

Table 2. Differences between New Zealand sleep population surveys 1999–2008

Survey topic	Obstructive sleep apnoea syndrome	Insomnia	Morningness eveningness	Circadian rhythm sleep disorders
Year of survey	April 1999	April 2001	August 2003	October 2008
Sample size				
Māori descent	5500	2100	2674	5000
Non-Māori	4500	1900	2326	4100
Total	10,000	4000	5000	9100
Age range (10-year age groups)	30-59 years	20-59 years	30-49 years	20-59 years
Location	Nationwide	Nationwide	Wellington region	Nationwide
Questionnaire length (A4 pages)	1× double-sided	1× double-sided	2× double-sided	1.5× double-sided
Question style	Majority tick boxes	Majority tick boxes	Majority tick boxes	~50% tick boxes, ~50% written answers
Collaboration with Māori Research Centre	Yes. Led by Māori researcher. Questionnaire sent from TRRHaEP ^a	Yes. Led by Māori researcher. Questionnaire sent from SWRC ^b	No, but led by Māori researcher. Questionnaire sent from SWRC ^b	No, but led by Māori researcher. Questionnaire sent from SWRC ^b
Incentive prize	Mystery holiday weekend	Sleepyhead product	Rimu mirror	5× iPod shuffles
Telematches of published telephone numbers				
Māori descent	39.0%	31.5%	45.8% ^c	24.8%
Non-Māori	50.0%	45.5%	60.8% ^c	36.9%
Non-responder follow-up	Postcard New study pack Telephone call	Postcard New study pack Telephone call	Postcard New study pack Telephone call New study pack to Māori	Postcard New study pack Telephone call New study pack to sample with no telephone number
Māori telephone interviewers	Yes	Yes	Yes	No

Notes:

^aTRRHaEP = Te Rōpū Rangahau Hauora a Eru Pōmare;

^bSWRC = Sleep/Wake Research Centre;

^cThe Wellington region is socioeconomically less deprived than other regions in New Zealand.¹⁰ Both the Māori descent and non-Māori samples in this study were less deprived than the national population surveyed in 1999. This may help to explain the high rate of telematching success for this survey.

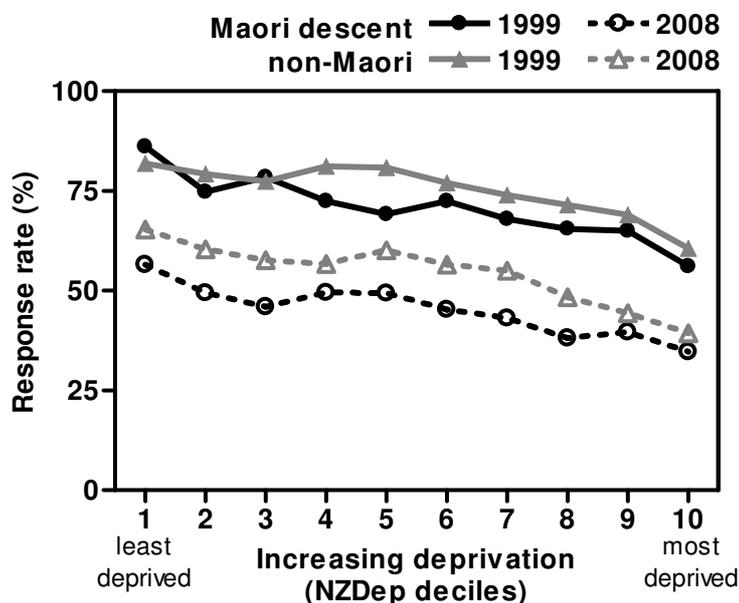
Table 2 describes the major differences in the four population-based sleep surveys including the sample sizes and age ranges, questionnaire style and length, increasing requirement for further follow-up, change in the leadership of studies from Te Rōpū Rangahau Hauora a Eru Pōmare to Māori health researchers at the Sleep/Wake Research Centre, and the lack of Māori interviewers during telephone follow-up for the final survey.

Response rates in sleep surveys

The response rates achieved for each survey are shown in Table 1. The response rate for Māori participants in each survey is consistently lower than that for non-Māori (χ^2 , $p < 0.0001$) and has declined with each successive survey. Māori were also over-represented in the most deprived NZDep⁹ deciles in all surveys, and response rates decreased with increasing socioeconomic deprivation (Cochrane-Armitage test for trend, $p < 0.0001$) in each survey.

Figure 1 demonstrates that the gradients of socioeconomic deprivation have not changed over time for either the Māori descent or non-Māori sample. Additionally, in each survey there was a significant trend for increasing response rates with each additional decade of age (Cochrane-Armitage test for trend, $p < 0.0001$).

Figure 1. Response rate in each NZDep decile for the Māori descent and non-Māori sample in 1999 and 2008, showing a trend of decreasing response with increasing socioeconomic deprivation



The changes in response rate are most apparent between the initial survey in 1999 and the most recent survey in 2008. Table 3 compares the response rate at each stage of

data collection for these two surveys. While telephone follow-up achieved a higher percentage of responses in the 2008 survey, the first mail-out elicited only about half as many responses as in the 1999 survey. Furthermore, the percentages of the sample who were ineligible or unable to be contacted had more than doubled between the two surveys. One factor contributing to this was the inclusion of 20-29 year olds in the 2008 survey, but not the 1999 survey.

Figure 2 shows the breakdown of response rate by descent and age for the two surveys. In both the Māori and non-Māori samples, the percentage of respondents in each age group was lower in 2008 than in 1999.

Table 3. Comparison of responses at each stage of data collection between the Māori descent and non-Māori samples (30–59 year age groups) in 1999 and 2008 in addition to the complete sample (20–59 year age groups) in 2008

Variables	Māori descent sample			non-Māori sample		
	1999	2008		1999	2008	
	Age 30-59 % of 5,500	Age 30-59 % of 3,750	Age 20-59 % of 5,000	Age 30-59 % of 4,500	Age 30-59 % of 3,075	Age 20-59 % of 4,100
Mail-out 1	30.4	16.1	14.1	43.2	23.6	21.3
Mail-out 2	14.0	11.6	10.4	14.5	16.0	14.5
Mail-out 3	15.9	6.7	6.1	13.2	10.5	9.6
Phone follow-up	6.1	10.7	10.0	4.6	9.7	9.3
Mail-out 4 ^a	-	1.6	1.5	-	0.9	0.8
Total	66.3	45.1	42.1	75.6	60.7	55.6
Overseas/ineligible ^b	1.0	0.7	2.0	1.5	1.5	3.5
Incorrect contact details ^c	5.1	5.6	10.3	2.6	2.7	6.2

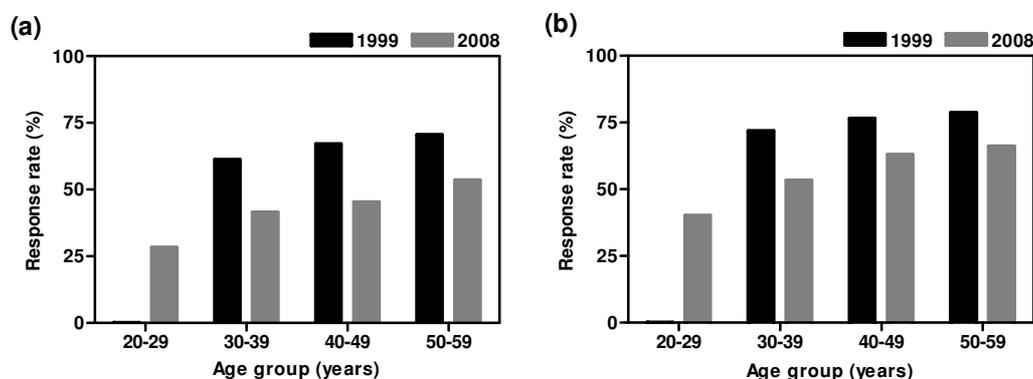
Notes:

^a A fourth mail-out was not performed in the 1999 study.

^b Ineligible respondents included those who were deceased, and in the 2008 survey also those who could not complete the questionnaire because of language difficulties and/or physical or emotional illness.

^c In 1999 this included only 'return to senders' whereas in 2008 incorrect telephone numbers were also included.

Figure 2. Response rate in each 10-year age group for the (a) Māori descent and (b) non-Māori samples in 1999 and 2008



Note: The 1999 survey did not include a 20-29 years age group.

Contextual trends affecting access to survey populations

The percentage of eligible voters on the electoral roll in each age group has increased slightly between each survey, however the proportion of younger voters enrolled in 2008 was still considerably lower than among older age groups (18-24 years=76%; 25-29 years=87%; 50-59 years=97%).¹¹

The Statistics New Zealand Household Economic Survey has reported that household access to cellular phones has increased from 59% in 2001 to 73% in 2007.¹² In 2004 an estimated 6.4% of households did not have access to a landline, and some groups, including Māori and those with the lower incomes, had higher than average access to cellular phones alone.¹³ It can be expected that the number of cellular-phone-only households in New Zealand will continue to increase, as has been seen in other countries.^{14,15} Thus, without a public telephone directory of cellular phone numbers, telephone follow-up is becoming increasingly difficult. In the 2008 national survey, telephone listings could not be found for approximately 75% of the non-responders, for whom the majority were of Māori descent, either through computerised telematching or manual search of telephone listings (total telematches are stated in Table 2).

In November 2006, New Zealand Post introduced a \$20 charge for their previously free mail redirection service.¹⁶ These change of address notifications previously prompted 95% of the changes that were made to maintain the accuracy of details on the electoral roll.¹⁷ Since 2002, New Zealand voters are continuously enrolled on the electoral roll and do not need to re-enrol prior to each election. Thus, without change of address notifications or the return of a pre-election enrolment update form, it is presumed that voters' contact details remain the same.¹⁸ This may in turn, affect the accuracy of the address information on the electoral roll.

Contextual trends affecting the survey-taking climate

There is evidence that survey response rates are decreasing worldwide, in part due to an increase in refusals, and that more effort is required to obtain responses.¹⁹⁻²² In New Zealand mail surveys, the usual practise of two reminders in the 1990s has been routinely superseded by the need for three reminders in the last decade.²³

It is thought that declining response rates may be a consequence of "over-surveying", as potential responders are exposed to an increasing number of research surveys, political polls and telemarketing requests.^{19,22} A 1991 study²⁴ found that in New Zealand, 60% of respondents had been exposed to a survey in the preceding 12 months, with 14% surveyed four times or more over the same time period. The subsequent increase in use of the internet and the proliferation of telemarketing in New Zealand may have increased this exposure, and hence the potential "survey burden",²⁵ although research evidence is lacking.

Both the 1999 and 2008 surveys were performed in Parliamentary election years. However, only the 2008 survey involved data collection immediately prior to and following the election. This may have been an added disincentive for some non-responders.

Specifics of each survey

A significant feature of this program of work has been the use of Kaupapa Māori as the underlying methodology that has informed our research strategy. For Te Rōpū Rangahau Hauora a Eru Pōmare, Kaupapa Māori research has evolved to encompass a broad spectrum of understanding, however the following principles guide their work:

- The research prioritises Māori in its questions, methods, processes and dissemination;
- The research is controlled by Māori, conducted by Māori researchers and with Māori;
- It is not a prescribed set of methods but rather about how research should be framed;
- It focuses on generating solutions and aspirations from within Māori realities; and,
- It contains a notion of action and commitment to change, and to Māori development.

While each of the sleep surveys have maintained consistency with regards to the methods used for data collection, an important point of difference between the 1999/2001 and the 2003/2008 surveys is the level of involvement of Māori health researchers and research Centres (see Table 2). The 1999/2001 surveys were collaborative research projects between Te Rōpū Rangahau Hauora a Eru Pōmare and the Sleep/Wake Research Centre, and this collaboration was made known to the survey participants through the use of Te Rōpū Rangahau Hauora a Eru Pōmare letterhead and the involvement of senior Māori health researchers.

Conversely, the 2003/2008 surveys were solely conducted by the Sleep/Wake Research Centre, but led by a Māori health researcher. Despite the continued commitment to the principles and ideals of Kaupapa Māori research and ongoing informal relationships between the two centres, the lack of explicit or formal collaboration with a Māori health research partner may have influenced the willingness of some Māori to complete the 2003/2008 questionnaires, particularly if there were concerns regarding the kaitiakitanga or guardianship of the research data, or if they had previous negative experiences with health researchers who did not reciprocate appropriately when they had agreed to participate in research.²⁶

The perceived saliency of each survey topic may also have affected response rates. The topics investigated in the first surveys, OSAS and insomnia, have received increasing attention in the popular media in recent years. In contrast, the topics of the final two surveys (morningness/eveningness and disorders of sleep timing) are less well known.

The question structure used in the later surveys was also more demanding. The original 1999 and 2001 surveys were comprised almost entirely of questions with tick box or single value answers. In 2003, participants were required to provide ratings on scales for many questions. In 2008, although approximately half of the questions required tick box or single value answers, participants were also asked provide a range of information on their sleep timing and to respond to unfamiliar ideas.

Discussion

Findings from the national sleep surveys have been published in leading international journals. Identified strengths of the earlier studies in particular are the inclusion of representative national samples, and the capacity to simultaneously evaluate the association of ethnicity and socioeconomic deprivation on sleep health. For surveys to achieve equal explanatory power for Māori and non-Māori, it is necessary to be able to recruit equal numbers of Māori and non-Māori participants, with representative samples of both groups. However, our experience with the national sleep mail surveys suggests that this is becoming increasingly difficult.

National health mail surveys using the New Zealand electoral roll as a sampling frame vary considerably in the study designs used and the response rates achieved.²⁷⁻³¹ A major advantage of using the electoral roll as a sampling frame is that it is possible to select a random sample stratified by Māori descent and age. This is important within the context of Kaupapa Māori as it allows researchers to adequately sample Māori and non-Māori participants and control for differences in the age structure between the Māori and non-Māori populations. The use of the electoral roll as a sampling frame also allows the comparison of responders and non-responders for the demographic variables of Māori descent, age, and socioeconomic deprivation. Researchers are then able to estimate the size of the selection bias inherent within their data particularly when less than adequate response rates are achieved, and/or weight data for responses by these variables.

The present study has identified a number of limitations that need to be considered when using the electoral roll as a sampling frame for national surveys. First, the currency of address information appears to have declined. From 1999 to 2008 there was a doubling in the proportions of electors with incorrect addresses, or for whom it was impossible to match telephone numbers and addresses, for both Māori and non-Māori. This was unexpected in 2008 as the electoral roll was obtained immediately prior to the parliamentary election, when the roll would be expected to be most up to date. The accuracy of address information on the roll may have been affected by New Zealand Post's introduction of charges for change-of-address notification. This might be expected to exacerbate the higher rate of non-response among more socioeconomically disadvantaged groups.

Although enrolment rates in general are increasing, younger voters are still less likely to be on the electoral roll. All the sleep surveys found a trend for increasing response rates with increasing age. Thus, using the electoral roll as a sampling frame to obtain representative information about younger adults remains a challenge. This is particularly pertinent for Māori, who due to their population structure are over-represented in the younger age groups. Some interview surveys³² have trialled using dual sampling frames, to target both the total population and smaller ethnic groups.

This study has also identified a number of other factors inherent within the study method that may have affected response rates over time. The effectiveness of telephone follow-up of non-responders is declining with the declining use of landlines in households, and the lack of a public directory of cellular phone numbers. There is evidence that this may also disproportionately affect Māori and more

socioeconomically deprived people (and probably younger people), thus exacerbating the lower response rates from these groups.

Mail surveys with telephone follow-up were originally selected for obtaining epidemiological data on the sleep health of New Zealanders, due to their relatively low cost and national coverage.⁸ Among other possible approaches, telephone surveys are quicker and less expensive than face-to-face surveys, but do not reach potential participants without telephones. Although face-to-face surveys generally yield the highest response rate,³³ the cost and logistics of this approach were considered prohibitive. However, the present findings on declining response rate to mail surveys indicate that these and other approaches may need to be considered in future.

People may be becoming less willing to participate in surveys, due to increasing “respondent burden”. In this context, it would seem to be increasingly important to design questionnaires that are short and straight forward to complete, and on topics that are considered relevant by, and are well described to, the population being surveyed. Offering the option of on-line completion of questionnaires would reduce participant workload (participants do not need to mail their response in the paper-based postal system). However, this approach may exacerbate the declining response gradient with increasing socioeconomic deprivation, as a result of lower access to the internet among more disadvantaged groups.

From a Kaupapa Māori perspective, Māori leadership in research is central. It is not clear whether the shift from leadership by a Māori health research centre to Māori researchers in a non-Māori research centre had a major independent impact on Māori response rate in the sleep surveys. Nevertheless, it is important for potential participants to have a clear understanding of the role of Māori researchers and the implications of a Kaupapa Māori approach in this type of study.

These analyses demonstrate that the proportion of the target population who cannot be contacted by mail and/or telephone has increased. Declining response rates has important implications for research in terms of the generalisability of the study findings to the population and as a potential source of bias especially if there are systematic differences between those who respond to the survey and those who do not. To promote maximum response from the proportion of the sample who can be contacted, and enable equal explanatory power modifiable survey design components should be optimised. These include ensuring that:

- Power calculations take into account coverage of the electoral roll and a differential between those who are listed as being of Māori descent and those who identify as belonging to the Māori ethnic group;
- Collaboration with and involvement of Māori researchers and research methods are clearly communicated to Māori participants;
- The survey topic is salient to participants and the questionnaire length and question style are as short and simple as possible, with the majority of questions requiring either tick box or single value answers;
- An appropriate incentive prize is included to decrease the likelihood of response bias;

- Digital or online response options are available in addition to freepost reply envelope and a toll free telephone number;
- Extensive and timely follow-up of non-responders is performed by mail and telephone (where possible);
- The timing of the data collection period does not coincide with other events that may negatively influence the likelihood of response through over-surveying or being too busy (e.g. parliamentary elections, sporting championships or vacation periods).

These factors need to be carefully considered in all survey studies and particularly those planning to use the electoral roll as a sampling frame..

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The utility of routine conjunctival swabs in management of conjunctivitis

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Abstract

Aim To determine the accuracy of preliminary results of conjunctival swab culture and to evaluate the utility of preliminary and final conjunctival swab culture results in the routine management of conjunctivitis.

Methods We prospectively identified 164 conjunctival swabs from adults and children over 3 weeks of age and compared preliminary (next day) with final culture results. We modelled the would-be effect on treatment and clinical outcome of three strategies (indiscriminant, delayed and targeted) for management of acute conjunctivitis.

Results In total, 54 of 164 (33%) samples yielded significant bacterial growth. Compared to final culture, preliminary culture had a sensitivity of 86%, positive predictive value of 98% and specificity of 99%. Modelling showed that an indiscriminant approach to management (all patients given topical antibacterial treatment, no swabs taken) was the most effective at reducing symptoms but led to substantial unnecessary use of topical antibacterial treatment. Modelling showed that a delayed treatment strategy (patients start topical antibacterial treatment only if not improving satisfactorily after 2 days, no swabs taken) was the least effective at reducing symptoms and lead to moderate unnecessary use of topical antibacterial treatment. The targeted treatment strategy (topical antibacterial treatment given to those with clinical predictors of bacterial infection on day 0, positive preliminary culture results on day 1 and positive final culture results on day 2) was highly effective at reducing symptoms and potentially the least wasteful of topical antibacterial treatment.

Conclusion Preliminary (next day) conjunctival swab culture results are highly predictive of the final result and could be used by practitioners to guide prescription of topical antibacterial treatment.

