CONTENTS

This Issue in the Journal
3 A summary of the original articles featured in this issue

Editorials
5 Opioid dependence, a life-threatening condition, is preventable
Jeremy McMinn
9 Māori-centred codes of ethics: championing inclusiveness in creating professional codes of ethics across the New Zealand health sector
Barry Smith

Original Articles
13 Self-rated health, health-related behaviours and medical conditions of Māori and non-Māori in advanced age: LiLACS NZ
Ruth Teh, Ngaire Kerse, Mere Kepa, Rob N Doughty, Simon Moyes, Janine Wiles, Carol Wham, Karen Hayman, Tim Wilkinson, Martin Connolly, Casey Mace, Lorna Dyall
30 Dietary intake in midlife and associations with standard of living, education and nutrition literacy
Catherine L Wall, Richard B Gearry, John Pearson, Winsome Parnell, Paula M L Skidmore
41 Unipedicle TRAM flap procedures are associated with symptoms of pelvic floor dysfunction in women: a case control study
Emily Liu, Jackie Smalldridge, Belinda Scott
George Thomson, Jane Oliver, Nick Wilson

Viewpoints
57 Opioid substitution treatment in New Zealand: a 40 year perspective
Daryle Deering, J Douglas Sellman, Simon Adamson
67 Bioethics for New Zealand/Aotearoa
Ben Gray
77 A critical analysis of the End of Life Choice Bill 2013
David E Richmond
Clinical Correspondence

88  A case of extensive cutaneous *Mycobacterium marinum* infection in a Pacific Islander living in New Zealand  
*Charlotte Kevern, Pleayo Tovaranonte, Roland Meyer, Alan Pithie*

93  Cardiac tamponade—still a difficult clinical diagnosis  
*Caoilfhionn Ni Leidhin, Suzanne Moran, Alastair MacLean*

97  Medical image. Multimodality imaging in *Granulicatella* endocarditis  
*Jen-Li Looi, Phil Weeks, Ruvin Gabriel, Niels van Pelt*

100  Medical image. Extraordinary extravasation  
*Matthew Zuckerman, Mathew Greenston*

Letter

102  Response to Richardson and Potter’s “Screening for colorectal cancer and prostate cancer: challenges for New Zealand”—with authors’ reply  
*Diana Sarfati, Ian Bissett*

100 Years Ago in the NZMJ

107  The Origin of Life

Methuselah

109  Selected excerpts from Methuselah
This Issue in the Journal

Self-rated health, health-related behaviours and medical conditions of Māori and non-Māori in advanced age: LiLACS NZ
Ruth Teh, Ngaire Kerse, Mere Kepa, Rob N Doughty, Simon Moyes, Janine Wiles, Carol Wham, Karen Hayman, Tim Wilkinson, Martin Connolly, Casey Mace, Lorna Dyall

The population of New Zealand is ageing and it is projected that the dependency ratio (ratio of the 65+ and children to those of working age) will increase. This suggest that the current services may not adequately funded by the available tax dollars in the future. In the Life and Living to Advanced Age cohort study in New Zealand, LiLACS NZ, we found, up to half of the participants were at risk of poor nutrition, and despite having multiple health conditions, they have high self-rated health and better physical performance (measured by grip strength) compared to international studies. We will continue to follow all surviving LiLACS NZ participants to determine the health outcomes in relation to their patterns of health behaviours and chronic conditions. Future work is planned to focus on improving nutrition and physical activity level and better management of health conditions to improve quality of life and enabling older New Zealanders to continue to make a valuable contribution to society.

Dietary intake in midlife and associations with standard of living, education and nutrition literacy
Catherine L Wall, Richard B Gearry, John Pearson, Winsome Parnell, Paula M L Skidmore

Cardiovascular disease is a leading cause of death in New Zealand, but risk factors may be decreased by consuming a heart healthy diet. This pilot study investigated whether participants met the guidelines for a heart healthy diet and whether a novel heart healthy dietary pattern could be identified using principal components analysis. The second aim of this project was to assess if higher education, standard of living and nutrition literacy are associated with a heart healthy dietary pattern. 62 participants completed questionnaires and an estimated food record. Higher standard of living, education and nutrition literacy were associated with a healthier dietary eating pattern. However, as no participants met all the dietary recommendations more education and support is needed to help people meet these.
Unipedicle TRAM flap procedures are associated with symptoms of pelvic floor dysfunction in women: a case control study
Emily Liu, Jackie Smallridge, Belinda Scott

A small pilot study has shown that women who have a UTRAM reconstruction as part of their treatment for their breast cancer appear to have more symptoms of pelvic floor dysfunction than those women having regular breast cancer surgery. Symptoms include urinary incontinence and vaginal prolapse. This is thought to be due to an increase in their intra-abdominal pressure following surgery. Larger studies to confirm this finding are planned.

George Thomson, Jane Oliver, Nick Wilson

A locally driven 2013 smokefree cars campaign in Wainuiomata appears to have helped half smoking in cars with children. However, the level of smoking in cars with children found was still five times that found in Karori.
Opioid dependence, a life-threatening condition, is preventable

Jeremy McMinn

Opioid dependence presentations are frequently late, typically between 2 and 10 years duration of untreated illness. Other associated and preventable chronic life-shortening conditions are usually acquired. Costs of acquired illnesses, obstructed potential, and social consequences are high.

Treatment (opioid substitution) is effective but treatment episodes are often longer than the original period of uncontrolled dependence. And although effective, treatment has its own complications: the “side-effects” of dispensing controls and stigma.

Deering et al in this issue of the Journal are circumspect about the 40 year report card for opioid substitution in New Zealand (NZ)—a “needs to do better” assessment. Many of the themes from the 20 year report remain: access difficulties, primary care integration, stigma. Even tempered with some optimism for buprenorphine specifically, this is a disappointingly slow trajectory.

The opioid-dependent typically have to face the bitter reality that short-term attempts to withdraw from opioids—to “detox”—are unlikely to be successful. Wishing this was not so is not enough to change this. Relapse prevention support with naltrexone, or “addiction interruption” with ibogaine offer tantalizing hope, but as yet without firm basis. Opioid substitution with methadone or buprenorphine remains the treatment supported by the evidence, in a class of its own by comparison with the alternatives.

Substance dependence has core qualities of compulsion to use, dyscontrol over the rate of use, salience (exclusive importance) pertaining to the use, and dysfunction arising from the use. Implementation of external controls, mainly by dispensing restriction, is a key requirement during the period that the patient has diminished internal control. Treatment is best achieved with the uniform serum levels of methadone and buprenorphine that allow single daily dosing without the on/off reinforcement of shorter-acting opioids.

With sustained treatment, frequently measured in years rather than months, perspectives develop, peers change and drug immediacy wanes. Rigid dispensing control may be justifiably relaxed to foster rehabilitation needs (employment, childcare, etc), with rehabilitation frequently providing the necessary resilience to allow successful treatment exit.

Compulsion, dyscontrol, salience, dysfunction. These are not easily measured in vivo. It is unclear how well specialist opioid providers assess these, perhaps poorly in many cases. Surveys of NZ’s lower North Island clients indicate that if decisions to allow loosened dispensing were based on perceived risk of self-injection, then these perceptions were frequently mistaken.
Similarly, findings that methadone constitutes a significant proportion of street opioid supply in NZ, with methadone prescribing in the main limited to opioid substitution providers, suggests insufficient dispensing control.6 These factors, with waiting lists reflecting underfunding by an estimated 50%, have been difficult to square with suggestions that more people be engaged in treatment with less dispensing restrictions.1

Opioid substitution providers witness daily the consequences of opioid dependence. It would be unsurprising if they were sensitised to the risk of initiating new cases, with opioids derived from their prescriptions. Burdensome role conflict is inherent in the desire to believe and help individual clients while remaining wisely doubtful on behalf of protecting the public. Longstanding underfunding diminishes the time, energy and patience to sustain compassion for a population with multiple needs—a far cry from the “special incentives” to ensure the quality of treatment programmes.2

Given these challenges, it is fortunate that younger people seem to be making drug use decisions less likely to include opioids—the opioid substitution cohort of has become progressively older. To some extent this may reflect knowledge about drug harms—with opioids, methamphetamines and nicotine increasingly seen, rationally, as the ones to avoid. While we wait for opioid substitution to tardily “come of age”, can we instead hope the current unmet and sometimes resented need for opioid substitution be consigned to history?

The “Mr Asia” prosecutions in the 1970s and 1980s dismantled the heroin supply chains into NZ. Although heroin has occasionally arrived since, its unreliable availability has limited its exposure.7 Only users within circles already abusing opioids are likely to have access, and only for discrete periods.

In the past 3 decades, nearly all NZ cases of opioid dependence have been initiated and maintained by pharmaceutical opioids. Use of opium, now more often derived from seasonal poppies or the washings from bulk poppy seeds, provides an infrequent diverting anachronism. Instead, most opioid dependence is sustained with the leading candidates of morphine or methadone, with oxycodone increasing its street market share over codeine-containing preparations.6

The rest of the developed world has caught up. Deaths from pharmaceutical opioids in the US outweigh deaths from heroin and cocaine combined, with similar trends in Canada, Australia, and the UK.8 However, in these countries, this change in the balance of problem opioids less a result of absolute limits on heroin supply—instead this reflects the relative ease with which pharmaceutical opioids can be acquired.

In a closed economic system, constrain the supply of one value, and unmet demand will drive access to the other. Alternatively, free the availability of one, and demand for the other will decrease. NZ was successful in constraint of heroin supply to an unusual degree, probably as a result of favourable factors (island isolation, a small market place, effective enforcement, low corruption rates).7

In retrospect, it has become clear this had left the country with two choices: maintain the closed system by providing only pharmaceutical opioids—or shrink the closed system by also reducing access to pharmaceutical opioids for aberrant use.
In reality, a third, more defeating choice has been unwittingly taken—to expand the system by putting in more pharmaceutical opioids. Portenoy and Foley’s small case series of 38 patients with heterogeneous chronic pains was extrapolated in pain management environments to promote hitherto much greater use of opioids, in longer courses and in higher doses. Courses were longer in many cases through being no longer finite—for non-malignant pain.

Although globally it is possible to read a retraction on this “opioiphilic”-prescribing, New Zealand had already invited into its system supplies of new opioids—oxycodone, codeine combinations—while simultaneously increasing its morphine prescribing (PHARMAC, unpublished data).

The benefit of prolonged courses of opioids is not assured: chronic opioids clearly cause pain in some cases. What proportion of cases is worsened by opioids is unclear: it may be that we struggle to read the evidence against the superficial logic that if opioids are effective analgesics for acute pain, they provide analgesia in chronic conditions. The few weeks of temporary relief by raising the dose provides both doctor and patient with an instant fix, artificially reinforcing this belief if there is no sustained change in function.

Yet there is no ambiguity about the harms associated with increased availability of opioids. Without adequate supervision, more opioids are used aberrantly, either in attempts to extend the analgesic effect beyond medical safe limits, or recreationally. Most people that use opioids recreationally did not have to gain the prescription first-hand.

Pain opioid users frequently resent being categorised as opioid “addicts” but find they may come to share the same core qualities. With escalating and early prescriptions, the prescriber colludes in the dyscontrol. Pain anticipation combines with the on/off effect of shorter-acting opioids to foster debilitating, relentless salience.

There is no indication that this “pain” group has different treatment needs to the “addict” group; a prolonged period with long-acting opioids combined with case support still shows best effect, irrespective of the origin of the opioid. Increasingly chronic pain opioid users have to suffer referral to struggling opioid substitution services.

The new gateway drug to opioid dependence may be the cursorily prescribed opioids. Well-meaning but naïve iatrogenic opioid supply, whether prescribed for pain or dependence, will ensure the need for opioid substitution.

Unless we achieve more prevention of opioid dependence, by collectively addressing pharmaceutical supply, we can expect to keep the 40 year old that “needs to do better”.

Competing interests: I have been present at presentations by Roche and Reckitt Benckiser and importers of Ibogaine. Reckitt Benckiser (manufacturer of Suboxone) paid for travel and attendance to a Belgium opioid substitution conference.

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Māori-centred codes of ethics: championing inclusiveness in creating professional codes of ethics across the New Zealand health sector

Barry Smith

Outside of health research ethics, many health-related professional bodies also create ethical codes and standards to ‘guide’ the behaviour, not of ethics committees and researchers, but of health practitioners in their day-to-day professional practice. Traditionally, these guidelines focus on a single profession which does reduce the intriguing possibility of developing useful ‘trans-professional’ codes, for instance, one which might cover the work interface between doctors and nurses.

The article by Ben Gray in this issue of the Journal looks at an example of a single professional code in which he examines the case of the New Zealand Medical Association (NZMA). Here, Gray is critical of the insufficient emphasis placed on relational ethics as well as the lack of attention paid to culture. While I support the sentiments behind the article I would like to select four of Gray’s assertions for comment.

First, although the NZMA Code is undoubtedly shaped by a few key principles it is not as confined as the picture Gray paints in his abstract and introduction. Indeed there has been critical reflection around ‘principalism’ over recent years resulting in the inclusion of other principles into ethical statements. Thus, the NZMA document also recognises confidentiality, veracity, fidelity, guardianship of the environment and being professional as key components of its ethical framework. Hence, it is safe to say that we have moved on from the four principle structure which supports the notion that doctors knows best.

Secondly, the concept of autonomy is more complex than Gray suggests in that it only has meaning when individuals are seen to play out the reality of their lives within a culture, community and society. Gray’s understanding of autonomy, particularly with regards to ‘physician autonomy’ which he sees as something that removes a physician from community as well as from collaborative effort, is thus somewhat misleading. As it turns out, the NZMA Code actually refers to patient not physician autonomy, so I am little confused as to the point Gray is attempting to pursue here.

Thirdly, Gray’s views on the value of collaboration seem somewhat dated and, more critically, restrictive. The ‘patient code’ in early 1996 was already implying a link between collaborative work and an ability to serve the best interests of the patient. On top of this, the need for improved collaboration is also discussed in contemporary conversations about cultural engagement where a case is made for promoting institutional as well as individual cultural competence, along with recognising the value gained from fully functioning relationships that take place across professional boundaries. In addition, the latter form of collaboration sits comfortably with the idea that the health sector needs to improve its capacity and ability to work with other sectors before optimal improvements in health outcomes can be achieved.
Lastly, Gray appears to merge the concepts of cultural safety and cultural competence into a single notion. But, in New Zealand, doctors are governed (in terms of values, relationships, education and ethics) by the idea of cultural competence whereas nurses tend to build their thinking around the concept of cultural safety.

Cultural safety and cultural competence are distinct ideas with this divide having its origins in the nurses’ curriculum having given prominence to the work of Irihapiti Ramsden while trainee doctors are often exposed to the concept of cultural competence, partly in recognition of the multicultural makeup of the medical student body. This difference has resulted in ethical codes for nurses and doctors having quite a different focus and flavour.

Towards more inclusive codes

However, notwithstanding the reservations expressed above, I congratulate Dr Gray on submitting this article where I see it as providing an opportunity to reflect on just how the medical profession is attempting to engage with Māori cultural and ethical constructs while also acting as a catalyst for helping prompt discussion within this ethical space. To that end I am pleased to take the opportunity to make some broad observations about the use and function of concepts derived from Te Ao Māori (Māori world views) in codes of ethics. These thoughts foreshadow findings stemming from my Marsden Grant research which explores ethical tensions between health researchers and ethics committees generated out of a lack of understanding of changing Māori cultural contexts, interests and concerns.

I want to begin the conversation by asking; is it in the best interests of Māori health if all health research in New Zealand is seen to be relevant to Māori—the irony being that Māori-centred foci can be associated with the promotion of exclusionary relationships. An example of this process of marginalisation taken from health research and ethics review contexts rests on the uninformed perception that kaupapa Māori research is simply about activity by Māori for Māori which many see as leaving non-Māori out in the cold.

Does this matter? Very possibly if we wish to argue that ethical codes which are more inclusive and less prone to gate keeping have greater capacity to generate increased understanding and levels of respect because of the greater likelihood that engagement will be purposeful, well resourced and take place in a mutually agreed space. Moreover, if the aim of the exercise is to build more collaborative relationships and better cultural understanding whilst recognising, from a social justice perspective, the value of utilising Māori concepts and ways of thinking (matauranga Māori) in ethical conversations, then all relevant parties should be ‘at the table’ sharing equal power and influence.

The consequences of this arrangement will include an increased ability and capacity to establish and sustain trust, build capacity and, most importantly, generate much needed health benefits for Māori. These are all objectives that underpin kaupapa Māori research.

In the end, ethical codes should be seen to support and motivate New Zealand health professionals and researchers to address persistent health disparities between Māori and other populations.
In this aim, New Zealand might learn from the codes of practice used in Canada that give explicit instructions on collaboration and engagement in indigenous research contexts by describing those situations where there must be consultation and those where this is not required.

In Canada (under the ‘Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, 2nd Ed), the degree of engagement with First Nation and Inuit peoples for those required to consult has no equal in New Zealand. The research question, the research design and how the research will build capacity and produce benefits for the local community are addressed before the research ever takes place.

This explicit binary in the Canadian Code clearly lays out the challenge that where issues and conversations are relevant and deemed to be important by indigenous peoples then these must be fully incorporated into all codes and modes of practice. While the Canadian document focuses on relationships in research, the principles and approach being promoted will be equally relevant to the area of professional practice.

The critical message here is that when dealing with cultural constructs in ethical codes these should impact the whole exercise and not be seen merely as ‘add-ons’ or ideas incorporated into the mix in a paternalistic and perfunctory manner which has so often been the case in New Zealand.

As a health assessment panel member for the recent National Science Challenge process I became familiar with the Ministry of Business Innovation and Employment’s Vision Matauranga. The role of this innovative perspective on managing science activity was to remind panel members and researchers alike that Māori issues and interests must be placed at the centre of conversations and that these exchanges must be underpinned by the use of Māori concepts and world views. This type of thinking has relevance for professional ethical codes because it promotes the idea that it is important to establish systems and procedures that, in the words of the Vision Matauranga policy, unlock the “… potential of Māori knowledge, people and resources…”.

If one accepts the implications of both the Canadian Tri-Council Policy Statement and Vision Matauranga then greater authenticity, credibility, integrity and sense of purpose and direction could be attached to the inclusion of Māori ethical ideas in the development of professional ethical codes and guidelines. Moreover, it will be necessary to take the argument to the degree just described before any profession could seriously claim to be properly incorporating the positions expressed in enlightened conversations about the use of Māori ethical ideas and frameworks in codes of ethics. Such a stance moves past that implied in the article by Gray.

Ultimately for Māori, it is not just a case of being at the decision-making table, but that others also seriously engage in ethical conversations that impact on professional behaviour and research outcomes that are genuinely relevant to Māori interests, aspirations and wellbeing.
Competing interests: Nil.

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Self-rated health, health-related behaviours and medical conditions of Māori and non-Māori in advanced age: LiLACS NZ

Ruth Teh, Ngaire Kerse, Mere Kepa, Rob N Doughty, Simon Moyes, Janine Wiles, Carol Wham, Karen Hayman, Tim Wilkinson, Martin Connolly, Casey Mace, Lorna Dyall

Abstract

Aims To establish self-rated health, health related behaviours and health conditions of Māori and non-Māori in advanced age.

Method LiLACS NZ is a longitudinal study. A total of 421 Māori aged 80-90 years and 516 non-Māori aged 85 years living in the Bay of Plenty and Rotorua district were recruited at baseline (2010). Socioeconomic-demographic characteristics and health related behaviours were established using interviewer administered questionnaire. Self-rated health was obtained from the SF-12. Medical conditions were established from a combination of self-report, review of general practitioner and hospital discharge records, and analyses of fasting blood samples.

Results 61% Māori and 59% non-Māori rated their health from good to excellent. Eleven percent of Māori and 5% of non-Māori smoked; 23% Māori and 47% non-Māori had alcohol on ≥2 occasions per week. Physical activity was higher in Māori than non-Māori (p=0.035) and the relationship was attenuated when adjusted for age. More Māori (49%) than non-Māori (38%) were at high nutrition risk (p=0.005); and more non-Māori (73%) than Māori (59%) were driving (p<0.01). The three most common health conditions were hypertension (83%), eye diseases (58%) and coronary artery disease (44%). The health profile differed by gender and ethnicity. Overall, participants had a median of five health conditions.

Conclusion Self-rated health is high in this sample considering the number of comorbidities. There are differences in health behaviours and health conditions between genders and by ethnicity in advanced age. The significance of health conditions in men and women, Māori and non-Māori in advanced age will be examined longitudinally.

The population of New Zealand is ageing and will yield a unique mix of older Māori and non-Māori. The proportion aged 80 years and above is increasing more rapidly with the numbers of non-Māori predicted to increase from 151,000 to 210,630 and, for Māori, from 5,000 to 10,000 (from 0.7 to 1.3% of the Māori population) by 2026.1 The dependency ratio (ratio of the 65+ and children to those of working age) is projected to increase, suggesting that current services may not adequately funded by the available tax dollars in the future.2 However, older people make a valuable contribution to society, particularly Māori elders who play essential roles in cultural protocols, decision making and maintaining te reo Māori me ngā tikanga and mātauranga Māori – Māori knowledge.3
Health disparities related to ethnicity are described in detail for younger population groups for example disease specific mortality and cancer, diabetes and cardiovascular disease show adverse disparities in prevalence and outcomes for Māori. For older Māori, there is evidence of unmet need. However, there has not been a thorough examination of health behaviours and conditions in those aged 80 and above (advanced age). Although the exact profile of health conditions in the oldest age groups (age 85+) have been described in Newcastle and Leiden for mainly European populations, this has not been adequately outlined in New Zealand.

_Te Puāwaitanga O Ngā Tapuawae Kia Ora Tonu: Life and Living in Advanced Age_, a cohort study in New Zealand (LiLACS NZ) began in 2010 and is following Māori (aged between 80 and 90 years in 2010) and non-Māori (aged 85 years in 2010) to establish predictors of successful ageing. The aim of this paper is to describe the health behaviours, health conditions and self-rated health of Māori and non-Māori in advanced age.

**Methods**

**Background and study design**—LiLACS NZ is a longitudinal study of advanced age in New Zealand. The study began in 2010 using equal explanatory power sampling methodology as directed by Te Kūpenga Hauora Māori, University of Auckland. A comprehensive sampling strategy recruited 937 octogenarians living in Rotorua and the Bay of Plenty between March 2010 and April 2011. At baseline, the sample consisted of 421 Māori aged between 80 and 90 years (born in 1920-1930) and 516 non-Māori aged 85 years (born in 1925). The recruitment procedures and response rate have been reported, with the overall response rate being 57%. In brief, complete population inception cohorts were attempted for all age-eligible older adults in the defined geographic boundaries of the Bay of Plenty District Health Board (DHB) and the Lakes DHB (excluding the Taupo region).

Participants were identified from the electoral rolls (general and Māori), primary care and tribal databases, word of mouth, advertising; whakawhanaugatanga (to establish good relations with people), whakapapa and kōrero (relationships to the earth and oral narrative about the relationships). Potential participants were approached by someone they knew (mainly their general practitioner). Kaupapa Māori methods were used to ensure appropriate research methods with Māori. The study was approved by the Northern X Regional Ethics Committee (NXT 09/09/088) in 2009. Written informed consent was obtained from all the participants.

A comprehensive questionnaire was developed for the study and translated by Te Rōpū Kaitiaki o ngā tikanga Māori (The protectors of the principles of proper conduct in Māori research). The questionnaire was administered through a face-to-face interview by trained interviewers, and physical assessments were completed for those who consented to this part of the study, by research trained nurses. The general practitioners’ records were audited by practice and research staff and administrative hospitalisation discharge diagnosis records were obtained by National Health Index matching from the Ministry of Health. A brief questionnaire consisting of core questions was administered for those who were unable to manage the comprehensive questionnaire. Details of the study protocol and used to ascertain the selected 19 chronic conditions have been published previously.

**Measures**—Interviewer-administered questions yielded demographic information including education and main lifetime occupation of the participant or spouse. Occupation was coded using the “New Zealand Standard Classification of Occupations 1999”. The New Zealand Deprivation (NZ Dep) index, a measure of small area deprivation based on the participant’s address, was used as an indication of socioeconomic deprivation and was obtained from the Ministry of Health. Self-rated health was asked using the standard question: “In general, would you say your health is: excellent, very good, good, fair, poor”; and in a separate part of the questionnaire “In general, compared with other people your age, would you say your health is: excellent, very good, good, fair, poor”. This measure is a robust predictor of hospitalization, disease exacerbation and mortality for older people.
Driving status was established from the item on the Nottingham Extended Activities of Daily Living scale: “Do you drive a car?”. Smoking status was ascertained by the questions “Do you currently smoke cigarettes?; Have you ever smoked?”. Tobacco smoking was converted to pack-year history using standard methods. Alcohol use was asked using the first two items of the Alcohol Use Disorders Identification tool (AUDIT). Use of denture was established by a direct question “Do you wear dentures?”.

