

# THE NEW ZEALAND MEDICAL JOURNAL

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## CONTENTS

### This Issue in the Journal

- 4 A summary of the original articles featured in this issue

### Editorials

- 6 Persistent rheumatic fever in New Zealand—a shameful indicator of child health  
*Michael Hale, Norman Sharpe*
- 9 Cursed rhetoric  
*Eric Crampton*
- 13 Continuity of care in New Zealand primary health services  
*Jim Ross, Kristin Kenrick*

### Original Articles

- 16 Continuity of care with general practitioners in New Zealand: results from SoFIE-Primary Care  
*Santosh Jatrana, Peter Crampton, Ken Richardson*
- 26 Rheumatic Fever Programme in Samoa  
*Satupaitea Viali, Puleiala Saena, Vailogoua Futi*
- 36 Consumer demographics and expectations of probiotic therapy in New Zealand: results of a large telephone survey  
*Michael Schultz, Achmed Baranchi, Lynda Thurston, Yu Ching Yu, Lily Wang, Jonothan Chen, Mark Sapsford, Joseph Chung, Maysa Binsadiq, Lauren Craig, Ben Wilkins, David McBride, Peter Herbison*
- 44 The epidemiology of giant cell arteritis in Otago, New Zealand: a 9-year analysis  
*Anmar M Abdul-Rahman, Anthony C B Molteno, Tui H Bevin*
- 53 An audit of venous duplex ultrasonography in patients with lower limb cellulitis  
*Michael J Maze, Alan Pithie, Timothy Dawes, Stephen T Chambers*
- 57 Steroid therapy for problematic proliferating haemangioma  
*Beryl H Tan, Philip Leadbitter, Neil Aburn, Swee T Tan*

### Viewpoints

- 66 Leadership for health: developing a canny nanny state  
*Peter Crampton, Janet Hoek, Robert Beaglehole*

- 73 Obesity and health—new perspectives from bioscience research suggest directions for clinical practice  
*Suzi Penny, Jenny Carryer*

### **Clinical Correspondence**

- 83 Gastritis cystica polyposa mimicking gastric malignancy  
*Ian Bloomfield, Jeremy Rossaak*
- 87 Cervical swelling following cardiac surgery: the hidden menace  
*Calvin S H Ng, Yee Eot Chee, Randolph H L Wong, Anthony M H Ho, Micky W T Kwok, Innes Y P Wan, Malcolm J Underwood*
- 91 Medical image. Progressive dysphagia in a 32-year-old woman—what is your call?  
*Pazhanivel Mohan, Jayanthi Venkataraman*

### **100 Years Ago in the NZMJ**

- 93 On some principles of hospital management: part 3

### **Methuselah**

- 95 Selected excerpts from Methuselah

### **Letters**

- 97 ACC response on rotator cuff tears  
*Michael Austen, Ray Fong, Peter Hunter, Patrick Medlicott, Ian Murphy, Karen Rasmussen, Michael Sexton; for the ACC Clinical Advisory Panel*
- 99 Non-melanoma skin cancer  
*Anthony I Reeder*
- 101 Movies with public health themes at a medical school library: interest and uptake  
*Nick Wilson, Peter Gallagher, Maxine Schutte*
- 104 Consistently cheap alcohol: national data on discounts for an 8-week period  
*Kate Sloane, Fiona Imlach Gunasekara, Nick Wilson*

### **Obituary**

- 109 Wilhelm Frederick Lubbe

### **Notice**

- 111 Reviewers for the New Zealand Medical Journal in 2010

## Book Reviews

- 112 Medicine, Miracle, and Myth in the New Testament (J Keir Howard)  
*H Bramwell Cook*
- 113 Essential Lists of Differential Diagnoses for MRCP with diagnostic hints (Fazal-I-Akbar Danish)  
*Simon Dalton*



## **This Issue of the Journal**

### **Continuity of care with general practitioners in New Zealand: results from SoFIE-Primary Care**

*Santosh Jatrana, Peter Crampton, Ken Richardson*

Continuity of care with a primary care provider (PCP) is high in New Zealand. People with high health needs have higher continuity of care (e.g. the elderly, Pacific and Asian ethnic groups, those with low income, and those with one or more chronic conditions).

### **Rheumatic Fever Programme in Samoa**

*Satupaitea Viali, Puleiala Saena, Vailogoua Futi*

Rheumatic fever and rheumatic heart diseases (RHD) are common in Samoa. The incidence of rheumatic fever and RHD have declined from 2005 to 2009. The registered-based Rheumatic Fever Programme is making an impact on this disease in Samoa. Screening with echocardiogram in primary schools is picking up a lot of undiagnosed RHD.

### **Consumer demographics and expectations of probiotic therapy in New Zealand: results of a large telephone survey**

*Michael Schultz, Achmed Baranchi, Lynda Thurston, Yu Ching Yu, Lily Wang, Jonothan Chen, Mark Sapsford, Joseph Chung, Maysa Binsadiq, Lauren Craig, Ben Wilkins, David McBride, Peter Herbison*

We conducted telephone interview with approximately 1500 people living in the greater Dunedin area regarding their attitudes towards probiotic therapy. It became apparent that quite a large number of people take probiotics for various reasons, mainly to alleviate gastrointestinal symptoms. Most people would consider taking probiotics if recommended by their GP. However, upon questioning GPs, they demonstrated a huge knowledge gap regarding indications, benefits and side effects.