Although infective conjunctivitis is in most cases a mild and self-limiting condition, a recent meta-analysis and review show that topical antibacterial treatment shortens the duration of symptoms and accelerates bacteriologic cure.^{1,2} Not surprisingly, randomized controlled trials have shown the greatest benefit when topical antibacterial treatment is given to patients with *proven* bacterial conjunctivitis: compared with placebo, topical antibacterial treatment improved clinical cure or improvement rates from 61% to 78% (levofloxacin; cure at day 6 to 10),³ from 63% to 93% (moxifloxacin; cure at about 1 week),⁴ from 28% to 62% (polymyxin-bacitracin; cure at day 3 to 5),⁵ and from 22% to 64% (ofloxacin; improvement at day 2).⁶

In a large recent randomized controlled trial in acute probable infective conjunctivitis, topical chloramphenicol reduced duration of moderate symptoms from 4.8 days to 3.3 days.⁷

If these benefits are desired then clinicians should ideally prescribe topical antibacterial treatment to patients with bacterial conjunctivitis and not to patients with viral or non-infectious conjunctivitis. Approximately half of cases of acute infective conjunctivitis are caused by bacteria, irrespective of age.^{2,7}

Clinical predictors of bacterial infections have been evaluated in three recent studies.⁸⁻¹⁰ Reitveld found that both eyes being glued on waking correlated significantly with bacterial conjunctivitis whereas a history of previous conjunctivitis correlated significantly with non-bacterial conjunctivitis.⁸ Reitveld used these risk factors to develop a clinical scoring system, which has a sensitivity of 67% and specificity of 73% at a cut-off of +2 and a sensitivity of 84% and specificity of 38% at a cut-off of +1.⁸

Patel et al studied a group of children with a high proportion of *Haemophilus influenzae* conjunctivitis and found that gluey or sticky eyelids and mucoid or purulent discharge were predictive of bacterial infection.⁹ Meltzer and colleagues in New York found in children that no or watery discharge, no glued eyes in the morning, presentation in summer and age 6 years or older correlated with negative bacterial culture.¹⁰

Some Ophthalmologists claim that adenoviral conjunctivitis has a distinct clinical pattern but provide no supportive data for this.¹¹ Based on these studies, glued eyes on waking and purulent discharge correlate consistently with bacterial infection but do not as single or even combined variables have sufficient predictive value to accurately distinguish bacterial from viral conjunctivitis.

Conjunctival swab culture is the gold standard diagnostic test for bacterial conjunctivitis. Testing is recommended for conjunctivitis in neonates, contact-lens wearers, outbreaks, suspected venereal infections and those not responding to treatment, all circumstances in which the microbial cause is relatively uncertain or could have specific management implications. For routine cases of conjunctivitis, however, conjunctival swab culture has been said to play a limited role.

Conjunctival swab cultures have been described as uncomfortable, impractical (due to the long turnaround time) and expensive. In one recent report the results of conjunctival swab cultures had no impact on patient outcome but in this study there was no prospective rational protocol for when and how to collect the samples or use the results.⁷

We prospectively identified all conjunctival swabs submitted in the Nelson region during a 6-month period. To examine the issue of turnaround time we measured the accuracy of preliminary (next day) results as a predictor of final results. To examine their potential utility in routine management of conjunctivitis we modeled the potential impact of preliminary and final swab results on treatment and clinical outcome.

Methods

Evaluation of microscopy and preliminary culture results—We prospectively identified the results of all eye swabs submitted for bacterial culture between 1 January and 30 June 2009 to Medlab South, the sole laboratory provider to Nelson city and surrounding regions. Approximately 90,000 people live in this geographically isolated region of the South Island of New Zealand. We excluded samples from non-conjunctival sources and children under 3 weeks of age.

An episode of conjunctivitis was defined as the submission of 1 or more conjunctival swabs from an individual patient in a 21-day period. In the laboratory, all eye swabs underwent Gram-stain microscopy followed by inoculation onto sheep blood and chocolate agars and incubation for 48 hours in a CO₂ atmosphere. At 24 hours, potential eye pathogens were identified by colony morphology and microscopy and, if appropriate, oxidase, butyrate disk and rapid antigen tests.

We compared the results of microscopy and preliminary culture to the results of final conjunctival swab culture. Positive microscopy was defined as at least 1+ leukocytes and at least 1+ microorganisms resembling a common conjunctival pathogen (e.g., gram-positive cocci or gram-negative bacilli, not gram-positive bacilli.)

Positive preliminary culture was defined as a pure or predominant growth of any quantity of proven or probable eye pathogen. Bacterial conjunctivitis was defined as a pure or predominant growth of any eye pathogen (does not include coagulase-negative staphylococci or non-pneumococcal alpha-haemolytic streptococci.) Normal skin flora was defined as a mixture of diphtheroids, viridans-group streptococci or coagulase-negative staphylococci.

Modelling utility of conjunctival swab culture results—We modelled the effect of three strategies (see Table 1) on treatment and clinical outcome in conjunctivitis.

Table 1. Management strategies for conjunctivitis

Strategy	Description
Indiscriminant	No conjunctival swab taken. Topical antibacterial eye treatment given to all patients on day 1.
Delayed treatment	No conjunctival swab taken. Patient educated and reassured about benign and self-limited nature of conjunctivitis. No antibacterial eye treatment given for first 2 days. If not improving at day 3 then start antibacterial eye drops. ⁷
Targeted treatment (T1 and T2)	At first assessment (day 1), conjunctival swab collected for culture from all cases. Patients prescribed topical antibacterial treatment on day 1 if they have a Reitveld's clinical score of +1 or more (group T1) or +2 or more (group T2). ⁸ Then use preliminary microbiology results (day 2) and final results (day 3) to guide offer of topical antibacterial treatment to patients who still have symptoms.

Assumptions made and methods applied in modelling:

- The population used for modelling was our own cohort of 157 patient episodes, including 53 episodes of bacterial conjunctivitis and 104 episodes of non-bacterial conjunctivitis.
- In the indiscriminant treatment strategy, all patients comply with topical antibacterial treatment, irrespective of symptom resolution, for the first few days.
- In the delayed treatment strategy, 53% patients collect a prescription for topical antibacterial treatment on day 3, irrespective of cause of conjunctivitis (53% chose to take treatment on day 3 in the Everitt study and the cause of conjunctivitis in these patients was not described).⁷
- In the targeted treatment strategy, the proportion of patients given topical antibacterial treatment on day 1 (subgroups T1 and T2) is based on the proportion of patients with these scores in Reitveld's published cohort.⁸
- In the targeted treatment strategy, the proportion of patients with positive Gram-stain microscopy and preliminary culture results on day 2 was based on the results in our cohort of actual patients.

- In the targeted treatment strategy, all patients are contacted on day 2 with the preliminary results of their conjunctival swab culture and treatment advice is based on that result (and the presence of any residual symptoms, see below); patients whose final result is different from the preliminary result are contacted again on day 3 and treatment advice is based on that result (and the presence of any residual symptoms, see below). On each day, the treatment advice supersedes that of the previous day; for example, if a patient is started on topical antibacterial treatment on day 1 based on clinical variables but the preliminary laboratory results do not indicate a bacterial infection, the patient is advised to stop treatment.
- Based on the reported clinical outcomes for patients with proven bacterial conjunctivitis who were randomized to placebo treatment in the studies by Gross et al, Gigliotti et al and the Ofloxacin Study Group III, the symptoms and signs spontaneously resolve in 10% of bacterial conjunctivitis patients per day.⁴⁻⁶ Therefore, in the targeted treatment strategy, 10% of patients on day 1 and 20% of patients on day 2 are not offered topical antibacterial treatment even if their laboratory results indicate bacterial infection.
- Efficacy of topical antibacterial treatment for bacterial infections is estimated to be 1 day fewer symptoms, irrespective of when treatment was started.

Results

Over the 6-month period we processed 164 conjunctival samples representing 157 patient episodes of conjunctivitis. Of the samples received, 88 (54%) were from female patients and 138 (84%) were requested by community general practitioners. Forty samples (24%) were from patients aged 3 to 51 weeks; the other 124 samples were from patients aged 1 to 95 years old and the age distribution of these patients was fairly even across this range. The final results of culture are presented in Table 2.

Table 2. Final results of 164 conjunctival cultures

Result	Number of cases (%)
No microbial growth	52 (32)
Mixed skin flora	58 (35)
Significant bacterial growth	54 (33)
<i>Streptococcus pneumoniae</i>	15
<i>Staphylococcus aureus</i>	12
<i>Haemophilus influenzae</i>	10
<i>Moraxella catarrhalis</i>	4
Others*	13

**E. coli*, *Proteus mirabilis*, *Haemophilus parainfluenzae*, *Pseudomonas aeruginosa*.

Comparisons of gram-stain microscopy and preliminary culture to final culture results are presented in Tables 3 and 4 respectively. Compared to final culture, microscopy had a sensitivity of 27%, specificity of 98%, positive predictive value of 87.5% and overall accuracy of 75%. Compared to final culture, preliminary culture had a sensitivity of 86%, specificity of 99%, positive predictive value of 98% and overall accuracy of 95%.

Table 3. Comparison of immediate gram-stain microscopy to final conjunctival swab culture result (n=161)

Variables	Bacterial conjunctivitis	Non-bacterial conjunctivitis
Microscopy positive*	14	2
Microscopy negative	38	107

* Contains at least 1+ leukocytes and at least 1+ microorganism compatible with an eye pathogen.

Table 4. Comparison of preliminary (next day) culture result to final conjunctival swab culture result (n=159)

Variables	Bacterial conjunctivitis	Non-bacterial conjunctivitis
Preliminary culture positive*	42	1
Preliminary culture negative	7	109

* A pure or predominant growth of any quantity of proven or probable eye pathogen.

The results of modelling three different management strategies are displayed in Tables 5 and 6. According to the results in Table 5 and the assumptions used for modeling, the days of symptoms saved by topical antibacterial therapy for the patients in each management group are estimated as follows: indiscriminant strategy = 53 days, delayed strategy = 28 days, targeted strategy - T1 and T2 = at least 42 days. According to the results in Table 6, the number of days of topical antibacterial treatment used for non-bacterial conjunctivitis in each management group during the first 3 days are as follows: indiscriminant strategy = 312 days, delayed strategy = 55 days, targeted strategy - T1 = 67 days and T2 = 30 days.

Table 5. The number of patients (modelled) with bacterial conjunctivitis (n=53) who would take topical antibacterial treatment (appropriately) in each management strategy

Day	Management strategy			
	Indiscriminant	Delayed	Targeted (T1)	Targeted (T2)
Day 1*	53	0	45	36
Day 2	53	0	41	41
Day 3	53	28	42	42

* Day 1 = the day the patient presents to his or her doctor for assessment.

Table 6. The number of patients (modelled) with non-bacterial conjunctivitis (n=104) who would take topical antibacterial treatment (unnecessarily) in each management strategy

Day	Management strategy			
	Indiscriminant	Delayed	Targeted (T1)	Targeted (T2)
Day 1	104	0	65	28
Day 2	104	0	2	2
Day 3	104	55	0	0

* Day 1: the day the patient presents to his or her doctor for assessment.

Discussion

We have shown that preliminary conjunctival swab culture results accurately predict final results and that these results could be used to guide prescription of the correct treatment to the majority of patients with conjunctivitis within a day after presentation.

When applied to our study cohort of patients presenting with routine conjunctivitis, modeling showed that a targeted management strategy involving a clinical algorithm and routine conjunctival swab cultures resulted in a high reduction in patient symptom days and strategy T2 led to the lowest number of inappropriate days of topical antibiotic use. The targeted approach therefore achieves the aims of high patient medical benefit and minimal unnecessary antibacterial use.

In our model the indiscriminant strategy (prescribing topical antibacterial treatment to all patients with conjunctivitis, without conjunctival culture) was the simplest and most effective approach to management of routine conjunctivitis. This strategy could be rationalized a little by applying a clinical prediction algorithm to determine which patients to treat on day 1.

In New Zealand and Australia, where chloramphenicol is the standard recommended topical antibacterial agent for conjunctivitis,^{12,13} there is little incentive to avoid the unnecessary use of topical antibacterial treatment as serious adverse reactions to topical chloramphenicol are rare and resistance to chloramphenicol amongst eye isolates is rare despite its widespread use for decades.¹⁴⁻¹⁶ In New Zealand a course of chloramphenicol eye ointment or drops costs less than \$2.50.

The situation is different in other parts of the world where fluoroquinolones and aminoglycosides are recommended first-line antimicrobial agents for conjunctivitis – these products are not only four- to five-fold more expensive than chloramphenicol but the agents have major roles in the treatment of systemic infections. Unnecessary or widespread use of topical antibacterial fluoroquinolones or aminoglycosides for conjunctivitis may contribute to the development of resistance, which threatens the use of these agents in more important clinical situations.

In our model both the targeted strategy and the indiscriminant strategy were more effective at preventing days of symptoms than the delayed treatment strategy studied by Everitt et al and recommended by others.^{2,7,17} This is consistent with the results presented in Everitt's study, which showed that those patients randomized to delayed topical antibacterial treatment had a longer mean duration of moderate symptoms (3.9 days) than those randomized to immediate antibiotics (3.3 days).⁷

The major disadvantage in delaying treatment for all cases is that those with bacterial infections lose an opportunity for 2 days of active treatment, which could have shortened their symptoms, potentially allowed them to return to work or school earlier and reduced the transmission of bacterial eye pathogens to others. Moreover, approximately half of those who decide to start antibacterial therapy after 2 days of persistent symptoms could be ineffectively treating a viral infection.

Advantages of the delayed approach include relatively low usage of topical antibacterial treatment and empowerment of the patient to make their own decision on

topical antibacterial treatment (which many will decline if told that their infection is a benign and self-limited condition, even if it means more days of symptoms).¹⁸

In a recent Cochrane review the authors commented on the lack of cost-effectiveness data for treatment of conjunctivitis.¹ We found there were too many intangible variables and outcomes and too much uncertainty in our assumptions to be able to model cost. For example, although the targeted approach has up-front additional costs for a conjunctival swab (approximately \$20 per patient), frequent initial prescription of topical antibacterial treatment (approximately \$2.40 per patient) and the time taken for at least one follow-up contact (approximately \$5 for a phone call), these may be offset by increased diagnostic certainty (reducing the need for repeat medical assessments), savings in reduced days off work or school for some patients and reduced antibiotic resistance pressure in your community.

Cost-effective analyses are complex and region-specific - a recent North American report, for example, concluded that US\$24 point-of-care adenovirus testing on conjunctival samples was cost-effective, despite that test providing less useful information to guide management than a swab culture.¹⁹

Our study samples were not collected routinely or deliberately for the purposes of this analysis but were collected when thought to be clinically indicated and therefore do not represent all cases of conjunctivitis presenting for care. Our patient population, however, is similar to that in other reports, which should allow most readers to apply our results to their circumstances. Provided there is co-operation by the local laboratory (e.g. phoning or electronic transmission of provisional results) and education and motivation of local practitioners, a targeted strategy similar to our model could be implemented in primary-care (community) or hospital settings.

Our results indicate that such a strategy would be effective and ecologically friendly and could lead to improved quality of care. To improve the cost effectiveness of the targeted strategy, clinicians could apply it only to patients for whom the conjunctivitis is preventing attendance at paid employment (like a health-care worker) or school.

A targeted approach may also have additional value in patients with severe symptoms, patients who have less predictive clinical features (for example a Rietveld score of +1 to +3) or patient groups from parts of the world or circumstances (e.g., hospital-acquired) where the ratio of bacterial to non-bacterial conjunctivitis is higher or where microbial causes of simple conjunctivitis are less predictable or less susceptible to local topical antibacterial agents.

Conclusion

Preliminary (next day) conjunctival swab culture results are highly predictive of the final result and could be used by practitioners to guide use of topical antibacterial treatment.

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Can general practitioners provide effective cardiovascular disease (CVD) prevention? Dreams and realities of CVD prevention

Emily Gill, Dee Mangin

Abstract

Aims This study explores how the New Zealand (NZ) population experiences approaches to cardiovascular disease (CVD) risk management: (1) the Primary Health Organisation (PHO) CVD risk performance indicator programme in Akaroa, Canterbury NZ and (2) consumer use of community services that promote healthier lifestyles.

Methods An audit identified patients enrolled at the Akaroa Health Centre eligible for CVD risk assessments and the portion with completed formal assessments. This was compared with the standard PHO performance tool for assessing CVD. An exploratory survey identified awareness of and barriers to use of local lifestyle resources that may directly or indirectly reduce CVD risk, in respondents over the age of 45 years.

Results Distinguishing the eligible population who had not already had their CVD risk calculated required complex database analysis. As of April 2009 11.8% of the eligible population had a CVD risk calculated using the PHO performance tool. However, another 10.1% had had these risks assessed through other tools. The combined total of 21.9% meets the minimum target of 21.7% for the year ending June 30th 2009. The community survey found around a third (36%) of lifestyle promoting resources available were recognised with about half (56.9%) of respondents participating in the activities. Barriers to use included lack of time and perceived need of the service.

Conclusions The current performance indicator approach is not practical, subject to error and may have significant opportunity costs. Furthermore, barriers exist in engaging the population identified as at risk in health-promoting activities.

Reducing the impact of cardiovascular disease (CVD) is one of the 6 health targets of the New Zealand (NZ) Ministry of Health (MOH).¹ This encourages at-risk individuals to modify lifestyle through smoking cessation, improving nutrition, increasing exercise and weight loss and to consider pharmacological treatment for blood pressure, cholesterol and blood sugar levels.

Patients experience healthcare through individual consultations and community activities. The complexity of CVD impact reduction is best understood through patients' perspectives, which include individual and community approaches to non-pharmacological lifestyle modification and pharmacological treatment.

Increasingly, database analysis for indicators of the provision of quality care is used in NZ and international primary care settings to evaluate practitioner or practice

performance. The NZ CVD indicator defines the well population eligible for 'CVD risk assessment' based on the NZ CVD guidelines² and is evaluated by counting recorded CVD risk percentages.

The specific MOH target is to 'increase the percent of eligible adults who have their CVD risk assessed' which assumes that such activity translates to risk modification in currently well individuals and then to improved health outcomes. Non-pharmacological lifestyle modification is difficult to evaluate in a randomised controlled trial (RCT) setting but observational data suggest significant benefits, including all-cause mortality reduction.³ Pharmacological approaches are amenable to randomised trials but the extent of long-term relevant benefits for primary prevention remains controversial.⁴⁻⁶

Individual non-pharmacological lifestyle modification advice complements population-based healthy lifestyle activities. Patients are influenced both through daily contact with their community and intermittent contact with the medical profession but research is limited in addressing which method (individual vs population) is most effective for reducing the impact of CVD. Community-based research indicates multifaceted interventions are more effective⁷⁻⁹ such as using multimedia (e.g. Internet, videos) and local businesses (e.g. supermarkets) and providing group-based support (e.g. weekly meetings, food planning courses, etc).

The "*exchange concept*, which means people receive valued benefits in return for their efforts and changed behaviours"¹¹ may explain this success and is part of social marketing strategies such as NZ's recently terminated 'Healthy Eating Healthy Action (HEHA): Oranga Kai – Oranga Pumau'.¹⁰ Understanding whether services and interventions are valued by a population is important.

The study reviews individual and population approaches to reducing the burden of CVD that prevail in a geographically constrained rural community. The challenge is to gauge whether populations gain more through GP performance indicator programmes or by improved access to and use of activities likely to improve lifestyle.

Methods

This study aims to:

- Assess the practical implementation of PHO performance indicators in a rural practice, by evaluating the difference between risk assessment determined through direct record audit and the PHO performance indicator calculated rate for the practice.
- Explore consumer awareness of and barriers to use of existing community activities and services that promote healthy lifestyles.

First aim—The PHO for this practice used the BestPractice CVD risk tool¹² alone to assess performance indicators. An audit of the patient population in Akaroa enrolled with the sole local health centre was conducted to determine the eligible population for CVD risk assessment as defined by the NZ CVD Guidelines (including 'high risk' groups—refer Table 2).¹³ The national performance indicator group uses a modified set of criteria based only on gender, age and ethnicity to calculate the 'vast majority' of the eligible population.²

Completed formal assessments of CVD risk recorded in the practice management software were counted. These included the 'BestPractice' CVD risk calculation, men and women's 'Wellness Checks'¹⁴ and the Annual Diabetes Review. Both the Wellness Checks and BestPractice CVD risk calculation were initiated in the last 2 years and the diabetes review is annual, so an audit was done of the last 2 years using the MedTech32 query builder in the practice software. MedTech32 is the main software provider for NZ general practices.

Second aim—An exploratory survey was designed to assess awareness, barriers and facilitators of access to services in the same local community likely to promote improved lifestyle. Through discussion with community organisers (e.g. health centre, social service centre, pharmacy, school nutritionist, PHO community service coordinator and community education coordinator) a list of 17 local services potentially associated with CVD risk reduction was built (e.g. nutrition, physical activity and psychological well-being [stress]).