Nutrition risk was ascertained by the Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN II) and a cut off score of <49 identified those at high nutrition risk as validated in this age group. Hearing disability was asked using a modified question from the Cognitive Function and Ageing Studies: “How much does your hearing interfere with your day-to-day functioning?” Disability related to vision was asked using the question “Does your eyesight interfere with normal day-to-day functioning?” Pain was asked on a numerical scale of 0 (no pain) to 10 (worst pain), and dichotomized to no pain (0) or any pain (≥1).

Falls were assessed using the questions “How many times have you fallen in the last 12 months?” The response was dichotomized to 0 or ≥1. Urinary incontinence was asked with the question “Do you have a problem with losing control of urine when you don’t want to?” and if so the severity was gauged with a 4-level Likert scale from “no problem” to “severe problem”. The same question substituting “bowels” for “urine” was used to assess faecal incontinence.

The Geriatric Depression Scale (GDS) was used for assessment of depressive symptoms, and the Modified Mini-Mental Status score (3MS) expressed as both total score and the subscore for the mini-mental state examination (MMSE) were used to assess cognition. The score was adjusted for those with severe visual impairment who were unable to complete the visual parts and for those who were unable to write because of a limb disability. Physical activity was assessed using the Physical Activity Scale for the Elderly (PASE).

Grip strength was assessed using a Takei digital handgrip dynamometer–Grip D, which was attempted three times in each hand in a standing position and the best performance by either hand was reported. Gait speed was assessed using the timed 3-metre walk according to the protocol in the Short Physical Performance Battery and expressed in metres per second (m/s). Numbers of prescribed medications were ascertained by direct view of the pill bottles in the house and expressed as median number of medications (rather than pills per day).

The presence of chronic medical conditions was established from a combination of self-report, general practitioners’ record review, and reviews of hospital discharge record. In brief, cardiovascular diagnoses were asked in the interview as “Have you ever been told by a doctor that you have high blood pressure…”, “…heart attack”, “…angina stroke”, “…transient ischemic attack or mini-stroke”, “…congestive heart failure”, “…intermittent claudication (pain in the calves when walking)”, “…peripheral vascular disease”. These were validated against the GP medical records and the hospital discharge records.

Atrial fibrillation (AF) was established from a 12-lead electrocardiogram (ECG) and the hospital discharge record. ‘Any AF’ is either of the two sources being positive and current AF represents the ECG showing AF. “Have you ever been told by a doctor that you had” “…osteoarthritis” and “…arthritis, rheumatism or trouble with your joints” was asked and participants asked if it was osteoarthritis or rheumatoid arthritis.

Depression was asked “Have you ever been told by a doctor that you have had depression?” The remaining medical conditions were established using reviews of the GP and hospital medical records, with the exception of anaemia which was defined from full blood count, analysed the same day as the blood draw in a public laboratory using standardized procedure, as haemoglobin level <120 g/L for women and <130 g/L for men. Blood glucose was drawn as a fasting sample, frozen at -80ºC and then analysed in batches in a publically funded laboratory.

Number of chronic conditions was summed from the 19 possible diagnoses mentioned above and the participants’ hospitalisations were counted as any overnight hospital admission in the 12 months before date of enrolment and was determined from the national administrative records on hospitalisation.

**Statistical analysis**—The sample size aimed for in the inception cohorts was based on an estimation of 20% mortality over two years. With a sample of 500 we have estimated 80% power to detect a relative risk of 1.67 related to a score of <15 in the functional measure using the Nottingham Extended Activity of Daily Living scale (NEADL). Similarly 450 people was determined to be sufficient to detect a
relative risk of mortality of 1.6 related to a score of <50 using the nutrition screening tool SCREEN II. Two equal size Māori and non-Māori samples were attempted.29

Descriptive statistics are presented for all variables, frequency and percentages (%) of non-missing values for categorical data and mean (standard deviation, SD) for continuous variables with a normal distribution and median (25th, 75th percentile) for non-Gaussian distribution. For univariate analyses, parametric and non-parametric tests were used to determine the relationships with gender and ethnicity. Generalised linear models were used to examine the potential disparities in socioeconomic status and health behaviour between Māori and non-Māori.

Comparisons of medical conditions between men and women, Māori and non-Māori were adjusted for age, education, occupation and deprivation status (NZ Dep Index) using logistic or generalised linear regression (Poisson distribution) depending on the form of the outcome variable. Interaction between ethnicity and gender were examined by adding the interaction term [ethnicity*gender] in the regression models. Statistical analyses were performed with IBM SPSS version 19. A p-value of less than 0.05, two tailed test, was considered statistically significant.

Results

All the participants answered a core set of questions; 61% Māori (n=255) and 78% of non-Māori (n=403) completed the comprehensive interview.

In the Māori cohort of 421 participants, 176 (42%) were men and 245 (58%) women. The mean age at baseline was 82.8 (SD 2.8) years. Six-percent men and 11% of women had attained a tertiary education. More than half of the participants (60%) lived in areas of high deprivation (NZ Deprivation Index 8-10).

Table 1 shows the general health status of the Māori participants. More than half of this sample rated their health as good/very good/excellent and 59% were driving. About a third of the participants had a significant hearing impairment (31%), visual impairment (37%), had fallen in the past 12 months (34%), reported having experienced pain at the time of interview (36%) or had been admitted to hospital in the 12 months before study enrolment (40%). Three-quarters of the participants wore dentures, 49% were at high nutritional risk. The median number of prescribed medications was 5 (minimum 1, maximum 14).

Gender differences were noted in driving (more men were driving), smoking (more women never smoked and men had a greater pack year history), alcohol consumption (more men had alcohol on ≥2 occasions per week), cognitive function (more men had impairment), physical activity (men did more), grip strength (men were stronger) and hospital admission (more men were admitted to a hospital 12 months prior to study enrolment).

In the non-Māori cohort, 237 (46%) men and 279 (54%) women were recruited. A tertiary level of education was attained by 11% of women and 16% of men. Participants were spread about equally between low, medium and high deprivation areas.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Total, n=421</th>
<th>Men, n=176</th>
<th>Women, n=245</th>
<th>P values</th>
</tr>
</thead>
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<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>115 (28%)</td>
<td>56 (33%)</td>
<td>59 (25%)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>237 (59%)</td>
<td>99 (58%)</td>
<td>138 (59%)</td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>17 (4%)</td>
<td>5 (3%)</td>
<td>12 (5%)</td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>37 (9%)</td>
<td>10 (6%)</td>
<td>27 (11%)</td>
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<tr>
<td><strong>Main occupation</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Legislators, administrators, professionals,</td>
<td>109 (26%)</td>
<td>47 (27%)</td>
<td>62 (25%)</td>
<td>0.480</td>
</tr>
<tr>
<td>agricultural and fishery workers</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Technicians, associate professionals and</td>
<td>45 (11%)</td>
<td>15 (9%)</td>
<td>30 (12%)</td>
<td></td>
</tr>
<tr>
<td>trades workers</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Clerks, service workers, sales workers,</td>
<td>266 (63%)</td>
<td>114 (65%)</td>
<td>152 (62%)</td>
<td></td>
</tr>
<tr>
<td>plant/machine operators, assemblers,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>elementary workers</td>
<td></td>
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<tr>
<td><strong>Deprivation, NZDep score</strong></td>
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<tr>
<td>1–4 (low)</td>
<td>60 (14%)</td>
<td>19 (11%)</td>
<td>41 (17%)</td>
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<tr>
<td>5–7 (medium)</td>
<td>109 (26%)</td>
<td>53 (30%)</td>
<td>56 (23%)</td>
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</tr>
<tr>
<td>8–10 (high)</td>
<td>251 (60%)</td>
<td>104 (59%)</td>
<td>147 (60%)</td>
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</tr>
<tr>
<td><strong>Self-rated health, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>15 (4%)</td>
<td>5 (3%)</td>
<td>10 (4%)</td>
<td>0.151</td>
</tr>
<tr>
<td>Very good</td>
<td>82 (20%)</td>
<td>43 (25%)</td>
<td>39 (16%)</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>151 (37%)</td>
<td>56 (32%)</td>
<td>95 (40%)</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>129 (31%)</td>
<td>57 (33%)</td>
<td>72 (30%)</td>
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</tr>
<tr>
<td>Poor</td>
<td>35 (8%)</td>
<td>12 (7%)</td>
<td>23 (10%)</td>
<td></td>
</tr>
<tr>
<td><strong>Self-rated health compared to same age, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>39 (15%)</td>
<td>17 (11%)</td>
<td>22 (14%)</td>
<td>0.636</td>
</tr>
<tr>
<td>Very good</td>
<td>101 (39%)</td>
<td>35 (24%)</td>
<td>66 (43%)</td>
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</tr>
<tr>
<td>Good</td>
<td>86 (33%)</td>
<td>37 (26%)</td>
<td>49 (22%)</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>29 (11%)</td>
<td>12 (7%)</td>
<td>17 (7%)</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>3 (1%)</td>
<td>2 (1%)</td>
<td>1 (1%)</td>
<td></td>
</tr>
<tr>
<td><strong>Driving, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently</td>
<td>148 (59%)</td>
<td>73 (46%)</td>
<td>75 (37%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Stop driving &lt;12 months ago</td>
<td>7 (3%)</td>
<td>4 (2%)</td>
<td>3 (2%)</td>
<td></td>
</tr>
<tr>
<td>Stop driving &gt;12 months ago</td>
<td>67 (27%)</td>
<td>19 (12%)</td>
<td>48 (20%)</td>
<td></td>
</tr>
<tr>
<td>Never drove</td>
<td>29 (12%)</td>
<td>3 (2%)</td>
<td>26 (11%)</td>
<td></td>
</tr>
<tr>
<td><strong>Smoking, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>177 (43%)</td>
<td>57 (33%)</td>
<td>120 (51%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Past</td>
<td>188 (46%)</td>
<td>101 (59%)</td>
<td>87 (37%)</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>43 (11%)</td>
<td>14 (8%)</td>
<td>29 (12%)</td>
<td></td>
</tr>
<tr>
<td>Pack year history, mean (SD)</td>
<td>9.3 (13.9)</td>
<td>11.5 (14.3)</td>
<td>7.9 (13.4)**</td>
<td>0.006</td>
</tr>
<tr>
<td><strong>Alcohol, n (%)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Monthly or less</td>
<td>61 (24%)</td>
<td>22 (22%)</td>
<td>39 (25%)</td>
<td>0.002</td>
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<tr>
<td>2–4 times Monthly</td>
<td>16 (6%)</td>
<td>6 (6%)</td>
<td>10 (7%)</td>
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</tr>
<tr>
<td>≥2 times/week</td>
<td>57 (23%)</td>
<td>35 (35%)</td>
<td>22 (14%)</td>
<td></td>
</tr>
<tr>
<td><strong>Dentures (upper, lower, full mouth, partial), n (%)</strong></td>
<td>191 (76%)</td>
<td>69 (69%)</td>
<td>122 (79%)</td>
<td>0.177</td>
</tr>
<tr>
<td>At high nutrition risk *, n (%)</td>
<td>126 (49%)</td>
<td>42 (42%)</td>
<td>84 (46%)</td>
<td>0.057</td>
</tr>
<tr>
<td>Hearing impairment *, n (%)</td>
<td>128 (31%)</td>
<td>65 (38%)</td>
<td>63 (26%)</td>
<td>0.011</td>
</tr>
<tr>
<td>Visual impairment, n (%)</td>
<td>150 (37%)</td>
<td>63 (37%)</td>
<td>87 (36%)</td>
<td>0.927</td>
</tr>
<tr>
<td>Pain, n (%)</td>
<td>81 (36%)</td>
<td>25 (30%)</td>
<td>56 (40%)</td>
<td>0.123</td>
</tr>
<tr>
<td>Fall in the past 12 months (≥ once), n (%)</td>
<td>138 (34%)</td>
<td>56 (33%)</td>
<td>82 (35%)</td>
<td>0.645</td>
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<tr>
<td>Urinary incontinence, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild problem</td>
<td>55 (22%)</td>
<td>16 (16%)</td>
<td>39 (26%)</td>
<td></td>
</tr>
<tr>
<td>Moderate problem</td>
<td>19 (8%)</td>
<td>10 (10%)</td>
<td>9 (6%)</td>
<td>0.190</td>
</tr>
<tr>
<td>Severe problem</td>
<td>4 (2%)</td>
<td>1 (1%)</td>
<td>3 (2%)</td>
<td></td>
</tr>
<tr>
<td>Bowel incontinence, n (%)</td>
<td>23 (9%)</td>
<td>9 (9%)</td>
<td>14 (9%)</td>
<td>0.935</td>
</tr>
<tr>
<td>Depressive symptomatology GDS≥8</td>
<td>7 (3%)</td>
<td>3 (3%)</td>
<td>4 (3%)</td>
<td>1.000</td>
</tr>
<tr>
<td>Depressive symptomatology GDS≥5</td>
<td>38 (15%)</td>
<td>15 (15%)</td>
<td>23 (15%)</td>
<td>0.989</td>
</tr>
<tr>
<td>Cognitive impairment, MMSE&lt;24</td>
<td>40 (15%)</td>
<td>23 (21%)</td>
<td>17 (11%)</td>
<td>0.017</td>
</tr>
<tr>
<td>Physical activity (PASE score), median</td>
<td>95 (51, 158)</td>
<td>113 (53, 194)</td>
<td>89 (50, 133)</td>
<td>0.013</td>
</tr>
</tbody>
</table>

NZMJ 4 July 2014, Vol 127 No 1397; ISSN 1175 8716 Page 17 of 110
URL: http://journal.nzma.org.nz/journal/127-1397/6201/ ©NZMA
Variables | Total, n=421 | Men, n=176 | Women, n=245 | P values
--- | --- | --- | --- | ---
Grip strength (kg), mean (SD) | 24.4 (8.1) | 30.8 (6.9) | 19.8 (5.2) | <0.01
Gait speed (m/s), mean (SD) | 0.7 (0.3) | 0.7 (0.3) | 0.7 (0.4) | 0.444
Number of prescribed medications, median (min, max) | 5 (0, 14) | 4 (0, 14) | 5 (0, 14) | 0.548
Hospital admission 12 months prior | 148 (40%) | 76 (47%) | 72 (34%) | 0.009

P values from univariate analyses

*Nutrition risk is defined as SCREEN II<49

b Those who reported “moderately”, “very” or “Extremely” to the question “How much does your hearing interfere with normal day-to-day functioning”

GDS = Geriatric Depression Scale; MMSE = Modified Mini Mental State Examination; PASE = Physical Activity Scale for the Elderly; kg = kilogram; SD = standard deviation.

More than half of the non-Māori participants rated their health as very good to excellent and 73% were still driving a car (Table 2). About a quarter reported having experienced pain at the time of interview (26%) and 40% had fallen in the past 12 months. About half (47%) of this sample had alcohol at least twice a week, 38% were at high nutrition risk and 35% had been admitted to the hospital in the previous 12 months prior to enrolment to the study. Similar to the Māori sample, three quarters of non-Māori wore dentures and the median number of prescribed medications was 5 (minimum 1, maximum 18).

Gender differences were noted in driving (more men), smoking (more women reported never smoking and men had a higher pack year history), alcohol (more men took alcohol), high nutrition risk (more women), hearing impairment (more men), pain (more women), bowel incontinence (more women), physical activity (men were more active), grip strength (men were stronger) and gait speed (men were faster).

To examine potential disparities in socioeconomic status and health behaviour related determinants of health, comparisons were made between Māori and non-Māori using generalised linear regression models after adjusting for age, education, occupation, and NZ Dep Index. The key findings were that:

- Educational status differed between ethnicities, more non-Māori achieved a tertiary education (68, 13%) than Māori 37 (9%), p<0.01;
- Occupational group status was higher for non-Māori, 109 (26%) of Māori and 200 (39%) of non-Māori were in the group of legislators, administrators, professionals, agriculture and fisheries workers, p<0.01;
- More Māori lived in areas of high deprivation, 251 (60%) of Māori vs. 179 (35%) of non-Māori p<0.01;
- Māori had a high pack year history of smoking, 9.3 (sd 13.9) for Māori vs. 6.6 (sd 10.6) for non-Māori, p < 0.01;
- Māori drank alcohol less frequently, 57 (23%) Māori vs. 187 (47%) non-Māori took alcohol at least 2 times per week respectively p =0.01;
- Māori were not at a higher nutrition risk, 126 (49%) Māori vs. 153 (38%) non-Māori, p=0.73 when the differing proportions of each gender was taken into account;
Māori were not more physically active, PASE score for Māori median 95 vs. 89 for non-Māori, \( p=0.29 \) when the differing proportions of each gender was taken into account.

Interactions between gender and ethnicity were noted for smoking and physical activity.

### Table 2. General health status of non-Māori participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total n=516</th>
<th>Men n=237</th>
<th>Women n=279</th>
<th>( P ) values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>83 (16%)</td>
<td>44 (19%)</td>
<td>39 (14%)</td>
<td>0.710</td>
</tr>
<tr>
<td>Secondary</td>
<td>295 (58%)</td>
<td>125 (54%)</td>
<td>170 (62%)</td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>60 (12%)</td>
<td>26 (11%)</td>
<td>34 (13%)</td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>68 (13%)</td>
<td>38 (16%)</td>
<td>30 (11%)</td>
<td></td>
</tr>
<tr>
<td><strong>Main occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legislators, administrators, professionals,</td>
<td>200 (39%)</td>
<td>93 (39%)</td>
<td>107 (39%)</td>
<td>0.891</td>
</tr>
<tr>
<td>agricultural and fishery workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technicians, associate professionals and trades</td>
<td>87 (17%)</td>
<td>38 (16%)</td>
<td>49 (18%)</td>
<td></td>
</tr>
<tr>
<td>workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clerks, service workers, sales workers,</td>
<td>228 (44%)</td>
<td>106 (45%)</td>
<td>122 (44%)</td>
<td></td>
</tr>
<tr>
<td>plant/machine operators, assemblers, elementary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Deprivation, NZDep score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–4 (low)</td>
<td>129 (25%)</td>
<td>60 (25%)</td>
<td>69 (25%)</td>
<td>0.691</td>
</tr>
<tr>
<td>5–7 (medium)</td>
<td>208 (40%)</td>
<td>91 (38%)</td>
<td>117 (42%)</td>
<td></td>
</tr>
<tr>
<td>8–10 (high)</td>
<td>179 (35%)</td>
<td>86 (36%)</td>
<td>93 (33%)</td>
<td></td>
</tr>
<tr>
<td><strong>Self-rated health, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>21 (4%)</td>
<td>13 (6%)</td>
<td>8 (3%)</td>
<td>0.144</td>
</tr>
<tr>
<td>Very good</td>
<td>96 (19%)</td>
<td>36 (15%)</td>
<td>60 (22%)</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>184 (36%)</td>
<td>93 (40%)</td>
<td>91 (33%)</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>174 (34%)</td>
<td>76 (32%)</td>
<td>98 (36%)</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>36 (7%)</td>
<td>17 (7%)</td>
<td>19 (7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Self-rated health compared to same age, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>70 (18%)</td>
<td>38 (20%)</td>
<td>32 (15%)</td>
<td>0.455</td>
</tr>
<tr>
<td>Very good</td>
<td>158 (40%)</td>
<td>73 (39%)</td>
<td>85 (40%)</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>111 (28%)</td>
<td>53 (28%)</td>
<td>58 (28%)</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>49 (12%)</td>
<td>18 (10%)</td>
<td>31 (15%)</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>9 (2%)</td>
<td>4 (2%)</td>
<td>5 (2%)</td>
<td></td>
</tr>
<tr>
<td><strong>Driving, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently</td>
<td>287 (73%)</td>
<td>154 (82%)</td>
<td>133 (64%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Stop driving &lt;12 months ago</td>
<td>20 (5%)</td>
<td>10 (4%)</td>
<td>10 (5%)</td>
<td></td>
</tr>
<tr>
<td>Stop driving &gt;12 months ago</td>
<td>73 (18%)</td>
<td>23 (12%)</td>
<td>50 (24%)</td>
<td></td>
</tr>
<tr>
<td>Never drove</td>
<td>16 (4%)</td>
<td>1 (1%)</td>
<td>15 (7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Smoking, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly or less</td>
<td>59 (15%)</td>
<td>13 (7%)</td>
<td>46 (22%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>2–4 times Monthly</td>
<td>49 (12%)</td>
<td>22 (12%)</td>
<td>27 (13%)</td>
<td></td>
</tr>
<tr>
<td>≥2 times/week</td>
<td>187 (47%)</td>
<td>120 (63%)</td>
<td>67 (32%)</td>
<td></td>
</tr>
<tr>
<td><strong>Dentures (upper, lower, full mouth, partial), n (%)</strong></td>
<td>309 (77%)</td>
<td>139 (74%)</td>
<td>170 (81%)</td>
<td>0.114</td>
</tr>
<tr>
<td>At high nutrition risk(^a)</td>
<td>153 (38%)</td>
<td>50 (27%)</td>
<td>103 (49%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td><strong>Hearing impairment(^b), n (%)</strong></td>
<td>133 (26%)</td>
<td>75 (32%)</td>
<td>58 (21%)</td>
<td>0.005</td>
</tr>
<tr>
<td><strong>Visual impairment, n (%)</strong></td>
<td>147 (29%)</td>
<td>65 (28%)</td>
<td>82 (30%)</td>
<td>0.594</td>
</tr>
<tr>
<td><strong>Pain, n (%)</strong></td>
<td>89 (26%)</td>
<td>29 (19%)</td>
<td>60 (32%)</td>
<td>0.011</td>
</tr>
<tr>
<td>Fall in the past 12 months (≥ once), n (%)</td>
<td>205 (40%)</td>
<td>90 (38%)</td>
<td>115 (42%)</td>
<td>0.459</td>
</tr>
<tr>
<td><strong>Urinary incontinence, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 shows the prevalence of common chronic medical conditions in Maori and non-Māori. Hypertension was the most common condition. When cases of hypertension were limited to those identified only from the medical records, 72% of Māori and 66% of non-Māori had hypertension. Cardiovascular disease was present in 66-68% of all participants. The next most prevalent conditions observed in the sample were eye disease (49% in Māori and 66% in non-Māori and then coronary artery disease (Māori 46%, non-Māori 42%).

Congestive heart failure, atrial fibrillation, diabetes, asthma or chronic lung disease and dementia were more prevalent in Māori men, whereas eye disease, osteoarthritis and cancer were more prevalent in non-Māori men. Diabetes was also more prevalent in Māori women than non-Māori women and eye disease, osteoarthritis and cancer were more prevalent in non-Māori women than Māori women. In women, we observed a higher proportion of rheumatoid arthritis in Māori and thyroid disease in non-Māori.

Differences by gender were noted with more women having hypertension, cerebrovascular accidents, eye disease, arthritis, osteoporosis and thyroid disease, whereas men were more likely to have coronary artery disease, peripheral vascular disease, atrial fibrillation, anaemia, cancer and Parkinson disease. Overall participants had a median of 5 conditions and 19 participants had none of the identified conditions.