A one-page survey was created with input from these community organisers that asked three questions:

- Which of the 17 services were respondents aware of? (yes/no),
- Whether respondents participated in the listed service? (yes/no), and
- Comments about services and barriers and facilitators to participation? (open-ended). Pre-coded categories were developed during analysis of the free text comments.

The questionnaire also asked participants to record age, gender, whether a participant had children and whether they had a health concern. Ethnicity data was not collected because this study was not designed to assess cultural influences on CVD risk reduction.

Source population—Two anonymous surveys were delivered to all post boxes on Banks Peninsula.

Sample population—CVD risk assessment is generally 10 years later for women but the Wellness Checks begin at age 45 years for both women and men. Analysis was limited to replies from the sample eligible for CVD risk assessment: those 45 years and older.

Data entry and analysis—Data was entered into an Excel spreadsheet and frequencies and proportions and statistical tests were calculated using Excel and OpenEpi Version 2.3 software.¹⁵

Results

PHO performance CVD risk assessment indicator—The enrolled population of the Akaroa Health Centre is 1684 people. The PHO generated list¹⁶ given to the health centre based on the performance indicator criteria² identified 694 people eligible for a CVD risk assessment and 88/694 (12.7%) had a BestPractice CVD risk percentage recorded.

Table 1. Eligible Population for CVD Risk assessment from April 2007–April 2009

CVD risk assessments	Number	Percentage
CVD risk calculated and entered (Best Practice) ¹	88	11.80%
Wellness Checks ²	50	6.70%
Annual DM review completed ³	25	3.40%
No CVD risk calculated/WC/DM assessment completed	579	78%
- routine screening	544	
(eligible for Wellness Check)	(389)	
- high risk	35	
Total as counted by query builds:	742	100.00%

¹ may include those who have also had a Diabetes review or Wellness Check

² may include those who have also had a Diabetes review

³ includes those with diabetes who have NOT had CVD risk calculated (i.e. not total population with diabetes).

In contrast, this study found 742 individuals eligible for CVD risk assessment, with 722 over 45 years of age. Of all those eligible (n=742, Table 1), 88/742 (11.8%) had a BestPractice CVD risk percentage recorded. An additional 50/742 (6.7%) had a Wellness Check and 25/742 (3.4%) a Diabetic Review giving a combined total of 21.9% of eligible patients with a CVD risk assessment. The difference between these data from the direct audit (21.9%) and the PHO Performance estimate (12.7%) is significant (p<0.001).

The remaining (579/742; 78%) eligible population have not had a CVD risk assessment. About two-thirds (389/579; 67.2%) of this group are of the age group eligible for a Wellness Check (age 45 – 65yrs).

Obtaining the appropriate data was complex and time-consuming: Seven sub-groups were used to determine the ‘eligible’ population based on the NZ Cardiovascular Guidelines Handbook 2009¹³ using variables of gender, ethnicity, ‘high risk’ factors and age (see Table 2).

More than 15 separate MedTech32 Query builds were required to identify patients in these subgroups. The queries then had to be manually searched to remove duplicates of individuals and combine queries. Table 2 is included solely to illustrate the complexity of this process and contains no additional data.

Community awareness of lifestyle resources—1400 surveys were delivered to households and 385 participants replied who were over 45 years of age (65 replied under 45 years of age). There were 981 enrolled patients in the practice over the age of 45 years. Assuming all survey respondents are enrolled in the practice, this is a response rate of 39.2% (385/981).

Of 17 well-being services offered in the community, respondents of the survey were aware of an average of 6.2 services (6.2/17; 36%). Six respondents recognised no services (6/385; 1.6%). Over half of respondents (219/385; 56.9%) report participating in at least one of these activities and this proportion is the same whether they had a health concern or not.

The potential participation rate drops to 22% (219/981) if non-responders don’t participate or increases the rate to 83% (815/981) if they do participate. The best-recognised services are sports groups, dance classes, TaiChi Classes and GP Wellness Checks (n/2369; 9 – 14.1%). Of PHO supported services, awareness was 4.1% (96/2369) for smoking cessation, 2.6% (62/2369) for Green Prescription, 2.5% (60/2369) for falls prevention exercise programme, 1.8% (42/2369) for the ‘Appetite for Life’ nutrition service, 1.4% (32/2369) for dietician services and 1.3% (30/2369) for the ‘Ageing/Changing’ fitness programme.

Table 2. Complexity of identifying sub-groups without a BestPractice CVD calculation recorded (n = 742 – 88)

	Age		Total = 654
	30 ↓ 34	(1) High Risk ⁺⁺ (♀+♂): 3	3
	35 ↓ 44	(2) Maori (♂): 8 -DM review recorded but no BPac risk: 0 -No BPac risk or DM review or M/WWC: 8 (3) High Risk (♀): 8	16
Wellness Checks ↓	45 ↓ 54	(4) Maori (♀): 7 - WWC recorded but no BPac risk: 1 - DM review recorded but no BPac risk or WWC: 6 - No BPac risk or DM review or WWC: (5) Eligible (♂): 117 -MWC recorded but no BPac risk: 4 - DM review recorded but no BPac risk or MWC: 92 - No BPac risk or DM review or MWC:	124
	55 ↓ 65 ↓ 74	(6) Eligible (♀+♂): 487 {NB- Eligible for Wellness Checks (55 – 65yrs): 291} -M(♂)WC recorded but no BPac risk: 15 -DM review recorded but, no BPac risk or MWC: 7 - W(♀)WC recorded but no BPac risk: 438 - DM review but no BPac risk or WWC: -No BPac risk or DM review or M/MWC (♀+♂):	487
	75 ↓ 79	(7) High Risk(♀+♂): 24	24

'BPac risk' - Best Practice CVD risk calculation; 'DM review' - Annual Diabetes Review' 'M/WWC'- Men's or Women's Wellness Check.

⁺⁺High Risk sub-groups (1), (3) & (7): read codes- current smoker, diabetes, obesity, [add for (7)- IHD, renal disease]; prescriptions- anti-hypertensives, lipid lowering [not included- gestational diabetes, IGT, renal, family history premature CVD]

Around one-third (142/385; 36.9%) of respondents did not attend any activities. Barriers reported were not enough time (28/142; 19.7%), no need (10/142; 7%) and living too far away (10/142; 7%). Just under half (65/142; 45.8%) gave no reason. Only 2 respondents (1.4%) stated cost as a reason for non-attendance. Other comments were suggestions for services (30/162; 18.5%), positive comments about existing services (30/162;18.5%) and comments about which activities people attended (29/162; 17.9%). Suggestions were mostly about swimming pool and gym services. Table 2 lists the results of the survey.

Table 3: Survey results from respondents over 45 years of age

Variables	Number	%
Characteristics of all participants	385	n=385
Males	157	40.8%
Age:		
45-55 yrs	133	34.5%
56-66 yrs	133	34.5%
67+ yrs	150	39.0%
Have children	238	61.8%
Health concerns that would benefit from lifestyle modification.	112	29.1%
Attendance at any of the activities	219	56.9%
If 'yes' had health concern (n=112), and attended activities	64	57.1%
If had 'no' health concern (n=227), and attended activities	130	57.3%
Any comment made	162	42.1%
All activities identified from a list of 17 options	2369	n=2369
Average number of services identified per participant (n=385)	6.2	
Most common services recognised-		
Sports groups (e.g., bowls, croquet, golf, tennis, walking, golf, badminton, rugby)	335	14.1%
Dance classes	322	13.6%
TaiChi classes	261	11.0%
GP Wellness Checks	256	10.8%
Wellbeing services (e.g., Akaroa Body Care)	231	9.8%
Yoga classes	228	9.6%
Counselling services	142	9.0%
Non-attendance	142	n=142
Gave no reason	65	45.8%
No Time (including 'No time + live too far')	28	19.7%
No need	10	7.0%
Live too far away	10	7.0%
Only recently arrived	5	3.5%
Cost	2	1.4%
Other	22	15.5%
Respondents who commented [Some respondents made multiple comments]	162	n=162
Reasons for not attending	77	47.7%
Suggestions	30	18.5%
- about use of pool	7	
- access to a gym	5	
Positive comments on services	30	18.5%
Activities attended	29	17.9%

Note: Numbers do not all add up to the total due to non-responders.

Discussion

Government health targets to reduce the impact of CVD must be understood from the perspective of patients who experience both individual GP consultations and community activities. The PHO CVD risk performance indicator programme (i.e.

individual focus) monitors CVD risk percentage calculations of patients entered into the screening part of MedTech as proxy for adequacy of care. The accuracy of the numerator and denominator determines the validity of these.

In this study, 11.8% of the eligible population of the Akaroa Health Centre had a risk calculated as of April 2009 using the standard measure. However, another 10.1% have had these risks assessed through other routine care such as Wellness Checks or a Diabetes review. The total of 21.9% meets the minimum target of 21.7% for the year ending June 30th 2009.

This illustrates that consideration of risk percentages entered into one database alone erroneously assesses a practice as under-performing by significantly underestimating the numerator. The complex, manual and name-by-name approach needed to determine who needs a CVD risk assessment is also a source of error in calculating the denominator.

By 2012 the government hopes to have 80% of an eligible population assessed for CVD risks. The audit found more than 500 patients needing a CVD risk assessment at the Akaroa Health Centre. Two-thirds of them (67.2%, n=389) would be eligible for Wellness Checks, though funds are limited for this. Furthermore, data entered into the Wellness Check electronic form are not accessible to the BestPractice CVD risk calculator, requiring the additional cost of manual data-entry for inclusion in CVD risk performance indicator evaluation. The intricate query builds required to truly determine the eligible population let alone the process of contacting these people (e.g., 500 in this study) means this target is logistically difficult and inaccurate with significant costs. Even if identification were feasible and accurate, minimal incentives exist to entice an asymptomatic person to attend and pay for a consultation to have this risk assessed.

Logistical opportunity costs were identified in the OXCHECK trial where improved health outcomes were marginal after 3 years of health checks and were reserved primarily for those already deemed 'high risk' (e.g., established diabetes, CVD and slightly for those with hypertension and hyperlipidaemia).¹⁷ The use of limited resources for opportunistic screening and subsequent lifestyle counselling during primary care consultations offers such small benefit that justifying this activity is debateable.¹⁷⁻¹⁹

National health targets that rely on clinical assessments of asymptomatic people is a screening programme and yet CVD risk assessment has not been subject to the evaluation process undergone by other screening programs such as breast and cervical cancer. There is debate whether the criteria for a screening program would be met, such as having a suitable test (e.g., CVD risk calculation) that is precise and valid, the process of screening reducing death and illness, cost-effectiveness of the programme and acceptability to the population in terms of follow-up. For instance, this study highlights the significant costs of one practice's accurate population-based screening.

A CVD screening based on the 'at risk' population defined in the NZ CVD Guideline Handbook would have screening start age 45 years for men and 55 years for women though this would be 10 years earlier for some segments of the population. If the cut-off for screening was 74 years as used by the Performance Indicator Programme, national CV screening would need to cover many more people than existing adult

screening programmes (e.g. breast: women aged 45-65 years; cervical: women aged 30-70 years).

Furthermore, the usual screening programme criteria require a reduction in death or illness from CVD as a result.²⁰ Given the paucity of evidence for the effectiveness of such CVD primary prevention methods and the significant resources required for such a large population 'at risk', CVD screening may not be the most cost-effective approach. (Though one model suggested this CVD risk screening would be the equivalent cost to a cervical screening program.²¹)

Pharmacological and non-pharmacological primary prevention of CVD are equally important to reduce the impact of CVD. Since the most effective approach to non-pharmacological management (individual vs population) is not clear both require consideration. In Akaroa, population-based lifestyle modification activities exist alongside GP CVD risk assessments.

Adults over 45 years in the Akaroa community report awareness of 36% of lifestyle promoting resources available with a participation rate of 56.9%, though actual participation may be as low as 22% or as high as 83% depending on the behaviour of non-responders. Most comments from respondents centred on reasons for not attending. Reasons were predominantly a lack of time or need of the service, which suggest these activities are not highly valued or acceptable, despite good levels of awareness.

There are significant flaws in the current performance-indicator approach to individual CVD risk management, including minimal evidence for the suitability of CVD risk calculations, effect on reducing death and illness and the acceptability of this approach. The community survey suggests barriers to participation in health-promoting activities. Effective approaches to CVD impact reduction are likely to be multifaceted,⁷⁻⁹ acceptable, relevant and valued by the population so that in exchange a population improves their lifestyles.

Alternative use of PHO resources would be to offer extended 'lifestyle consults' (e.g., akin to Mental Health and Sexual Health consults) and provide subsidised pedometers for weight reduction.²² Funding the cost-effective Green Prescription programme to cover the population eligible for CVD risk assessments may be more efficient at changing outcomes than calculating risk percentages.²³

There are several limitations of this study. Evaluation only included patients who had a Best Practice CVD risk calculated, a Diabetes Annual Review or a Wellness Check though there are other ways to assess CVD risk, including data not entered into the screening section of the MedTech software. Furthermore, neither this study nor the PHO list of eligible patients excluded those already diagnosed with CVD, which may have falsely inflated both the denominator and the numerator. Interestingly, the BestPractice risk calculator includes a 'personal CVD event' as a risk, though in theory a patient with a personal event has no need for this calculation.

While the response rate was reasonable for a single mailed questionnaire it may not be a representative sample. There was a predominance of female respondents (59.2%).

Conclusion

In a resource-restricted health system there is an obligation to ensure appropriate use of such resources. This study suggests the current performance indicator approach is not practical, subject to error and may have significant opportunity costs. Furthermore, barriers exist to population participation in health-promoting activities, if these are recommended to individuals. Research is limited to guide the most effective approach to CVD prevention. Implementing a population-based screening programme usually requires evidence from pilots conducted as randomised controlled trials.

Evidence for the individual components of treatment is not sufficient, and the limited evidence from primary care RCTs such as the OXCHECK study is not strong. Though an individual approach has a role, especially in secondary prevention, a population-based approach that reflects local interests and contributes to environmental modification may well be the most effective use of money. This approach is the historical foundation of successful population interventions for public health issues such as those aimed at reducing infectious disease.

Competing interests: None.

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Transfers from rural hospitals in New Zealand

Trevor Lloyd, Katharina Blattner, Garry Nixon

Abstract

Aim To canvass the experience of a group of New Zealand rural hospital doctors of transfers from their hospitals.

Method Ten rural hospital doctors were required to write an assignment on patient transfer as part of their assessment for a postgraduate diploma. The information from the completed assignments was grouped into themes for analysis.

Results The responses from the ten doctors could be grouped into six themes: resources at the rural hospital, clinical conditions, mode of transfer, communication, issues during transfer, and health system issues.

Conclusions The experience of this group of doctors is consistent with the available published information. Transfer of patients is an inevitable part of rural hospital practice. The outcome for patients could be improved through better resourcing of rural hospitals and education for staff, improved communication with transport services and with base hospital specialists, and involvement in the development of regionalised transport protocols.

Approximately 10% of New Zealanders live within the catchment of a rural hospital.¹ Over 40% of admissions to hospital of these patients can be managed at a generalist level.² Most of the rest are likely at some point to be transferred to a larger hospital.

Much of the published information in the medical literature about interhospital transfers relates to larger countries that contain more remote populations such as Australia,³⁻⁵ Canada,^{6,7} or the USA.⁸⁻¹² The majority of the articles^{4,5,7,13,14} deal exclusively with transport by air.

Many of the studies^{5,10-12} relate to trauma, specifically transfer of patients with other surgical emergencies,² and patients in labour.^{8,15} Two papers^{7,15} deal mainly with social and emotional factors.

Ironically, one of three published New Zealand papers¹³ describes transfers out of an urban hospital, including some to rural hospitals, during a nurses' strike in Christchurch. The others are both from Northland: one a useful review of helicopter transfers in and out of Whangarei¹⁴ from the perspective of the retrieval team, the other¹⁶ a highly relevant audit of transfers out of Rawene Hospital.

We aimed to canvass a wider range of New Zealand rural hospital doctors and make some recommendations by combining the experience of these doctors with published information.

Method

As part of the assessment for the Rural Hospital Clinical Practice paper for the Diploma in Rural and Provincial Hospital Practice taught by the University of Otago in 2008, the students were required to

submit an assignment on transfers from their hospital (Box 1). They were advised at the start of the course that the information from this might be submitted for publication and, after the assignments were marked, the ten doctors who completed the paper gave their permission for the information from them to be used as the basis for this paper, for their words to be quoted if necessary, and to have their identities acknowledged.

Box 1. Transfer project

You will be required to write a project during the course of this paper. This project should attempt to illustrate the themes we have covered in this paper. The topic for the project is patient transfer. We have chosen this topic because transfer of patients, for various reasons, is an inevitable and regular part of our practice. It can lead on to an examination of our personal, our professional, our hospital's and our community's values (perhaps best understood in comparison with the doctors, the hospital and the urban centre that you are sending the patient to). It is also likely to highlight the disjunction that often exists between these sets of values (usually when there is disagreement or things go wrong). You can describe a particular transfer, or a number of transfers, or transfers from your hospital in general, as long as you take into account the wider issues that arise.

The information from the assignments was grouped into themes, which arose from the issues that each doctor had chosen to cover (Box 2), for analysis and reporting.

Box 2. Issues mentioned by rural hospital doctors

Resources at the rural hospital	Isolation (10), Variable workload(4), Doctors (4), Locums(2), Nurses (5) Laboratory (4), Imaging (2).
Clinical conditions	Acute coronary syndromes(3), Trauma(3), Bowel obstruction (3), Other surgical (4), Other medical (9), Paediatric (9), Obstetric (1), Dental (1), Unclear diagnosis (1), For investigation(3)
Mode of transfer	Air (7), Road (7), Private car (1).
Communication	Nurses (2), Specialists (6), Registrars (2), Transport services (2), Feedback from base hospital (2).
Issues during transfers	Level of escort (4), Treatments (4), Potential for the patient to deteriorate (3).
Health system issues	Audits (2), Peer review (2), Most appropriate hospital to receive patient (6), Keeping patients at their local rural hospital ((4), Equity issues (4), Education (4), Coordination (5).

Note: (number of doctors mentioning each issue in brackets).

Results

All of the doctors described working in isolation, at a distance from their base hospital. "The area is large but the population is small". Many doctors rely on nurses to help with decision making. "Rural transfers often happen as a team process." Several mentioned the need for education, of themselves and of the rest of the team. Lack of availability of diagnostic investigations was seen as a problem that sometimes necessitated transfer.

There were a variety of clinical conditions mentioned as examples where transfer had been required. Trauma, bowel obstructions and acute coronary syndromes were the ones most frequently mentioned.

Factors influencing the transfer were explained mainly in general terms "Transfer is appropriate when better care can be provided elsewhere". or "when specialist care is not available". "To await events in a doubtful situation in rural New Zealand and not transfer is a recipe for regret." Where further investigation and treatment were likely to be futile, there was support for the idea that people should be allowed to die near where they lived rather than be transferred out.

Air transfers (mainly by helicopter, though fixed-wing aircraft were seen as an option for longer flights) were preferred in emergencies.

Helicopters were not always available, mainly because of bad weather. There was a general feeling that the helicopter should not be overused. Not all transfers are for emergencies. "By far the majority of ... transfers are conducted by road ambulance." Ambulances were often not available when they were needed. "Our ambulance crews are almost all made up of volunteers and we rely on these volunteers heavily."

Occasionally there were communication problems within the team at the rural hospital. More commonly, the doctors reported communication difficulties with base hospital specialists. Several doctors were critical of the poor feedback from the base hospital about patients who had been transferred.

Both registrars and consultants were perceived as sometimes obstructive, giving conflicting advice, not passing on information to the receiving team, causing delays, and generally having a lack of understanding of the rural facility and what was available. "Arguing with them takes time; time better spent stabilizing an ill patient." "There is a perception in some quarters that, in some way, specialist treatment in a large hospital is intrinsically superior to anything that goes on at the periphery."

Most doctors thought that it was best to discuss the proposed transfer with a base hospital consultant, rather than more junior staff. Several doctors mentioned the importance of gaining the trust of specialists within the base hospital and working together on protocols for transfers. One doctor wrote of the need to "advocate against a system trying not to use resources".

There were also instances described where communication had gone well. "The above emergency and transfer that took place went smoothly only due to the well coordinated effort of staff and telephone communication between our hospital and the staff of the other involved hospitals.

There was mention of the need to provide treatments before and during transport. There was recognition of the vulnerability of the patient during transport, and the need for early detection of things going wrong. “It is about keeping the patient safe”.

Several doctors expressed frustration at the difficulty of by-passing the nearest provincial hospital when they knew that only a tertiary hospital would be able to provide the definitive care that the patient required. “The overriding principle in ... in medical and surgical emergencies is timely arrival of the sufferer in a hospital with sufficient facilities and expertise to provide ... definitive care.”

In many cases definitive care could have been provided at the rural hospital with better facilities for diagnosis and treatment, and better-trained staff. The system for patient care was seen ideally as an extended team, which was “only as strong as its weakest link”.

Discussion

As these examples illustrate, transfer to other hospitals is a reality of rural medicine.⁶ Around the world, rural areas have disproportionately high death rates from trauma^{5,10} A similar situation seems to exist within New Zealand with cardiology services, where patients admitted initially to some peripheral hospitals receive fewer interventions and have poorer outcomes than patients admitted to the receiving tertiary hospitals.¹⁷

Deciding which patients can be managed in rural hospitals is a constant dilemma for health workers in rural areas.¹⁸ The number of patients requiring transfer is likely to vary depending upon the resources available.⁶ Transport will become necessary when the care needs, or potential care needs, of the patient are beyond the scope of the facility at which the patient is receiving care.⁸ This is especially relevant for rural patients.⁴

An expert opinion in a recent case before the Health and Disability Commissioner,¹⁹ where there had been doubt about the advisability of transferring a patient, stated: “Smaller hospitals require a system of support and back-up where potentially unstable patients can be easily transferred to the larger centre ... [and] medical officers have a right to the ability to transfer patients to the larger centres if they feel this is required.”

In the audit from Rawene, the primary reason for transport to an outside facility was to achieve definitive treatment for a defined medical condition.¹⁶ The doctors in our study felt that some transfers could have been avoided by better access to imaging, up-skilling of rural generalist doctors, and improved access to specialist advice.

The arrangement of the transfer can be frustrating to the attending physician and can actually become more stressful than the patient care.⁶ Decisions on transfers should always be regarded as mutual ones between the two hospitals¹⁷. Good communication between referring and receiving medical and nursing staff is imperative.²⁰

Futile transfers, as some of the doctors in our study emphasise, should be avoided. Patient transfer should only occur if there is a reasonable likelihood of it improving the patient’s clinical outcome.²⁰

Closer liaison between referring and receiving clinicians may avoid unnecessary transfers in some cases.⁴ In a 2002 audit at Dunstan hospital in Central Otago of patients surviving after an acute coronary syndrome, there was documented consultation with a specialist in 60% of cases.¹⁸ Only 24.3% at that time were transferred to the base hospital.

Education for all categories of staff was seen by the doctors in our study as essential. Training of staff and the resources available at the hospital, will impact on the care provided.²

There is now an opportunity to generate the skilled generalist medical workforce New Zealand rural hospitals need with the recognition of rural hospital medicine as a new scope of practice.²¹ There is a strong emphasis on the skills necessary to appropriately and safely transfer patients.²¹ To remain vocationally registered in rural hospital medicine, doctors have to meet a number of requirements, including passing specified courses in resuscitation and trauma care.^{22,23}

To practise safely across a broad scope, doctors need strong and healthy relationships with their specialist colleagues.²¹ Trust and “knowing the person you are talking to” are important elements of effective and satisfactory communication.³ Maintenance of professional standards will include requiring rural hospital doctors to spend some time each year working in the base hospital.²³

For trauma patients, regionalized systems of care have been shown to improve mortality.¹⁰ The purpose of organised trauma systems is to ensure the expeditious transfer of seriously injured patients to the facility best equipped to care for their injuries.¹² There a need in New Zealand for staff at different levels to continue to work together in the development of similar systems for all categories of patients.

To summarise, we have listed the elements of what we consider to be the ideal emergency transfer from a rural hospital in New Zealand:

- Transfers should occur as part of a regional transport system with guidelines agreed between rural hospitals, transport services, base hospital and tertiary centres;
- Rural hospitals should be adequately resourced to properly triage sick and injured patients, provide care themselves when appropriate, and organize timely transfers when required;
- Transfer when required should be to the nearest hospital capable of providing definitive care;
- There should be one doctor at consultant level at both the referring and the receiving hospital who is responsible for initiating and organizing each transfer;
- Staff at the referring hospital need to liaise closely with transport services and the receiving hospital. The receiving hospital should be kept informed of any change in plan or change in the patient’s clinical status;
- Patients, where possible, should be adequately stabilized before transfer. For air transport or for longer journeys this will generally include a secure airway, two intravenous lines, an indwelling urinary catheter and a nasogastric tube;

- Transporting personnel should have the expertise and equipment required to manage any deterioration that might occur en route. There should be an adequate handover to them from the referring hospital and from them to the receiving hospital;
- A referral letter, copies of observations recorded, treatments given, laboratory test results, X-rays, medications and any signed consents should accompany the patient;
- Relatives should be kept informed, and assisted where necessary to make their own arrangements for transport and accommodation (or, where appropriate for family reasons, to go with the patient); and
- Every effort should be made to improve communication with transport services and between staff at the referring and receiving hospitals.

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Serious ski and snowboard injuries in southern New Zealand requiring acute orthopaedic admission and treatment during winter 2009

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Abstract

Aims The aims of this study were to report on ski and snowboard injuries which required in-patient assessment and treatment, by investigating demographics, complexity and cost.

Methods A prospective study investigating the pattern of ski and snowboard injuries admitted to the Orthopaedic Department of Southland Hospital (Invercargill) during 2009. Patient demographics, injury characteristics, treatment and financial implications have all been examined.

Results 88 patients were admitted with 92 injuries over 129 days. Thirty-six skiers sustained 37 injuries compared to 55 injuries in 52 snowboarders. The median age of skiers was 32.5 years compared to 26 years for snowboarders, which represented a statistically significant difference. Thirty-two admissions were visitors from Australia, compared to 29 from New Zealand and 14 from Great Britain and Ireland. Fifty-two patients (59.1%) were transported to Invercargill by ambulance compared to 13 (14.8%) by helicopter. Twenty-five ski-related injuries were treated operatively (67.5%) compared with 37 snowboard-related injuries (67.3%). Twenty-three patients (26%) were admitted with spinal injuries including one C5 burst fracture which was ultimately fatal. A total of 124.46 case weights were generated by all 88 admissions representing a cost of almost \$500,000.

Conclusions Ski and snowboard injuries represent a significant workload and financial burden to a typical mid-sized district general hospital in New Zealand. There is little published data on the natural history of serious orthopaedic injuries related to skiing and snowboarding in New Zealand.

Skiing and snowboarding are part of an important adventure tourism industry in New Zealand. Winter sports carry an element of risk. Previous research suggests a risk of injury of 1.74 ski injuries per 1000 'skier days' and 3.55 snowboard injuries per 1000 'boarder days'.¹ The demographics of ski and snowboarding injuries are well documented in other parts of the world suggesting a predominance of lower limb injuries in skiers and upper limb injuries in snow boarders.^{1,2}

In New Zealand, treatment for accidents and injuries is covered by the Accident Compensation Corporation (ACC) irrespective of nationality or domiciliary status in New Zealand. In 2007, ACC accepted claims for 11,633 snow sports injuries at a cost of around NZ\$12 million.³

Queenstown is a major hub for snow sports during winter months. Snowsports injuries sustained in this area are usually managed initially at the ski field or in

medical centres in Queenstown. Injures requiring orthopaedic specialist assessment, are referred to the orthopaedic department in Southland Hospital, Invercargill. Severely injured patients can be transferred directly from the ski field to Southland Hospital for rapid assessment and treatment.

The resident population of Queenstown is around 23,000 people.⁴ An increased population typical during winter months places increased strain on local emergency, medical services and orthopaedic services. Very little published data exists on the demographics of significant ski and snowboard-related injuries, and their acute orthopaedic inpatient assessment and treatment in New Zealand.

The aims of this study were to report on the demographics, complexity and cost of ski and snowboard injuries presenting to a medium sized orthopaedic trauma unit during winter 2009.

Methods

Data collection for this prospective audit was undertaken using a pro forma designed by the author. A literature search for published articles on ski and snowboard injuries was performed prior to the study to help establish appropriate information regarding patient demographics, injury and treatment and to provide data for comparison. Patients admitted to the orthopaedic ward in Southland Hospital with ski or snowboard injuries were included in this study. Patient details were passed to the main author for inclusion in the study and these details were double checked against admission records to ensure all patients were identified for inclusion. Patients admitted in the semi-acute or chronic period, at least two weeks after injury were excluded.

Demographic data, country of origin and injury date were collected. Referral Source and means of transport to Southland Hospital were recorded along with site of injury (spine/pelvis, upper limb or lower limb), including a written description and Radiographic means of acute investigation. Treatment was documented (conservative/operative) including a description. In-patient duration and complications associated with treatment initiated were also recorded.

Cost analysis was calculated in terms of both case weights and actual cost based on hospital coding data. Case weights (CWs) are a financial currency used by District Health Boards in New Zealand to calculate the cost of admissions and are necessary when applying for funding, particularly for elective admissions not covered under ACC bulk funding. One case weight is equal to approximately NZ\$4000.

Mean, median and standard deviation have been calculated to allow interpretation of the spread of data and 95% confidence intervals have been calculated to test significance of data when comparing groups. P-values were also calculated using an unpaired t-test, with $p < 0.01$ accepted as significant. There was no conflict of interest between the author and the study and no pecuniary interests. Ethical Approval has been sought for this study from the Southern Regional Ethics Committee.⁵

Results

Eighty-eight patients were admitted with 92 injuries to Southland Hospital (Invercargill, New Zealand) for orthopaedic assessment and treatment of injuries sustained from skiing and snowboarding over 129 days from 8 June 2009 until 14 October 2009. One injury occurred in one patient heliskiing and all other injuries were sustained on local fields. There were no admissions for injuries sustained during telemark skiing.

Thirty-six skiers and 52 snowboarders were admitted with 37 injuries and 55 injuries respectively over the season. Injured snowboarders were significantly younger than skiers. Injured male snow boarders were also significantly younger than male skiers. No significant difference was found between female skiers and snowboarders or between sexes generally. See Table 1.

Table 1. Demographics of injured skiers/snowboarders

Variables		Ski(range)	95% CI	Snowboard(range)	95% CI	Both(range)	P
Admissions		36		52		88	
Injuries		37		55		92	
Sex	Female	13		14		27	
	Male	23		38		61	
Median age (range)	Female	29 (5-59)	24.4-40.5	25.5 (17-49)	23-32	28 (5-49)	0.249
	Male	39 (15-69)	33.7-48.6	26.5 (11-47)	23.7-28.7	27 (11-69)	<0.001 ^a
	Both	32.5 (5-69)	32.3-43.6	26 (11-49)	24.4-28.7	27.5 (5-69)	<0.001 ^a

^asignificant difference

Thirty-two admissions (37.5%) were Australian comprising 18 skiers and 14 snowboarders, compared to 29 New Zealanders (31.8%) comprising 10 skiers and 19 snowboarders (Table 2).

In total there were 11 different nationalities included in this study. Most admissions were made in July (30 [34%]) compared to the least in October (5 [6%]).

Table 2. Country of origin of injured skiers/snowboarders

Variables		Skiers	Snowboarders	Both
Country of origin	New Zealand	10	19	29
	Australia	18	14	32
	UK & Ireland	3	11	14
	Europe	2	4	6
	USA/Canada	2	2	4
	Japan	1	0	1
	Other	0	2	2
Admission month	June	5	6	11
	July	9	21	30
	August	18	10	28
	September	4	10	14
	October	0	5	5

The majority of patients were referred from either a general practice-led medical centre in Queenstown of Lakes District Hospital. Most patients were transported to Invercargill by ambulance. See Table 3.

Eighty-eight admissions spent 292 inpatient days in hospital throughout the study period with a mean stay of 3.3 days and median stay of 2 days. There was no significant difference in in-patient stay between skiers and snowboarders. All patients had an X-ray and more than half had a CT scan. See Table 3.

Table 3. Hospital admission details of injured skiers/snowboarders

Variables		Ski	(95% CI)	Snowboard	(95% CI)	Both	P
Referral source	Ski field (%)	3 (3.4)		0		3 (3.4)	
	MC	15 (17)		16 (18.2)		31 (35.2)	
	LDH	18 (20.4)		35 (39.8)		53 (60.2)	
	ED	0		1 (1.1)		1 (1.1)	
Transport to Invercargill	Helicopter (%)	9 (10.2)		4 (4.5)		13 (14.8)	
	Ambulance	24 (27.3)		28 (31.8)		52 (59.1)	
	Personal	3 (3.4)		20 (22.7)		23 (26.1)	
Inpatient duration	Median (range)	2.5 (1-12)	(1.4-4.9)	2 (1-14)	(2.2-3.8)	2 (1-14)	0.233 ¹
Investigation	X-ray (%)	36 (40.9)		52 (59.1)		88 (100)	
	CT	17 (19.3)		33 (37.5)		46 (52.3)	
	MRI	0		0		0	
	Bone scan	1 (1.1)		0		1 (1.1)	

¹No significant difference of inpatient duration between groups

MC: medical centre

LDH: Lakes District Hospital

ED: Emergency Department (Southland Hospital)

There was a predominance of lower limb injuries in skiers and upper limb injuries in snowboarders. Spinal injuries were more common in snowboarders than skiers. One death occurred following a cervical burst fracture in a snowboarder (Table 4).

Table 4. Injury type by sport

Variables		Skiing	Snowboarding
Spine	Cervical spine fracture	1	2
	Cervical spine soft tissue injury	1	1
	Thoracic spine fracture 1 level		4
	Thoracic spine fracture multiple levels	3	2
	Lumbar spine fracture 1 level	1	5
	Lumbar spine fracture multiple levels		1
	Pelvic fracture	2	
	Total (%)	8 (21.6)	15 (27.3)
Upper limb	Clavicle fracture	1	
	Complicated shoulder dislocation		2
	Proximal humerus fracture	1	4
	Mid shaft humerus fracture	1	2
	Distal/supracondylar humerus fracture	1	4
	Elbow dislocation	1	4
	Proximal ulna/radius fracture		
	Mid shaft ulna/radius fracture		1
	Distal radius/ulna fracture	2	3
	Carpal dislocation including scaphoid injury		8
	Metacarpal fracture		1
	Phalangeal fracture		1
	Upper limb wound	1	1
	Total (%)	8 (21.6)	31 (56.4)

Lower limb	Dislocated hip	1	
	Neck of femur fracture	2	
	Sub-trochanteric fracture	2	
	Supra-condylar femoral fracture	1	
	Tibial plateau fracture	3	5
	Tibial shaft fracture	8	
	Distal tibial fracture	2	
	Ankle fracture	1	
	Talus fracture (excluding lateral process)	1	1
	Lateral talar process fracture		1
	Calcaneal fracture		1
	Wound lower leg		1
	Total (%)	21 (56.7)	9 (16.4)

Sixty-two primary operations were performed for ninety two injuries (67%). There were four further planned returns to theatre for fasciotomy wound closure in a snowboarder. Four injured skiers chose to their country of origin for surgery when surgery was recommended as treatment of choice for their injury. There were three unplanned returns to theatre for operative complications in three different skiers. One skier was transferred to the regional spinal injuries unit in Christchurch for a single level lumbar burst fracture and one snowboarder for an unstable cervical fracture after HALO traction was applied (Table 4).

Table 5. Locations of injuries

Variables	Operation	Ski	Snowboard
Spine	Halo application	1	1
	ORIF lumbar spine		2
	Total (%)	1 (4)	3 (7.3%)
Upper limb	Clavicle ORIF	1	2
	Greater tuberosity ORIF		2
	Capsular repair		2
	MUA shoulder		2
	Proximal humerus ORIF		
	Humeral Shaft ORIF		1
	Humeral IMN		1
	Humeral Shaft TENS	1	2
	Distal humerus/condylar ORIF	1	3
	Olecranon ORIF		1
	Shaft radius or ulna ORIF		3
	Distal radius MUA		3
	Distal radius MUA +K-wires		1
	Distal radius ORIF		2
	Scaphoid ORIF		1
	MUA hand/fingers		
	MUA +K-wire/ORIF hand/fingers (exc. scaphoid)		2
Wound debridement/washout	2		
Total (%)	5 (20)	28 (68.3)	
Lower limb	Cannulated or Compression hip screws	2	
	Cephalo-medullary nail	2	
	ORIF distal femur	1	
	Tibial IMN	7	
	ORIF proximal tibia	1	3

ORIF distal tibia	2	
External fixation Tibia		1
ORIF ankle	2	
MUA ankle		
MUA + K-wires mid-foot	1	1
ORIF foot	1	
ORIF lateral process talus		1
Fasciotomy management		4 ^a
Total (%)	19 (76)	10 (24.3.)

^a 4 planned returns to theatre for fasciotomy wound closure; ORIF: open reduction and internal fixation; MUA: manipulation under anaesthesia; IMN: intra-medullary nail; K-wire: Kirschner wire.

More case weights were attributed to snowboard injuries than ski injuries, however no significant difference was found for size of case weights between these groups. The total cost in terms of case weights for all 88 admissions was approximately \$497,840 or 124.46 case weights. Ski and snowboard injuries in New Zealanders generated the most case weights and therefore costs. See Table 6.

Table 6. Costs associated with the injured skiers/snowboarders

Variables	n	Total CW	Median CW (range)	95% CI	Average cost NZD	Total cost NZD	P
Ski	36	56.03	1.88 (0.19–3.97)	1.19–1.921	6240	224,120	0.342
Snowboard	52	68.44	1.09 (0.20–7.30)	0.99–1.641	5280	273,760	
New Zealand	29	39.34	1.17 (0.20–3.27)		5440	157,360	
Australia	33	33.88	0.60 (0.19–3.97)		4120	135,520	
UK & Ireland	14	30.98	1.88 (0.60–7.30)		8840	123,920	
USA & Canada	4	3.52	0.56 (0.52–1.88)		3520	14,080	
Europe	6	13.24	1.98 (0.60–3.76)		8840	52,960	
Japan	1	0.54	0.54		2160	2160	
Other	2	3.43	1.72 (1.55–1.88)		6880	13,720	
All patients	88	124.46	1.21 (0.19–7.30)		5640	497,840	

CW: case weight (approx. \$4000); n: number of admitted patients; *no significant difference found.

Discussion

Eighty-eight patients were admitted with ski and snowboard-related injuries to orthopaedics in Southland Hospital during the 2009 winter season. No data could be found for previous years. Siu et al report on 936 snowsports-related admissions to Canberra Hospital, Australia over an 8-year period, and over a period of 6 years to December 1995 in Vermont, Sacco et al reported on 279 injuries admitted for significant ski and snow board injuries.^{2,6}

Sacco reports on 40 (14.3%) snowboard-related injuries and 238 (85.3%) skier injuries, differing substantially from 59% and 41% of snowboard and ski injuries respectively in this study. This difference may be best explained by the increasing popularity of snowboarding in recent years, although no data on ski field usage was available.

A significant difference was found between the age of skiers and snow boarders with median skier age of 32.5 years compared to 26 years old for snowboarders. This difference was also noted within the subgroup of males, where again snowboarders were significantly younger. Without reliable control data on ski field usage it is impossible to attribute a true increased risk of snowboarding to the younger male.

Australian visitors sustained most injuries amongst tourists, followed by British and Irish visitors. This follows the pattern of visitors to New Zealand by country of residence as outlined by Statistics New Zealand in 2004.⁷ Admissions to Dunedin Public Hospital from any cause of injury found Asian visitors represented the highest number of admissions (20%), which varies greatly from the two Asian visitors admitted during this study (2.3%).⁸ The busiest months for admissions were July and August which most likely represents the peak holiday season and most reliable snow conditions.

There were 53 ambulance transfers from Lakes District Hospital to Invercargill, the cost of which is approximately \$466.67 (ex. GST).⁹ Thirteen (14.8%) patients were transported either directly from the ski field or Lakes District Hospital to Southland Hospital by helicopter at a cost of approximately \$2494 (ex. GST) per hour for a typical 2½ hour return trip.¹⁰ Neither of these costs account for a nurse if required for the transfer.