Ethnic disparities in medical conditions were present with Māori being more likely to have congestive heart failure, atrial fibrillation, asthma/chronic lung disease, diabetes, rheumatoid arthritis and dementia. Non-Māori were more likely to have eye disease, osteoarthritis, cancer and thyroid disease.
Table 3. Medical conditions and hospitalisations in Māori and non-Māori in LiLACS NZ

<table>
<thead>
<tr>
<th>Variables</th>
<th>Men</th>
<th>Non-Maori</th>
<th>Women</th>
<th>Non-Maori</th>
<th>OR (95% CI) Gender (Ref: Men)</th>
<th>OR (95% CI) Ethnicity (Ref: Māori)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>138 (78%)</td>
<td>188 (79%)</td>
<td>215 (88%)</td>
<td>238 (85%)</td>
<td>1.88 (1.31–2.71)</td>
<td>0.82 (0.54–1.25)</td>
</tr>
<tr>
<td>Any clinical evident CVD</td>
<td>119 (68%)</td>
<td>158 (67%)</td>
<td>160 (66%)</td>
<td>169 (61%)</td>
<td>0.87 (0.66–1.14)</td>
<td>0.87 (0.62–1.20)</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>88 (50%)</td>
<td>110 (46%)</td>
<td>105 (43%)</td>
<td>106 (38%)</td>
<td>0.73 (0.56–0.96)</td>
<td>0.83 (0.61–1.14)</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>63 (36%)</td>
<td>48 (20%)**</td>
<td>65 (27%)</td>
<td>60 (22%)</td>
<td>0.82 (0.61–1.12)</td>
<td><strong>0.58 (0.41–0.82)</strong></td>
</tr>
<tr>
<td>Cerebrovascular accident</td>
<td>34 (19%)</td>
<td>57 (24%)</td>
<td>66 (27%)</td>
<td>79 (28%)</td>
<td><strong>1.41 (1.04–1.92)</strong></td>
<td>1.23 (0.86–1.76)</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>30 (17%)</td>
<td>41 (17%)</td>
<td>35 (15%)</td>
<td>27 (10%)</td>
<td><strong>0.67 (0.46–0.98)</strong></td>
<td>0.96 (0.52–1.49)</td>
</tr>
<tr>
<td>Any AF</td>
<td>58 (35%)</td>
<td>51 (22%)**</td>
<td>62 (27%)</td>
<td>54 (20%)</td>
<td>0.80 (0.59–1.09)</td>
<td><strong>0.62 (0.43–0.89)</strong></td>
</tr>
<tr>
<td>AF on ECG</td>
<td>28 (27%)</td>
<td>27 (15%)*</td>
<td>23 (16%)</td>
<td>21 (11%)</td>
<td><strong>0.61 (0.39–0.94)</strong></td>
<td><strong>0.56 (0.32–0.96)</strong></td>
</tr>
<tr>
<td>Eye disease</td>
<td>70 (41%)</td>
<td>151 (65%)**</td>
<td>132 (55%)</td>
<td>186 (68%)**</td>
<td><strong>1.52 (1.14–2.02)</strong></td>
<td><strong>1.62 (1.17–2.25)</strong></td>
</tr>
<tr>
<td>Asthma or chronic lung disease</td>
<td>62 (36%)</td>
<td>57 (24%)**</td>
<td>78 (34%)</td>
<td>77 (29%)</td>
<td><strong>1.29 (0.95–1.76)</strong></td>
<td><strong>0.64 (0.45–0.89)</strong></td>
</tr>
<tr>
<td>Type II diabetes</td>
<td>49 (28%)</td>
<td>40 (17%)**</td>
<td>73 (31%)</td>
<td>41 (15%)**</td>
<td>1.04 (0.75–1.45)</td>
<td><strong>0.53 (0.36–0.78)</strong></td>
</tr>
<tr>
<td>Blood glucose ≥7.0 mmol/L</td>
<td>12 (13%)</td>
<td>7 (4%)*</td>
<td>15 (13%)</td>
<td>10 (6%)*</td>
<td>1.11 (0.59–2.10)</td>
<td><strong>0.37 (0.17–0.82)</strong></td>
</tr>
<tr>
<td>Any arthritis</td>
<td>50 (30%)</td>
<td>93 (40%)*</td>
<td>96 (43%)</td>
<td>124 (46%)</td>
<td><strong>1.49 (1.12–1.97)</strong></td>
<td>1.29 (0.93–1.79)</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>38 (23%)</td>
<td>85 (36%)**</td>
<td>75 (33%)</td>
<td>115 (43%)*</td>
<td><strong>1.44 (1.08–1.92)</strong></td>
<td><strong>1.63 (1.16–2.29)</strong></td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>22 (13%)</td>
<td>21 (9%)</td>
<td>50 (22%)</td>
<td>31 (12%)**</td>
<td><strong>1.62 (1.07–2.43)</strong></td>
<td><strong>0.59 (0.37–0.93)</strong></td>
</tr>
<tr>
<td>Depression</td>
<td>38 (22%)</td>
<td>54 (23%)</td>
<td>71 (30%)</td>
<td>71 (26%)</td>
<td>1.34 (0.98–1.83)</td>
<td>1.19 (0.82–1.71)</td>
</tr>
<tr>
<td>Anaemia</td>
<td>30 (33%)</td>
<td>50 (28%)</td>
<td>15 (13%)</td>
<td>25 (14%)</td>
<td><strong>0.36 (0.23–0.56)</strong></td>
<td>0.84 (0.49–1.44)</td>
</tr>
<tr>
<td>Cancer</td>
<td>36 (21%)</td>
<td>132 (56%)**</td>
<td>41 (18%)</td>
<td>112 (42%)**</td>
<td><strong>0.59 (0.44–0.79)</strong></td>
<td><strong>3.78 (2.62–5.47)</strong></td>
</tr>
<tr>
<td>Skin cancer</td>
<td>31 (18%)</td>
<td>114 (49%)**</td>
<td>36 (16%)</td>
<td>87 (32%)**</td>
<td><strong>0.57 (0.42–0.77)</strong></td>
<td><strong>3.26 (2.21–4.80)</strong></td>
</tr>
<tr>
<td>Melanoma</td>
<td>2 (1%)</td>
<td>18 (8%)**</td>
<td>1 (0.4%)</td>
<td>13 (5%)**</td>
<td>0.50 (0.24–1.03)</td>
<td><strong>9.34 (2.23–39.03)</strong></td>
</tr>
<tr>
<td>Non–skin cancer</td>
<td>26 (15%)</td>
<td>120 (51%)**</td>
<td>33 (15%)</td>
<td>104 (39%)**</td>
<td><strong>0.63 (0.46–0.86)</strong></td>
<td><strong>4.55 (3.05–6.68)</strong></td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>11 (6%)</td>
<td>17 (7%)</td>
<td>53 (23%)</td>
<td>89 (33%)*</td>
<td><strong>5.37 (3.48–8.31)</strong></td>
<td>1.33 (0.87–2.03)</td>
</tr>
<tr>
<td>Dementia *</td>
<td>31 (18%)</td>
<td>22 (9%)**</td>
<td>33 (15%)</td>
<td>25 (9%)</td>
<td>0.97 (0.63–1.49)</td>
<td><strong>0.59 (0.37–0.95)</strong></td>
</tr>
<tr>
<td>Variables</td>
<td>Māori</td>
<td>Men</td>
<td>Non-Maori</td>
<td>Women</td>
<td>Non-Maori</td>
<td>OR (95% CI)(^\dagger) Gender (Ref: Men)</td>
</tr>
<tr>
<td>-------------------------------------------</td>
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<td>------</td>
<td>-----------</td>
<td>-------</td>
<td>-----------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Renal impairment (^b)</td>
<td>1 (1%)</td>
<td>2 (1%)</td>
<td>3 (3%)</td>
<td>2 (1%)</td>
<td>1.61 (0.37–6.99)</td>
<td></td>
</tr>
<tr>
<td>Parkinson disease</td>
<td>2 (1%)</td>
<td>9 (4%)</td>
<td>0 (0%)</td>
<td>3 (1%)</td>
<td>(0.15 (0.03–0.69))</td>
<td></td>
</tr>
<tr>
<td>Thyroid disease</td>
<td>5 (3%)</td>
<td>7 (3%)</td>
<td>10 (4%)</td>
<td>31 (12%)**</td>
<td>(3.01 (1.55–5.86))</td>
<td></td>
</tr>
<tr>
<td>Chronic conditions, median (min, max)</td>
<td>5 (0, 13)</td>
<td>5 (0, 12)</td>
<td>5 (0, 12)</td>
<td>5 (0, 12)</td>
<td>0.04 (-0.02–0.10)</td>
<td></td>
</tr>
</tbody>
</table>

Chi-squared test \(*p<0.05, \ **p <0.01,
\(^a\)Dementia from the GP record, NZHIS and adjusted 3MS for vision impairment <75.
\(^b\)Renal impairment from estimated glomerular filtration rate <30 mL/min/1.73 m\(^2\).
We found no interaction between ethnicity and gender; interaction term [ethnicity\(\times\)gender] with all outcome measures \(p>0.05\).
\(^c\)Controlled for ethnicity, age, education, occupation, and NZ Dep Index using regression techniques.
\(^\ddagger\)Controlled for gender, age, education, occupation, and NZ Dep Index using regression techniques.
\(^\ddagger\)Controlled for gender, age, education, occupation, and NZ Dep Index using regression techniques.
\(^\ddagger\)Controlled for ethnicity, age, education, occupation, and NZ Dep Index, smoking status using regression techniques.

\(\dagger\)Controlled for gender, age, education, occupation, and NZ Dep Index, smoking status using regression techniques.
Discussion

The main findings are that both Māori and non-Māori have high self-rated health but health behaviours and health conditions differ by ethnicity and gender.

One in five Māori and non-Māori reported “excellent” for the general self-rated health question and 40% reported “excellent” for health considering your own health compared with others your own age. This is better than the Newcastle 85+\(^{10}\) where 11% of their sample rated their health as “excellent” compared with others the same age.

Self-rated health is a very salient health outcomes\(^{19}\) and generally declines with age,\(^{34}\) however when compared with “others your age”, very old people tend to rate themselves better than their peers,\(^{30}\) and view of one’s own health tend to be stable over time.\(^{30}\) The impact of each accumulated disease on self-rated health tends to be less incremental in those in advanced age compare with the younger old,\(^{31}\) thus reaching advanced age may mean well-being, as reflected in self-related health, is relatively robust despite multiple morbidities. However, careful comparison of outcomes over time is needed to confirm this and the differences may be due to sampling bias.

Health behaviours—In this study, smoking was more common over the life-course for Māori than non-Māori, and there was a corresponding disparity in respiratory disease. Potentially marked differences in outcomes from respiratory disease observed in other studies\(^{32}\) were also observed in our study.

Older people are at particular risk from poor nutrition,\(^{33}\) and this risk may increase with advanced age. In our sample, two-fifths were at risk of undernutrition. The ability to drive plays a role in accessibility to a variety of foods, particularly in rural areas. Our results suggest most Māori and non-Māori in advanced age continue to drive, probably reflecting the regionalisation of the NZ population and our sampling frame which included large areas with no public transport, thus the need to drive to maintain independence.\(^{34}\) In the univariate analyses, we observed fewer Māori continue to drive and more of them were at high nutrition risk. Factors related to nutrition risk will be examined further.

All people over age 85 years are at increased CVD risk.\(^{35}\) Our study found that Māori were undertaking more physical activity than non-Māori and also drink less alcohol. Both of these health behaviours should protect them from ongoing cardiovascular events. The ongoing observation of cardiovascular events will allow estimation of the contribution of health behaviours to CVD risk in this age group.

Physical function and health conditions—In LiLACS NZ, both Māori and non-Māori have a higher grip strength compared with international studies; we found 30.8 kg for Māori men and 30.3 kg for non-Māori men compared with 27.5 kg for men; and 19.8 kg for Māori women and 18.5 kg for non-Māori women compared with 16.0 kg for women ascertained in a systematic review of the 85 year olds.\(^{36}\) Gait speeds observed in our study are modest. A gait speed of less than 0.8 m/s is considered to highlight significant risk from poor health outcomes\(^{37}\) and the mean for Māori was below this speed and for non-Māori it is about the same.
Falls were prevalent with 34% of Māori and 40% of non-Māori falling in the prior year. This is similar to the Newcastle 85+ study where 38% fell. This is higher than the expected 30% predicted for people aged 65+. Our findings suggest that those in advanced age are at increased risk from poor health outcomes thus impacting overall function.

More than four-fifths of the sample was found to have hypertension. This is higher than observed in the Leiden 85+ and Newcastle 85+ (58%) studies. There were different definitions and methods used in these studies and the definition of hypertension has changed over the last two decades. When we used similar definitions from the Leiden 85+ and Newcastle 85+ studies, the prevalence of hypertension in LiLACS NZ was still higher (79% in Māori; 70% in non-Māori). The optimal SBP for older group beyond 85 years of age is yet to be determined. In the Umea 85+ study, lower SBP was found to be associated with risk of mortality. In a subsample of the Leiden 85+ study it was found that a low SBP was associated with low cardiac output meaning impaired cardiac performance. The health outcomes related to the level of hypertension (systolic BP 140mmHg vs. 160mmHg) will be examined longitudinally.

One in five of the LiLACS NZ participants were anaemic; twice as prevalent in men as in women. In adults aged 65+ living in the community, the prevalence of anaemia is 14% to 15% and increases to about 20%-25% in those aged 85 and above. The Leiden 85+ study findings suggest that the excess anaemia in men was in part due to folate deficiency.

We seek to examine cardiac size and function in these cohorts. The differences between Māori and non-Māori in congestive heart failure and potentially atrial fibrillation means that examination of the left ventricular function and the atrial size and function are critical to informing clinical management of cardiac diagnoses and symptoms in advanced age. The Newcastle 85+ echocardiographic study showed that there was a high prevalence of undiagnosed cardiac abnormalities and without detailed examination and follow up the significance of these findings is unknown.

**Gender and ethnic disparities**—For both health behaviours and health conditions, there were differences between genders and ethnicity. For both Māori and non-Māori, more men than women reported that they had smoked, drank alcohol more frequently but had higher physical activity. The risk of under nutrition was more prevalent in non-Māori women than men.

This study shows persistent differences between Māori and non-Māori for diabetes and congestive heart failure which are not only statistically but might be clinically significant. Diabetes is an important predictor of early mortality even in old age and differences are noted at all ages in New Zealand. Our study suggests that attention to diabetes will continue to be important for Māori throughout the life-course. There were greater prevalence of atrial fibrillation and congestive heart failure for Māori. Atrial fibrillation in this age group can be a significant contributor to congestive heart failure.

New Zealand research suggests a higher prevalence of CVD has been observed for Māori younger than 80 years old, contrasting with our finding of equal prevalence in CVD. It is possible that the marked differences in CVD and CVD outcome observed
between Māori and non-Māori of middle age may attenuate in advanced age, but further follow up and more studies are needed to be certain.

We found rheumatoid arthritis to be more common among Māori and osteoarthritis to be more common among non-Māori with the highest prevalence of any arthritis to be 43% among non-Māori women. The morbidity associated with arthritis is well described but is less than the prevalence of 69% for women and 58% for men in the Newcastle 85+ study. Occupational, activity and dietary patterns between Newcastle UK and New Zealand may differ in part potentially explaining this difference.

The differences in prevalence of conditions underline the need for an individualised approach to health management with differing emphases for men and women, Māori and non-Māori in older age groups.

It is known that poorer health outcomes are associated with social and economic deprivation. Lower education, occupational status and neighbourhood deprivation for Māori underlie the impact of colonization and unfair opportunities for this age group over the last decades. This cohort of octogenarians Māori had documented limited access to health services as they grew up and has had a lifetime of inequalities in health services access, delivery and outcomes. Although the 1938 Social Security Act enabled access to publicly funded health care for Māori, this cohort was already in their teens by then. If these inequalities had been addressed earlier in life, health disparities now may not have been as marked. Overall disparities for Māori observed here may reflect the life-course of Māori and we acknowledge the legacy of a life time of disparities. The ongoing observations of LiLACS NZ will seek to quantify the impact of disparities on health outcomes.

Limitations—This study is limited by the response rate of less than 60%. However, the age distributions for Māori and gender distribution for Māori and non-Māori who participated are the same as the underlying target populations. Generalisation of the health patterns observed here may not be appropriate outside the Bay of Plenty region for Māori. There is a diversity of tribal identification by Māori participants in the study demonstrating that they have wide whakapapa (genealogical connections) across the country. Diagnostic accuracy may be in doubt for some diagnoses as self-report may be influenced by other socioeconomic and health factors in advanced age.

Future work is planned to focus on the outcomes related to these patterns of health behaviours and chronic conditions. CVD risk and outcomes over time will be a main focus as little is known about the utility of aggressive or conservative treatment in this age group. The prevalence of hypertension is such that most of the participants receiving some CVD medications and management patterns and outcomes over time will be examined.

Conclusion

Differences in socioeconomic status and chronic condition patterns are observed for Māori, compared with non-Māori in advanced age. Self-rated health is high for Māori and non-Māori, especially considering comorbidities and lower socioeconomic status for Māori suggesting resilience in ageing and positive health behaviours are common.
The significance of health behaviours and pattern of health conditions will be examined longitudinally.

**Competing interests:** Nil.

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References:


Dietary intake in midlife and associations with standard of living, education and nutrition literacy

Catherine L Wall, Richard B Guearry, John Pearson, Winsome Parnell, Paula M L Skidmore

Abstract

Aim Cardiovascular disease is a leading cause of death in New Zealand, but risk factors may be decreased by consuming a heart healthy diet. This pilot study investigated whether participants met the guidelines for a heart healthy diet and whether a novel heart healthy dietary pattern could be identified using principal components analysis (PCA). The second aim of this project was to assess if higher education, standard of living and nutrition literacy are associated with a heart healthy dietary pattern.

Method This exploratory study was undertaken using data from the first participants enrolled in the Canterbury Health Ageing and Lifecourse study: an observational study of 50 year olds in the Canterbury District Health Board region. Eighty-two people were selected from the General and Māori electoral role and interviewed prior to the 22 February 2011 Christchurch Earthquake. PCA was conducted to identify dietary patterns, based on intake of specific nutrients as indicated by the New Zealand and international heart healthy dietary guidelines.

Results 62 participants completed questionnaires and an estimated food record. No participants met all five of the heart healthy dietary guidelines. One dietary pattern was produced by PCA: a “higher CVD risk” pattern. Regression analysis indicated that higher standard of living, education and nutrition literacy were inversely associated with a “higher CVD risk” pattern.

Conclusion Higher standard of living, education and nutrition literacy were associated with a healthier dietary eating pattern. However, as no participants met all the dietary recommendations more education and support is needed to help people meet these.

Cardiovascular disease (CVD) is the second most common cause of death after cancer in New Zealand (NZ). The prevalence of CVD increases dramatically with age; at 45 years of age only 8% of New Zealanders are diagnosed with CVD compared to 75% of those aged 75 years.

New Zealand has an aging population which will increase the burden of CVD. Among the risk factors for CVD, some are partially modifiable, including high blood pressure, high blood cholesterol, overweight and poor glycaemic control. Modifiable risk factors are known to be influenced, in part, by dietary intake. Consumption of particular heart healthy foods has been shown to improve modifiable risk factors.

A heart healthy diet typically includes high intakes of fruit, vegetables, whole grain foods, fish and seafood, lean meat and poultry, low fat dairy products, nuts and seeds.
and low consumption of high sodium products. Unfortunately, consuming a heart healthy diet and improving one’s CVD risk may not be achievable for all sectors of the community particularly for those in lower socioeconomic groups.\textsuperscript{7} The relationship between lower socioeconomic status (SES) and morbidity and mortality rates from chronic diseases such as cardiovascular disease (CVD) are well established worldwide\textsuperscript{8} and in New Zealand.\textsuperscript{9}

International research has shown that lower socioeconomic status is often associated with higher intakes of dietary fat\textsuperscript{10–12} and lower intakes of dietary fibre and fruit and vegetables, independently of each other.\textsuperscript{13,14} Lower socioeconomic status is thought to not only influence the dietary intake of families but, in turn, body weight of children.\textsuperscript{15} It is not known if these relationships are also present in the NZ population.

Socioeconomic status can be measured using a variety of methods, the newest of which is the Economic Living Standard Index short form (ELSI\textsubscript{SF}).\textsuperscript{16} The ELSI is a measure of individual living standards and has been included in the New Zealand Health Survey since 2006/07 to describe sociodemographics of New Zealanders. The ELSI\textsubscript{SF} has been used to describe dietary intakes of children\textsuperscript{16} but to our knowledge nutritional intake of adults or body weight status has not been compared using the ELSI\textsubscript{SF}. Nutritional intake of NZ adults has been described according to level of community deprivation (NZDep) but not by individual living standards.\textsuperscript{7}

Associations between selected psychosocial factors including standard of living measures, education, knowledge of food and dietary intake, as assessed by investigation of single foods, food groups and nutrients, have been studied internationally\textsuperscript{11,17–19} and in New Zealand.\textsuperscript{7,13,15}

Dietary patterns have been proposed as a solution to investigating relationships between food choice and chronic disease risk as these analyses allow for the multiple factors in the diet to be examined in combination, rather than focusing on intakes of single nutrients or food groups. This is a more powerful approach as foods can have synergistic or inhibitor effects on each other. One such type of analysis is PCA, which has been shown to be successful in producing patterns associated with CVD risk factors in many studies.\textsuperscript{20} However, most dietary patterns are generated from food frequency questionnaire data, which are not as robust as data from food records.\textsuperscript{20} This exploratory study uses estimated food records to investigate whether a novel heart healthy dietary pattern could be identified using PCA.

A secondary aim of the study was to investigate if such a pattern is associated with a higher level of education and standard of living. Analysis of this type has not been previously conducted using the ELSI\textsubscript{SF}. The aims of this study are in line with the wider aims of the Canterbury Health, Ageing and Life Course (CHALICE) study to build a database of important determinants of health.

**Methods**

**Study design**—The data for this pilot study were collected from the first 82 participants who completed baseline assessments in the CHALICE study between August 2010 and February 2011. Data included in this study were collected prior to the Christchurch Earthquake on 22 February 2011.

**The CHALICE study**—CHALICE is a longitudinal, observational study of a random sample of people aged 50 years currently living in the Canterbury District Health Board (CDHB) area.\textsuperscript{21} CHALICE aims to recruit 1000 participants. Fifty-year olds were randomly recruited from the general population.
and Māori Canterbury electoral rolls from the Kaikoura, Hurunui, Waimakariri, Christchurch city, Selwyn and Ashburton districts. Māori were over-sampled (one in every four participants were selected from the Māori electoral roll). Ethical approval was obtained from the Upper South A Regional Ethics Committee.

Data collection—The overall CHALICE methods have been described in detail elsewhere. Participants were invited to attend a four to six hour face to face interview at the University of Otago, Christchurch offices where information was collected by trained interviewers on physical and mental health, family and social factors and lifestyle. For this study only body composition, demographic, nutrition related questionnaires and the estimated food record data were included in the analysis. These are described in more detail below.

Demographic data collected included ethnicity as assessed by the question used in the NZ census; “Which ethnic group or groups do you belong to?” For the purposes of these analyses results were dichotomised where anyone who selected Māori, even if more than one ethnicity was chosen, were identified as Māori. All other participants were categorised as non-Māori. Participants were asked “What is the total income that your household got from all sources, before tax, or anything that was taken out of it, in the past 12 months” and asked to pick from a range of answers, where the lowest was less than <$5000 and the highest $150,001 or more. For these analyses participant responses were grouped into the following groups: <$40,000, $40,000–$69,999, $70,000–119,999 and $120,000 or over. Highest level of education was classified as either no qualifications, secondary school qualifications, post-secondary (non-degree) qualification, or University degree and for these analyses was dichotomised to Secondary school or less, or Post-secondary qualification.

Standard of living was assessed using the ELSI$_{SF}$. This is a 25 item questionnaire that assesses standard of living, based on three components – ownership restriction (e.g. not owning a car), social participation restriction (not doing activities that a participant would like to do because of cost) and economising (e.g. not buying fresh fruit and vegetables due to cost). The ELSI$_{SF}$ answers were summed to produce a score of between 0 and 31. These scores were then coded into seven categories ranging from “Severe hardship” to “Very good”. Due to small participant numbers in these analyses these categories were reduced to three categories: low (score of 0-16), medium (score of 17-24) or high (score of 25-31) standard of living.

Weight and height measurements were taken with shoes removed and in light clothing to the nearest 0.1 cm. Weight was measured using an electronic scale and height was measured against a wall using a permanently attached tape measure. Waist circumference was measured against the skin. A tape measure was placed at the mid-point between the lowest rib and the top of the iliac crest. Waist circumference was measured once to the nearest 0.5cm. Body mass index (BMI) was calculated as weight (kg) divided by height (m$^2$).

A nutrition literacy score was calculated from 24 questions based on the United Kingdom “The Family Diet Study” questionnaire. This questionnaire asked about the fat, sugar, salt and/or fibre content of commonly consumed foods. The foods used in the nutrition literacy questions were modified to make them compatible with the NZ diet e.g. Rice Krispies changed to Rice Bubbles, squash changed to New Zealand Bubbles. The results of the food record analysis were compared with guidelines for a heart healthy diet. The data from one participant was excluded from analyses because they had a rare health condition controlled by diet and their diet was not representative of the general population.

There are many national dietary guidelines available from countries including the United States of America, United Kingdom, Australia and NZ and while some of the individual food and/or nutrients
included in these may differ from country to country, the foods and nutrients most consistently included are total fat, saturated fat, fruit, vegetables and fibre. Therefore, for the purpose of this study a heart healthy diet was defined as a diet including a healthy intake of all five of these components, based on the current NZ recommendations. Criteria for this are a total fat contribution of less than 35% of total energy (% TE), saturated fat contribution of than 10% TE, dietary fibre intake of more than 25 g/day, fruit intake of at least two serves per day and vegetable intake of at least three serves (excluding potatoes). Yes/No variables were created to indicate whether each participant met each of the five guidelines.

**Statistical analyses**—Analyses were carried out using R, version 2.13.0 (Vienna, Austria). Median intake and interquartile ranges were calculated for each nutrient and associations with demographic variables and BMI were explored using the Mann Whitney U test and the Kruskal-Wallis test. Associations between standard of living and education were adjusted for income, sex and ethnicity. Heart healthy dietary pattern scores were also generated using PCA. PCA is a commonly used data reduction technique to provide summary measures of diet. As individual foods or food groups are not eaten in isolation, analysis of individual nutrients or food groups does not take into account the complexities of meals eaten, and the possible nutrient interactions occurring when meals are consumed.