One skier underwent a bone scan following a pathological distal femoral fracture secondary to metastatic malignant melanoma. No other metastatic lesions were found and this patient was treated with open reduction and internal fixation and adjuvant radiotherapy. No patients required Magnetic Resonance Imaging.

The overall pattern of injuries in this study between skiers and snow boarders follows typical trends seen in other studies, with a higher tendency towards upper limb injuries in snowboarders (56.4%) and lower limb injuries in skiers (78.4%). Six patients with upper limb injuries were found in this study to discharge from hospital with a preference to return to their country of origin for definitive surgical treatment. This practice was less common in lower limb due most likely to the significant restriction to overall mobility. Most injuries were treated with surgery (67.3%) in both skiers and snowboarders.

Twenty-three patients (26%) were admitted with spinal injuries across the study period; 15 snowboarders and 8 skiers. Donald et al reported on 25 spinal injuries from skiing or snowboarding presenting to Dunedin Public Hospital between 1991 and 2002.¹⁰

Siu et al report on 66 patients (7%) admitted with spinal trauma over 8-year period from the Snowy Mountains, Australia with a predominance of lumbar spine injuries as found in this study.⁸ Single level lumbar spine fractures represented the most common area of injury and three required surgical treatment. Two snowboarders with unstable lumbar vertebra level 1 (L1) fractures were treated surgically in Invercargill and one referred to the regional spinal unit in Christchurch.

Halo vest bracing was used as definitive treatment for a cervical spine fracture in an Australian skier, and Aspen bracing for a C2 fracture in a snowboarder. One patient required temporary halo application for transfer to the regional spinal injuries with an unstable C5 burst fracture and associated tetraplegia which eventually proved fatal.

124.46 case weights were generated with the total cost of inpatient admissions for ski and snowboard-related orthopaedic injuries being over \$550,000 including patient transfer costs. Acute injury treatment including implant costs is covered by ACC bulk funding and does not directly rely on individual case weights. The actual cost of implants used may exceed the case weight value and will not be caught by generic coding data used for certain injuries.

Without previous data, it is difficult to say if ski and snowboard-related trauma is on the increase in New Zealand. However injury prevention measures may help to reduce the incidence of injuries. The Accident Compensation Corporation is committed to prevention of injuries and measures related to winter sports include posters reminding skiers and snowboarders of the risks involved and advice on codes of conduct for skifield users. An increased use of protective equipment may reduce injury rate and severity. Increased utilisation of other theatres and clinics along with increased staff awareness of ski and snowboard-related trauma may help to deal with the influx of trauma from the skifields during peak season, such as the school holidays.

Conclusion

Skiing and snowboarding-related injuries are at times severe, and as well as major patient morbidity, represent a reasonable drain on hospital resources in terms of cost and time. This is the first study to document the demographics, complexity and costs of orthopaedic ski and snowboard trauma in New Zealand. Low overall numbers are a limitation and data collection over more than one season along with other studies are required to further clarify the impact of snowsports injuries on New Zealand.

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Patterns of trust in sources of health information

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Abstract

Aims To understand the different patterns of trust that exist regarding different sources of information about health issues.

Method Data from a large national health lifestyles survey of New Zealanders was examined using a factor analysis of trust toward 24 health information sources (HIS). Differences in trust are compared across a range of demographic variables.

Results Factor analysis identified six different groupings of health information. Variations in trust in sources for health information are identified by age, employment status, level of education, income, sex and ethnic group.

Conclusions Systematic variations exist in the trust that people report with respect to different sources of health information. Understanding these variations may assist policymakers and other agencies which are responsible for planning the dissemination of health information.

Choice of the channels for delivery of health information to the public is a critical decision that faces agencies interested in improving the health status of a population. Trust in different sources of information and media through which the information is disseminated can be a major factor in determining the effectiveness of any health promotion.^{1,2}

Research in recent years has focused on the use of the Internet³ as a health information source⁴ (HIS) and its acceptability as a medium of communication.⁴⁻⁶ However, relatively little attention has been paid to the wide variety of other sources individuals can draw upon for information. Instead, research reinforces how the Internet is preferred in use⁷ as a HIS but that it is not highly trusted.⁸

Findings also are mixed regarding whether increased frequency of use changes this.^{9,10} It is recognised however, that trust toward a HIS can improve adherence to medical advice provided.¹¹ Therefore, it is important to gain a comprehensive understanding of how people trust the wide variety of sources that are used to deliver health information. In this paper we examine the expressed trust that people have in a range of 24 different sources and types of media. In terms of overall approach this research complements that undertaken in the US by the Health Information National Trends Survey (HINTS). HINTS focuses on how personal characteristics influence perceived information needs and examines the consequent effects for choosing appropriate information channels for health information.¹²

‘Trust’ is taken to mean the “message received is true and reliable and that the communicator demonstrates competence and honesty in conveying accurate objective, and complete information”.¹³ Previous studies demonstrate trust toward information sources influences both usage¹⁴ and frequency of searching.⁹ Research on trust in

sources for health information has also produced interesting links to personal characteristics such as education, ethnicity and sex which can then be used to assist in the selection of different media and potentially increase the effectiveness of health communications.⁷

A key way in which this study differs from previous research on trust in health information is the range of sources investigated. Firstly, we have a comprehensive list of different types of health professionals, including physiotherapists, nurses and alternative sources such as homeopaths. Additionally our range includes different types of institutional sources, including Government agencies and some charities, as well as media types and friends and family. Many of these are consistently omitted from studies on health information.^{7,15,16}

Methods

The data reported in this paper were collected during a replication of the Maibach et al. American Healthstyles study¹⁶ adapted for and conducted in New Zealand and funded by Sport and Recreation New Zealand (SPARC) and the Cancer Society.¹⁷ The questionnaire covered comprehensive information regarding health status and beliefs as well as a data on physical activity and fruit and vegetable intake. Measures of trust were replicated from the Maibach survey with appropriate updates and adjustments for the local context.

A total of 24 relevant sources and media were included in the survey (see Table 2) and respondents were asked to indicate their level of trust toward each source with respect to obtaining health information. This level of trust was measured on a five point scale ranging from *don't trust at all* (1) through to *trust a lot* (5). While this approach to measurement obviously cannot capture the variation that lies within any particular category, for example a patient is likely to trust one doctor within their general group practice more than another, it is still clear that people do hold overall attitudes to different types of information sources and that measurement at this global level allows the comparisons across the wide assortment of sources and media that is intended in this paper.

The survey was mailed to a sample of New Zealanders drawn from the electoral roll, achieving a 61% response rate and yielding a total of 8,291 respondents for analysis. Those identifying themselves as Māori were 'oversampled' by 26% in order to compensate for the normally lower response rate from this group. Specifically, individuals were required to self report themselves as Māori or of Māori descent to be eligible for the Māori electoral roll, which was then used as a sampling frame for this group.

A summary of the main demographic characteristics of the sample is given in Table 1 which shows more female respondents than would be expected. The categories for other variables in the table have been collapsed for reporting purposes and are presented to show the main features of the sample. Respondents were allowed to nominate more than one ethnic grouping, an option chosen by 4.7% of the sample. People choosing more than one ethnicity were removed from the analysis for comparisons on this variable. Different Pacific Island groups (Cook Islands, Niuean, Samoan and Tongan) were recorded separately in the survey but were subsequently amalgamated to one group as no differences were identified between them in analysis on the trust ratings.

Table 1. Characteristics of study participants

Characteristics	Sample percentage	2006 Census percentage
Sex (women / men)	60.2 / 39.8	51.1 / 48.9
Age group (20–29 / 30–64 / 65+)	12.6 / 67.5 / 15.7	30.9 / 49.2 / 19.9
Race/ethnicity (NZ European / Māori / P.I/ Other)	76.2 / 8.7 / 2.5/12.6	67.6 / 14.6 /6.6/11.2
Employment status:		
Full time	46.8	48.4
Part-time	16.9	14.4
Retired	15.4	16.5
Educational attainment (< high school / ≥ high school)	45.8 / 54.2	50.9 / 49.1
Annual personal income (< \$30,000 / ≥ \$30,001)	52.1 / 47.9	58.5 / 41.5

Exploratory factor analysis, using principal axis factoring and direct oblimin rotation, was conducted on the trust ratings for the 24 different HISs in order to identify underlying patterns in the ratings of different information sources. Polychoric correlations estimated in LISREL were used as inputs for the factor analysis and all other analysis was conducted using PASW v18.0 software. Summary variables were generated to represent the factors by computing an average score for all the variables that loaded with an absolute value greater than 0.6. A multivariate general linear model was used to compare these trust variables across categories of age, gender, education, income, ethnic background and occupational status.

Results

Before exploring the results of the factor analysis it is useful to briefly consider the median trust ratings and ranges for each of the information sources (see Table 2). Medians are reported as opposed to means because four of the rating scales deviate significantly from a normal distribution.

Table 2: Median trust scores for each health information source

Information source	Median	Interquartile range	Information source	Median	Interquartile range
Doctor	5	1	Cancer Society	4	2
Doctor's nurse	4	2	Diabetes New Zealand	4	2
Dietician	4	2	Heart Foundation	4	2
Naturopath or Homeopath	3	2	Gym/personal trainer	3	1
Other health professionals (e.g. physiotherapist)	3	1	Family	3	1
Pharmacist or chemist	3	1	Friends	3	1
Local hospital	4	1	The Internet	3	1
Public Health unit	3	1	Books/journals	3	1
District health board	3	2	Magazine articles	3	1
Ministry of Health	3	2	Newspaper articles	3	1
SPARC	4	1	Television programmes	3	1
Regional sports trusts	3	1	Radio programmes	3	1

Range = 1–5: “don’t trust at all” (1) to “trust a lot” (5); n = 6,541. SPARC: Sports and Recreation New Zealand.

Overall the pattern of responses for these average trust scores looks reasonable and consistent with expectations from previous research. For example, similar to the HINTS survey,¹² personal professional sources, in particular the person's own general practitioner, but also their nurse and trained dieticians are seen as very trustworthy sources of health information.

The three other HIS that are rated especially highly are the three major national charities that were included in the list: The Heart Foundation, Cancer Society and Diabetes New Zealand. Amongst these the rating for the Heart Foundation is significantly higher than the other two. This is possibly a reflection of its high public profile and the repeated exposure that it achieves through schemes like the product endorsements that it offers to 'healthy foods'. The Heart Foundation mark of approval is a recognized symbol on many food products and offers continuous reinforcement of its name as a supplier of health-related information.

While the remaining sources all have a median of 3, the mean scores suggest that they fall into three broad groups. The highest rated of these three is a mixed range of sources including official public health bodies, professional in health-related occupations including pharmacists and gym/personal trainers. Friends and family are rated next and the lowest set of ratings are those offered to the mass media sources, though the idea of books and journals contains more credibility with the sample than do the other sources.

Table 3 gives the main results of the exploratory factor analysis. For ease of interpretation only loadings above 0.4 are displayed. Five factors had an eigenvalue of over 1 with a sixth factor having an eigenvalue of .989. The scree plot showed a marked drop after that with the next eigenvalue at .667. The 5-factor solution essentially combined Factors 3 and 4 in table 3 but the resulting factor was also highly correlated (.645) with Factor 2, with many sources cross-loading. The 6-factor solution presented below is much more interpretable with more face validity.

Parallel analysis was also conducted following the procedure published by O'Connor.¹⁸ This also produced an ambiguous result with the sixth factor failing to meet the equivalence criteria by 0.06. Ideally future work in this area would test both five and six factor structures on a different sample using confirmatory factor analysis. In total the factors explained 77.6% of the variance. The lowest communality for any single variable was 0.408 (trust in naturopaths).

The distribution of factor loadings in Table 3 has considerable face validity. There are a few items that cross-load between factors, especially three and five, but most sources only load on one factor and those (such as dieticians and SPARC) which are more distributed are understandable. Factor 1 was identified as grouping mass media together as sources for health information.

The variables that load most heavily on Factor 2 are the three major New Zealand health charities that were included in the list. SPARC and Regional sports trusts also contribute to this factor. These are the two organisations that cross into more than one factor which would seem appropriate since, while they have overlaps with charities and other official bodies they also fall outside the official 'health industry' sources.

Both can act as a source of funding to support local community physical activity initiatives.

Factor 3 is plainly related to official health sources and, apart from the small cross-loading by pharmacists on this factor all the other contributing variables are official health bodies who could contact people outside a normal primary care situation. Conversely Factor 4 is centred on the primary personal professional health contacts experienced by most people: doctors and doctor's nurses. Pharmacists, and local hospitals also contribute to this factor.

Table 3. Rotated factor loadings from the exploratory factor analysis

Information source	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Doctor				-.862		
Doctor's nurse				-.803		
Dietician			.526	.464	.630	
Naturopath or Homeopath					.667	
Other health professionals (e.g. physiotherapist)			.520		.716	
Pharmacist or chemist			.554	-.607		
Local hospital			.766	-.663		
Public health unit			.890		.453	
District health board			.949		.502	
Ministry of Health			.834			
Sports and Recreation New Zealand (SPARC)		-.704	.620		.604	
Regional sports trusts		-.686	.625		.648	
Cancer Society		-.911				
Diabetes New Zealand		-.931				
Heart Foundation		-.915				
Gym/personal trainer					.625	
Family						.854
Friends						.896
The Internet	.676					
Books/journals	.783					
Magazine articles	.896					
Newspaper articles	.913					
Television programmes	.876					
Radio programmes	.856					

Factor 5 is linked to alternative or 'non-medical' personal HISs and the final factor constitutes family and friends as an independent grouping. Thus the factor analysis suggests that, in terms of trust, the New Zealand public perceive six major groupings of sources for health information.

In Table 4 below we report associations between these trust factors and a number of demographic characteristics. All the results reported below are statistically significant

at $p \leq 0.001$ though, based on partial eta squared, effect sizes would all be regarded as small.

Table 4: Variations in trust factors by demographics

Sex	Females express more trust in all six factors than males. The smallest difference is in relation to personal health professionals, while there are large differences in relation to alternative personal health sources.
Work status	Respondents identified as sick or invalid express less trust in alternative health professionals whilst those who are retired rate both personal health sources and family and friends more highly.
Age	Trust in media sources and alternative health professionals declines with age. Trust in all four other factors rises with age.
Income	Trust in official health sources and alternative health professionals declines as income rises
Ethnicity	Trust in official health sources is much lower amongst those identifying themselves as British/European (not the same as NZ European). Charities are rated most highly by the British/European group and lowest by Chinese. Media sources are rated most highly by Chinese, Indian and 'other Asian' ethnic groups. Friends and Family are rated lower by the NZ European and the British European group. Alternative health professionals are rated more highly by the Chinese and the 'other Asian' group.
Education	Trust in the media and alternative health professionals falls as education levels rise.

The variations across demographics reveal some interesting patterns though immediate explanations for all the relationships are not obvious. Why females exhibit more trust than males is not absolutely understood although it has been recorded in other contexts such as the internet and trust games in experimental economics^{20,21}. The links with work status are the weakest of all those examined and possibly the least useful from a policy perspective. A possible explanation for lower trust in alternative health professionals by those identifying themselves as sick or invalid may simply be lower levels of contact with some of these sources – for example sports organisations and gym trainers.

The two sources that retired people rate more highly than other work status groups are both personal sources as opposed to other the factors that contain at least some impersonal items. The associations with age, income and education all follow the same pattern with media and alternative sources being less trusted as all three increase. Intuitively this seems sensible and as would be expected. Ethnicity is rather more complex. Two of the groupings in the survey are composite groups— 'British/European' and 'other Asian' but both still show some significant variations across the factors. Overall the biggest differences are found between the different Asian groups and the rest of the sample.

While these groups still trust personal health professionals such as doctors and nurses more than other sources for HIS they do express more trust in the media and alternative health professionals. Arguably the latter may be a feature of a wider view of medicine that is sometimes attributed to Asian countries. An interesting finding is the difference in trust accorded to friends and family.

In New Zealand recognition and involvement of whānau (extended family) has been a significant issue in relation to Māori in recent years. Our data suggest that this is not just a feature of Māori but more a difference between those of European heritage and all other ethnic groupings. It is possible that the latter groupings reflect cultures that pay more attention to the extended family and are less individualistic in their value systems than European, especially Anglo-Saxon, cultures.

Conclusions

The purpose of this paper is to investigate how the source of information used to about health might affect the trust that people have in the information. As such it differs from most of the work in trust and health information that manipulates an individual message and identifies the effects and interactions of the different message components. Trust was assessed by single statements that asked people to judge sources at a general level. While this approach does not capture variation that exists within any of the categories—for example some radio programs on science may be more trusted than information coming from a radio talkback show—it does allow for comparisons across a wide variety of media types and the results of the factor analysis suggest that the data is capturing systematic variations in a reliable way.

While some cross-loading is evident, the factor solution is quite clear and each factor has a distinctive set of sources. Not surprisingly, health professionals with whom people have personal contact are the most trusted sources across the whole spectrum. But clearly not all information can be delivered through these channels.

For many of the population their contact with these health professionals is sporadic and usually motivated by some specific need which may be far removed from an information message that policy makers or higher level planners want to put across to the population. Therefore it becomes important to understand the mix of media that might be required in order to effectively communicate trustworthy health information and it is clear that the optimum mix varies across the population. Choice of channels could well be as important as the message itself.

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The use of CPR in New Zealand: is it always lawful?

Stuart McLennan, Ron Paterson, PDG Skegg, Richard Aickin

Abstract

Since its development in the early 1960s, the use of CPR in the hospital setting has undergone intriguing changes. After initially being used very selectively, at the discretion of the doctor, the use of CPR rapidly expanded to the point that it was promptly begun on all patients having a cardiac arrest in hospital, regardless of the underlying illness. However, it soon became evident that the use of CPR on all patients created problems. In response to this, DNR orders were developed. The standard policy of New Zealand hospitals is now for CPR to be attempted on all patients having a cardiac arrest unless a DNR order is in place. We argue that this approach is not consistent with New Zealand law and that current policies should be amended to bring them into line with the Code of Rights and New Zealand law generally.

The changing use of CPR

By the early 1960s, the medical profession could use cardiopulmonary resuscitation (CPR).¹ Once CPR became available, decisions had to be made about when it should be attempted. A review of the changed patterns of use is instructive.

Initially CPR was used very selectively in a hospital setting: at the discretion of the doctor, and generally on patients with acute illnesses whose cardiac arrests resulted from reversible conditions. This selective use of CPR was linked to the fact that training in its use was fairly restricted, being provided mainly for those doctors (cardiologists, surgeons and anaesthetists) whose patients were most likely to have reversible causes of cardiac arrest.²⁻⁴ For the most part, CPR was used only for hospital patients who had (in Claude Beck's memorable phrase) "hearts too good to die".⁵

In 1965 the introduction to a monograph on CPR stated:

"Resuscitation of the dying patient with irreparable damage to the heart, lungs, brain, or any other vital system of the body has no medical, ethical, or moral justification. The techniques described in this monograph are designed to resuscitate the victims of acute insult, whether it be from drowning, electrical shock, untoward effect of drugs, anaesthetic accident, heart block, acute myocardial infarction or surgery."⁶

Later in the same volume, two of the founders of CPR spelt out principles for its use. The first was as follows:

"1. *The patient must be salvable.* Cardiopulmonary resuscitation is indicated for the patient who, at the time of cardiopulmonary arrest, is not in the terminal stage of an incurable disease. Resuscitative measures on terminal patients will, at best, return them to the dying state. The physician should concentrate on resuscitating patients who were in good health preceding the arrest, and who are likely to resume a normal existence."⁷

With the increased training of health practitioners in CPR, and the development of 'code teams' and 'code protocols' in American hospitals, the use of CPR expanded

rapidly to the point where it was begun promptly on all patients having a cardiac arrest in hospital, regardless of the underlying illness.⁴ One writer states that these changes were instituted “to improve the chances of a response to cardiopulmonary resuscitation, and to ensure good neurologic function in patients who did respond”.⁴ Another suggests that the “ever-present legal threat for failure to resuscitate” was also an important factor.⁸

Problems resulted from the use of CPR on all hospital patients who were having a cardiac arrest.^{4,9} It has been said that “far more often than not CPR transiently restored physiologic stability but prolonged patient suffering”.⁹ By the late 1960s reports of this phenomenon were appearing in the medical literature. They described the agony that many patients experienced from CPR that only prolonged their dying.¹⁰

Sometimes, terminally ill patients were subjected to repeated CPR. Consequently, many practitioners did not commence CPR, or performed less than a full attempt, when they considered CPR inappropriate.⁹

In response, institutions began to develop their own means of indicating that CPR was not to be used on a particular patient if they had a cardiac arrest. As it has been noted:

“At some institutions, these decisions were concealed as purple dots on the medical record or written as cryptic initials in the patient’s chart, whereas at other institutions, they were simply communicated as verbal orders passed on from shift to shift...”⁹

Given the major changes that were occurring in the doctor-patient relationship (including a much greater emphasis on patient autonomy and on patient participation in decision-making³) these developments led to controversy. There was concern about the lack of patient involvement in decisions to withhold CPR, and about the lack of documentation of these decisions. There was felt to be a failure “to provide sufficient rationale and accountability for what did transpire”.⁹ It was in this context that, in the early 1970s, more formal processes began to be introduced.