Using a PCA-derived pattern means that a greater proportion of the variation within the dietary data can be explained than when using individual food group or nutrient data. The use of PCA means that summary scores can be calculated for each of the five heart healthy diet components entered into the analyses. These scores are based on an equation based on the amount consumed (for nutrients), or the number of servings (for fruit and vegetables), multiplied by the factor loading produced by the PCA. Foods/nutrients with higher factor loadings contribute more to the overall score than those with lower loadings, and in accordance with other similar studies, eigenvalues above 1, the elbow in the scree plot and factor loadings ≤-0.3 or greater than ≥0.3 were considered important when identifying and naming patterns.

Negative factor loadings mean that a particular food or nutrient is contributing negatively to the overall score. A sample size of 62 participants allows for the examination of six variables using PCA, as ten participants per variable are required for robust results. Varimax rotation was conducted using z-scores of the five dietary components of a heart healthy diet. As continuous data (not dichotomised data) is needed for PCA data for the amount consumed (for nutrients) or the number of servings (for fruit and vegetables) were used for the PCA. The first principal component was used based on both the elbow in the Scree plot (not shown) and its interpretability based on factor loadings.

Multiple linear regression was applied to the first principal component with demographic and nutrition related variables. Non-significant variables that did not contribute to the fit of the model were removed, second order interactions were tested and all but standard of living, education and nutrition literacy were not significant, there was insufficient data in all cells to properly fit higher order interactions. All results were considered statistically significant at the 5% level where reported p values were adjusted for multiple comparisons using Tukey’s method. All model assumptions were checked by graphical inspection of residual plots (QQ, Leverage, residual versus fitted values).

**Results**

Of the 82 CHALICE participants interviewed 62 (75.6%, 32 females and 30 males) returned a completed food record prior to the 22nd of February 2011 and provided information on all variables of interest. Table 1 details the participant characteristics.
Table 1. Sample characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Number of participants (n=62) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>30 (48)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>32 (52)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Māori</td>
<td>8 (13)</td>
</tr>
<tr>
<td></td>
<td>Non-Māori</td>
<td>54 (87)</td>
</tr>
<tr>
<td>Education</td>
<td>Secondary school or less</td>
<td>21 (34)</td>
</tr>
<tr>
<td></td>
<td>Post-secondary school</td>
<td>41 (66)</td>
</tr>
<tr>
<td>Employment (current)</td>
<td>In paid employment</td>
<td>55 (89)</td>
</tr>
<tr>
<td></td>
<td>Not in paid employment</td>
<td>7 (11)</td>
</tr>
<tr>
<td>Household income (per annum)</td>
<td>&lt;$40,000</td>
<td>12 (19)</td>
</tr>
<tr>
<td></td>
<td>$40,000–69,999</td>
<td>13 (21)</td>
</tr>
<tr>
<td></td>
<td>$70,000–119,999</td>
<td>19 (31)</td>
</tr>
<tr>
<td></td>
<td>≥$120,000</td>
<td>15 (24)</td>
</tr>
<tr>
<td></td>
<td>Don't know</td>
<td>3 (5)</td>
</tr>
<tr>
<td>Standard of living (ELSI&lt;sub&gt;3&lt;sup&gt;)</td>
<td>Low</td>
<td>7 (11)</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>18 (29)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>37 (60)</td>
</tr>
</tbody>
</table>

Table 2 summarises mean body composition of participants. Mean BMI was 28.0±6.0 kg/m<sup>2</sup>, which is within the WHO overweight range (BMI 25–29.9 kg/m<sup>2</sup>). Twenty-nine percent of participants were classified as normal weight, 40% overweight and 31% obese. Mean waist circumference of participants falls within the range (94–102 cm for men and 80–88 cm for women) which is associated with an increased risk of metabolic complications.

Table 2. Body composition of sample

<table>
<thead>
<tr>
<th>Body composition measures</th>
<th>Females (n=32)</th>
<th>Males (n=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>75.2 (18.5)</td>
<td>89.5 (17.1)</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>165.2 (7.0)</td>
<td>177.4 (6.5)</td>
</tr>
<tr>
<td>BMI (kg/m&lt;sup&gt;2&lt;/sup&gt;)</td>
<td>27.6 (6.6)</td>
<td>28.5 (5.4)</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>87.6 (15.7)</td>
<td>100.0 (13.4)</td>
</tr>
</tbody>
</table>

BMI=body mass index.

The median dietary intake of participants is shown in Table 3. Of the five heart healthy dietary components, no participants met all five recommendations, 8% met four recommendations, 24% met three recommendations, 25% met two recommendations, another 25% met one recommendation and 18% met none of the recommendations.

Single nutrient analyses—Table 3 also summarises non-parametric and post hoc tests with dietary intake, standard of living and education. The only dietary component which varied significantly with standard of living was total fat intake (P=0.018, P adjusted (for income)=0.024). There was no evidence of a difference between total fat intake for the medium and high ELSI ranges. This result remained unchanged after adjustment for BMI, sex and ethnicity (results not shown).
Total fat and vegetable intake did not vary significantly by education. Median saturated fat as a % TE was lower in the higher education group, 12.4% TE compared with 14.8% TE, than in the lower education group (P=0.002). Median intake of both groups was higher than the recommended intake of less than 10% of TE.

Table 3. Median (LQ, UQ) food and nutrient intake compared with heart healthy dietary guidelines and median (LQ, UQ) nutrient and food intake by standard of living category and education

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Total fat (% TE)</th>
<th>Saturated fat (% TE)</th>
<th>Dietary fibre (g/day)</th>
<th>Fruit (portions/day)</th>
<th>Vegetables (portions/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended intake for a heart healthy diet</td>
<td>&lt;35%</td>
<td>&lt;10%</td>
<td>&gt;25g</td>
<td>&gt;2</td>
<td>&gt;3</td>
</tr>
<tr>
<td>Median (LQ, UQ)</td>
<td>33.7 [31.2, 37.0]</td>
<td>13.5 [11.5–14.8]</td>
<td>22.9 [18.2–27.8]</td>
<td>1.8 [0.5–2.5]</td>
<td>2.0 [1.3–2.7]</td>
</tr>
<tr>
<td>Percentage achieving recommended intake</td>
<td>57%</td>
<td>11%</td>
<td>38%</td>
<td>48%</td>
<td>14%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Median (LQ, UQ) food and nutrient intake by standard of living</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>High</td>
</tr>
<tr>
<td>P Kruskal-Wallis test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Median (LQ, UQ) food and nutrient intake by education level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower education</td>
</tr>
<tr>
<td>Higher education</td>
</tr>
<tr>
<td>P Kruskal-Wallis test</td>
</tr>
</tbody>
</table>

Note: * p<0.05; **p<0.01 compared to low standard of living group or lower education group. % TE=percentage of Total Energy intake, LQ = lower quartile, UQ = upper quartile.

 Principal components analysis—PCA produced one meaningful pattern (Table 6). The first principal component reflected a “higher CVD risk” dietary pattern: a high saturated fat, and low fruit, vegetable and dietary fibre diet based on factor loadings of 0.42, -0.55, -0.50 and -0.46 respectively. A higher score for an individual for the “higher CVD risk” pattern indicates a higher saturated fat intake and a lower fruit, vegetable and fibre intake, all of which are not recommended as part of a heart healthy diet.

Table 6: Principal component analysis loadings and importance

<table>
<thead>
<tr>
<th>Variables</th>
<th>“Higher CVD risk” pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fat</td>
<td>0.26</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>0.42</td>
</tr>
<tr>
<td>Dietary fibre</td>
<td>-0.46</td>
</tr>
<tr>
<td>Fruit</td>
<td>-0.55</td>
</tr>
<tr>
<td>Vegetables</td>
<td>-0.50</td>
</tr>
<tr>
<td>Percentage variation explained</td>
<td>40%</td>
</tr>
</tbody>
</table>

Multiple linear regression analysis on normalised “higher CVD risk” diet scores showed significantly lower scores for those with a higher education level (0.98, 95%)
CI [0.27–1.69], \( P=0.008 \) while there was evidence for a difference in the impact of nutrition literacy on diet by standard of living (\( P=0.001 \)). The diet score of the low standard of living group increased by 0.35 (95%CI [0.02–0.67], \( P=0.039 \)) for each one unit increase in nutrition literacy while the diet score of the high standard of living group decreased by 0.10 (95%CI [0.11–0.79], \( P=0.011 \)) for each increase in nutrition literacy by one unit. Neither sex nor ethnicity had significant effects at the 0.05% level, nor was there a significant difference between the two higher levels of standard of living, the model explained 28% of the variation.

The results show that there were significant interaction effects between nutrition literacy and standard of living on the “higher CVD risk” pattern scores. Those in the medium or high standard of living categories, who had better nutrition literacy, had lower scores for the “higher CVD risk” pattern, indicating consumption of a more heart healthy diet, compared to those of medium or high standard of living who had lower nutrition literacy. Conversely, those in the low standard of living category, who had higher nutrition literacy scores, had higher scores for the “higher CVD risk” pattern, indicating consumption of a less heart healthy diet.

**Figure 1. Association between nutrition literacy and standard of living interaction with a “higher CVD risk” dietary pattern (multiple linear regression, \( p=0.001 \))^a,b,c,d**

\(^a\) All of the data included in the multiple linear regression are plotted in the figure; however the regression lines are only relevant for those participants in the respective lower education group; \(^b\) Low standard of living \( \beta=0.35, \) 95%CI [0.02, 0.67], \( p=0.039 \). \(^c\) Medium standard of living \( \beta=-0.23, \) 95%CI [-0.97 – -0.17], \( p=0.006 \). \(^d\) High standard of living \( \beta = -0.10 \) – 95%CI [-0.79 – -0.11], \( p=0.011 \).
Discussion

The results discussed here are based on preliminary analysis from the first wave of the CHALICE study aiming to recruit 1000 50 year olds from Canterbury over the period 2010–2014. This study describes aspects of the dietary intake and the associations with selected social variables.

None of the participants in this study met all five heart healthy guidelines, and the majority of participants met two or less guidelines. These results suggest that, as expected, a higher standard of living, education and nutrition literacy were all associated with consuming a heart healthy diet. Using results of the PCA, those who had a medium or high standard of living and who had higher levels of nutrition literacy had higher scores for a heart healthy diet. However, those with a lower standard of living, and who had higher nutrition literacy had pattern scores that corresponded with a less heart healthy diet.

Previous studies have shown associations between socioeconomic status and education with selected foods or nutrients\textsuperscript{2,7,12,14,22,28,29} but there is limited evidence available from New Zealand populations.\textsuperscript{30} No research, that we are aware of, has used the ELSI\textsubscript{SF} to describe socioeconomic circumstance or standard of living in relation to adult dietary intake. In this population there was a significant pattern toward decreasing fat (as a % TE) intake as standard of living increased. There are no questions in the ELSI\textsubscript{SF} that assess variables that may influence fat consumption such as frequency of purchasing food from outside of the home or access to affordable healthy foods.

Studies from abroad have shown that those living in lower socioeconomic areas may struggle to access affordable, healthy, lower fat foods due to the positioning of supermarkets, fruit and vegetable shops and takeaway outlets\textsuperscript{30,31} and that eating out more often has been associated with higher fat intake.\textsuperscript{32} It is not known if this is also the case in NZ. In this population there were no significant patterns with the other components of a heart healthy diet; although this may be due to the wide interquartile ranges of some of the components.

In addition to assessing associations between socioeconomic status, education and nutrition literacy and single nutrients this study also investigated associations between social variables and a “higher CVD risk” dietary pattern.

Dietary patterns, as with intakes of selected nutrients, have been shown to be less healthy in lower socioeconomic groups\textsuperscript{2} and deprived sectors of the community.\textsuperscript{7} Dietary modelling (PCA) showed that standard of living, as well as nutrition literacy and level of education, were inversely associated with a “higher CVD risk” dietary pattern. Interestingly, those with a high standard of living tended to consume a less healthy dietary pattern than those with a medium standard of living, however this did not reach statistical significance (P = 0.28).

Conversely there was a significant pattern with the lowest standard of living group towards increasing consumption of saturated fat (as a % TE), and lower consumption of fruit, vegetables and dietary fibre as nutrition literacy increased.
The relationship between nutrition literacy and dietary intake is often complex. Previous research that has explored this relationship has shown inconsistent results.\textsuperscript{11,18,19,22,28,31,33} The lack of a significant association in this group may be due to the small sample size of the low standard of living group (seven participants); further research with a larger sample may show a more definitive pattern.

This study was designed as an interim analysis to investigate whether an interpretable heart healthy dietary pattern could be obtained from this small dataset comprising the first participants enrolled into CHALICE. The analysis was also a pre-planned part of our quality assessment strategy, in particular with the dietary instruments, data entry and analysis of the food records.

While the study had sufficient sample size to derive a meaningful, robust dietary pattern,\textsuperscript{27} we acknowledge that a sample size of around 60 participants severely restricts our ability to detect significant differences in individual dietary components. However as the participants are all fifty years of age the overall variability within the dietary data will be smaller than for a similar sample over a larger age range.

The Canterbury earthquake sequence began on 4 September 2010 with the second, most destructive, and only fatal major episode on 22 February 2011. The data presented was all collected prior to the 22 February 2011 and is in our view the best representation of diet of 50 year olds unaffected by the earthquakes.

Future analyses will attempt to quantify the effect of the earthquake, if any. While we would have preferred more participants the first 62 form a natural grouping. Nevertheless, these findings show that it is possible to generate a heart healthy dietary pattern in smaller samples and we once the final CHALICE recruitment is completed we will explore these relationships further, using more sophisticated analyses.

This study provides evidence that the 50 year olds from Canterbury included in these analyses do not consume a heart healthy diet and that socioeconomic status, education and nutrition literacy may influence dietary consumption. If these findings are found to be similar in the whole CHALICE sample then this is particularly pertinent for Canterbury which has an aging population, hence identifying modifiable risk factors in midlife has the potential to better target interventions for this increasing proportion of the population.

This study provides further evidence that improving dietary intake through improving the social and financial circumstances of a population may help reduce health inequalities and the burden of disease.

Competing interests: Nil.

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References:

Unipedicle TRAM flap procedures are associated with symptoms of pelvic floor dysfunction in women: a case control study

Emily Liu, Jackie Smalldridge, Belinda Scott

Abstract

Hypothesis Chronic conditions that cause raised intra-abdominal pressure, such as obesity, chronic cough and constipation are risk factors for pelvic floor dysfunction (PFD). We hypothesise that unipedicle transverse rectus abdominis musculocutaneous flap (UTRAM flap) for reconstruction following mastectomy for breast cancer increases the risk of PFD.

Aim The aim of this study is to assess if there is increased risk of pelvic floor dysfunction associated with UTRAM flap reconstruction compared to controls.

Method 39 patients who had UTRAM flaps for breast reconstruction following mastectomy for breast cancer between year 1997 to 2004 were recruited as cases. They were matched by age with 36 controls, who have had breast cancer but not UTRAM flap reconstruction as part of their treatment. Validated questionnaires (Pelvic floor distress inventory PFDI-20) were completed by study participants, and demographic data were also collected. Mixed effect analysis of variance was used to assess for statistical difference in the mean PFDI-20 scores, adjusted by age, parity, BMI and history of gynaecological surgery.

Results The case group has significantly higher mean PFDI-20 score than the control group, 13 (3–29) vs 5.5 (1–11), MH odds ratio 1.8 (1.1–2.8), p value=0.02.

Conclusion Women who have undergone U TRAM flap reconstruction appeared to have more symptoms of PFD, compared to women who did not have the procedure. It is likely that the reduction in volume of abdomen, following surgery leads to an increase in intra-abdominal pressure (IAP) which predisposes these women to PFD. Future work to assess changes in IAP is proposed.

Transverse rectus abdominis myocutaneous (TRAM) flap was introduced in 1982 by Hartrampf, Schefln and Black. In this procedure, autogenous tissue is transferred from the abdomen for breast reconstruction. There is also an added effect of abdominal rejuvenation.

TRAM flap now constitutes 25–50% of breast reconstructions performed in the United States, and it is proven to be the autogenous tissue of choice for breast reconstruction.1 TRAM flap reconstruction may be considered in any patient who is undergoing mastectomy as either an immediate procedure at the time of mastectomy or as a delayed procedure after mastectomy.

Obesity is one of the contraindications for the operation. If chest wall radiation has been or will be part of the patient’s therapy, reconstruction may be delayed.
During the procedure of UTRAM flap reconstruction, an oval section of skin, fat and the rectus abdominis muscle is divided from its pubic insertion, allowing superior rotation of the flap through a tunnel to the mastectomy site. The superior epigastric arterial system remains attached as much as possible, which provides the blood supply to the transferred tissue. Abdominal closure begins with closure of the fascia, which can be performed primarily or with synthetic mesh, depending on the patient’s anatomy and the preference of the surgeon.

Additional liposuction and skin tailoring may be necessary to achieve the optimal aesthetic result. The flap tissue is then shaped into a natural looking breast and fixed into place. If blood supply has been damaged, microscopic techniques are used to reattach the blood vessels to the chest area.

Abdominoplasty is recognised to be a risk factor for genital prolapse and progression of stress urinary incontinence. The study showed high degree of satisfaction in urogynaecological health in patients who underwent prolapse surgery simultaneously with abdominoplasty. For the controls who declined to have simultaneous urogynaecological surgery, they experienced worsening of their condition within 10 months following abdominoplasty. This was thought to be associated with reduced volume of abdominal cavity and consequently higher intra-abdominal pressure on the pelvic floor. However, these were patients with increased body mass index (BMI), which is a well-known risk factor for PFD, and different from the TRAM flap patients who usually have normal BMI.

Anecdotally clinicians have reported an association of patients presenting with PFD who have had histories of having undergone TRAM flap reconstruction as part of their treatment for breast cancer.

Method

A retrospective case control study was performed at Breast Associates, a private breast clinic in Auckland, New Zealand. The advantages of using this group of patients are easy access of notes and that the operations were done by the same surgeons. Biostatistics input informed the sample size and the study also gained ethics approval from Northern X Ethics Committee.

The case group included patients who had UTRAM flap reconstruction as part of their treatment for breast cancer between 1997 and 2004. Most of the cases were performed by the same surgeon.

In most cases the same side as the breast cancer was used and in most cases there was muscle splitting such that not all of the muscle was removed. Data on subsequent hernia rates was not collected.

The participants were between 4 to 11 years postoperative when the questionnaires were completed. There were 55 patients who had U TRAM flaps within the period at Breast Associates, and all were sent an invitation to participate in the study along with the study pack, including information sheet, consent form, and questionnaires.

The demographic data were also collected, including date of birth to calculate age, smoking status, height and weight to calculate BMI, parity and mode of delivery, year of breast surgery and U TRAM flap reconstruction, and details of previous gynaecological surgery. Validated questionnaire, Pelvic Floor Distress Inventory – Short Form 20 (PFDI-20) was also included for patients to complete. A second pack was sent to those who did not reply by two months. 39 patients (71% of the intended study number) agreed to participate and returned the completed questionnaire.

The control group included patients who received treatment for breast cancer in the same clinic but did not have UTRAM flap reconstruction. They were randomly selected from the patient database, and matched with age to the case group by 5-year bands. The randomisation was done through a random number generation online. The same study packs were sent to these participants, and the total number
participated in the control group was 36. The response rate was 50% from the control group. More invitations were required to obtain the sufficient number for the control group.

Statistical analysis carried out with the Biostatistics Department at Counties Manukau District Health Board. Chi-squared tests were used to assess the differences of the categorical variables between case and control groups. Mann Whitney U tests were used to assess the continuous variables. Means for PFDI-20 scores were calculated for each group. Mixed effect analysis of variance was used to assess if there is statistically significant difference in the mean PFDI-20 scores between the case group and the control group.

**Result**

The comparison of the demographic data is demonstrated in Table 1. The mean age is 59 for the case group and 61 for the control group. The mean BMI is 24 (range 21–33) for the case group and 26 (range 17–31) for the control group. While there is statistically significant difference between the two groups for the BMI (p value=0.03), the difference is not clinically significant. Almost all patients in both groups were non-smokers. The mean parity is 2 for both groups with similar distribution of mode of deliveries in each group, most commonly by normal vaginal deliveries, followed by instrumental deliveries including Ventouse and forceps, and Caesarean sections.

Patients who reported histories of hysterectomy (abdominal or vaginal), prolapse repair or other urogynaecological procedures were classified as significant gynaecological surgeries. There is no statistically significant difference in the number of patients with history of significant gynaecological surgery between the two groups (p value=0.58). The demographic data of the case group and the control group were comparable.

### Table 1. Demographic data and PFDI-20 score

<table>
<thead>
<tr>
<th>Variables</th>
<th>Case</th>
<th>Control</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>59</td>
<td>61</td>
<td>0.10</td>
</tr>
<tr>
<td>BMI (mean)</td>
<td>26</td>
<td>24</td>
<td>0.03</td>
</tr>
<tr>
<td>BMI (range)</td>
<td>21–33</td>
<td>17–31</td>
<td></td>
</tr>
<tr>
<td>Smoking (number/percentage)</td>
<td>1(2.6%)</td>
<td>3(8.3%)</td>
<td>0.27</td>
</tr>
<tr>
<td>Smoking (number/percentage)</td>
<td>2(2.3%)</td>
<td>2(2.3%)</td>
<td></td>
</tr>
<tr>
<td>Parity (number/percentage)</td>
<td>12(30.8%)</td>
<td>7(19.4%)</td>
<td></td>
</tr>
<tr>
<td>Parity (number/percentage)</td>
<td>24(61.5%)</td>
<td>17(47.2%)</td>
<td></td>
</tr>
<tr>
<td>Parity (number/percentage)</td>
<td>11(28.3%)</td>
<td>12(33.4%)</td>
<td></td>
</tr>
<tr>
<td>Number of normal vaginal delivery</td>
<td>0(0.1)</td>
<td>0(0.1)</td>
<td>&gt;0.90</td>
</tr>
<tr>
<td>Number of normal vaginal delivery</td>
<td>12(30.8%)</td>
<td>8(22.2%)</td>
<td></td>
</tr>
<tr>
<td>Number of normal vaginal delivery</td>
<td>22(56.4%)</td>
<td>22(61.1%)</td>
<td></td>
</tr>
<tr>
<td>Number of normal vaginal delivery</td>
<td>5(12.9%)</td>
<td>6(16.6%)</td>
<td></td>
</tr>
<tr>
<td>Number of instrumental delivery</td>
<td>0(0.1)</td>
<td>0(0.1)</td>
<td>&gt;0.90</td>
</tr>
<tr>
<td>Number of instrumental delivery</td>
<td>29(74.3%)</td>
<td>26(72.2%)</td>
<td></td>
</tr>
<tr>
<td>Number of instrumental delivery</td>
<td>9(23.1%)</td>
<td>10(27.8%)</td>
<td></td>
</tr>
<tr>
<td>Number of instrumental delivery</td>
<td>1(2.6%)</td>
<td>0(0%)</td>
<td></td>
</tr>
<tr>
<td>Number of Caesarean delivery</td>
<td>0(0.1)</td>
<td>0(0.1)</td>
<td>&gt;0.90</td>
</tr>
<tr>
<td>Number of Caesarean delivery</td>
<td>31(79.5%)</td>
<td>34(94.4%)</td>
<td></td>
</tr>
<tr>
<td>Number of Caesarean delivery</td>
<td>7(17.9%)</td>
<td>2(5.6%)</td>
<td></td>
</tr>
<tr>
<td>Number of Caesarean delivery</td>
<td>1(2.6%)</td>
<td>1(2.6%)</td>
<td></td>
</tr>
<tr>
<td>Number of Caesarean delivery</td>
<td>17(43.6%)</td>
<td>18(50%)</td>
<td></td>
</tr>
<tr>
<td>PFDI-20 Score (median/range)</td>
<td>13(3–29)</td>
<td>6(1–11)</td>
<td>0.02</td>
</tr>
</tbody>
</table>

* Chi square test for categorical variables and Mann Whitney U test for continuous variables.
The PFDI-20 scores were collected as total scores for individuals. The comparison is further demonstrated by the box plot on Figure 1. The median PFDI-20 score is significantly higher for the case group (median PFDI-20 of 13) than for the control group (median PFDI-20 of 5.5), odds ratio 1.8, p value=0.02.

**Figure1. Boxplot of PFDI-20 score for cases and controls**

**Discussion**

This pilot study has demonstrated that patients who underwent U TRAM flap reconstruction reported more pelvic floor distress symptoms, compared to a matched control group. Our findings are consistent with previous research which has identified abdominoplasty as a risk factor for PFD. Although the mechanisms for this are uncertain, it is not unreasonable to assume that increased IAP results as a consequence of a reduction in abdominal volume. Other surgical techniques such as perforator flaps may be used for breast reconstruction in order to conserve abdominal muscles. The perforator flaps harvest only the skin and fat overlying the muscle along with the perforating vessels and dominant vasculature supplying the flap.

The underlying muscle must be split to dissect out the perforating vessels, but the muscle itself is not included in the transfer. Thus, this procedure is less likely to reduce the volume of the abdomen limiting the probability of a concomitant increase in IAP. However, its effect on the pelvic floor has never been researched, and may be an area for future research.
Meshes may be used in some cases for abdominal closure following breast reconstruction with autogenous tissues. Indications for use of mesh include laxity of the abdominal wall, tightness of the closure and tissue characteristics. This can be an important factor for future research to follow up patients prospectively to see if there are any differences in the pelvic floor symptoms when a mesh is used.

It is well recognised that increased body mass index (BMI), chronic cough or straining predisposes women to a greater risk of pelvic floor disorders. Although there was a statistically significant difference of mean BMI between the cases and the controls (26 vs 24, p value=0.03), it was not considered large enough to be clinically significant and possibly related to the variability in the BMI in both groups.

The response rates between the cases and the controls are different. This is expected as the patients who have had the UTRAM flap procedures are likely to be more interested in participating, but this may introduce selection bias to the study.

The study was intended to be a pilot study, and we chose to have a small sample size involving patient cohort from a single clinic. Although the sample size is small, the difference of symptoms of PFD is significant between the two groups, but the sample size was not large enough to draw any meaningful conclusions from a subgroup analysis to assess each scale of pelvic floor distress symptoms individually, such as urinary, anorectal or pelvic organ prolapse. It is likely that these patients who are symptomatic of PFD are more likely to report symptoms of pelvic organ prolapse. With larger sample size in future studies, it would be possible to assess each scale of pelvic floor distress symptoms.

In our study, the patients in the case group were between 4 to 11 years after UTRAM flap reconstruction surgery. Due to the retrospective nature of our study, we were not able to assess the duration from the surgery to the development of PFD symptoms. Further study with different methods, such as a prospective cohort study may be exploited to assess this. This information would assist to format a structured holistic approach to the surgical follow-up plan for the women undergoing UTRAM flap reconstruction surgery, including not only the routine breast cancer follow-up but also their urogynecological health.

Despite the limitations, our study has demonstrated a significantly increase risk of developing PFD for patients who had UTRAM flap reconstruction. We have suggested that a probable mechanism leading to the increased risk of PFD is a rise in IAP due to a reduction in the abdominal volume following surgery. Further work using a novel intra-vaginal pressure sensor in patients who have had UTRAM flap reconstruction surgery, comparing to those who had not had the procedure would help to verify this.

Although more evidence is required to confirm the correlation, patients who undergo this procedure in the future need to be informed of the potential risks, and advised on how to seek help should they develop symptoms of PFD.
Competing interests: Nil.

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George Thomson, Jane Oliver, Nick Wilson

Abstract

Introduction We aimed to describe long-term trends in smoking in vehicles in a deprived local community in the Wellington region of New Zealand, and to consider the impact of a local community-initiated smokefree vehicle campaign.

Methods An observational study in 2013 of smoking in vehicles repeated the methods of two previous studies (conducted in 2005 and 2011) in the same location (Wainuiomata) in New Zealand. The 2013 study followed a local smokefree vehicle campaign which began in early 2013.

Results Data were systematically collected on 57,672 vehicles in 2013. The point prevalence of smoking in vehicles decreased from 6.4% (95% CI: 5.9%–7.1%) in 2005 to 4.9% in 2011 (95% CI: 4.8%–5.1%) to 3.4% in 2013 (95% CI: 3.2%–3.5%). For vehicles with others (adults and children) there was a reduction from 1.4% in 2005 to 1.1% in 2011 and to 0.7% in 2013. In vehicles with children, the decline was from 0.22% in 2011 to 0.10% in 2013 (p<0.001 for all 2011-13 comparisons). Smoking in vehicles with other people present declined three times faster during 2011-13 than during 2005–2011.

Conclusions In the context of relatively slow change in national trends for smoking prevalence and for smoking in cars, the results appear to be consistent with the local campaign having some beneficial impact on smoking behaviour in vehicles. However, achieving fully smokefree vehicles, and the consequent health equity dividend, will probably require national-level smokefree vehicle legislation.

The hazard of secondhand smoke (SHS) is of particular concern inside vehicles, even with windows open.1–3 This is due to the confined space and the particular effects on children.4,5 Exposure to smoking in vehicles may also increase the risk of smoking initiation by children, due to the normalisation of smoking.6–8 While the exposure rates of children to smoking in vehicles have decreased in some jurisdictions, there is still significant exposure in others.9,10

Legislation has been used to increase the proportion of smokefree vehicles in parts of a few countries, including jurisdictions (cities, states, provinces) in: the United States, Canada, Australia and Ireland,11,12 but the large majority of jurisdictions have been unable to consider or pass legislation.

There has been almost no evaluation of the impact of smokefree vehicle laws. A South Australian study found an increase in the proportion of cars with children that were reported to be smokefree, from 69% in 2005 to 82% in 2008.13 A Canadian study found smokefree car laws there reduced SHS exposure among youth by about a quarter within the first year after the law’s implementation.12
Internationally, there have been a limited number of studies where the prevalence of smoking in cars was observed. A 2008 study (5928 vehicles observed) in Italy found point prevalence of smoking in vehicles of 6.9%, and of 0.1% for smoking with children.\(^{14}\) In a 2011 study in Barcelona (2442 vehicles), 5.5% of vehicles had smoking and 0.2% had smoking and children.\(^{15}\) A 2012 study (2230 cars observed) in Ireland found a point prevalence of smoking in cars of 1.39%, and this varied by car value.\(^{16}\)

In New Zealand, a 2012 observation study (2857 cars) in Auckland found a point prevalence of 5.7% of smoking in cars, and 2.2% with smoking with children. This study also found that in Manurewa (a relative socioeconomically deprived suburb), the respective results were 13% and 6.4%.\(^{17}\)

In 2005 and 2011 we investigated the different point prevalences of smoking in vehicles in two suburbs in the Wellington urban area, New Zealand, and the proportion of vehicles with smokers and others.\(^{18,19}\) The 2011 study also measured the point prevalence of smoking in vehicles with those who appeared to be aged 12 and under. That study reported that in the suburb with greater socioeconomic deprivation, Wainuiomata, the prevalence of smoking in vehicles with children was 11 times that for the less deprived suburb. The findings were publicised in the New Zealand media, with an emphasis on the greater exposure of children to smoke in Wainuiomata vehicles.\(^{20,21}\)

As a result of the 2011 study findings, from April 2012, local community workers in Wainuiomata started to organise a campaign for smokefree vehicles in their suburb, with the help of schools, sports clubs and other local organisations. They were supported by the regional public health organisation (Regional Public Health).

In February 2013, there was a campaign launch event that included the Associate Minister of Health, Tariana Turia (who is also a leader in Māori health and development), and other Members of Parliament. This launch gained national television coverage.\(^{22}\)

The campaign was specifically for the suburb, which is separated by a large hill from the rest of the Wellington urban area, and has a single access road to it from the region. Campaign aspects included local role models, a webpage, billboards, posters, radio advertising, community newsletters, signage at school drop off zones, logo and branding at community and school events, smokefree car information packs, and a smokefree car story competition.\(^{23}\)

Studies on local community campaigns for smokefree indoor legislation have reported essential campaign elements such as media coverage and leadership.\(^{24–29}\) However, while there have been a number of intervention studies on reducing smoking in homes,\(^{30}\) little has been published on community campaigns to reduce such smoking. For example, a news item described a New South Wales state level campaign in Australia for smokefree homes that contained local projects.\(^{31}\)

There also appears to be little or no literature on local or national campaigns to get non-legislated public behaviour change in smoking in vehicles. In Australia and the USA, elements in the design of campaigns for smokefree homes and cars have been described.\(^{32,33}\) A Welsh smokefree vehicle campaign is currently being evaluated.\(^{34}\)
We could not find any published study of changes in the level of smoking in vehicles as the result of a local or national campaign to change such behaviour.

In New Zealand, all workplace vehicles accessible by the public have been required to be smokefree since 1990, but there is no law on smoking in private vehicles, and there was no national smokefree vehicle media campaign between 2008 and the end of 2013.

In an annual national survey of 14–15 year old students, exposure to smoking in a vehicle in at least one day in the last week was reported by 31% in 2006, 26% in 2011 and 23% in 2012 (there was a change of question for only 2011, which may have increased the reporting for that year). In 2008, this exposure for students from high-deprivation schools was 40%.

The current (at least monthly) self-reported national smoking prevalence for adults had decreased from 20% in 2006/07 to 18% in 2011/12, although ‘this decrease was not significant after standardising for age’. In 2012-13 the adult smoking prevalence was 17.6%. Census data indicates a greater fall from 2006 to 2013 (21% to 15%) although these data may be an underestimate of the prevalence of smoking due to non-response to the smoking question.

The 2006 census reported that the prevalence of daily smoking in Wainuiomata adults was 30%, compared to the national average of 21%.

Given this background, we aimed to further describe long-term trends in smoking in vehicles in this community (Wainuiomata), and to consider the potential impact of the 2013 local smokefree vehicle campaign.

### Methods

We largely repeated the methods used in the 2005 and 2011 studies, with roadside observers at a roundabout on the road in and out of the Wainuiomata suburb. Observations of passing vehicles were made within 7.30–9.30am and 3.15–5.15pm (to allow for sufficient daylight) on 15 weekdays from 30 May to 22 June 2013. The times were selected to maximise the traffic flows and the proportion of vehicles with children, and so maximise the efficiency of observer time. In 2011 the afternoon observations were made within 4–6pm, and the observation was during 20 weekdays in February–April. In 2005, observations were made during 8–10 am and 4–6 pm, in August–September.

In contrast to the 2011 study, two observers were used. One used a mechanical counter to count the total number of vehicles that fitted the sample frame (regardless of whether smoking was observed or not). For each vehicle with observed smoking, the other observer recorded on a preformatted data sheet: the presence of smoking, the presence of other adults than the smoker; and the presence of children. The observers were trained on site, and provided with a procedure sheet and data collection sheets.

As in 2011, observers did not observe buses, taxis, trucks, and vehicles where it was difficult to see inside. Children were defined as those appearing to be aged 12 years or younger. Smoking was defined as one or more people in a vehicle holding a cigarette, pipe or cigar in their hand or mouth.

The data were entered into a Microsoft Excel file and analysed using the statistical program R version 2.13.2. The proportions of people smoking in vehicles were calculated for each category within each year group (i.e. 2005, 2011 and 2013). These categories were: (i) smoking in vehicles; (ii) smoking in vehicles with only a driver; (iii) others (adults and children) in vehicles with smoking occurring; and (iv) children in vehicles with smoking occurring. The total number of vehicles observed in the year of interest was used as the denominator. The 95% confidence intervals for each proportion were calculated. Differences between proportions were assessed using the Chi-squared test. Differences were considered statistically significant when p-values were <0.05. The relative declines in smoking and relative risks (RR) of exposure to smoking in vehicles were also calculated so as to compare year...
groups. Ethical approval was obtained through the University of Otago (Category B ethics approval process).

Media coverage of smoking in vehicles may be one of the background influences for perceptions about smoking around others. To provide information on any changes, we searched the Factiva media database (http://global.factiva.com/) for the number of references to smoking in cars during the 2-year periods before the 2011 and 2013 data collection (February 2009–January 2011, and June 2011–May 2013) for the New Zealand region. The search phrase ‘smoking in cars’ was used, since the New Zealand media rarely use the phrase ‘smoking in vehicles’.

**Results**

Observations of 57,627 vehicles were made during 52.5 hours over the 15 days (there was no observations for 7.5 hours due to weather and other issues). Including training, the study involved a total of 108 hours of observer time. There were large reductions in all the smoking point prevalences between 2011 and 2013 (Table 1).

Changes are first shown below with the number of vehicles observed as the denominator for all three groups (vehicles with only drivers, vehicles with others and those with children), and then (for vehicles with others and those with children) with the number of vehicles in which smokers were observed as the denominator.

For all vehicles observed, there was a reduction in vehicles with smoking from 6.4% in 2005 and 4.9% in 2011 to 3.4% in 2013 (Table 1). In vehicles with only the driver, from 3.8% in 2011 to 2.6% in 2013. In vehicles with others (adults and children) 1.4% in 2005 to 1.1% in 2011 and 0.7% in 2013. In vehicles with children, from 0.22% in 2011 to 0.10% in 2013. All decreases for 2011-2013 were statistically significant (p <0.001).

The relative decline of smoking in vehicles in 2005-2011 was 3.9% a year, compared to 15% a year during 2011–13. The decline of smoking in vehicles with others in 2005-2011 was 6% a year, compared to 18% a year during 2011-13 (see Table for statistically significant relative risks).

For vehicles in which smokers were observed, the smoking with others (adults and children) changed little: 21.2% in 2005 to 23.1% in 2011 and 21.5% in 2013. For vehicles in which smokers were observed and with children, there was a decline from 4.6% in 2011 to 2.9% in 2013.

The search of the Factiva media database found 62 items with the phrase ‘smoking in cars’ in the New Zealand media for the 24 months before the 2011 data collection, compared to 91 items in the 24 months before the 2013 data collection, an increase of 47%.
Table 1. Prevalence of smoking in vehicles in the suburb of Wainuiomata for three observational studies (in 2005, 2011 and 2013)

<table>
<thead>
<tr>
<th>Year (observed vehicles)</th>
<th>Smoking in vehicles</th>
<th>Smoking in vehicles with only a driver</th>
<th>Others (adults and children) in vehicles with smoking occurring</th>
<th>Children in vehicles with smoking occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (n)</td>
<td>Yes (%) [95% confidence interval (CI)]</td>
<td>Yes (n) (%) [CI]</td>
<td>Yes (n) (%) [CI]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005 (n=5055)</td>
<td>325</td>
<td>6.4% [5.9%–7.1%]</td>
<td>316* 6.3% [5.6%–7.0%]</td>
<td>69 1.4% [1.1%–1.7%]</td>
</tr>
<tr>
<td>2011 (n=79,750)</td>
<td>3927</td>
<td>4.9% [4.8%–5.1%]</td>
<td>3020 3.8% [3.7%–3.9]</td>
<td>907 1.1% [1.1%–1.2%]</td>
</tr>
<tr>
<td>2013 (n=57,672)</td>
<td>1952</td>
<td>3.4% [3.2%–3.5%]</td>
<td>1509 2.6% [2.5%–2.8%]</td>
<td>419 0.7% [0.7%–0.8%]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005–2011 % relative decline (decline/year)</td>
<td>23% (3.9%)</td>
<td>35% (6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011–2013 % relative decline (decline/year)</td>
<td>31% (15%)</td>
<td>31% (15%)</td>
<td>36% (18%)</td>
<td>54% (27%)</td>
</tr>
<tr>
<td>2011 vs 2013 (RR) [CI]</td>
<td>0.68 [0.65–0.72]</td>
<td>0.69 [0.65–0.73]</td>
<td>0.70 [0.62–0.79]</td>
<td>0.44 [0.33–0.59]</td>
</tr>
</tbody>
</table>

* In 2005 the data collection was for ‘drivers smoking in cars with smoking’ which included vehicles where others were also smoking.
Discussion

This appears to be the first observation study of in-vehicle smoking using three waves of data, and the first study of the potential impact of a local smokefree vehicle campaign. During 2005–13 there was decreasing smoking in vehicles in this community, with three times the percentage decline/year during the 2011–2013 period in which the local smokefree vehicles campaign was held.

The results suggest a much sharper decline per year between 2011 and 2013 for: smoking in vehicles, smoking with others, and smoking with children, compared to between 2005 and 2011. The 2011–2013 decline for smoking in vehicles with children was also much greater than for the 2011–13 decline for smoking in vehicles with others (adults and children).

These results suggest that the local campaign may have had some impact, in addition to those from other national-level influences. The wider factors include the ongoing slow national decline in smoking prevalence, and similarly slow national decline in smoking in vehicles. Another factor that may have influenced smoking in cars nationally was the 47% increase that we identified during 2011–13, compared to 2009–11, for national media coverage around smoking in vehicles.

Strengths and limitations of this study—Multiple other issues limit our ability to quantify campaign specific impacts (including slight differences in the data collection methods, and potential changes in passengers per vehicle with increasing fuel prices over the study period). The lack of data from a control area is a principal limitation (it unfortunately was out of scope for this highly resource-constrained study). Such data would have helped determine the extent to which the decrease in smoking in cars that we found was attributable to the smokefree campaign, rather than a decline evident across New Zealand.

The results may not be representative of smoking in cars across Wainuiomata, as data were only collected at one (albeit major traffic flow) point. The judgment of the ages of children (12 years and under versus over 12 years) will remain an issue, although this might be minimised by training with photographs of children of a known age between the ages of 10 and 14.

This study used direct observation of behaviour, rather than self-reported data, and thus avoided the bias inherent in that source. Testing of inter-observer variation in a previous study using this method found high agreement across all the observational categories. The degree of accuracy may have been increased with pairs of observers, compared to the single observers used in the 2011 study.

Such local observation studies are of relatively low cost (for this one the main cost was the 108 hours of observer time), and allow local communities to be aware of a sentinel health risk. Sentinel, because it can give an indication of trends in smoking around children in private places (including homes).

Future studies—if resources permit, future such studies of the impact of a local campaign would ideally also observe vehicles in a control community where there was no campaign impact. In future similar studies, data on other background factors that might influence smoking in vehicles with others could be gathered. These could include legislative changes (e.g., requiring smokefree outside areas) and general mass
media campaigns relating to tobacco use (besides those specific to smokefree vehicles). The content of news media coverage of smoking in vehicles could be systematically analysed for the extent of positive or negative comments, and for changes in the articles across the relevant time period.

**Policy implications**—While this local smokefree campaign may have helped to further increase levels of smokefree vehicles, it also demonstrates the positive effect that local data may have, in sparking change for a community. Where there are large inequalities, and ‘difficult to reach’ populations, such health campaigns may be effective in reaching the population and reducing the inequalities. National health campaigns may also be made more effective by using local media for particular areas.

However, the more than halving of smoking in vehicles with children in Wainuiomata during 2011–13, to 0.1%, still resulted in a point prevalence that was five times that of the equivalent prevalence in 2011 for a low-deprivation suburb in Wellington that we previously studied (at 0.02%). This indicates that a range of interventions would be needed on top of such local campaigns, to maximise reductions in inequalities associated with smoking.

Government reliance on such local campaigns is likely to be far less efficient than national-level action, especially legislation for smokefree vehicles and mass media campaigns. Furthermore, the implementation of a smokefree vehicle law in New Zealand could utilise the 3.5 million random vehicle stops which are conducted each year by the police, rather than require extra stops by police.

**Competing interests:** Nil.

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**References:**


Opioid substitution treatment in New Zealand: a 40 year perspective

Daryle Deering, J Douglas Sellman, Simon Adamson

Abstract

We provide an overview of the history and philosophy of the treatment for opioid dependence, which has been dominated by methadone substitution treatment for the past 40 years in New Zealand. Although changes in approach have occurred over this time, influenced by various sociopolitical events and changing ideologies, opioid substitution treatment has still “not come of age”.

It remains undermined by stigma and risk concerns associated with methadone and has struggled to be accessible and attractive to illicit opioid drug users, comprehensive and integrated into mainstream health care. However, the introduction in 2012 of Pharmac-subsidised buprenorphine combined with naloxone (Suboxone) in the context of an emerging trend towards a broader recovery and well-being orientation could signal a new era in treatment.

The availability of buprenorphine-naloxone may also facilitate a further shift in treatment from primarily siloed specialist addiction services to integrated primary care services. This shift will help reduce stigma, promote patient self-management and community integration and align opioid substitution treatment with treatment for other chronic health conditions such as diabetes and asthma.

Opioid substitution treatment (OST) was pioneered in the 1960s by Drs Vincent Dole and Marie Nyswander through providing a maintenance dose between 80–120mg of the mu opioid receptor agonist medication, methadone. Their results were so startling they termed heroin addiction, a “metabolic disease”, to emphasise the effectiveness of a blockading dose of an opioid substitution medicine in combination with psycho-social rehabilitation. In so doing, they made the point that addiction is best considered a medical rather than moral issue.

Subsequent randomised controlled trials and outcome studies confirmed the effectiveness of OST in reducing injecting opioid use, mortality, criminal offending and improving health and general functioning. However, studies have also shown that variability in engagement and retention rates (indicators of effective treatment) and patient outcomes are influenced by stigma and misperceptions associated with methadone treatment.

Furthermore, that service related factors influence patient outcomes. These include adequacy of methadone dose, leadership and philosophical approach, how restrictive treatment policies are, staff stability and attitudes and the quality of staff/patient relationships.

Opioid substitution treatment was introduced into New Zealand in the early 1970s by psychiatrists Dr Fraser McDonald in Auckland and Dr John Dobson in Christchurch.
The first national Methadone Conference was held in 1979 in Palmerston North which initiated a Ministerial Drugs Advisory Committee (DAC). The DAC, under the chairmanship of John Hannifin, subsequently led to the development of methadone treatment programmes throughout New Zealand and the publishing of a National Protocol in 1992.5

The first 20 years of opioid substitution treatment in New Zealand

During the first 20 years of OST in New Zealand five different perspectives influenced methadone treatment trends and tensions in service delivery.6

Firstly, Dole & Nyswander’s model implied that opioid dependence was a chronic medical condition. It was thought that the person could very well stay on the medication for many years or for as long as he or she was benefiting from the treatment, if not for life, similar to prescribed insulin for a patient with diabetes.

In direct contrast to this approach was an abstinence model with an associated catch-cry that “methadone treatment is like giving gin to an alcoholic”. This moralistic perspective significantly impacted on both the dose and the duration of treatment. There was an expectation of prescribing lower and often sub-therapeutic doses of methadone and shorter versus longer term treatment.

Clinicians became more narrowly focused on the patient’s substance use in contrast to taking a broader health and functioning perspective. Rather than positive reinforcement for an individual’s achievements, a more protocolised approach was taken with negative sanctions for illicit substance use that included use of opioid and non-opioid substances. Sanctions included limiting takeaway doses and even involuntary discharge if urine samples were found to be “dirty”.

These two opposing positions were then challenged by the appearance of the HIV/AIDS epidemic in the early 1980s which jolted the OST sector into a new paradigm. The primary goal of “harm reduction” was to reduce the spread of HIV through recruiting injecting opioid drug users into methadone treatment and retaining them in treatment. This goal justified a more pragmatic approach; allowing a more flexible admission policy and methadone dosing regime, greater acknowledgement of the reality of relapse and other substance use as well as a broader outreach orientation incorporating the introduction of needle exchange programmes in 1987.7

Two further developments facilitated a more comprehensive, individualised approach to opioid dependent patients that brought treatment into line with normal medical approaches to other chronic relapsing disorders. The first was the recognition that many patients with opioid dependence had co-occurring psychiatric conditions which required consideration when formulating treatment responses and highlighted the need for specialised training for OST staff. The second was the development of serum methadone concentration technology, which assisted clinicians in optimising the methadone dose for individual patients.

With these developments in the first 20 years of methadone treatment in New Zealand, it was felt that by the mid-1990s the stage had been set for “the coming of age” of methadone treatment in New Zealand.6
Has opioid substitution treatment “come of age” in this second 20 years?

What has happened over this second 20 years? Is treatment more readily available? Is treatment more effective now? Is treatment of a higher standard of quality; flexible and responsive to the needs of patients? Is treatment less stigmatised and more accepted as part of normal medical practice? These were the key questions driving three Ministry of Health commissioned reviews of OST undertaken by the National Addiction Centre (NAC) (formerly known as the National Centre for Treatment Development) in 1996, 2001 and 2008 respectively.

Estimated need for treatment and service delivery options

At the end of 1992 there were 1340 people receiving OST in New Zealand\(^8\) and this number nearly tripled over the next 4 years (see Table 1).

Table 1. The number of opioid substitution treatment (OST) patients in New Zealand and percentage in primary care over the past 20 years

<table>
<thead>
<tr>
<th>Year</th>
<th>OST patient number</th>
<th>% primary care</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>1340</td>
<td>not known</td>
</tr>
<tr>
<td>1995</td>
<td>2500</td>
<td>not known</td>
</tr>
<tr>
<td>1996</td>
<td>3774</td>
<td>20</td>
</tr>
<tr>
<td>2008</td>
<td>4608</td>
<td>25</td>
</tr>
<tr>
<td>2012</td>
<td>5018</td>
<td>29</td>
</tr>
</tbody>
</table>

In the light of growing concerns about the potential numbers of people with opioid dependence seeking treatment, coupled with the need for cost-effective treatment services, the NAC was commissioned to estimate the current and projected need for methadone treatment services for opioid dependence and identify a range of service delivery options.\(^8\)

The number of people using opioids regularly (not necessarily daily or almost daily) in New Zealand was estimated, via an indirect extrapolation of international data, to be possibly as high as 20,000. Only 2500 were receiving methadone treatment at the time and the gap between treatment need and treatment provision was reflected in the presence of waiting lists for the first time.