In 1974, a National Conference on Cardiopulmonary Resuscitation and Emergency Cardiac Care was convened by the National Academy of Sciences and the American Heart Association. Its task was to set standards for basic and advanced cardiac life support. This Conference agreed that decisions not to perform CPR should be formally documented in the medical record, communicated to all staff, and based on patient or “patient surrogate” consent.¹¹ The resulting guidelines were the first of a professional organisation to adopt this approach.

The first hospital policies on do not resuscitate (DNR) orders were reported in the medical literature in 1976.¹²⁻¹⁴ This movement towards explicit DNR orders policies soon spread to other hospitals in the United States.⁹

These changes led to modifications of CPR policies and to a requirement that CPR be attempted on all hospital patients who were having a cardiac arrest, unless a DNR order was in place.^{2-4,8,15} Policies relating to DNR orders evolved over the years. By the late 1980s many hospital policies allowed doctors to make DNR orders for particular patients if, in their judgement, it would be futile to attempt CPR on those patients, once a cardiac arrest occurred.¹⁶ Such policies have been maintained and have spread widely around the World.¹⁵⁻¹⁸

A distinction should be made here, however, between “Not For CPR” orders and “Not for Resuscitation” orders. Resuscitation includes more interventions than CPR and a

person may want to specify what aspects of resuscitation (if any) they would wish to receive in the event of a collapse. Some health professionals and patients/relatives prefer to use the term “allow natural death” (AND) rather than DNR. This positive statement suggests supporting a person through provision of end of life care rather than a withdrawal of care which DNR can imply.¹⁹

Advance directives and medical DNR or AND orders are most useful if they include advice regarding which interventions are considered to be in the patient's interests even if CPR is to be withheld. For instance IV fluids, antibiotics and non-invasive ventilation may still be believed appropriate if there is a reasonable chance of the person regaining their pre-collapse level of functioning. For the same person CPR, invasive ventilation, extracorporeal membrane oxygenation (ECMO), ventricular assist devices and other interventions may be withheld because they would act only as a bridge towards a transplant for which the patient would not consent or be eligible for because of their overall condition.

These distinctions are important since the focus of health staff should be on recognising and responding to early warning signs of deterioration or imminent collapse rather than simply responding to a cardiac arrest. Some of these interventions may be as equally unwanted as CPR by a person who is in the later stages of dying from irreversible processes.

CPR in New Zealand

These changes in the provision of CPR also occurred to New Zealand. Currently, the standard policy of New Zealand hospitals (both public and private) is for CPR to be attempted on all patients having a cardiac arrest unless a DNR order is in place. However, this practice is not consistent with New Zealand law.

CPR and New Zealand Law: advance decisions regarding CPR

By patients

Advance directives in general

Right 7(5) of the Code of Health and Disability Services Consumers' Rights (“the Code”) provides: “Every consumer may use an advance directive in accordance with the common law.” In the context of the Code “advance directive” has a particular broad meaning, as clause 4 of the Code provides that it means any “written or oral directive—(a) By which a consumer makes a choice about a possible future health care procedure; and (b) That is intended to be effective only when he or she is not competent”.

In law there is an important distinction in the legal efficacy of advance directives that request CPR and those which prohibit it.

Requiring CPR

Patients are free to make an advance directive requesting (or even demanding) the provision of CPR if they have a cardiac arrest in the future. However, such an advance directive would not of itself impose a legal obligation to provide CPR whatever the circumstances. Nevertheless, a patient's request to receive CPR would

be an important factor to take into account when deciding whether CPR would be in the patient's best interests, and hence should be provided.

Prohibiting CPR

Right 7(7) of the Code provides that: "Every consumer has the right to refuse services and to withdraw consent to services." This provision is consistent with section 11 of the New Zealand Bill of Rights Act 1990, which states: "Everyone has the right to refuse to undergo any medical treatment." This right would count for little if an advance refusal could be ignored once a patient became incompetent.

In New Zealand law, a competent patient may make the type of advance directive known as an anticipatory refusal of consent. If the patient was adequately informed as well as competent, this anticipatory refusal of consent has effect once the patient becomes incompetent. In the context of CPR, this advance directive is conveniently referred to as a "patient-initiated DNR order".

Where, by a patient-initiated DNR order, a competent and properly informed patient has made an applicable anticipatory refusal of consent to CPR, this will render the provision of CPR unlawful. Its provision in such circumstances would violate the patient's legal right to refuse medical treatment.

This right to refuse CPR must be exercised by the patient: it cannot be delegated to a proxy. New Zealand law does enable a competent adult to grant an enduring power of attorney, whereby (once the adult becomes incompetent) the attorney may give or refuse consent to a wide range of interventions. However, the law imposes some limits. One is that the attorney may not refuse consent to "any standard medical treatment or procedure intended to save that person's life".²⁰ The holder of an enduring power of attorney is therefore precluded from prohibiting CPR on the patient's behalf.

It does not follow that, in the absence of a DNR order, an omission to provide CPR will always be unlawful. On the contrary, it will only be lawful when its provision can reasonably be regarded as being in the patient's best interests.²¹

By providers

In the course of treatment planning, the health professionals in charge of a patient's care may decide that future resuscitation of the patient is not clinically indicated or appropriate. Having made this assessment, a "medically-initiated DNR" order may be put in place as part of the patient's treatment plan.

While medically-initiated DNR orders do not require the patient's consent, many DNR policies require health practitioners to record that the patient has been informed, or that an attempt has been made to do so.

Providing CPR in the face of a medically-initiated DNR order will not, for that reason alone, be unlawful. This is striking contrast to the legal position where a patient has made a valid anticipatory refusal of consent to CPR (i.e. a patient-initiated DNR order).²²

CPR and New Zealand Law: decisions regarding CPR at time of arrest

Sudden cardiac arrest is a medical emergency. At this stage, the patient is unlikely to have the level of competence required for a decision about the provision of CPR. Those providing care have to decide quickly whether to commence CPR.

To provide

In the absence of a patient's valid anticipatory refusal of consent, the provision of CPR is lawful whenever there are reasonable grounds for believing that it is in the patient's best interests.²³

However, it will by no means always be appropriate to provide CPR. The law would support the withholding of CPR in some circumstances, especially where it could be said to be good medical practice to do so.

To withhold

The omission to provide CPR to a patient having a cardiac arrest needs to be examined in the light of the statutory duty to provide "the necessities of life". Section 151 of the Crimes Act 1961 provides that where someone "has charge" of another person, who is unable to withdraw him or herself from such charge, and to provide him or herself with the necessities of life, there "a legal duty to supply that person with the necessities of life". A patient who is having a cardiac arrest in hospital clearly comes within the ambit of section 151, so *prima facie* there is a duty to provide the necessities of life. This would usually include CPR.

However, section 151 goes on to provide an important qualification. The section only imposes criminal responsibility for an omission to provide the necessities of life where this is done "without lawful excuse" (and where the omission caused death or permanent injury to health, or endangered life).

The courts have rarely had to consider what lawful excuses are available to providers who omit to take all possible steps to prolong life. However, New Zealand case law confirms that, where an omission to provide the necessities of life is in accordance with good medical practice, there will be a lawful excuse for it.²⁴

A patient-initiated DNR order would provide a lawful excuse in this context, provided that there was reasonable assurance of the validity of the patient's consent. So too would a medically-initiated DNR order, at least if was made in accordance with what the courts accepted as "good medical practice". But it is not only where there is a DNR order in place that the withholding of CPR may be permitted, or even required, by law.

Both under the Code and apart from the Code, the legal grounds for providing treatment without consent depend upon a judgment that the provision of treatment is in the patient's best interests. Although considerable latitude will be provided for any health practitioner who makes this assessment, often in less than ideal circumstances, the issue of whether further treatment is in the patient's best interests must always be kept to the fore.

Where the omission to provide CPR to a patient having a cardiac arrest is in keeping with "good medical practice", there will be a "lawful excuse" for omitting to provide CPR. A 'medically-initiated DNR order' will be helpful, but not always necessary, for

there to be a “lawful excuse” for omitting to provide CPR on the “good medical practice” grounds.

Where the cardiac arrest is irreversible, there is clearly no duty to provide the necessities of life. Obviously once death has occurred, the question of lawful excuse does not arise. It is the law relating to corpses, rather than living persons, which is then applicable.

Conclusions and recommendations

Advance decisions regarding CPR

‘Patient-initiated DNR orders’ and ‘medically-initiated DNR orders’ should not be equated. Given the different status and legal consequences of DNR orders made by patients and those made by clinicians in the course of treatment planning, a clear distinction should be drawn between them. For a start, we recommend that providers develop different forms: one for where the DNR is patient-initiated (and hence gives effect to a competent patient’s right to refuse treatment); another for where it is initiated by medical practitioners as part of treatment planning. Both patient- and medically-initiated orders should specify whether they refer to CPR alone, or include other interventions which might be required during resuscitation.

Decisions regarding CPR at time of arrest

Health practitioners are not required to provide CPR in situations where it is not clinically indicated or appropriate. Indeed, the provision of CPR without consent, in circumstances where its provision cannot reasonably be regarded as in the patient’s best interests, is unlawful.

We are concerned that current policies do not direct clinicians to consider whether CPR is clinically indicated or appropriate at time of arrest. There is no justification for pressing ahead with CPR where a DNR order has not been made but all involved are agreed that further treatment is not in a patient’s best interests. Hospital policies should therefore be reviewed to ensure that they are in accordance with the criteria provided by New Zealand law.

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22. However, assuming that there is no one legally competent who is available to give consent on behalf of the patient, it would not be lawful for a clinician to attempt CPR knowing that it was futile, at least in a situation where it was not in the patient's best interests, nor in accordance with good medical practice to do so.
23. See Right 7(4)(a) of the Code.
24. Auckland Area Health Board v A-G [1993] 1 NZLR 235; Shortland v Northland Health Ltd [1998] 1 NZLR 433.



Adrenal myelolipoma: a rare case

Kheman Rajkomar, Isaac Cranshaw

Adrenal myelolipomas are benign and hormonally inactive tumours that have been described in 1929 by the French pathologist, Professor Charles Oberling.¹ Microscopically it is made up of adipose and hematopoietic tissue. Its pathogenesis is unclear but the favoured mechanism is reticuloendothelial cell metaplasia that is triggered by necrosis, infection or stress.²

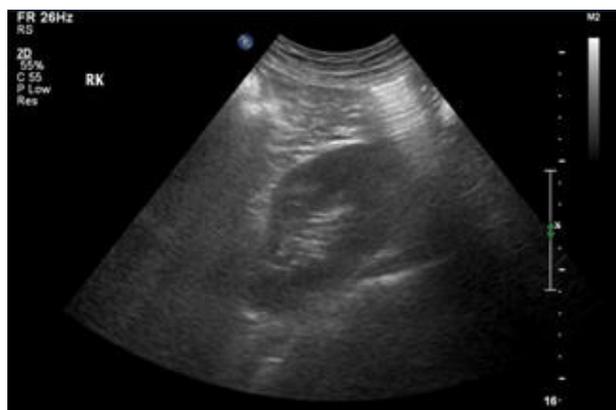
This lesion is still not clearly defined as it is a rare entity. The incidence is 0.08–0.2% as quoted by autopsy series.³ Our knowledge is mainly based on published case series and case reports.

The case reported here is the sixth largest such lesion reported in the literature. Moreover it has some malignant radiological features that distinguish it from other such reported lesions.

Case report

A 47-year-old man with schizophrenia presented to the hospital in July 2008 with a urinary tract infection. On examination he had abdominal distension and right flank tenderness. An abdominal ultrasound revealed a large homogeneous mass, about 3700cc in volume, displacing the right kidney inferomedially (Figure 1).

Figure 1. Ultrasound of right flank



The sonographic finding prompted a CT of the abdomen to further define the lesion. A 22×22×16cm right retroperitoneal well circumscribed mass was seen with mixed fat and soft tissue density. The right lobe of the liver was indented, suggestive of invasion. A lesion was noted in segment 8, which raised the possibility of metastatic liposarcoma (Figure 2).

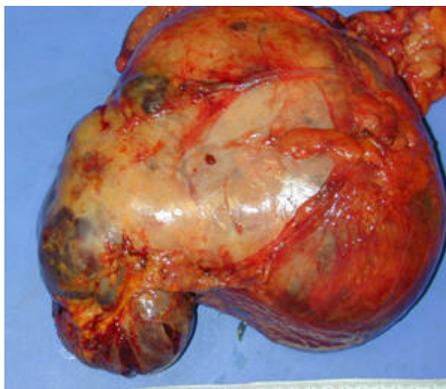
Figure 2. CT abdomen – coronal view showing the invasive lesion with a liver nodule



Interestingly there was no paraortic lymphadenopathy noted on radiological investigation.

On 23 July 2008, a trial of excision of this lesion was attempted. A J-shaped incision was made on his right upper quadrant. A large retroperitoneal mass was seen, with clear planes around the kidney, liver and IVC. The adrenal gland was resected together with the mass. The liver lesions noted on CT were haemangiomas. The specimen was 220×180×120mm, and weighed 3695g (Figure 3).

Figure 3. Right retroperitoneal mass with adrenal gland in the lower left corner



The adrenal gland was distinct from the mass. On cut section the lesion was fatty yellow with less than 20% patchy necrosis seen. The tumour was made up of mature adipocytes and haematopoietic cells. No malignant tissue was seen. The features were consistent with an adrenal myelolipoma.

Apart from an episode of opiate overdose the patient made an uneventful recovery and was discharged from hospital eight days after admission.

Discussion

A PubMed search reveals that our case is the sixth largest adrenal myelolipoma that has been reported (Table 1). Boudreaux et al⁴ reported the second biggest one (5900g), although it included the kidney and some retroperitoneal tissue too.

Table 1. Largest cases reported in literature

Cases reported	Size (cm)	Weight (g)
Akamatsu et al ⁷	31	6000
Boudreaux et al ⁴	34	5900
Wilhelmus et al ⁵	30	5500
O'Daniel-Pierce et al ⁶	30	4370
Lamont et al ⁸	40	4254

Apart from its size, its radiological appearance was singular. Adrenal lesions greater than 6cm with an inhomogeneous consistency are more likely to be malignant.⁹ This lesion's bosselated appearance with mixed soft and fat tissue density on CT was unusual for an adrenal myelipoma.

Those lesions are typically asymptomatic. However, they can present with abdominal or flank pain as a result of haemorrhage, necrosis or pressure effect on surrounding organs. A study of the largest series published shows that they are mostly incidentally picked up on imaging. 58% and 75% of the adrenal myelolipomas studied by Meyer et al¹⁰ and Han et al¹¹ respectively were asymptomatic. Interestingly in Meyer's series symptomatic myelolipomas were smaller than ones picked up incidentally.

We also looked at the therapeutic options offered to patients in both series. Meyer et al resected all the lesions from their patients. Han et al on the other hand were selective, offering surgery to large or symptomatic myelolipomas—i.e. to only 25% of their patients. Their 3-year clinical and radiological follow-up did not reveal any complications from the adrenal myelolipomas.

We hope that as more cases get reported more light will be shed on this rare lesion.

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A young male with gradual onset of bilateral calf swelling and generalised weakness

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Case history

A 36-year-old male presented with generalised weakness, loss of appetite, hoarseness of voice and gradual onset of bilateral calf swelling during the previous 2 months. He also complained of symptoms suggestive of proximal muscle weakness of both his lower limbs, an excessive cold sensation and constipation during the same period.

There is no significant past history of any ailment nor any contributory family history.

General examination revealed mild pallor, facial puffiness and dry coarse skin. Pulse and blood pressure were 64/min and 120/90 mmHg respectively. Cardiac and respiratory system examination was normal. CNS examination showed hypotonia in all the four limbs, power grade 3/5 in both lower limbs proximally and 4/5 distally. Power in upper limbs was normal.

Deep tendon reflexes were normal throughout except for the ankle jerk which revealed delayed relaxation. Rest of the examination was normal.

Relevant investigations revealed the following:

- Anaemia (haemoglobin 8.9 gm/dL), hypertriglyceridaemia (TG 350 mg/dL), hypercholesterolaemia (Sr. LDL-C 300mg/dL)
- Serum T4–1.0 microgram/dl (normal value is 4.5 to 12 microgram/dl), serum T3–21 microgram /dl (normal value is 60 to 200 microgram /dl), serum TSH–99 U/ml (normal value is 0.3 to 5.5 U/ml).
- Creatine phosphokinase was 1565 U/L (normal value is less than 140 U/L).
- Chest X-ray was normal study, ECG showed low voltage complexes in all the leads.
- Electromyography (EMG) was suggestive of mild spontaneous activity, polyphasic myopathic motor unit potentials (MUAPs) along with small amplitude and duration in proximal muscles consistent with hypothyroidism.
- Nerve conduction studies of the nerves of both the extremities were normal.
- Anti TPO (thyroperoxidase) antibodies were strongly positive.

Relevant photographs are shown below.

Photographs showing calf hypertrophy, loss of hairs and shiny skin over the affected area

Figure 1



Figure 2

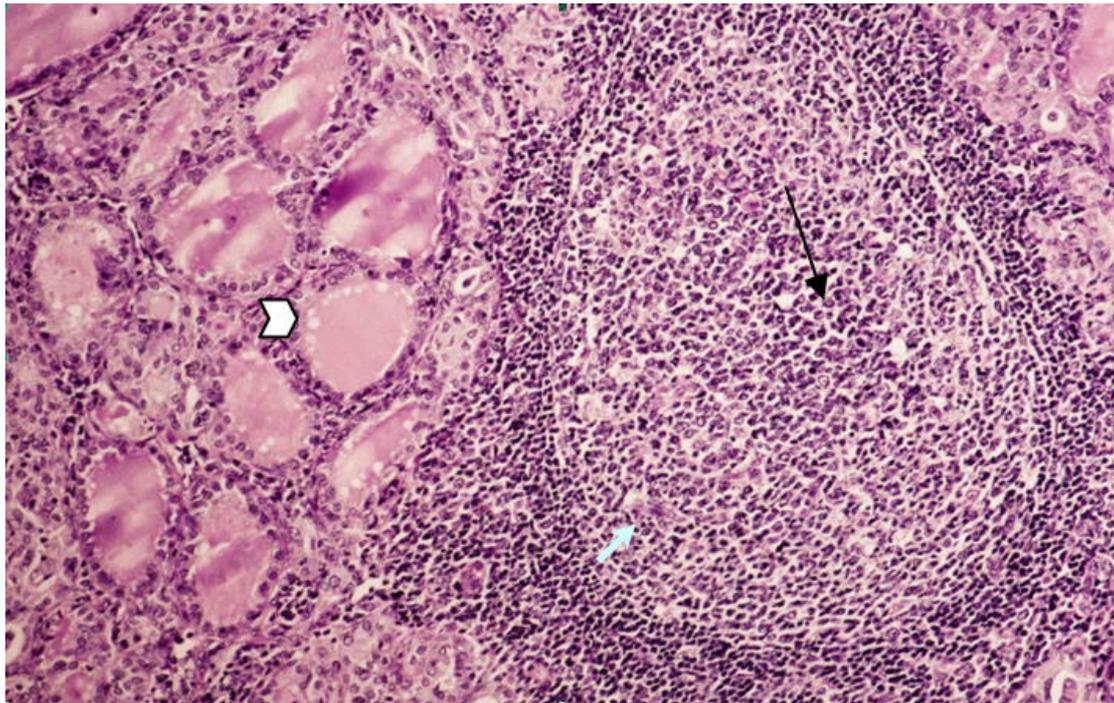


Question—*Name the complete diagnosis*

Answer

Pseudohypertrophic myopathy (Hoffman's syndrome) as initial manifestation of hypothyroidism secondary to Hashimoto's thyroiditis.