The cost of treatment for one opioid dependent person for 1 year was estimated to be $4400, comparing favourably with the $50,000+ cost of incarceration in a New Zealand prison at that time, or the $60,000 required to maintain an opioid dependence, almost all by illegal activity.\(^9\)

Five models of service provision were developed and analysed and a preferred option was recommended on the basis of cost, quality, and future sustainability. This model combined general practitioner (GP) and specialist service care in an “integrated model”. It was recommended that following stabilisation at a specialist service 80% of opioid dependent patients would receive continuing treatment by GPs in primary care settings and the remaining 20% with more complex needs would be managed by the specialist services.
It was also recommended that an increase of at least 2000 methadone treatment places nationally be funded as soon as possible. However, due to concerns raised by both the primary care and specialist service sectors about the competence and willingness of GPs to take on the proposed continuing care component, the Ministry of Health (MOH) subsequently revised the recommended proportions of 80/20 to an aspirational goal of a 50/50 split between the two sectors.

**Interim prescribing**

In September 1996 there was an increase to 3774 patients receiving methadone treatment in New Zealand (see Table 1), with numbers being strictly controlled through service contracts. Due to concern about rising waiting lists in most regions throughout New Zealand, particularly in the South Island, the NAC was commissioned by the MOH to examine this problem, focusing on the South Island programmes.\(^\text{10}\)

The main finding in this 2001 report was a waiting time of around nine months for most of the methadone treatment programmes in the South Island. It was considered that the official number of people waiting was an underestimate of the true number because the length of the waiting list deterred opioid dependent people from presenting for assessment.

It was suggested at the time “…that continuing this intolerable situation is analogous to maintaining a nine-month waiting list for acute tuberculosis, a similarly life-threatening, personally and socially damaging and infectious disorder” (pg. 21) and that an immediate goal should be to reduce waiting list times to less than one month.

In the absence of any new funding, recommendations from this review included the option of interim, low intensity methadone treatment for patients on regional waiting lists through their GP on authorisation from the regional specialist drug service together with the development of an interim methadone prescribing protocol. This clinical strategy was in accord with a highly successful randomised controlled trial conducted a decade earlier.\(^\text{11}\)

The trial demonstrated that methadone prescribing in a three-month low intensity interim programme significantly decreased intravenous heroin use during this time and also increased retention when patients were transferred to the methadone treatment programme, compared with being on a routine waiting list which included counselling.

In 2003, Dr Alistair Dunn, a Whangarei GP and addiction medicine specialist working on a sessional basis at the Northland regional specialist service conducted a pilot study to assess the feasibility and effectiveness of providing interim methadone by a GP within a primary care setting. This initial pilot comprised prescribing up to 60mg of methadone to eight consenting opioid dependent patients on the Northland specialist service waiting list.

Considerable improvements were found in both drug use and general functioning at three months.\(^\text{12}\) At least five further interim methadone pilot projects were undertaken in different localities over the next 2 years; in Whanganui, Palmerston North, Nelson, Christchurch and Dunedin.
The results and experiences of each of these pilots, including the initial Whangarei study, were presented at a one-day conference on interim methadone prescribing in December 2005 in Wellington. No deaths and no critical incidents had occurred and all six presenters were positive about the outcomes observed in each locality. The meeting concluded with a call for interim methadone prescribing to be formally endorsed and standardised in a national protocol. Eighteen months later a formal MOH guideline was published.

This guideline was strengthened by the publication of a second high-quality randomised controlled trial of interim methadone prescribing showing very similar results to the original Yancovitz study. The MOH guideline included a directive that when there is a longer than two-week waiting list, patients with established opioid dependence be given the choice of undertaking an interim methadone-prescribing programme, ideally by the patient’s own GP, up to a maximum of 60mg.

Unfortunately, this guideline was not enacted by all district health board specialist services and waiting lists of much longer than 2 weeks for methadone treatment in New Zealand continued in many regions.

**Continuing concerns**

Continuing concerns about the treatment of opioid dependence led to a third MOH commissioned report from the NAC. The main questions related to the prevalence of opioid dependence (including within prisons) and the numbers being treated with OST (including those in prison and in primary care), continuing waiting lists and potential barriers to people gaining the treatment they want.

A more direct methodology of estimating prevalence was employed compared with that used in 1996. Data were obtained directly from 97 opioid drug users recruited via OST and needle exchange services in Auckland and Christchurch and a smaller provincial city, Tauranga, through interviews conducted by trained and supervised peer research assistants.

The number of people in New Zealand with opioid dependence, which would only include people who are using illicit opioids daily or almost daily (those receiving OST and those not currently in treatment), was estimated as 9953 (95%CI 8,940–10,967). The number of OST patients was found to be 4608 (Table 1) including 87 in prison. A quarter (25%) were being prescribed by general practitioners, still well below the 50% MOH target.

The estimated waiting time for admission to treatment varied considerably from 2-290 days with a median of 30 days (mean 90.3 days). The waiting time guideline of less than 2 weeks was met in less than a third of programmes and only 46 patients had been treated with interim prescribing in the previous 12 months.

Continuing concerns expressed by a number of services about interim prescribing included that it was less than ideal treatment and providing interim prescribing could mask the need for increased specialist OST resources.

It was also discovered that the size of waiting lists was obscured in some services by a new category of “not ready”, meaning not ready to be put on an OST waiting list because of other substance use in addition to opioid drug use, the presence of criminal
charges, or inability or unwillingness of people to meet lengthy or perceived unrealistic assessment requirements. This was despite the foreword to the 2003 Opioid Substitution Treatment Practice Guidelines highlighting that “…opioid substitution treatment will be more successful when services are accessible, entry is prompt…” (pg. III).

The most important finding from this study was the perceived barriers to receiving OST where there was a consensus between the opioid dependent study participants and the specialist service providers. The presence of waiting lists was listed in the top four perceived barriers. The other three were: restricted takeaways; being tied to staying in one place; and having to go to a chemist every/most days. These latter three are components of what has long been referred to by patients as “liquid handcuffs” referring to restrictions on daily life including, for some, gaining or maintaining employment.

Also of concern to many patients were the “judgement and stigma” associated with receiving methadone treatment, negative staff attitudes and an overly restrictive and paternalistic approach. Almost all services reported staffing resource issues and barriers to the transfer of stable patients to primary care which were perceived to be related to costs for patients, unavailability of GPs, GPs unwillingness to provide OST, lack of training and patients not yet ready for transfer.

Key recommendations from this report centred on strategies to increase accessibility and attractiveness of OST to people with opioid dependence; the provision of interim methadone and the subsidising by Pharmac of buprenorphine, a partial mu opioid receptor agonist shown to be an effective OST medication as an alternative opioid substitute medication; active involvement of consumers at all levels of OST, establishment of peer support worker roles; bringing about a culture change in at least some specialist services and a review of staff attitudes and professional development needs.

Subsequent developments

In the subsequent 4 years, waiting lists continued to fluctuate and to be of concern in some regions. The number of patients receiving OST increased to over 5000 and the percentage of patients receiving continuing care in primary care increased by 4% up to 29% (see Table 1), still considerably short of the 50% MOH target. Also during this time two other potential influences emerged.

Firstly, the concept of “recovery” entered the New Zealand OST treatment discourse and policy guidelines reflecting overseas trends in the US and the UK. Acknowledging the continuing place of harm reduction and the debate about the definition of “recovery”, concerns about OST that have emerged in overseas debate are of relevance to the New Zealand setting. These include a narrow focus on substance use and a lack of responsiveness to the broader healthcare needs of patients, particularly those of older patients, and services not taking opportunities to motivate and support patients to develop longer term recovery plans that address well-being and community integration. Such an approach requires more than retention in treatment and the prescribing of a medication. It also requires a shift in patient status from passive recipient of care to active participant, consistent with a chronic care self-management approach.
Secondly, buprenorphine became subsidised by Pharmac in July 2012 and provided an alternative OST medication to methadone. A legitimate concern of specialist services has been the safety profile of methadone and concerns about overdose and diversion. The principal advantages of buprenorphine (administered as a sublingual tablet) over methadone is that as a partial mu agonist (and kappa antagonist) it has a ceiling effect beyond which dose increases prolong its duration of action without further increasing its agonist effect, thereby reducing potential risk of overdose.\(^9\)

To deter injecting and diversion, buprenorphine is combined with naloxone, a narcotic antagonist (Suboxone). While naloxone is poorly absorbed sublingually, it is activated by injection resulting in an unpleasant precipitated withdrawal. Buprenorphine-naloxone has also not been found to be associated with clinically significant QT-interval prolongation.\(^{25}\)

While a proportion of patients may prefer the less “dense” effect of buprenorphine, others will prefer the full agonist effect of methadone. This alternative medication now offers people with opioid dependence a choice of medications, is less associated with stigma compared to methadone and does not necessarily require daily administration, improving cost-effectiveness and reducing the negative “liquid handcuffs” experience associated with methadone.\(^{26}\)

The higher safety profile of buprenorphine-naloxone relative to methadone is likely to promote a higher proportion of patients receiving OST treatment within routine primary care settings.\(^{27}\)

**Concluding comments**

While gains have been made, the response to the questions: Is treatment more readily available? Is treatment more effective now? Is treatment of a higher standard of quality; flexible and responsive to the needs of patients? Is treatment less stigmatised and more accepted as part of normal medical practice? Is that there is still much more to be achieved? Taking into account the reported change in method of estimating prevalence of opioid dependence we don’t consider the actual number of people with opioid dependence has reduced.

A review of the past 40 years of OST in New Zealand shows an initial rapid rise in OST with a far more modest increase over the past 10–15 years, despite significant levels of unmet need. Unmet need is reflected in the number of people waiting for treatment, those deemed “not ready” for treatment, those who don’t seek or engage in treatment because of the associated stigma and those who perceive OST to be too restrictive to be an attractive or viable treatment option.

It is important to emphasise that New Zealand studies have quantified the significant community cost of untreated opioid dependence\(^9\) and demonstrated that cost-effectiveness of OST and treatment for hepatitis C could be improved by reducing barriers to entry to OST and engaging opioid dependent individuals in treatment at an earlier age.\(^{28}\)

Improving the quality of OST requires a continuing harm reduction approach as well as the promotion of a broader person-centred recovery and wellbeing approach. This direction is reflected in the revised 2014 OST Practice Guidelines\(^{21}\) and is supported by the National Association of Opioid Treatment Providers.
There has been some progress towards an integrated specialist service and primary care model proposed over 16 years ago but the proportion of patients receiving continuing treatment in primary care settings remains substantially short of the MOH target of 50%. There is also still some way to go towards achieving a greater willingness by GPs to provide continuing OST, considered in part to be influenced by stigma, risk concerns and misperceptions associated with methadone treatment and the patient group. These factors all point to the need for renewed efforts to achieve a paradigm shift in OST delivery in New Zealand and a true “coming of age” of the treatment.

The availability of the alternative combined buprenorphine-naloxone medication in conjunction with a broader recovery and wellbeing treatment orientation has the potential to catalyse a new era in OST provision. This new era would be characterised by reduced stigma, increased accessibility and treatment responsiveness, choice of medication, adjunctive interventions, greater treatment integration with mainstream health services and a focus on patient self-management and community integration consistent with treatment for other chronic health conditions.

Such change will require a concerted and sustained effort to advance the quality of OST provision in New Zealand.

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Bioethics for New Zealand/Aotearoa

Ben Gray

Abstract

The New Zealand Medical Association (NZMA) is reviewing its Code of Ethics. The current Code is predominantly an individual patient-focussed, doctor as independent practitioner and monocultural document, based substantially around the four principles of Beauchamp and Childress.

This paper discusses the limitations of this approach and describes three groups who have developed ethical codes that depart substantially from the NZMA; the Public Health Association, The New Zealand Nurses Organisation (NZNO) and the Putiaora Writing Group “Guidelines for Maori Research Ethics”. All of these put much greater emphasis on trusting relationships as a foundation for ethical behaviour, which the current NZMA Code of Ethics pays little attention towards.

This paper argues that the emphasis on the universality of the four principles is incompatible with the development of trusting relationships with diverse individuals and groups and is a barrier to culturally competent practice, public health practice and collaborative interdisciplinary practice.

The New Zealand Medical Association (NZMA) Code of Ethics is currently being revised. The draft revised Code acknowledges that changes to the health care environment have led to some additions to the Code. The Preliminary Statement notes that “some ethicists are beginning to argue for a fifth principle, namely the duty of doctors in some circumstances to recognise the need to work in collaborative groups”. Section 70 addresses the need for doctors to have a responsibility toward society in matters relating to “health and safety, health promotion and education and legislation affecting the health or wellbeing of the community”. Proposed sections 71 and 72 add the importance of applying efforts to achieve health equity, and advocating for resources for patients and populations.

However despite the increasing acceptance of New Zealand/Aotearoa as a Bicultural nation and the Preliminary Statement noting recognition of the principle of partnership, there is no reference at all to Maori values such as the importance of relationships, nor to our increasingly diverse population.

The Health Practitioners Competence Assurance Act (2003) (HPCA Act) Section 118 requires registration authorities to set standards on just three things: clinical competence, cultural competence, and ethical conduct, and yet this document completely ignores the concept of cultural competence. In addition the draft Code does not address the need for mandatory health promoting practices necessary for safe public health.

The Code remains a predominantly individual patient-focussed, doctor as independent practitioner and monocultural document. In this paper I will argue that more
widespread amendments are needed to meet the societal and health changes that we are currently facing.

The problem of autonomy

The current Code relies heavily upon the four principles (justice, beneficence, non-maleficence and autonomy) of Beauchamp and Childress\(^6\) particularly the principle of autonomy, both in relation to patient autonomy and physician autonomy. The primacy of this principle reflects its origin from the USA which is a highly individualistic society.\(^7\) This is not a good foundation upon which to respond to the challenges we face. Developing collaborative practice is very difficult if doctors behave autonomously.

The principle of autonomy has limitations for Māori and Pacific people who are traditionally collectivist societies.\(^8,9\) It is also problematic for Public Health practice where many activities are based on the “Wellbeing of the Collective”.

Doing the right thing

The NZMA Code is based around Principlism, substantially depending on the approach of Beauchamp and Childress.\(^6\) In summary they argue there is a Common Morality that has core tenets that are “not relative to cultures, groups or individuals.”, and that ethical problems should be analysed against this moral code in order to decide what is ‘right’ which consequently determines how to act. The underlying premise is that there is a “right” answer to most ethical problems and once found it is clear what should be done.

This premise can be questioned on several grounds. Autonomy is not unanimously accepted as a primary universal principle and other groups have adopted different principles which conflict with this such as “Guardianship of the environment and its resources”.\(^3\) More importantly this approach is in direct conflict with the concept of Cultural Competence.

The Medical Council Statement on Cultural Competence\(^10\) is explicit in section 13(c) “Attitudes A preparedness not to impose your own values on patients.” Despite their assertion that their Common Morality is not relative to cultures, groups or individuals, Beauchamp and Childress\(^6\) clearly hold some values that are distinctively American: “It is extremely difficult for morally compelling social objectives to outweigh basic rights.”

Increasing attention is being paid in New Zealand\(^2,4\) to the importance of process or “doing”; the development of the relationships required to achieve good ethical outcomes.

Change in burden of disease

The largest part of our work now is in managing chronic conditions:

- Mismanagement of chronic conditions is the leading cause of hospitalisations, accounts for 80 percent of all preventable deaths and is estimated to consume a major proportion of our health care funds.
- Chronic conditions account for a higher proportion of illness and deaths among Māori, people on low incomes and Pacific peoples than among the general population.\(^11\)
Effective management of patients with these conditions is not possible without effective collaboration between the clinicians involved in their care\textsuperscript{12}. As with smoking related chronic conditions, there will need to be a significant public health response to affect the obesity epidemic: bariatric surgery for all obese people is not a viable option.

**Collaborative practice**

Collaborative care between disciplines is one aspect of a move to better integrate care within and between health and social agencies. The National Patient Safety Foundation in the USA produced a substantial document looking at how to accelerate care integration. They view physician autonomy as a barrier to care integration:

> The principle of the autonomous physician…. is ill-suited to address the problems that many patients have today, where optimal solutions require collaboration, shared decision making, and cooperative care management. Continuing to inculcate in medical students the concept of the autonomy of the physician is a formidable barrier to preparing them for the collaborative activities and interactions required in an integrated care process for the patient. In fact, we believe it may be the largest single barrier that stands in the way of successful care integration going forward.\textsuperscript{13}

In New Zealand the Health and Disability Commissioner expressed similar views about the importance of integration in a submission to the review of the Health Practitioners Competence Assurance Act:\textsuperscript{14}

> …care integration is an important factor in quality service provisions and quality and safety are becoming increasingly dependent on how multidisciplinary teams and clinical networks operate. Failure or inadequacy in care integration is a recurring theme in complaints…. which often result in consumers receiving a poor standard of care.

The current NZMA view that “some ethicists” think that in “some circumstances” doctors merely “recognise the need to work in collaborative groups” significantly downplays this imperative. In many circumstances doctors must work collaboratively with other clinicians to be able to address the needs of patients.

> The days of the brilliant solo operator in medicine are gone. From primary to tertiary care, healthcare is delivered by (interdisciplinary) teams, and the ability to be a team player is essential for the team to function well for the benefit of patients. Yet we still see the old medical hierarchy at play, with junior doctors, nurses, pharmacists and technicians feeling unable to speak up and question the treatment being provided to the patient.\textsuperscript{15}

Intuitively you might expect that nurses and doctors would share similar ethical codes, particularly if you believe in a “Common Morality”. However Hall\textsuperscript{16} believes the cultures of Medicine and Nursing have differing values and that compared with nurses, “The culture of physician training has focused on action and outcome more than on relationships.”

The New Zealand Nurses Organisation Code of Ethics\textsuperscript{3} has relationships as a central feature. Like the NZMA Code it is based around principles, but has expanded beyond Autonomy, Justice, Beneficence and Non-Maleficence to include Confidentiality, Veracity, Fidelity, Guardianship of the Environment and Being Professional. Each of these nine principles is examined as they apply to the different relationships nurses have: with clients, colleagues, organisations and society.

The question of adopting uniform codes of ethics was addressed in the recent review of the Health Practitioners Competence Assurance Act\textsuperscript{14} “the majority of submissions
agreed that there was sense in at least a degree of standardisation [of codes of ethics]”. It stands to reason that if doctors and nurses shared a Code of Ethics, collaborative practice might be easier to develop and the process of collaborative practice may be more effective.

Diversity of the New Zealand population

New Zealand is the fourth most diversely populated country in the world as measured by proportions of people born outside of the country. Since 1996 the percentage of New Zealand residents born overseas has increased from 17% to 25%. In the seven years between the 2006 and 2013 censuses the Chinese population grew by 16%, and the Indian population by 48%.

Asia is the most common region of birth for the overseas born. The proportion of people from non-English-speaking backgrounds is also increasing; Hindi and Samoan are the most widely spoken languages in New Zealand after English and Māori.

New Zealand’s immigrant population is disproportionately concentrated in the Auckland region. In 2013, over half (52%) of the overseas-born population lived in Auckland, which was home to 33% of the country’s total population. Of the children cared for by the Auckland District Health Board, 13% are Māori, 20% are Pacific, 26% are Asian and just 40.5% are European and other.

Ethnic diversity brings a rich variety of ethical viewpoints and communities may not share a common view of ethical behaviour. The Kaiwhakahaere (Māori director) from the Health and Disability Commissioner noted:

“The cultural norm for Pacific Island people makes it difficult for them to complain and the concept of the Code of rights is hard to accept.”

Harding notes that Chinese approaches to ethics are significantly different “…Confucianism emphasises virtue, duty and context. The self in Chinese culture is subordinate to relationships with others”

The Medical Council of New Zealand has a comprehensive Statement on Cultural Competence, but the only references in the draft NZMA Code are (clause 9) proscribing discrimination, and (clause 71) supporting efforts to achieve health equity. This fails to address many of the issues raised in the Medical Council Statement, and thus is at odds with the HPCA Act

Māori ethics

Te Ara Tika Guidelines for Māori Research Ethics demonstrates a different way of approaching ethics. The ethical principles in this document focus on relationships or “Doing”:

The Māori ethics framework references four tikanga based principles whakapapa (relationships), tika (research design), manaakitanga (cultural and social responsibility), and mana (justice and equity) as the primary ethical principles in relation to research ethics. The outer quadrant relates to what has been termed minimum standards. The minimum standards are expected to have been met by researchers before ethics committee members consider ethical approval for the research project. The middle quadrant refers to good practice which indicates a more Māori responsive approach to the research project. Best practice extends the ethical consideration to align with expectations of behaviour within Te Ao Māori.
An important feature of the model is the stages of transition from the guiding principles on the outer circle, moving inwards to the highest level ethical obligations (figure 1). Researchers who operate at the centre are obligated not to deceive, manipulate or harm. Such an obligation cannot be fully carried out without a significant relationship with both parties trusting in each other, understanding respective values and goals, and reaching agreement by collectively working together.

This approach is not incompatible with the “Principles” approach. The document notes that:

The Māori ethical framework should be used in conjunction with the Health and Disability Ethics Committee] Operational Standard and the majority of the concepts and issues identified within the Māori ethical framework can be referenced back to the Operational Standard.

What it does is change the emphasis of activity from analysis of the best option to developing a relationship between researcher and subject, who then analyse the problem together. They then agree on the most acceptable option.
Although the focus of this document is on ethical principles as applied to research, it also has application to clinical ethics. Research ethics is largely based on “Doing the right thing”, predominantly not causing any harm to research participants whilst gathering research data.

The conventional approach is to analyse the proposal in detail, anticipate ethical problems and determine ways to mitigate them. The participant can then either consent or refuse to participate. This process is based on the presumption that there is one “right” way to do the research. The Māori approach depends on developing a trusting relationship with rights and obligations for both parties and analysing the proposal together.

A presumption is made that if there is a good relationship then a way that both parties agree to will be found. Such an approach does not require full agreement on what the “right” thing is, they may not have congruent values, but on negotiating an agreed approach that is sufficiently cognisant of the important values of both parties. My contention is that a similar change of focus is needed for clinical ethics to greater highlight the importance of relationship and on negotiating an agreed approach, rather than the current focus on seeking the “right” approach.

**Pacific health and relationships**

The importance of relationship is also high in Pacific communities. In a report looking at a Pacific approach to Primary Care\(^27\) one of the four main results of the study was around the importance of relationship:

> Significantly, Pacific people judged the quality of their health care by their sense of whether or not the va [sacred space] was being respected. Consultations are more than just a commercial transaction in which doctors provide a service and patients pay; when the relationship between patient and health professional respects the va, then, to the Pacific person, there is a completely different quality to the relationship.

**Public health ethics**

Almost everything that a public health worker does affects the autonomy of individuals, from quarantining infectious people, limiting supply of tobacco to adults or adding fluoride to water supplies. Internationally\(^28,29\) and in New Zealand\(^30\) following the SARS scare there was much focus on public health ethics in a pandemic. Baylis \(^31\) argued that a relational framework for public health ethics works best for managing pandemics. The title of the New Zealand pandemic planning document was “Getting Through Together” and included values of:

> Neighbourliness/whanaungatanga helping and caring for our neighbours and friends helping and caring for our family/whanau and relations working together when there is a need to be met

And

> Respect/manaakitanga recognising that every person matters and treating people Accordingly, supporting others to make their own decisions whenever possible supporting those best placed to make decisions for people who cannot make their own decisions restricting freedom as little as possible, but as fairly as possible, if freedom must be restricted for the public good

The Public Health Association of New Zealand has developed a Code Of Ethical Principles For Public Health in Aotearoa New Zealand\(^2\) that extends these principles to apply to all public health practices. It retains many of the ethical principles in other
codes, although it omits autonomy. The important difference is the inclusion of Māori Principles such as Manaakitanga and Whanaungatanga that focus on the quality of relationships rather than the content of decisions. Like the Māori research ethics this is not incompatible with a “Principles” approach but again adds the importance of relationships and the quality of the decision making process.

**Relationships and trust**

An important element of a functional relationship is trust. The New Zealand Medical Council standard on medical practice in New Zealand “Coles Medical Practice in New Zealand” states:

> You should aim to establish and maintain trust with your patients. Relationships based on openness, trust and good communication will enable you to work in partnership with them to address their individual needs.

Despite this the only sections in the NZMA Code of Ethics that refer to trust or relationship are

“Preliminary Statement “In return for the trust patients and the community place in doctors, Ethical Codes are produced to guide the profession and protect patients”

1. Exploitation of any patient…..is unacceptable and the trust embodied in the doctor-patient relationship must be respected.

12. Patients must be able to trust their doctor to deal with their needs fairly and honestly”

“The revelations of the inquiry have damaged this trust and good faith not only in the National Women’s Hospital but also elsewhere in New Zealand. Many doctors are extremely perturbed about the new lack of trust. Those doctors need to stop and think. The trust that existed has been shown not only to have been misplaced but to have been dangerous to the women concerned.”

“Inevitably, new consent procedures will be recommended, especially for patients concerned in research and teaching……. Patients will welcome more information and a greater chance to make informed decisions about their treatments, but I suspect that both doctors and patients will continue to worry about the lack of trust. People who are ill need to be able to trust their medical advisers, but that trust is not bestowed with a higher degree; if it has been abused it will need to be earned again.

Lewis subdivides trust into three types: cognitive, emotional and behavioural, although noting that they usually combine together. Rousseau adds the idea that people can also trust institutions (such as the hospital or the profession of medicine). Paul refers to providing patients with more information and being able to make
informed choices, an approach which is analogous to enhancing cognitive trust. The trust that ill people need to have in their medical advisors that is not "bestowed by a higher degree" is emotional trust; trust that has been built through a developing relationship.

Conclusion

Building and maintaining a relationship is a central ethical activity. The proposed updated NZMA Code of Ethics is still overly dependent on the "Four Principles" approach. The Principles approach particularly the emphasis on autonomy is the antithesis of good Culturally Competent care. Autonomous physicians preclude good collaborative care; individual autonomy is problematic for public health practice. Codes of Ethics have been developed by Public Health practice, Māori Research and Nursing with each proposing alternative models which combine the traditional ‘Principles’ with the importance of clinician – patient relationships. It is time that the NZMA ethical Code paid more attention to the quality of relationships.

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A critical analysis of the End of Life Choice Bill 2013

David E Richmond

Abstract

**Aim** This paper aims to alert medical practitioners to the legal and ethical problems that passage of the End of Life Choice Bill (which seeks to legalise euthanasia and physician-assisted suicide) would have for them in New Zealand. Although sponsor MP Maryan Street withdrew the Bill on political grounds in October 2013, she has pledged to reintroduce the Bill after the next Parliamentary elections and remains committed to its objectives.

**Method** A clause by clause analysis of the Bill was undertaken from a clinical perspective, following the sequence of requesting, validating, providing and reporting episodes of euthanasia or physician-assisted suicide rather than following the administrative sequence in which the Bill has been drawn up for Parliamentary debate. Where possible, the experience of other jurisdictions where these end of life options are legal has been drawn upon to enable inferences to be drawn as to the likely effects of the legislation.

**Results** The analysis supporting this paper reveals that the legislation would:
- make it possible for virtually any person over the age of 18 to request and receive euthanasia provided they took care in the way they phrased the request,
- expose medical practitioners who attempted to deter applicants too vigorously to the possibility of legal action on the grounds of attempting to frustrate the applicant’s wishes,
- compromise the ability of practitioners to opt out on conscience grounds,
- allow the easy circumvention of reporting requirements for each event,
- provide minimal protection against some people suffering euthanasia without consent or request, and
- exempt medical practitioners providing euthanasia services from prosecution for any action in the provision of such services, even if they were negligent. The branch of medical practice that specialises in killing people would be the least regulated of all.

**Conclusion** If passed into legislation, the End of Life Choice Bill will create the most momentous changes to clinical practice and the regulation of certain professional activities of medical practitioners that this country has ever seen. Whether they choose to be or not, sooner or later every medical practitioner will be affected by the legislation. It therefore behoves every medical practitioner to examine and understand this Bill and its implications.

The End of Life Choice Bill whose objective was to legalise euthanasia and assisted suicide in New Zealand was introduced to Parliament’s ballot system for Private Members Bills in 2012 by its sponsor, MP Hon Maryan Street.
It was withdrawn in September 2013 on the grounds that it would not receive serious attention if drawn for debate in an election year. Ms Street has however pledged to reintroduce the Bill after the next Parliamentary election and remains committed to its objectives. It is therefore important that medical practitioners should have a thorough understanding of what the Bill intends.

The purpose of this paper is to critique the Bill as it stood on withdrawal in order to provide a clinician’s perspective on it. The sequence of the analysis follows the process of requesting, validating, providing and reporting an episode of euthanasia or physician-assisted suicide, rather than the administrative sequence in which the Bill is drawn up.

**Purpose of the Bill**

The stated purpose of the Bill is to provide individuals aged 18 years and over, with a choice to end their lives under certain circumstances and to receive medical assistance to “give effect to their choice”.

**Making the request**—Section 7 is headed *Request made in person for medically assisted death*. Subsections 1) and (2) specify that requests must be in writing and signed by the applicant. The request must be confirmed no sooner than 7 days later before further action can be taken. However, subsection(3) allows that an applicant who is unable to write or confirm a request in writing may instead mark, with an X, a request or confirmation written on their behalf by some other person; or they may make a request “by other means” which *may* be recorded in writing by another person. The “certifying medical practitioner” (CMP), i.e. the medical practitioner who receives the request, must certify that s/he believes that the written (or other) record of the request “properly records the wishes of the applicant.”

**Comments**—The purpose of regulations in a Bill such as this that authorises citizens to kill one another under certain conditions is to prevent abuse of the powers and procedures it legitimises. Protection is sought in the voluntary and personal nature of applications as in subsections (1) and (2). Subsection (3) however, provides a loop hole in the regulations in that it leaves open an avenue for an interested third party, e.g. a family member, to make the request on behalf of applicants who either have never learned to read or write or who are prevented from doing so by some physical or cognitive impairment. The “other means” does not rule out an oral request being conveyed to the CMP. The CMP will have the responsibility of determining whether the request is a spontaneous one, made without coercion. That will be impossible in many cases, especially where the application is made by a third party and there is no written record of the applicant’s wishes.

**Grounds for the request**—Section 6 entitles a person to receive medical assistance to end his or her life if he or she:

- Is mentally competent (for comment on the definition of ‘competency’ see under discussion of sections 8 and 9 below)
- Suffers from either “a terminal disease or other medical condition likely to end his or her life within 12 months” OR
• Suffers (from) an “irreversible physical or mental medical condition that, in
the person’s view, renders his or her life unbearable.” 6(1) (b) (ii)

Comments—

• The Bill assumes the infallibility of diagnosis. But diagnoses are made on the
basis of probability.1,2 Not everyone diagnosed with terminal cancer, for
example, will have it. There are records of people being euthanized who did
not have the “terminal disease” they were thought to have.3,4 If euthanasia is
legalised, over time, many will suffer the same fate.5 The sponsors of this Bill
are apparently prepared to accept some ‘collateral damage’ in the pursuit of
their cause. Yet New Zealand prohibited capital punishment in 1961 largely on
the grounds that one innocent life taken in error was one too many.

• All the experts agree that it is not possible to forecast with certainty that a
person is going to die within 12 months, even in the case of terminal cancer.
Even 6 months is problematic. Studies have shown that only 20% of
prognostic predictions made by competent physicians were within 33% of
actual survival.6 Prognosis is an uncertain art. Some people will be euthanized
on the basis of a pessimistic or incorrect prognosis. Moreover, if lethal drugs
are going to be prescribed so far ahead of an expected death, there is no
mechanism for accounting for them in the event that they are not used. In
Oregon, since inception of the legislation, 36% of people who received lethal
prescriptions under the Death With Dignity Act as reported in 2011, died of
their disease and did not take the drugs.7 What happened to them? No-one
knows, and, as with this Bill, there is no mechanism for finding out.

• Euthanasia could be justified by the descriptors offered in 6 (1) (b)(ii) for a
wide range of non-terminal human conditions, including loneliness,
 depression, poor family relationships, tired of living, feelings of helplessness,
demoralisation syndrome, loss of dignity, post-traumatic stress disorder and
fear of future pain. Many people, not all of them seriously ill will fall under
this category where, as in Belgium and Holland, euthanasia becomes a
panacea for all manner of social ills—including unsuccessful sex-change
operations.8 The deciding factor is how the patient feels. In this respect, this
Bill offers what it took the Dutch 30 years to accomplish.

• People contemplating suicide will have a ready state-funded avenue to achieve
the end they desire. A week’s reflection before confirming a request is a very
short time: one could hardly for example imagine it to be sufficient to allow
the pain of a jilted teen-age lover to be alleviated. We will have the
contradictory situation of being a society concerned deeply about the suicide
rate on one hand,9 yet providing a state-approved means of facilitating suicide
on the other.

• There is no definition of the term ‘unbearable.’ It is a very subjective emotion.
If it is meant to be a subtle allusion to pain, it fails. There is growing
awareness in the pro-euthanasia movement that modern approaches to
symptom relief no longer make intolerable pain a plausible reason for
euthanasia.10 In the first 10 years of Oregon’s legal assisted suicide
programme, not one request was on account of actual unbearable pain.11
Role of the certifying medical practitioner (CMP)

Section 8: On receiving an application, the CMP must:

- Encourage the applicant to consult with family/friends and seek professional counselling, but also “must advise the applicant” that they are not obliged to consult family or friends.

Section 9 (1)(a): The CMP must complete a certificate (which will be devised) relating to the following matters. He/she must:

- Certify that s/he “believes that the request properly records the wishes of the applicant” (Section 7 (4)) and has been duly confirmed (Section 9 refers to this as a “valid” request.)
- Certify that the applicant has made a valid request to end his or her life and confirmed that request.
- Certify that the applicant genuinely does wish to end his or her life
- Certify that no coercion was placed on the applicant to make the request or confirmation.
- Confirm that the applicant has the medical condition specified in the request.
- Certify that s/he has advised the applicant of all the other medical options available, including palliative care.
- Certify that s/he has encouraged and advised the applicant as required in section 8 (see above).
- Certify that the applicant is mentally competent.

Comments—

- A great deal of responsibility is placed on the CMP. It will not be easy to uncover, particularly in the case of old and frail people, whether there has or has not been coercion to apply for euthanasia, given the well-recognised reluctance of dependent people to admit being abused by their families. A review in Oregon in 2007 found that 45% of people requesting assisted suicide included being a ‘burden’ as one of the rationales behind the request.\(^\text{12}\)
- There is no requirement for professional counselling or psychiatric assessment prior to termination in this Bill. Depression may have an adverse impact on decision-making. It encourages a desire for hastened death thoughts.\(^\text{13}\) No mention is made in the Bill about the need to diagnose depression: indeed, depression could well be a legitimate ground for applying for euthanasia. In any case, psychiatrists are clear that attempting to diagnose depression in circumstances such as this can be very difficult.\(^\text{14}\)
- Confirming the diagnosis or condition may also prove to be difficult. Moreover there is no requirement for any of the medical practitioners involved
to document the reasons and evidence for their opinions, hence no audit of the thoroughness or otherwise of the doctor-patient interaction will be possible. This leaves it open for lazy, incompetent or euthanasia-friendly doctors to cut corners when doing assessments.

- There is no provision for insisting on a trial of palliative care for patients with a terminal illness before proceeding to euthanasia. Yet it is well recognised that when a person’s fears in the realms of the physical, psychological, social or spiritual domains are identified and assuaged in the hospice situation, their request for euthanasia is often not repeated. There is not even a requirement to advise the applicant’s family or significant others who might have the time, energy and motivation to explore them with the applicant, of other treatment options. Indeed in this Bill, such actions could be regarded as illegal according to Section 7:5: which states: “No family member or friend of the applicant can annul the applicant’s request”.

- There is nothing in the Bill to prevent the applicant’s own medical practitioner from suggesting euthanasia as a therapeutic option. Any such suggestion would be illegal in Holland.

- What happens if the doctor’s enquiries, e.g. through social workers, reveal a history of elder abuse and s/he declines the application? The Bill is silent on this matter. But we do know from the Oregon experience that a good deal of ‘doctor shopping’ goes on in such circumstances, aided and abetted by voluntary agencies specialising in promoting and facilitating assisted suicide.15

Meaning of mental competency

Section 5 (1) states that “for the purposes of this Act, a person is mentally competent if he or she has the ability to understand the nature and consequences of a request to end his or her life, in the knowledge that the request will be put into effect and mentally incompetent has a corresponding meaning”. (2) A person is presumed to be mentally competent unless the contrary is shown.

Comments—The test is whether the person has the ability to understand, not whether they do actually understand. Thus a passing score in a screening test for cognitive function such as the Mini Mental Status Score would meet the criterion laid down, yet individuals may not have complete understanding of the process they have set in train or which have been set in train for them by a third party.

Role of the second medical practitioner (SMP)

Section 10. The CMP is required to refer the applicant to a second medical practitioner (SMP) together with all relevant medical information s/he has relating to the applicant and the certificate made under section 9 (1)(a). The SMP is required to:

- Confirm that the applicant has the medical condition that was specified in the request. S/he does this by examining the certificate prepared by the CMP with all other relevant information. S/he is required to make his/her own enquiries and examine the applicant.
- If there is agreement, s/he completes a certificate to that effect and gives it to the CMP.

Comments—

- The SMP is not required to check that the applicant has a genuine wish to end his/her life, nor to check if there is any coercion, nor to check whether the applicant has been informed of all the alternatives to euthanasia. In the majority of cases, the SMP will be a medical practitioner previously unknown to the applicant with all the barriers to intimate communication such a relationship embodies. More likely than not the SMP will be one of the euthanasia friendly practitioners whose identities will, over time, become known to the community.

- Note that the Bill is silent as to what happens if there is disagreement between the CMP and the SMP. But doctors will have to be very careful as to the extent they attempt to persuade an applicant against going ahead with euthanasia because if that person laid a complaint against the doctor on the grounds that he or she was attempting to frustrate their wishes, then under section 30 (1) an offence has been committed that could result in a summary conviction and a term of imprisonment “not exceeding three months or a fine not exceeding $10,000 or both”. So doctors could risk being convicted of attempting to persuade patients not to be killed. It is not beyond the realm of possibility that a test case would be brought against a doctor soon after the passage of the Bill in order to warn all doctors of their duties under the legislation.

- As is the case with the CMP, there is no requirement for the SMP to document his/her findings or reasoning used to reach the conclusions s/he comes to, hence no audit, either medical or legal, will be possible.

Request by means of End of Life Directive (ELD)

Sections 11–19 These sections cover the making of ELDs and the protocols for applications for euthanasia made as the result of activating a previously made ELD. The procedures are virtually identical to those involved in making a new request. In preparing such directives, the provisions listed in Sections 8 and 9 apply. The major differences are that:

- Section 13(2). Once prepared, the ELD is sent to the Registrar of End of Life Directives and Medically Assisted Deaths who enters it in a register that will be established and sends a copy to the person to whom the ELD relates. ELDs expire five years after being entered in the register but may be renewed at five yearly intervals unless the person concerned becomes mentally incompetent.

Section 14 allows the person concerned to vary or cancel an ELD but restricts the power of any other person to do so on behalf of the applicant.
Section 17 enables the person to whom the ELD relates to appoint one or more persons to act as advocates whose task it is to ensure compliance with the applicant’s requests as listed in the ELD

Comments—ELDs are good in theory but can be problematic in practice. Difficulties arise where the medical condition assumes a form that was not envisaged when the ELD was prepared, there are differences of opinion between the guardians as to the circumstances in which it should be triggered, or if the applicant wishes to take back control.

Carrying out medically assisted death

Section 20 stipulates that the procedure cannot be carried out unless all the certificates completed under sections 9 and 10, 18 and 19 have been “provided”.

Section 21 gives the applicant the right to choose the method of assisted suicide or euthanasia—“to the extent that it is feasible”—when it is to be carried out, by whom, where and who else may be present.

Section 22 covers the procedures involved in assisting death. These include: provision of oral medication if the person can swallow, or using a gastric tube if one is in place, or, if the person is unable to take drugs into the stomach, the attending medical practitioner “must administer the life-ending medication.” If the person elects to delay the procedure or take the drugs privately the medical practitioner is not required to be present when the medication is consumed. In the case of people who are mentally incompetent and have a registered ELD, the attending medical practitioner is not required to attempt to discuss the choice of route of administration with him/her.

Section 23 allows the medical practitioner to delegate the procedure to another person if the person about to be euthanized requests that someone else should participate or assist in the procedure.

Comments—

• In some sections the Bill assumes that a medical practitioner will be present to administer the fatal dose but there is actually no requirement for this and there are some conditions in which a doctor does not have to be present (22 (5)). Moreover the applicant has the power to decide who will be present during the procedure. The absence of a medical practitioner raises the question of who would manage any serious side-effects or complications of the procedure. On the basis of overseas experience these will occur in up to 20% of cases. The fact that the medical practitioner does not have to be present also introduces the possibility of abuse of the system, most likely by family members who have an interest in expediting the process. Elder abuse is very prevalent throughout the Western World and well recognised in New Zealand.

• Although the supporters of this Bill claim that it is based on the Oregon-style Physician Assisted Suicide model, the fact that medical practitioners are authorised under some conditions to administer the fatal medication makes it quite clear that this Bill is about both assisted suicide and euthanasia. In the absence of any supervision and given the disparity in power between doctor
and patient, and in the presence of an audience that is sympathetic to euthanasia—or none—and because the chief witness is dead, there is in fact nothing whatsoever to moderate a medical practitioner’s approach to causing the subject’s death by the fastest and most convenient route, namely IV injection. Some have made the point that at the fatal moment the decision about the mode of euthanasia will be the doctor’s and not the patient’s. Not many doctors will have the resources to wait around for one half to one hour to supervise a death due to drug ingestion.

Requirements after completion of the procedure

Section 24 requires that the medical practitioner must send a report to the Registrar within 14 days of the completion of the procedure. This report must contain the following information.

- The name of the medical practitioner.
- The name and last known address of the deceased.
- The place where the procedure was carried out.
- The date and time of the procedure.
- The means by which it was carried out.
- An assurance that the medical practitioner had informed the person of their rights.

In addition the following should be attached:

- The certificates given by the CMP and the SMP.
- A copy of the ELD if the procedure was carried out in accordance with the ELD provisions in the Act.

Section 25 The medical practitioner who signs the death certificate “must include the person’s underlying disease or condition as the cause of death”.

Comments—

The reporting format will no doubt be as simple as possible since experience in Holland and Belgium is that a major reason for non-compliance with the requirement to report events is the amount of paper-work required.17 There is a similar problem in Oregon. There, the Public Health Division admitted that reporting is so haphazard that it has no idea how the law is being applied.18

The Bill appears to require that the Death Certificate be falsified in cases of assisted suicide or euthanasia. It is not clear whether this is to meet the requirements of Insurance Companies or is an attempt to hide the extent of the practice, or both. It is conceivable that the falsification of death certificates could facilitate the concealment of the use of euthanasia if the attending physician chose not to report it to the registrar. In Holland and Belgium the rates of unreported euthanasia procedures are high.19,20 There is no reason to think it would be any different in New Zealand.
Section 34 The Registrar must report annually to the Review Body. The report consists of numbers: total deaths, number by self-administration, number with oral medications not self-administered, number by ‘other means’, number after ELD etc.

**Comments**—There is no provision for reporting any complications arising during the procedures so no learning from the experience of others will be possible. No mechanism is provided for reporting or investigating non-compliant behaviour by medical practitioners: indeed there is no mechanism for detecting it.

**Legal consequences**

Section 26:

- Confirms that it will be legal for a person to receive medical assistance to end their life under this Act.

- Grants immunity from civil or criminal liability to any person “for any act done or omission made while acting in good faith when assisting or participating in implementing any aspect of this Act.” This applies despite the person having “inadvertently failed to comply fully with any requirement of this Act.”

**Comments**—Here, despite all the assurances about legislating for a tight protective safety net around the practice of assisted suicide or euthanasia, we discover that there is a huge gap in it that nullifies all other ‘safeguards’. Anybody, professional or lay person, participating in euthanasia or assisted suicide is fully protected under the law from any consequences whatsoever of their acts providing that they shelter under the mantra “I was acting in good faith” (a ‘good faith’ attempt to meet the requirements of the law is virtually impossible to disprove because it is entirely subjective.) Moreover, they are protected even if they fail to comply fully with the requirements of the Act. This allows enormous flexibility in the use of euthanasia and assisted suicide with no possibility of anyone being called to account. In Holland and Belgium, a similarly vague phrase: “force majeure” (there was no option) has been used by doctors for years to justify any kind of application, even euthanizing people who had not requested or consented to it—which is actually illegal there—and escape prosecution.

New Zealand medical practitioners who kill patients under the guise of euthanasia will be protected from disciplinary proceedings by Hospital Boards, The Health and Disability Commissioner, the Medical Council and even the police. They will have far greater protection under the law than will the medical practitioners who treated the patient prior to their request for euthanasia.

**Conscience clause**—Section 27 allows people not to participate “directly or indirectly in any aspects of this Act”. A person who refuses to participate does not have to give any reason for refusing. However, a medical practitioner who receives a request for euthanasia but declines to be involved, must refer the person to another medical practitioner who is willing to comply with the person’s request and carry out medically assisted death in accordance with the Act. A medical practitioner who is
asked by a CMP to be a SMP but does not wish to be, must advise the CMP and return any material relevant to the case that has been given him/her by the CMP.

**Comments**—This is a non-protective conscience clause. After giving an assurance in 27 (2) that no one is obliged to participate either “directly or indirectly” under the Act, subsection 3 requires that people who apply to an opting-out medical practitioner must be referred on to a compliant one. If this is not participating ‘indirectly’ what is? Presumably, a medical practitioner who refused to refer could be prosecuted under Section 30 and fined or imprisoned or both on the ground that he or she was frustrating the expressed wishes of the applicant.

The section implies that some medical practitioners will become recognised as euthanasia-friendly as has happened in Oregon and elsewhere. It is likely that voluntary organisations will set up advisory and assistance schemes to direct potential applicants for euthanasia to these doctors. This has happened in Oregon, Belgium and Holland.

**Summary**

- The proposed legislation would make it possible for virtually any person over the age of 18 to request and receive euthanasia provided they took care in the way they phrased the request.
- Medical practitioners who attempted to reason with applicants could be subject to legal action on the grounds of attempting to frustrate the applicant’s wishes.
- The conscience clauses are seriously flawed.
- The reporting requirements could be easily circumvented.
- There would be minimal protection against vulnerable people being euthanized involuntarily or non-voluntarily.
- Medical practitioners would be exempt from prosecution for any action in the provision of euthanasia, even if they were negligent. The branch of medical practice that specialises in killing people would be the least regulated of all.
- It is hard to escape the conclusion that the ‘safeguards’ built into the Bill are designed to facilitate access to assisted suicide and euthanasia rather than protect patients from their unlawful use.

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A case of extensive cutaneous *Mycobacterium marinum* infection in a Pacific Islander living in New Zealand

Charlotte Kevern, Pleayo Tovaranonte, Roland Meyer, Alan Pithie

**Abstract**

*Mycobacterium marinum* is a rare cause of cutaneous infection. The typical clinical picture consists of one or more discrete well circumscribed lesions affecting the upper limbs. However, a more exuberant form has been described in the South Pacific, where it is sometimes entitled ‘Spam disease’ given the infected skin’s similar appearance to the canned food. We describe a case of this more extensive infection in a South Pacific Islander who appears to have acquired the infection in New Zealand, and remained undiagnosed for many years.

**Case report**

A 43-year-old Samoan man presented with a 3-month history of progressively worsening skin ulceration of his right leg and arm. This was on a background of an 8-year history of a chronic, unexplained right lower leg skin lesion. He was systemically well.

The skin problem initially developed following a grazing injury on his right knee on metal steps at an abattoir in New Zealand (NZ). He denied any fresh or salt water exposure. Following the injury, a progressively expanding, pruritic, erythematous, keloid skin plaque with pustules gradually developed to involve the right lower limb. Subsequently, the right upper limb was affected with similar abnormalities of 7 months duration but without any initial trauma.

Previous investigations over the 8-year period had included a skin biopsy which revealed chronic and acute non-specific dermatitis, skin scrapings which revealed no fungal elements, and a wound swab which grew *Staphylococcus aureus* (*S. aureus*) and *Streptococcus pyogenes*.

Multiple treatments were trialled over the 8 years including terbinafine, mometasone, clobetasol propionate ointment, flucloxacillin, and erythromycin. There was at best temporary regression of the skin lesion with all therapeutic options trialled.

The patient had no other significant medical history. Of note there was no evidence of immunosuppression. He migrated to NZ from Samoa 10 years before.

On examination, the right leg was affected with erythematous, hypertrophic, scarring papules and dried exudates with an open area of ulceration on the medial aspect of the lower leg (Figure 1).

The right upper arm and forearm were similarly affected (Figure 2). There was no lymphadenopathy and the chest examination was unremarkable.
Initial investigations revealed a raised C-reactive protein, but normal blood count differential. Wound swabs revealed Gram-positive bacilli on Gram stain and \textit{S. aureus} on culture. The patient was initially treated with intravenous flucloxacillin and clindamycin.