Figure 3. Thyroid gland cytology revealed profound lymphocytic infiltrate (thin black arrow), a portion of unaffected gland with colloid (white chevron) and Hurthle cell (white arrow) consistent with the diagnosis of Hashimoto's thyroiditis



Discussion

Although hypothyroid patients usually complain of various muscular symptoms like fatigue, cramps, stiffness and myalgia, myopathy and muscle hypertrophy associated with hypothyroidism is rare, being responsible for only 5% of acquired myopathies.¹ This could be of four subtypes: Kocher-Debré-Semelaigne syndrome (in infants with cretinism), Hoffman's syndrome, atrophic form and myasthenic syndrome.²

Hoffman's syndrome, described by Hoffman in 1897, is a specific rare form of hypothyroid myopathy, which causes proximal weakness and pseudohypertrophy of muscles in adults. While involvement of gastrocnemius is most common (as seen in our patient), thigh, forearm and arm muscles may also be involved.

The muscle involvement in hypothyroidism is caused by changes in muscle fibre from fast twitching Type II to slow twitching type I fibres. Calcium ATPase activity of fast twitching variety of muscle fibres is decreased in hypothyroidism producing delayed

relaxation, the pseudomyotonic reflex. The hypertrophy of muscles is probably due to accumulation of glycosaminoglycans.³

Primary hypothyroidism accounts for 95% of the cases of thyroid insufficiency. The main aetiology in iodine replete areas of the world is Hashimoto's thyroiditis, an autoimmune chronic thyroiditis characterised by high levels of antithyroperoxidase antibodies (anti-TPO) and anti-thyroglobulin along with marked lymphocytic infiltration and destruction of the gland, presence of germinal centres and Hurthle cells. Anti-thyroglobulin is present in 80-90% of the cases and anti-TPO may be present in 90-100% of the cases⁴.

In this case the patient was started on tab. levothyroxine 100 microgram/day on which he gradually started improving. After 2 months of hormone replacement his muscle hypertrophy had regressed, although not fully but his power had improved. Other symptoms of hypothyroidism had also started improving.

We thought to share this clinical experience to highlight a rare treatable muscular condition associated with hypothyroidism, a very common disorder seen in day to day practice. Also, one has to be aware that Hoffman's syndrome, although rare, can be the initial presenting symptom in a case of hypothyroidism and that levothyroxine replacement can lead to substantial improvement in this setting.

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On some principles of hospital management: part 2

Second part of an article by Dr Colquhoun, Dunedin, published in NZMJ 1910;9(36):33–37.

Continued from part 1 at <http://www.nzma.org.nz/journal/123-1327/4485>

Socialism may be right or may be wrong. Socialistic principles may ultimately prevail in this and other States, but at least let us not drift into this experiment with our eyes shut. If as an individual class we are to be extinguished, let other classes clearly understand that their turn will come quickly, and that the free hospital must be succeeded by free meat, free clothing, free houses and free land. If these definitions are accepted, and if it is recognised that it is the truest economy to care for the sick poor in the most effectual manner possible, then it is clear that the hospital authorities must make provision for a great variety of cases, and that the same accommodation will not do for all.

Excluding mental cases, for which the State makes provision, the local authorities have two great classes of patients to provide for—1st. Those who are acutely ill and who need constant medical and nursing supervision ; 2nd. Chronic and convalescent cases which need care but of a less exacting nature than the first class. There will of course be sub-classification as between male and female cases, children and adults, medical and surgical, infectious and non-infectious cases-but for practical purposes, especially in connection with the cost of the hospital, the first classification is the most important.

The cost of maintaining each patient in 1906 in Dunedin Hospital was 5s. 4¼d. per day, or over 37s. 9d. a week An examination of the wards of the Hospital, made on July 27, 1906, showed that of 121 patients 66 belonged to the acute class and 55 to the second class. If, therefore, there were a secondary hospital established in one of the near suburbs of Dunedin, nearly half of the patients could be transferred to it with advantage to themselves. Their maintenance would be less costly, they would have advantages of more space and more fresh air, and the relief to the Primary of Central Hospital would be enormous.



Can dietary supplements of vitamin E prevent haemorrhagic and ischaemic stroke?

Amongst the suggested virtues of dietary vitamin E supplements is the possibility that they may protect subjects from cardiovascular disease, including strokes. This meta-analysis reviews 9 trials involving 118,765 participants (59,357 randomised to vitamin E and 59,408 to placebo).

The follow-up data revealed that vitamin E supplements had no effect overall on the incidence of strokes. However, the risk for haemorrhagic stroke was increased by 22% and the risk of ischaemic stroke was reduced by 10%. And in terms of the absolute risk, these results translate into 1 additional haemorrhagic stroke for every 1250 individuals taking vitamin E, and 1 ischaemic stroke prevented for every 476 individuals taking vitamin E.

As haemorrhagic strokes tend to be more devastating, vitamin E appears to be of very dubious value for stroke prevention.

BMJ 2010;341:1033.

Risk of venous thromboembolism after prolonged work- and computer-related seated immobility

Case reports of an association between prolonged recreational computer-related use and venous thromboembolism (VTE) prompted this case-control study. 197 patients with proven VTE were compared with 197 patients admitted to hospital without VTE.

Prolonged work- and computer-related immobility was defined as being seated at work and on the computer at home, at least 10 hours in a 24-hour period and at least 2 hours at a time without getting up, during the 4 weeks prior to the onset of symptoms that led to VTE diagnosis.

16.8% of the patients with VTE fitted into the prolonged work etc category as compared with 9.6% of the controls (odds ratio 2.8, $p=0.013$).

The authors recommend dissemination of this information and advice on how to avoid the problem.

J R Soc Med 2010;103:447–54.

Placebos—do we need to know what they contain?

The medical literature is flush with randomised double-blind placebo-controlled trials. The authors of this interesting paper suggest that we are under-informed about the nature of these agents and that this may matter. They selected 4 journals—The New England Journal of Medicine, JAMA, The Lancet, and Annals of Internal Medicine for their study based on the facts that they were English language and had high impact factors over the period between January 2008 and December 2009.

Over this period they found 167 eligible studies. Most studies did not disclose the composition of the study placebo. Disclosure was less common for pills than for injections and other treatments (8.2% vs 26.7%; $p=0.0002$).

So they were right, we are under-informed. Rather interesting the difference between the pills and the injections. Does it matter that we don't know? It might, for example lactose as a placebo might upset the lactose intolerant. On the other hand, the placebo might actually be therapeutically active. Interesting.

Ann Intern Med 2010;153:532–35.

More intensive lowering of LDL cholesterol?

Lowering of LDL cholesterol with standard statin regimens reduces the risk of occlusive vascular events. The question examined in this systematic review is whether more is efficacious and safe. Data from 5 trials involving 39,612 individuals are reviewed. Several statins including simvastatin, atorvastatin and pravastatin are involved in the comparative studies. In the largest study a daily dose of 20 mg of simvastatin was compared with 80 mg per day. At a median follow up of 5.1 years there was, as expected, a more marked reduction in LDL cholesterol in the higher dose regimen. The more intensive regimens produced a highly significant 15% (95%CI: 11–18; $p<0.0001$) further reductions in major vascular events.

The only adverse effect of note was myopathy. They note 14 subjects with rhabdomyolysis in the intensive treatment arm versus 6 cases in the standard treatment group. In particular they report no increase in the incidence of cancer in those with the lowest LDL cholesterol concentrations.

Lancet 2010;376:167-81.

Omega-3 fatty acids for the prevention of recurrent symptomatic atrial fibrillation

Apparently fish oils have proven autonomic-modulating anti-inflammatory effects on heart tissue. Hence these agents have been used to correct atrial fibrillation (AF). But, do they work?

This prospective trial was intended to evaluate the safety and efficacy of prescription omega-3 (8 g/d) or placebo for the first 7 days; prescription omega-3 (4 g/d) or placebo thereafter through week 24.

Apparently the dose used was at the higher end of the range. Adverse effects were similar. The outcome-omega-3 did not reduce recurrent AF.

JAMA 2010;304(21):2363–72.

Acute medical admissions and the weekend effect

The 'weekend effect' is the adverse effect that weekend admissions have on hospital outcomes (e.g. in-hospital mortality) when compared with weekday admissions.

This study retrospectively analysed data from public hospitals in Queensland during 2002/2003–2006/2007. During the study period there were 30,522 chronic obstructive pulmonary disease (COPD), 17,910 acute myocardial infarction, 4183 acute hip fracture and 1781 intracerebral haemorrhage admissions.

There was no significant weekend effect on in-hospital mortality (i.e. increase) for COPD, hip fracture or intracerebral haemorrhage. But there was a significant effect for acute myocardial infarction ($p=0.007$). This observation mirrors a similar study in the USA. It is suggested that the cause of the weekend unfavourable outcome is related to reduced access to invasive procedures used in the management of heart attacks. They note a possible confounding factor—such patients may have delayed admission to hospital at weekends.

Internal Medicine Journal 2010;40:777–83.



Response from New Zealand Injury Prevention Strategy Head

Dear Editor

Your publication recently featured an article by Professor John Langley, from the Injury Prevention Research Unit at the University of Otago entitled *The New Zealand Injury Prevention Strategy; significant shortcomings after 5 years*.

By way of background, the NZ Injury Prevention Strategy (NZIPS) was established in 2003, essentially to ensure that across the whole of government there was appropriate targeting and prioritisation of injury prevention resources and to maximise cooperation between agencies, both government and non-government. Of course the ultimate goal was to achieve further reductions in injury rates.

In 2008 an evaluation was done of the progress made by NZIPS, which found that although there were areas for improvement that the strategy was sound.

Professor Langley's article made a number of points that were critical of NZIPS, and the evaluation of it, but in my view his article could lead to an unnecessarily gloomy picture of injury prevention overall in New Zealand.

For example, the fact that over the period of the evaluation, good progress had been made in reducing fatal road and workplace accidents merited no more than a single sentence in his article. Of course this is not all due to NZIPS, far from it, but it is an important point and we should be encouraged by it. Good progress has been made in other areas as well.

Likewise, the simple fact that we actually have a whole of government approach to injury prevention puts us ahead of almost every other country in the world. Yes, there is more that can, and will, be done but NZIPS is a great platform to do that work from.

Equally importantly, Professor Langley's article did not take into account the Government's response to the evaluation of NZIPS, i.e. what's being done about the issues that have been raised. Some of the things that have already been agreed include:

- Initiatives to strengthen NZIPS focus and improve accountability and collaboration among the lead agencies. This will also foster increased engagement.
- A new governance structure. All the lead agencies have approved the new structure and are committed to the Strategy.
- A new outcome monitoring framework is under development. This should help ensure that initiatives remain focused on key populations and serious injury areas. It will also help align the Strategy with lead agency's policy documents and progress measures.

- The inclusion of four new areas for special attention by NZIPS. Professor Langley suggests it is unlikely that work will proceed on these areas but actually ACC has already picked up the lead roles for the alcohol and child areas (at this stage) and work is beginning.

The fact is that the Government has renewed its commitment to achieving a reduction in the injury toll and is determined to get results. More of the recommendations in the evaluation of NZIPS, which were fully endorsed by Cabinet, will be implemented over time. Over the next 12 months, the NZIPS Secretariat's focus will be on measurable results, clear accountability and active collaboration.

Of course there are challenges for the injury prevention sector in driving down injury rates, not the least of which is that these things involve changing human behaviour, which simply takes time. That's always been the case. Many of these challenges are touched on in Professor Langley's article and while I welcome any discussion of the issues, I found the article to be overly pessimistic.

Progress has been made; areas for improvement have been identified and are being worked on. Certainly more could be done but like everything else in life we need to focus on the most important areas first, and we think we are.

And of course, NZIPS is not the "be all and end all" of injury prevention in New Zealand. There are lots of organisations and individuals doing great work in a range of areas, including Professor Langley and the Injury Prevention Research Unit at Otago University.

Anyone who is interested in learning more about NZIPS for themselves can visit www.nzips.govt.nz

Jennifer Brown
Head of NZ Injury Prevention Strategy
ACC, Auckland



Celebrating 20 years of the Smoke-free Environments Act, and the next steps to end the tobacco epidemic

Twenty years ago, the politics and hysteria about regulating the activities of the tobacco industry in New Zealand reached a peak with the passing of the Smoke-free Environments Act. Much of the frenzy was posed as a show of concern for smokers. John Banks, then a National Party MP, said:

“The government will have an army of leather-vested, jackbooted officials sniffing out tobacco smells around the country...Little tin gods from the Department of Health will be going around the country in hobnail boots”.¹

The tobacco industry organised a lobby group called “*New Zealanders for the Right to Decide*”, fronted by former national soccer coach John Adshead. According to a *North and South* magazine article of March 1990, the group was actually run by a public relations firm, Burston-Marsteller.² This firm had run a similar ploy in Canada, which was paid for by the tobacco industry. An offshoot of their campaign in 1990 was the full page advertising from the “*Sports People for Freedom in Sport*”, another front, run by Andy Haden’s public relations agency.³

The tobacco industry efforts weren’t off-the-cuff. As early as 1981 or before, they were planning to oppose smokefree efforts, running an international campaign “Operation Mayflower”.

The objectives in New Zealand, summarised by Ogilvy & Mather in their report to the Tobacco Institute of New Zealand,^{4(p.29)} were to:

- Maintain smoking as a socially acceptable pastime (freedom to choose).
- Reassure people that it has not been scientifically proven that passive smoking is harmful to non-smokers.
- Position the Tobacco Institute of New Zealand as a responsible body which wants to present the facts about smoking issues.

In the late 1980s the industry organised “Operation Leo”—a plan to counter the Government’s smokefree plans.⁵ Within this plan, there was also “Operation Bo-Beep” to develop the *New Zealanders for the Right to Decide* and to form a smokers’ rights group.⁶

What did the Smoke-free Environments Act do?

The new law stopped print media advertising, restricted shop advertising, phased out sports and event tobacco sponsorship, and created a Health Sponsorship Council to provide smokefree sponsorship. It prohibited smoking in buses, domestic aircraft, lifts, multi-person offices, and the public section of any workplace.

But more importantly, along with the tobacco price rises of 1986–91, the publicity around the Act, and the impetus it gave to quit smoking, saved thousands of lives. Thousands of New Zealanders now have parents and grandparents alive and healthy, who would otherwise be sick or dead from their smoking.⁷

Are the politics different now?

Smokefree indoor public places may now be accepted,⁸ but there are a number of signs that real change in ending the tobacco epidemic will continue to be delayed by politicians. One example is the absence of substantive progress around smokefree cars.

Prime Minister John Key has said a 'National Government' wouldn't be telling people they couldn't smoke in their own cars. His reasoning was that National is a party of 'reasonable choice'. He said that he wasn't 'opposed to banning smoking in bars, because other New Zealanders are there and people work there' and that this issue would 'distract the parliament'.⁹

The implication is that 'other' New Zealanders are not to be found in cars. Two years later, smokefree cars are still not in the proposed new smokefree legislation as outlined in late 2010. Policymakers appear to have little concern about the children who have no 'reasonable choice' when they travel in cars with smokers, compared to their concern for adult 'rights'.¹⁰ This is despite the survey evidence that indicates that over 95% of Kiwi smokers think that smoking should not be allowed in cars with pre-school children.¹¹ It is also in contrast to a growing number of North American and Australian jurisdictions that have banned smoking in cars with children.¹²

What needs to be done

The Maori Affairs Select Committee (MASC) Inquiry report in November provided much of the template for the future reduction of the tobacco epidemic in this country.¹³ It provides a goal (making New Zealand smokefree by 2025), a comprehensive programme of measures, it recommends that an updated tobacco control strategy be developed, and it addresses the issue of the structure of tobacco control management. It clearly targets the tobacco industry.

Many of the MASC recommendations would be practical to insert into the new Smoke-free Amendment Bill.¹³ Health workers and concerned citizens can all make submissions to the Health Select Committee suggesting these insertions. But prompt action is needed since submissions close on 28 January 2011 – in only one week.

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Smoking cessation in patients undergoing treatment for head and neck cancer

Smoking is a risk factor for many disease processes and adds a great burden on our healthcare system. It is a major public health issue in New Zealand with a prevalence of 21%.¹ Smoking and alcohol are independent risk factors for cancer of the aerodigestive tract and their synergistic effect is well documented.²⁻⁷ Techniques are available to assist people to quit smoking. Advice on cessation of smoking is part of our management of head and neck cancer patients. We present here results of our study determining the effectiveness of smoking cessation strategy, contributing factors, and long-term abstinence in these patients.

Consecutive patients who were smokers at the time of diagnosis of head and neck cancer were culled from our prospective head and neck database. Demographic data, diagnosis, tumour location and risk factors were obtained. The patients were sent a questionnaire to document their smoking habits, factors that influenced cessation and the interval of abstinence. A follow-up telephone interview was conducted for non-responders.

Fifty-six (49%) of the 114 consecutive patients had deceased. The remaining 58 patients had cancer in the oral cavity (n=31), salivary gland (n=7), oropharynx (n=5), bone (n=4) and paranasal sinus (n=3), metastatic skin cancer (n=7), and neck metastasis with unknown primary (n=1). 50 (86%) of the 58 patients responded to the questionnaire. Of those who responded 37 (74%) stopped smoking, with 27 (75%) doing so around the time of diagnosis and treatment.

The most influential factor for quitting smoking were the diagnosis of cancer (n=20), hospitalisation (n=14), medical advice (n=13), family advice (n=8), Quit Line (n=2), and nicotine replacement therapy (n=1). The latter two factors were ranked 6 and 5 times respectively as the least important factor influencing their quitting smoking. 18 (49%) of the 37 participants who stopped smoking restarted, and the remainder continued to abstain. Of those who restarted smoking, 5 (28%) did so within 1 month, 7 (39%) 1–12 months, 2 (11%) 1–5 years, and 4 (22%) did not mention the interval.

We infer that most patients undergoing treatment for head and neck cancer quit smoking in response to a personal “crisis”, i.e. the diagnosis. This is reinforced by the non-smoking hospital environment and consistent medical and family advice. This finding may have implications to mechanisms leading to successful quitting in other patients who smoke. However, strategies are needed to reduce the high rate of restarting smoking for successful quitters in head and neck cancer patients.

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Nicotine e-cigarette cartridges can be sold as tobacco products

End Smoking NZ, a charitable trust focussed on tobacco policy, has identified the sale of safer, satisfying nicotine products as a top priority for greatly reducing smoking.¹ Tobacco smoke includes thousands of compounds, including carcinogens, and lung and cardiovascular toxicants. In contrast, pure nicotine carries far less risk, and can provide a safer alternative for those too addicted to yet quit smoking.

Medsafe's interpretation of the Medicines Act is that nicotine electronic (e-)cigarettes (which vapourise nicotine into a mist for inhalation) are medicines "even if they are not represented as aids to smoking cessation",² and cannot be sold unless medicinally licensed. As no such licensing is imminent, a virtual ban is in place.

Instead, we argue that nicotine e-cigarettes are primarily recreational nicotine alternatives to smoking, though some brands may obtain licensing as medicines at some future date. We argue they already qualify as tobacco products under the Smoke-free Environments (SFE) Act, which has regulated all tobacco products for (recreational) human consumption since 1990. For example, at Section 30, the Act bans their sale to those under 18 years of age, while at Section 31 it has powers to reduce or remove any substances deemed hazardous. All that e-cigarette distributors would have to do, is strictly refrain from making therapeutic claims, and abide by current or future regulations of the SFE Act. We now examine how the SFE Act can accommodate nicotine electronic cigarettes.

The SFE Act's interpretation section defines a tobacco product as:

... "any product manufactured from tobacco and intended for use by smoking, inhalation, or mastication and includes nasal and oral snuff, but does not include any medicine (being a medicine in respect of which there is in force a consent or provisional consent under section 20 or section 23 of the Medicines Act 1981) that is sold or supplied wholly or principally for use as an aid in giving up smoking."