Histological examination of a skin biopsy demonstrated focal ulceration of the epidermis, with an acute inflammatory infiltrate with suppuration, and reticular dermis replaced by granulation tissue with one area of granulomatous response. Ziehl-Neelsen stain revealed acid-fast bacilli. The histological appearances were consistent with a mycobacterial infection.

Pending full culture results he was commenced on rifabutin, clarithromycin, ethambutal, imipenem and isoniazid for suspected atypical mycobacterial infection. \textit{Mycobacterium marinum (M. marinum)} was subsequently confirmed on culture. Following this, his anti-mycobacterial regime was rationised to rifabutin, clarithromycin and ethambutol.

He tolerated anti-mycobacterial therapy well. Twelve months later, the patient’s skin lesions have healed and the skin is intact with keloid formation.

\textbf{Discussion}

\textit{M. marinum} generally causes cutaneous infection which classically develops following contact with aquatic animals, or fresh or salt water.\textsuperscript{1,2} It is therefore commonly known as swimming pool granuloma, although only 50\% of patients have known inoculation.\textsuperscript{3,4}

Disruption in skin integrity often precedes infection, allowing a point of entry.\textsuperscript{1–3,5} It is known to affect both the younger and older population.\textsuperscript{4,5} The upper limb is predominantly affected, which is likely secondary to the increased risk of contact with aquatic animals with the hand.\textsuperscript{3,4,7} Typically the initial lesion is a papule, which may subsequently progress to shallow ulceration and scar formation.

It characteristically presents as non-healing skin lesions with or without subcutaneous nodules which are hyperkeratotic in nature.\textsuperscript{4,7} In addition, \textit{M. marinum} can occasionally cause arthritis, tenosynovitis and bursitis.

\textit{M. marinum} infection has been recently noted to have an increased prevalence in some parts of the South Pacific. The clinical appearance there is quite distinct from the classical solitary papular nodule described above.

A case report published in 2008 described a 29-year-old man who exhibited a 18-year-history of a progressively expanding verrucous plaque skin lesion on his left lower limb. Investigations revealed \textit{M. marinum} as the causative organism.\textsuperscript{5}

Locally the condition is called ‘Spam disease’ given the infected skin’s similar appearance to the canned food.\textsuperscript{5,6} Spam disease has been seen in a large number of the residents of Satowan, a small island in the Federated States of Micronesia, likely secondary to the presence of \textit{M. marinum} in introduced fish that proliferated in water-filled bomb craters remaining after World War II.\textsuperscript{5}
In 2004, greater than 10% of the Satowan Island’s 650 inhabitants were affected by this disease, with a mean duration of infection of 12.5 years. A limited number had received antibiotics or undergone surgical debridement, but the majority of management was topical. 100% of those affected were taro farmers, an occupation which requires standing in deep still water, and presumably results in chronic exposure to *M. marinum*.

*M. marinum* infection may respond to several classes of antibiotics. Patients can be treated with standard anti-tuberculosis agents, but ciprofloxacin, clarithromycin, doxycycline and co-trimoxazole have been used with better effect. There is evidence of resistance to isoniazid, and pyrazinamide. One retrospective study revealed that the majority of patients were treated with one antibiotic alone, either minocycline, doxycycline or clarithromycin. Combination antibiotic regimens all included clarithromycin in this study, and 97% of patients cleared the disease.

Successful treatment of *M. marinum* in patients of Pacific Island descent was noted following the initial combination of rifampicin 600 mg once daily plus co-trimoxazole (800 mg/160 mg) twice daily for a range of 6 to 12 weeks, followed by co-trimoxazole alone for varying lengths of time.

Further success in Pacific Island patients has been seen with doxycycline twice daily with or without the addition of rifampicin. Unfortunately these results are based on small case series with limited long-term follow up.

To our knowledge this is the first description of a case of “Spam disease” caused by *M. marinum* in NZ. The source of infection is not known, although it seems most likely that it was acquired in NZ. It is possible that there was unrecognised infection at the time of his emigration from Samoa.

Infection with *M. marinum* can cause chronic, extensive and debilitating skin involvement, especially in those of Pacific Island decent who seem to be at increased risk of this severe form of the disease. It is important to consider this condition in susceptible individuals presenting with atypical skin lesions.

Although exposure to water is a risk factor, not all patients have a history that suggests this. Diagnosis can be made by a combination of skin biopsy for culture, histology and/or polymerase chain reaction.

Doxycycline, co-trimoxazole, or clarithromycin are likely to confer the most therapeutic benefit in Pacific Island patients.

**Competing interests:** Nil.

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Cardiac tamponade—still a difficult clinical diagnosis

Caoilfhionn Ni Leidhin, Suzanne Moran, Alastair MacLean

Abstract

A 51-year-old man with multiple risk factors for ischaemic heart disease attended the emergency department (ED) with sudden-onset chest pain, dizziness and breathlessness. He was tachycardic but had normal heart sounds and normal QRS complexes on ECG. Bedside ultrasound was performed, revealing a pericardial effusion. Emergent pericardiocentesis was performed with excellent outcome.

This case highlights the importance of early detection of cardiac tamponade as well as the role of bedside ultrasound in diagnosis and management of the condition.

Cardiac tamponade, a medical emergency, is a state of hemodynamic compromise resulting from compression of the heart by fluid trapped in the pericardial space.\(^1\)

It was first described by Dr Claude Beck in 1935 as the clinical diagnostic triad of decreasing arterial pressure, increasing venous pressure and a quiet heart.\(^2\)

The symptoms and signs of cardiac tamponade are often non-specific, making it a difficult clinical diagnosis.

Early detection is crucial, as untreated, the condition is rapidly and universally fatal.

Case report

A 51-year-old man with a history of hypertension, dyslipidaemia, atrial arrhythmias, previous strokes and a patent foreman ovale, closed in 2004, attended ED with sudden-onset, crushing chest “pressure”, dizziness and breathlessness.

On examination, he was diaphoretic, plethoric, centrally cyanosed, tachypnoeic and tachycardic with cool peripheries and a blood pressure (BP) of 95/60 mmHg in both arms. Cardiovascular, respiratory and abdominal examinations were otherwise unremarkable with normal heart sounds. ECG revealed sinus tachycardia with normal-sized QRS complexes and no changes suggestive of ischaemia/pericarditis.

The patient then became unstable and hypoxic with a BP of 60/48 mmHg; at this stage, distended neck veins were noted.

Bedside ultrasound was performed and revealed a moderate pericardial effusion with right ventricular collapse.
The on-call cardiologist was contacted and attended immediately. The patient was transferred to the Cardiac Catheterisation Laboratory (located on the same floor as the Emergency Department [ED]) where emergent pericardiocentesis was performed. 400 ml of bloody pericardial fluid was drained with immediate cardiovascular improvement. Post-procedural echocardiogram confirmed resolution of the pericardial effusion.

The patient’s post-procedural recovery was uneventful. Subsequent investigations were normal. The patient had no prodromal illness. Blood tests revealed normal renal function, mildly elevated C-reactive protein with negative autoimmune/viral serology, protein electrophoresis and tumour markers. Pericardial fluid was negative for malignant cells, acid-fast bacilli and viral serology. A CT thorax, abdomen, pelvis showed no evidence of neoplastic disease, tuberculosis or superior vena cava obstruction.

Discussion

The symptoms and signs of cardiac tamponade are often non-specific. Generally-speaking, slow accumulation of pericardial fluid results in oedema, whereas rapid accumulation leads to shock with Beck’s described triad. Five features common to the majority of patients with tamponade have been identified: dyspnoea, tachycardia,
pulsus paradoxus, elevated jugular venous pressure and cardiomegaly on chest radiograph.¹

Cardiac tamponade must be considered in any patient with haemodynamic instability as rapid diagnosis is crucial in averting poor outcome.

In ED, targeted ultrasound has become an invaluable tool in diagnosis and management of patients with suspected tamponade.⁴

Haemodynamic compromise and cardiac tamponade is an absolute indication for drainage. Following pericardiocentesis, extended pericardial drainage has been shown to lower pericardial effusion recurrence rates.⁵

The underlying cause of the pericardial effusion should be sought in order to optimise treatment and provide patient prognostication. Causes of painful acute cardiac tamponade include free wall rupture after myocardial infarction (MI), spontaneous or post-traumatic dissection and rupture of the ascending aorta. Less-acute causes of cardiac tamponade are likely medical—i.e. infection, metastatic cancer, connective tissue disease, inflammatory bowel disease, hypothyroidism, congestive heart failure, uraemia, radiation therapy, medication side effects.⁶

Up to one-third of patients with asymptomatic large chronic pericardial effusions develop unexpected cardiac tamponade.⁵

The most common cause of bloody pericardial effusion causing tamponade in USA community hospitals was found to be iatrogenic disease followed by malignancy, complications of MI and idiopathic disease.⁷

This case highlights the importance of considering cardiac tamponade in any patient attending ED with haemodynamic compromise. Bedside ultrasound has become an invaluable tool in diagnosis and management of these patients.

Competing interests: Nil.

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Multimodality imaging in *Granulicatella* endocarditis

Jen-Li Looi, Phil Weeks, Ruvin Gabriel, Niels van Pelt

A 59-year-old man presented with right flank and buttock pain. Magnetic resonance imaging of the pelvis demonstrated right sacroilitis (See Figure 1: A, circle) and myositis without obvious abscess (B, arrow). Blood cultures subsequently grew *Granulicatella adiacens* which was sensitive to penicillin MIC 0.064 mg/L.

Echocardiography showed a dilated ascending aorta measuring 4.9 cm and a functional bicuspid aortic valve with a 6 mm × 9 mm mobile mass on the ventricular aspect of the non-coronary cusp consistent with vegetation (C, D, arrows).

Severe aortic regurgitation was noted which is likely chronic as the ventricle was dilated at 6.1 cm. Computed tomography (CT) of aorta confirmed a severely dilated aortic sinus measuring 5.0 cm (E).

CT angiography showed mild eccentric calcified atherosclerotic plaque in the left anterior descending artery. He underwent aortic root replacement and recovered well.

*Granulicatella adiacens* (F) is a nutritionally variant streptococcus associated with high morbidity and mortality in endocarditis. Early surgical intervention should be considered when *Granulicatella adiacens* endocarditis is diagnosed.

This case highlights the utility of multimodality imaging in the evaluation of patients with endocarditis and in guiding treatment.

Learning points

- Embolisations are frequent in *Granulicatella adiacens* endocarditis and therefore possess a diagnostic and management challenge to clinicians.
- Pre-existing cardiac pathology is a risk factor in endocarditis due to *Granulicatella* and most commonly affects aortic and mitral valves.
Figure 1 (A) There was abnormal increased signal intensity within the right sacroiliac joint and in the adjacent sacral bone marrow (circle) on T2-weighted imaging (STIR) consistent with right sacroilitis; (B) Similarly, there was also increased signal intensity around and in between the muscle fibres of the right iliicus muscle superiorly (arrow) on T2-weight imaging (STIR) consistent with myositis; (C) Transthoracic echocardiography revealed a 6 mm × 9 mm mobile globular echogenic mass (yellow arrows) on the ventricular aspect of the aortic valve. The ascending aorta was also dilated at 4.9 cm; (D) On parasternal short axis view of the aortic valve, the aortic valve had three leaflets but was functionally bicuspid (arrow) with fused left and right coronary cusps. The mobile mass (arrow) was attached to the ventricular aspect of the non-coronary cusp; (E) Computed tomography (CT) of the aorta confirmed a severely dilated aortic sinus measuring 5.0 cm and the sinotubular junction measured 4.4 cm; (F) *Granulicatella adiacens* is a Gram-positive bacterium with streptococcus morphology which appears as cocci, coccobacilli or rod-shaped cells (from Christensen JJ, Facklam RR. *Granulicatella and Abiotrophia* species from Human Clinical Specimens. J Clin Microbiol. 2001;39(10):3520–3523.)
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Extraordinary extravasation

Matthew D Zuckerman, Mathew Greenston

A 20-year-old female with a history of coeliac disease presented to the emergency department with painless skin discoloration one day after receiving intravenous infusion (Figure 1).

Figure 1. Skin discoloration one day following infusion, with marker outline and arrow indicating infusion site

The patient had received 1 gram iron polymaltose in 500 milliliters of normal saline via right antecubital intravenous catheter for anemia related to her coeliac disease. Immediately following the infusion, arm swelling and coolness of the distal extremity with normal pulses were noted and treated with elevation, observation, and discharge home.

The patient presented to the emergency department the following day because of the skin discoloration, and she was distressed that she was not notified of such a possible complication. Differentiating between discoloration from bruising and iron deposition can be difficult; however, the timing of the symptoms along with the pigmentation were more consistent with iron discoloration. The lesion lacked the dark bluish discoloration typically seen one day after bruising, but was similar to the brownish pigmentation associated with the haem breakdown product bilirubin, seen in older bruises.

Medsafe indicates that iron polymaltose may be administered intravenously or via gluteal intramuscular injection; however, intramuscular injection in arms and exposed areas is not recommended.
Skin discoloration following intravenous and intramuscular administration has been rarely described in the literature and can be expected to persist for 6 months up to several years, occasionally requiring laser therapy.\textsuperscript{1,2} Unfortunately, the patient was lost to follow up.

**Learning points**

- Iron polymaltose can lead to skin discoloration when administered intramuscularly or in the case of intravenous extravasation.
- Patients should be counselled before administration of medications and after adverse events, such as extravasation, regarding potential adverse effects.

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Response to Richardson and Potter’s “Screening for colorectal cancer and prostate cancer: challenges for New Zealand”—with authors’ reply

The recent paper by Richardson and Potter\(^1\) argue coherently and strongly that screening for colorectal cancer should be prioritised before screening for prostate cancer. By laying out the benefits and harms of screening for the two cancers side by side, the authors make a valuable contribution to the policy debate.

We agree that a national bowel cancer screening programme is overdue. However, we are not so convinced that the analysis provided supports their conclusions that the balance of benefits to harms is clearly better for a flexible sigmoidoscopy-based programme than a faecal occult blood test (FOBT)-based one.

The key question is whether or not a flexible sigmoidoscopy-based screening programme would be more effective in a New Zealand population than a FOBT-based one. Effectiveness depends on both screening efficacy (i.e. whether a screening test works among those who use it) and a range of other factors, most importantly, participation rates. A highly efficacious screening tool will obviously be ineffective if no one uses it. In order to assess and compare the expected benefits and harms of population based screening, efficacy information alone is not sufficient.

In the case of bowel cancer screening, the cited randomised controlled trials (RCTs) that were carried out to assess the role of FOBTs in reducing bowel cancer mortality were population-based (in other words, eligible people in the general population were randomised to either be invited to undergo screening or not).

In contrast, the UK flexible sigmoidoscopy was explicitly set up to only assess efficacy.\(^2\) Recruitment into the trial was a two-stage process where eligible people in the general population were first asked if they would accept an invitation for bowel cancer screening if they were invited. Only the 52% who accepted this invitation were included in the trial, and randomised to be invited to be screened by flexible sigmoidoscopy or not.

The results clearly demonstrated that flexible sigmoidoscopy-based screening is efficacious within a population who is interested in accepting an invitation to be screened. The downside of this approach is that the reduction in bowel cancer mortality amongst the entire population has not been established. The other RCTs cited by Richardson and Potter are also efficacy trials or trials among volunteers in which exactly the same issues apply.

Two extreme assumptions are possible in generalising from these findings (1) that the participation rates of those who did not accept the initial invitation indicating an interest in bowel cancer screening will have exactly the same participation rate as those did (this seems highly unlikely); or (2) that those who did not accept the initial invitation would in fact not accept the invitation to undergo bowel cancer screening at all. In this latter case, we would expect the mortality benefit at a population level to be
approximately half that observed in the UK RCT. In fact, the truth is likely to be between these extremes.

The only way to establish the effectiveness of flexible sigmoidoscopy for the NZ population is to establish the participation rate in a general population sample. There are no good quality data on this in New Zealand. To our knowledge, only one RCT has reported a direct comparison of participation rates comparing FOBTs with flexible sigmoidoscopy, using the same invitation approach. In that study, the participation rates were 61% for immunochemical FOBT; 49% for guaiac FOBT and 32% for flexible sigmoidoscopy. There are pilot studies in the UK assessing the uptake of flexible sigmoidoscopy in population samples. Results of these will inform the issue.

The second point touched on by the authors, but dismissed rather lightly is the fact that the guaiac FOBT trials were based on old technology. These studies were started over thirty years ago. The newer immunochemical FOBTs have considerably higher sensitivity both for colorectal cancer and for high risk adenomas (the removal of which can prevent the development of cancer). The results presented in the paper in effect make the assumption, that despite this, the likely benefits of FOBT screening have remained unchanged over time, an approach somewhat inconsistent with other reviews on the subject (e.g. ).

In summary, the two assumptions that the authors have implicitly made in the paper, namely 1) that the mortality benefits of flexible sigmoidoscopy screening observed in a trial of volunteers is generalizable to the whole population of New Zealand, and 2) that despite substantial improvements in technology, the benefits of FOBT-based screening remain unchanged from those observed in original trials result in a pro-flexible sigmoidoscopy bias.

The authors also make the valid point that colonoscopy capacity is a real issue in New Zealand, and that a flexible sigmoidoscopy-based programme would have require fewer additional colonoscopies than a iFOBT-based one.

This is a serious issue that will require substantial resources regardless of the screening modality used particularly considering that while there will be fewer colonoscopies required in a flexible sigmoidoscopy-based programme, the flexible sigmoidoscopies themselves require resources that will intersect with those of the colonoscopy services. This issue is not easily resolved.

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Richardson and Potter’s reply

Thank you for the opportunity to respond to the letter from Associate Professors Sarfati and Bissett; they raise important discussion points regarding screening.

We are aware that the UK trial of flexible sigmoidoscopy screening was undertaken in a volunteer population and that this could affect the external validity of that trial. Our estimates were per 1000 people screened, rather than per person offered screening; clearly, the impact on the invited population will depend on the uptake of screening. However, it still may be a bit too simplistic to assume that uptake is the most important determinant of success; a population-based RCT comparing guaiac FOBT (FOBTg), immunochemical FOBT (FOBTi), and flexible sigmoidoscopy screening found that, despite lower uptake, flexible sigmoidoscopy provided a considerably higher detection yield of advanced adenomas and colorectal cancer per 100 invitees than either type of FOBT.1

We agree entirely that the only way to assess the effectiveness of flexible sigmoidoscopy in the New Zealand population is to establish the acceptability and uptake in this population. Like Sarfati and Bissett, we believe it would be appropriate, perhaps essential, to pilot this and not rely on studies done elsewhere.

It is correct that the estimates of benefits and harms of colorectal cancer screening with FOBT in our paper are based on the Nottingham and Funen randomised controlled trials, which used FOBTg screening. There have been no randomised controlled trials of colorectal cancer screening using FOBTi (which is being used in the pilot colorectal cancer screening programme in Waitemata).

As we stated in our paper, screening with FOBTi is likely to result in more colorectal cancer diagnoses per 1000 screened, but at the expense of more people with false-
positive results, because FOBTi has higher sensitivity and slightly lower specificity than FOBTg.²

Although the potential benefits of FOBTi screening may have been underestimated in our paper, it is unlikely that this would completely negate the comparative advantage of flexible sigmoidoscopy. The main reason to consider the potential benefits and harms of flexible sigmoidoscopy is that, unlike FOBT, it has the ability to detect pre-cancer as well as existing colorectal cancer, and thus potentially reduce colorectal cancer incidence as well as mortality.³

We agree that colonoscopy capacity is an important issue for colorectal cancer screening.⁴ Although the capacity to deliver flexible sigmoidoscopy is also an important issue, flexible sigmoidoscopy is likely to result in fewer colonoscopies (especially if one-off flexible sigmoidoscopy is used rather than repeated FOBT screening), and may be easier to deliver, for instance by trained nurses in a primary care setting, than colonoscopy.⁵

We appreciate the comments from Sarfati and Bissett, but believe, also, that it is helpful to include the comparison with flexible sigmoidoscopy screening, especially when other countries are considering this modality, and because this issue has been raised for bowel screening in New Zealand.⁶,⁷

We urge close and careful consideration of piloting flexible sigmoidoscopy in New Zealand.

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The Origin of Life


The consideration of this sublime theme was in the minds of many people last year mainly as the result of an address delivered before the British Association by Professor Schafer, who is probably the greatest physiologist of the present day. Many of his views have been put forward by Huxley, Tyndall and Ray Lankester, but it is evident that less heed is paid now to the confident opinions of materialists than formerly, and the denial of scientific dogmas is now the work of scientists. Science was supposed to rest at one time on a foundation of experimental proof, but it is now a compound of fact and fancies.

The Atomic Theory was once part of the scientific gospel, but has become largely discredited, and it seems unsafe to pay too much heed to the speculations of science because what is proved to-day is often disproved to-morrow. The scientists are doing now what they used to attribute to the theologians, and the value of “scientific fact” has undoubtedly depreciated.

Professor Schafer believes that there is no hard and fast line to be drawn between living and lifeless matter. He sees little difference in the movements of an amoeba, an oil globule and a crystal. It would indeed be strange to find no similarity in the actions of organic and inorganic matter, seeing that we believe that the Universe is governed by Law. “We are compelled to believe,” he said, “that life is a product of evolution from non-living matter.” “Further,” he added, “we are compelled to accept the conclusion that its evolution from lifeless matter is possible in the present and the future.” All experiments have shown that life cannot arise from non-living matter, and the conclusion based on these experiments seemed to stand as firm as a rock. A plain man cannot understand from Professor Schafer’s address whether abiogenesis is to be considered true or false. It appears to be quite evident, however, that the artificial production of living matter in our laboratories, if it were in fact instead of a scientific aspiration, would not necessarily carry with it the acceptance of a materialistic view the Universe.

It is amazing to read the professor’s view that “the melancholy that hovers bat-like over the termination of our lives” may be dispelled when men “have learned to regard the change as a simple physiological culmination of life.” Even people whose faith is well grounded in a happy future existence do entirely the fear of death, and this being so, they are not likely to be influenced by Professor Schafer’s paraphrase of “it is appointed unto men to reach the simple physiological culmination of life! Professor Schafer things highly of the potentiality of life that may reside in a “colloidal substance.” He seems still to have in his mind visions of the gelatinous mud called by Huxley Bathybius Haecklii, and hailed him as the promise and potency of all organic existence. The putative father of mankind, on further investigation, was found to be nothing but—mud. How are the mighty fallen! Haeckel was wrong with Bathybius. May he not be equally astray in his Monistic theories, to which apparently Schaefer lends the weight of his support.
Some of the professed scientific doctrines to the present day require a very large amount of faith for their acceptance, and are not very unlike Hamlet’s suggestion that the sun breeds maggots from a dead dog.
Effect of smoke-free legislation on perinatal and child health

Smoke-free legislation has the potential to reduce the disease burden associated with second-hand smoke exposure, particularly in children, bearing in mind the immaturity of their lungs and immune system.

This research paper included 11 eligible studies published between 2008 and 2013 involving more than 2.5 million births and nearly 250,000 asthma exacerbations. The primary outcomes were preterm birth, low birthweight, and hospital attendances for asthma.

The meta-analysis demonstrated that smoke-free legislation was associated with a 10.4% reduction in preterm birth and a 10.1% reduction in hospital attendances for asthma. No significant effect was noted in the incidence of low birthweight but there was a 5% decline in children being born very small for their gestational age. The authors conclude that their study provides strong support for WHO recommendations to create smoke-free environments.


Treating infant colic with the probiotic *Lactobacillus reuteri*

Previous small trials suggested that *L. reuteri* effectively treats colic in breastfed infants; however these studies had limitations, and the effect of the probiotics on formula fed infants with colic were unknown. This report concerns a randomised placebo controlled trial which evaluates this proposition.

167 breastfed and formula fed infants aged less that 3 months were randomised to receive an oral daily dose of the Lactobacillus or placebo for 1 month. The primary outcome was the daily duration of infant cry and fuss at age 1 month.

The conclusions reached were that treatment with the *Lactobacillus* did not reduce crying or fussing in infants with colic, nor was it effective in improving infant sleep, maternal mental health, family or infant functioning, or quality of life.

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Oseltamivir (Tamiflu) for influenza in adults and children

Neuraminidase inhibitors are used globally for treatment and prophylaxis of influenza, but the evidence for their effectiveness in preventing complications of influenza is sparse and information regarding their adverse events is lacking.

This report from the Cochrane Acute Respiratory Infection Group investigates this matter by reviewing the relevant data. Their systematic review included study reports of randomised trials and relevant regulatory comments (roughly 150,000 pages).
The conclusions were that oseltamivir shortens the duration of influenza-like illness symptoms in treatment of adults and non-asthmatic children and prevents their appearance in prophylaxis.

It reduced the time to first alleviation of symptoms in adults by 16.7 hours. There appears to be no significant effect on rates of hospitalisation.

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