Thus the nicotine e-cigarette can be classified as a tobacco product, if its nicotine is manufactured from tobacco (it is) and it is not supplied wholly or principally as an aid in giving up smoking.³

Nicotine e-cigarettes, unlike medicinal nicotine patches or gum, are shaped and designed to provide nicotine-based and smoking-ritual-based pleasure by inhalation, and so can be regarded as tobacco products provided no medicinal claims are made. A recent United States district court decision,⁴ upheld on appeal in December 2010, supports the classification of e-cigarettes as inhaled tobacco products, and recognises that almost all nicotine is consumed for recreational, not medicinal purposes.

According to the definition above, tobacco products can be used for smoking, inhalation or mastication. Of these three, the SFE Act permits sale for smoking, but not for oral use, and does not mention sale for inhalation:

... "No person shall import for sale, sell, pack, or distribute any tobacco product labelled or otherwise described as suitable for chewing, or for any other oral use (other than smoking)".⁵

Sale of nasal tobacco snuff for inhalation remains legal. Sale of nicotine electronic cigarettes for inhalation is not mentioned; and their import, distribution and sale can we believe, be allowed under the SFE Act. This is reinforced by observations on how e-cigarettes are used—for inhalation, not oral use.

As with cigarettes the e-cigarette mist is inhaled, but more negative pressure is needed,⁶ requiring inhalation directly to the lungs. Smokers switching to e-cigarettes, instead of holding smoke in the mouth before inhalation as many smokers do, learn to inhale mist into the lungs in a one-stage manoeuvre.

The mouth has a separate secondary role as part of the respiratory tract, and the inhaled mist transits the mouth in seconds, whereas oral products (snuff or nicotine gum) are normally held in the mouth for half an hour. For the above reasons, we believe the sale of electronic cigarettes is not caught by the Act's ban on sale of oral tobacco products.

As nicotine e-cigarettes contain no tobacco, they attract no tobacco excise. Nicotine-free electronic cigarettes are widely advertised and sold, but most users want nicotine cartridges – which, being tobacco products, cannot be advertised (Section 22, SFE Act). Every nicotine cartridge sold means a pack of cigarettes not sold. UK surveys have shown 52% of smokers have heard of e-cigarettes but never tried them, 6% of smokers have tried them but no longer use them, and 3% currently use them.⁷

The Maori Affairs Select Committee Tobacco Inquiry recommended further research into the benefits and risks of alternative products.⁸

A recent review backs e-cigarettes as much safer than cigarettes, although absolute safety is yet to be proven.⁹ Further reliance, however, on regulation solely under the Medicines Act, as at present, would deny satisfaction to the thousands of smokers who have already bought e-cigarettes without nicotine, as currently advertised. No hospitalisations or deaths have been reported globally so far from over 3 years of nicotine e-cigarette sales. Smokers merely want the choice now, without having to order the nicotine cartridges from China.

Conclusion—The Smoke-free Environments Act provides a comprehensive framework for governing recreational tobacco and nicotine, and already permits the import, distribution, and sale of nicotine electronic cigarettes as tobacco products.

Murray Laugesen, Marewa Glover, Trish Fraser, Ross McCormick, John Scott
Board Members, End Smoking NZ Trust
chair@endsmoking.org.nz

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Health claims on food labels: is there cause for concern?

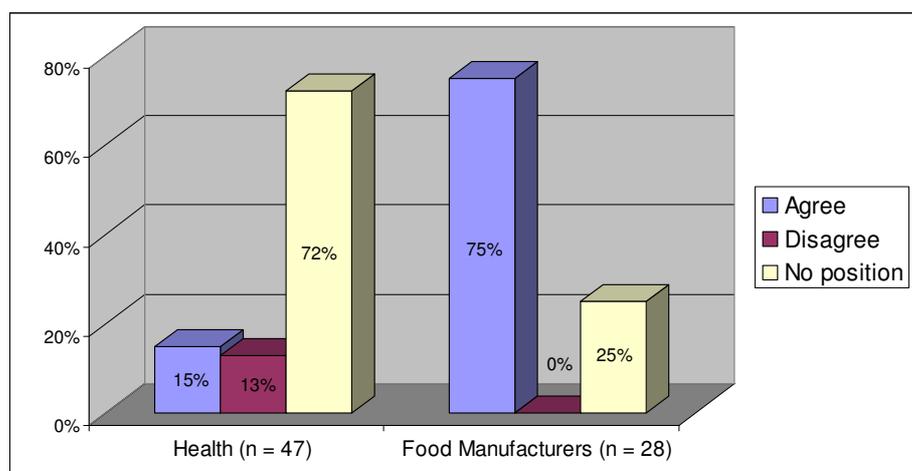
Health claims, with one exception—the exception is for folate and a reduction in the risk of neural tube defects—are not permitted for food sold in New Zealand and Australia.^{1,2} Food manufacturers want this to change. The health sector is divided, with some health organisations strongly opposed to the introduction of health claims, and others supportive.

Health claims are being considered at present as part of the Review of Food Labelling Law and Policy (the Review) being conducted in Canberra. Our aim in this letter is to bring attention to the some of the views about health claims expressed in submissions to the Review, particularly in terms of the implications for public health.

Views of food manufacturers and health organisations on health claims—We have completed a preliminary analysis of what submissions to the Review say about health claims. All 451 submissions available on the Review website³ as at 18 November 2010 were classified by sector (e.g. food industry) and sub-sector (e.g. retail), and coded for direct or implied agreement or disagreement with a number of propositions. The results reported here are for the 28 submissions from food and beverage manufacturers and the 47 from the health sector (excluding submissions concerned only with alcohol labelling).

Food manufacturers were of one view: three-quarters of submitters agreed that health claims that can be objectively supported by evidence should be permitted, with the remaining quarter expressing no view (Figure 1). The health sector, however, was split, with 15% (7 submissions) agreeing, 13% (6 submissions) disagreeing, and the majority (72%) not expressing a position.

Figure 1. Percentage of submissions agreeing and disagreeing that health claims that can be objectively supported by evidence should be permitted, by selected sub-sector



The main reasons given by submitters in support of permitting health claims were that this would:

- Allow consumers to be informed about how particular products may protect and promote good health
- Help consumers to make healthier food choices
- Help educate consumers about, and raise consumer awareness of, the health benefits of particular foods or nutrients
- Encourage the food industry to produce and market products that assist people to achieve healthier eating patterns.

The main reasons given against permitting health claims were that they:

- Are primarily a marketing vehicle for highly processed food products, with no net benefit to public health
- Can confuse consumers, and may mislead them about the contribution to health of individual products

Promote a perception of individual foods as drugs, and this medicalisation of foods distorts public health messages about the importance of balance, variety and moderation in food selection.

Reasons given by those *agreeing* that health claims should be permitted were backed by very little argument, and in no case was supporting evidence cited. Reasons given by those *disagreeing*, on the other hand, were in most cases backed by supporting arguments and citation of evidence.

These results need to be seen in the context of continuing work by Food Standards Australia New Zealand (FSANZ) to develop regulations under which health claims would be permitted. In 2008 the Australia and New Zealand Food Regulation Ministerial Council called for changes to a draft proposal that were about the detail of the process of approving health claims, but which implied support for their eventual introduction.⁴ Final decisions have yet to be made.

It may well be that food manufacturers, in their submissions to the Review, did not bother to provide argument and evidence to back their call for the introduction of health claims because they assumed the battle had already been won.

Evidence from the submissions suggests that a number of health submitters who failed to express a view about the introduction of health claims opposed their introduction. For example, nine health submitters from among the 34 *not* expressing a position on whether health claims should be permitted suggested that permitting health claims would be harmful to consumers from a health perspective. None of the 34 suggested this would be beneficial.

It appears likely, then, that some health submitters opposed to health claims were resigned to their introduction, and focussed their submissions on ways in which harmful effects could be mitigated. As an example, 22 of the 47 of health submitters

(47%) expressed the view that *if* health claims were permitted this should *only* be for products that meet minimum nutrition standards.

Do health claims matter for public health?—Health claims are important for food manufacturers as they continually seek to develop new products with a point of difference from their competitors. Once permitted, we can expect to see health claims proliferate, with foods increasingly marketed on the basis of claimed health benefits. Some health submissions make a strong case that this will work against the public health strategy of encouraging people to improve their diet, and reduce their risk of chronic disease, by consuming less processed food and more fruit and vegetables.

Food manufacturers have been united for years in pushing for the ability to make health claims. The health sector, on the other hand, is divided and to some extent indifferent. It will be an easy decision for governments to permit use of health claims unless effective opposition is organised.

Competing interests: Both authors have done work for health sector agencies involved in nutrition policy advocacy. John White drafted the submission from FOE (Fight the Obesity Epidemic) to the Review of Food Labelling Law and Policy.

Funding: The research referred to in the letter was funded from a University of Otago PhD Scholarship.

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THE NEW ZEALAND MEDICAL JOURNAL

Journal of the New Zealand Medical Association



Eva Ruth Seelye

27 May 1929 – 12 November 2010

Eva Ruth Hersch escaped Nazi-occupied Vienna in late 1938. Her father from a distinguished medical family had been taken underground by patients and Eva and her mother made their perilous escape aided by her uncle's contacts.



The family were reunited in Dubrovnik and with the assistance of the Myer family were granted a permit to enter New Zealand.

Her father Hans retrained at Otago Medical School and German-speaking Eve entered a convent school in Dunedin. Her schooling was very much that of teach yourself, having been given a copy of Dickens and a German/English dictionary, and sat at the back of the class. Following his graduation her father set up General Practice in Herne Bay.

Appropriate schooling again was difficult for intelligent Eva and she spent much of her time reading in the Auckland Public Library. She matriculated at the age of 15 years after attending correspondence school and at the age of 16 was offered a place at Otago Medical School. Her wise father decided she was far too young and she enrolled at Auckland University graduating with a Bachelor of Arts in 1948 before proceeding to Dunedin to graduate MB ChB in 1953. Whilst at Auckland University she met Ralph Seelye a lecturer in the Chemistry Department and they married in 1954.

Her father died in 1954 and following her House Surgeon years she worked in her father's General Practice. This she did not find to her liking and left to become an Anaesthetic Registrar in the Auckland Hospitals. With her husband, Ralph, she travelled to Oxford University where he completed his Doctorate and she gained her FFARCS in 1961. Following their return to Auckland Eve became a Specialist Anaesthetist with the Auckland Hospital Board, based at Green Lane Hospital. She was granted her FFARACS in 1968 and became FANZCA in 1992.

Eve was to spend the rest of her career at Green Lane Hospital, spending most of her time working with the Cardiothoracic Surgical Unit (CTSU). She and her close friend, the late Dr Marie Simpson, provided most of the anaesthesia for that unit and they were heavily involved in the Intensive Care room, Catheter Lab and with Cardiac Perfusion. These were the early days of cardiac surgery in New Zealand and Eve was engaged in a considerable body of research coauthoring 26 papers from 1962. These

covered anaesthesia, hypothermia, cardiopulmonary bypass and physiology being published in the British Journal of Anaesthesia (8), the New Zealand Medical Journal (4), Clinical Science and Molecular Medicine (5) and others in Cardiothoracic journals.

Eve was also a coauthor of and contributor to three books. Despite her aversion to administration, Eve was a very competent Chair of the Department of Anaesthesia at Green Lane Hospital from 1978 until her retirement in 1985.

Eve was an excellent teacher, lecturing to the CTSU nurses, involved in anaesthetic technician training and was a practical instructor for all, in theatre, Intensive Care and on the wards. She was an examiner for the Final FFARACS examinations, a role she enjoyed and filled with distinction.

Eve took early retirement to spend more time with her beloved Ralph and they spent “15 blissful years” exploring New Zealand, tramping and enjoying the company of their many friends before his death in 2002.

Eve was a delightful companion with a quick wit and a great sense of humour although she did not tolerate fools gladly. She gave of her best and expected others to do the same. Sadly, after Ralph’s death her own health deteriorated and despite constant pain she still managed to keep up with her reading, maintained a keen interest in all things medical and her enquiring mind was with her to the end.

Eve and Ralph were grateful for their own education and were keen to provide educational and learning opportunities for others. Having no children of their own, they established the Ralph and Eve Seelye Trust, which provides funding for undergraduate and postgraduate students, Visiting Lecturer Fellowships at the University of Auckland and a Doctorate Scholarship in Anaesthesia.

Recipients come from varied specialities and Eve enjoyed reading through the resumés and deciding who would receive funding. A wider public benefitted from visits from Early Childhood Educators, Architects, Marine Biologists, Lawyers and others as well as Medical Educators.

Eve always had a sense of gratitude towards New Zealand for taking her and her family in but it is we who have (and will continue to benefit from) the contribution she made to anaesthesia and the legacy she and Ralph have left.

Basil Hutchinson (FANZCA, retired, Auckland) and Kaye Ottaway (FANZCA, Auckland) wrote this obituary.

THE NEW ZEALAND MEDICAL JOURNAL

Journal of the New Zealand Medical Association



Rodger Heath Maxwell

2 November 1925 – 13 November 2010

Rodger Maxwell was born in Whangarei and educated in Auckland at Epsom Model Country School and Auckland Grammar School. He was ranked first in his 4th form academically and first in senior Latin. He enjoyed playing rugby throughout his Grammar years.



He left Auckland Grammar School in 1943 to spend 2 years as a cadet quantity surveyor. He then entered Medicine at Auckland University then to Dunedin to graduate in December 1953 as MBChB.

Rodger joined the Auckland Hospital Board's service as Junior House Surgeon and progressed to Registrar's posts in Medicine (Cornwall Geriatric Hospital) and Pathology (Auckland Hospital).

He and his wife proceeded to London to study and hold medical positions from June 1958 for 3½ years.

On their return to New Zealand in 1962 Rodger spent 2 years as full-time physician at Kaitia Hospital qualifying as a Junior Medical Specialist.

In 1965, after spending a year in Dunedin, Rodger gained DPH (with Distinction) in Hospital Administration. Special consideration in this training was given to principles of medical administration , medicolegal issues and study of relevant statutes governing hospital practice.

Back in Auckland, Rodger entered Medical Administration briefly at Middlemore Hospital before being transferred to the position of Deputy Medical Superintendent at Auckland Hospital in February 1966. He worked there until 1972. He attended Investigation Committees of the Board for 4 years and was involved with the Medical Advisory Committee, staff appointments committees and was representative in Hospital Administration on MANZ Representation Body in Auckland. He gained a unique experience in issues involved in commissioning of a large hospital.

He progressed to being appointed inaugural Medical Superintendent of North Shore Hospital in 1972 overseeing the commissioning of the new hospital and its subsequent administration. In 1974 he also became official Head Medical Officer of the Obstetric Hospitals in Devonport, Eastern Bays, Warkworth and Helensville.

After Medical Superintendent appointments at Waitakere and Whangarei hospitals he retired from Medicine for family reasons in May 1986 and returned to live on North Shore, Auckland.

Apart from his conscientious application to his medical and hospital administrative work, he was very proud of his family and encouraged his children in their educational studies, sport and relaxation activities. He always endorsed his wife, Margaret's medical practice involvement as a solo general practitioner and Student Health work.

As a family, holidays were spent camping in Northland, and subsequently at Pataua North and Oakura Beach in seaside baches. He and Margaret enjoyed much time in Northland during their retirement years, where his fishing, gardening, reading and music were favourite pursuits.

In 2006 he suffered a significant stroke and needed hospital care at Northbridge Private Hospital for the last 4 years of his life. Total blindness added to his problems during this time. Each day Margaret was able to augment the capable and loving care he received there.

He died peacefully at Northbridge surrounded by his family and is survived by wife Dr Margaret Maxwell, daughter Deirdre, sons Rowan and Garth, and granddaughters Ayumi, Miyuki and Ruby.

Rodger's family wrote this obituary and supplied the photograph.

THE NEW ZEALAND MEDICAL JOURNAL

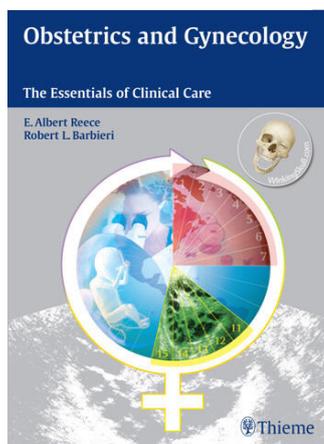
Journal of the New Zealand Medical Association



Obstetrics and Gynaecology—The Essentials of Clinical Care

E Albert Reece, Robert L Barbieri. Published by [Thieme](#) (Stuttgart, Germany), 2010. ISBN 9783131439512. Contains 576 pages. Price US\$ \$55.96

This is a refreshing basic text which will appeal to many medical students commencing their studies in Obstetrics and Gynaecology. The publication covers a clear introduction to all of the relevant aspects of the specialty an undergraduate would be expected to encounter.



The material content of several of the chapters is presented in interesting and sometimes novel formats. Many of the illustrations are vivid and the anatomical diagrams are clear and relevant. Some chapters break down issues into sections reviewing definitions, presentations, clinical course, treatment and so on for a number of conditions sequentially and this can make rather interrupted gleaning of information but for some will perhaps be a stimulating way of acquiring information.

The incorporation of a section on Professional behaviour ethical and legal aspects of the specialty enriches the publication.

This is a useful addition to the selection of publication available for Undergraduates and has the potential to stimulate interest in a broad range of Women's Health issues, covering basic knowledge and acting as a rich information source.

Rosemary Reid

Obstetrics & Gynaecology

Christchurch Women's Hospital, Christchurch School of Medicine and Health Sciences

University of Otago, Christchurch

THE NEW ZEALAND MEDICAL JOURNAL

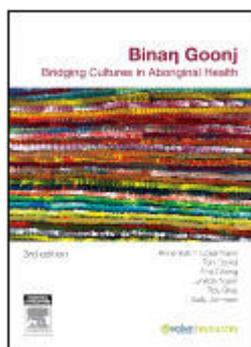
Journal of the New Zealand Medical Association



Binan Goonj—Bridging Cultures in Aboriginal Health (3rd edition)

A Eckermann, T Dowd, E Chong, L Nixon, R Gray, S Johnson. Published by Churchill Livingstone ([Elsevier Australia](#)), 2010. ISBN 9780729539364. Contains 239 pages. Price AU\$ 44.96 (online at Elsevier Australia)

This 3rd edition of *Binan Goonj* represents the experiences and perspectives of Eckermann, Dowd, Chong, Nixon, Gray, and Johnson on research and government reports on Aboriginal Affairs and Aboriginal Health over 19 years of collaboration.



In the Introduction, the authors have written that people in Health [in Australia] cannot begin to understand Aborigine peoples' health situation without becoming aware of their history since invasion.

Therefore, Eckermann et al strip the philosophical, historical, social, political, cultural, and economic 'onion' on colonisation, genocide, and racism since Captain Cook 'discovered' and claimed Australia for the British Crown.

Yet, there is only a feeble attempt by the authors, on page 163, to stir the readers' awareness of the significance and usefulness of the groups of Aborigine peoples' languages [and cultures] to living well with each other and with others on the cattle station and the reserve, in the mission and the urban centre.

The 'Aboriginal' problem [in Health], according to the authors, lies in the history that the non-Aboriginal British and the western European colonisers simply took over the so called 'empty continent' [Terra Nullius] and the responsibility fell on the Aborigine peoples to shape up to the invaders' violence and perception of civilisation, to accept without question their new position of subjugated peoples in their own country. The niche or subjugated position, of course, was, and still is, largely defined by the more powerful non-Aboriginal majority. This early contact set the ethic—colonisation, genocide, and institutionalised history of subjugation—for the present position of Aboriginal peoples in Health and Australian society.

After 195 pages, Eckermann et al dash to finish the book, and the authors end the volume with several Case Studies illustrating the very significant history of Empowerment in Aboriginal Health.

Do the authors convey what is promised in the subtitle? In a word, no. Is the book worth reading? Unquestionably.

(Dr) Mere Kēpa

Project Manager & Research Fellow, Life and Living in Advanced Age Cohort Study in NZ (LiLACSNZ)

Te Kūpenga Hauora Māori & Department of General Practice and Primary Health Care, Tamaki Campus, the University of Auckland