### **The epidemiology of giant cell arteritis in Otago, New Zealand: a 9-year analysis**

*Anmar M Abdul-Rahman, Anthony C B Molteno, Tui H Bevin*

The first large study on the patterns and characteristics of giant cell arteritis (GCA) which is an inflammatory disease of the major arteries in the body from Australasia. It was noted that a variation in the annual incidence rate for GCA in Otago, NZ showed a cyclic pattern with a peak in 1998 and 2003. The mean annual incidence of GCA in Otago was 12.73/100,000 population for patients  $\geq 50$  years over the 9 years of observation. The overall incidence seems to reflect the ethnic origins of the majority of the population from Britain reinforcing the genetic susceptibility to this disease.

### **An audit of venous duplex ultrasonography in patients with lower limb cellulitis**

*Michael J Maze, Alan Pithie, Timothy Dawes, Stephen T Chambers*

Having both infection of the soft tissue of the leg and a blood clot of the veins of the leg is rare and this study suggests that investigation with ultrasonography in the absence of risk factors for deep vein thrombosis (DVT) has a low yield.

### **Steroid therapy for problematic proliferating haemangioma**

*Beryl H Tan, Philip Leadbitter, Neil Aburn, Swee T Tan*

Haemangioma (strawberry birthmark) while disfiguring can also threaten life or function. High-dose steroid has been the mainstay treatment for haemangioma over the last 40 years. The majority of haemangiomas respond to steroid treatment which is associated with significant side effects. Beta-blockers are now replacing steroid, as the first-line treatment for problematic haemangioma.



## **Persistent rheumatic fever in New Zealand—a shameful indicator of child health**

Michael Hale, Norman Sharpe

Rheumatic fever is a “Third World disease” related to poverty and overcrowding. It has been eradicated in practically all developed countries and in many developing countries, but has persisted in New Zealand over the past 30 years;<sup>1,2</sup> it is also prevalent in our Pacific neighbour Samoa as outlined in an article by Viali and colleagues in this issue of the *NZMJ*.<sup>3</sup> Rheumatic fever occurs alongside other childhood diseases including chest and skin infections which are also related to social deprivation.

Rheumatic fever and resultant rheumatic heart disease reflect gross and intolerable health inequalities—being 23 and nearly 50 times more likely in Māori and Pacific people respectively than in European/other, and 29 times more likely in the most deprived socioeconomic groups (NZDep 9–10) compared with least deprived socioeconomic groups (NZDep 1–2).<sup>4</sup> The local “hot spots” for occurrence, where recent clusters of cases have continued to occur—in the Northern, Midland and Central regions of New Zealand’s North Island—are well identified.

This is a shameful situation, embarrassing and intolerable in the sense of our designation as a developed country. Rheumatic fever deserves topmost priority for eradication and should be regarded as a key indicator of child health and how we as a community value our children. The disease which is eminently preventable “casts a long shadow” with a large consequent adult disease burden and a high cost to individuals, families, the community and the health system. More broadly, as a measure of relative inequalities, social and economic conditions, it is a clear indicator of the need for urgent leadership and coordination for improvement.

The rationale for monitoring child health even more closely during an economic recession through the development of a Children’s Social Health Monitor has been proposed recently.<sup>5</sup> This should include rheumatic fever as a specific indicator amongst a number of indicators monitoring prevailing economic conditions, health and wellbeing.

Rheumatic fever can indeed be eradicated as has been shown even in poorer countries through a comprehensive public health approach with open access to primary care.<sup>6,7</sup> In New Zealand, success has been achieved in Whangaroa county through a community-led, school-based clinic.<sup>8</sup> A target for total eradication in New Zealand within 10 years is entirely realistic and achievable.

The current work and dedication of many individuals and organisations in this area over a long period should be acknowledged. From this strong base, a more comprehensive and coordinated national approach across the continuum of prevention can now be established and coupled with higher levels of community empowerment to accelerate progress towards eradication.

Indeed, 2010 has seen the establishment of a national steering group to work alongside the Ministry of Health and with providers to raise the profile of rheumatic fever in the sector and in the community, coordinate linkages, and work to promote effective evidence-based interventions for accelerated improvement.

What then should we do better? As previously stated, rheumatic fever is derived from conditions of social deprivation and crowding. Solutions involve multiple agencies working together in partnership with vulnerable families and communities as articulated in the Government's *Whanau Ora Approach*. At the primordial level there is a need for ongoing support for housing improvement which has been shown to significantly reduce hospital admissions for infectious diseases.<sup>9</sup>

Primary prevention through general child health clinics and more highly focused community and school-based sore throat clinics in areas of high prevalence could be very effective and rapidly reduce cases by more than half.<sup>10</sup> Such clinics require high quality standards, ongoing monitoring and evaluation for success and need to be joined with heightened community awareness that "sore throats matter" and open access to primary care. An appropriate targeted approach for antibiotic treatment for Group A streptococcal pharyngitis in high-risk settings is outlined in existent Heart Foundation guidelines for rheumatic fever prevention.<sup>11</sup>

Rigorous early identification, registration and follow-up of cases for secondary prophylaxis with appropriate household testing and treatment are complementary essentials for eradication. Preliminary echocardiographic screening studies in high risk communities in New Zealand indicate that for every known case there may be another unknown case of rheumatic heart disease with no known history of acute rheumatic fever that would benefit from penicillin prophylaxis.<sup>12</sup>

At the moment there is optimism that rheumatic fever—an indicator of the most striking health inequalities in New Zealand children—can be eradicated in New Zealand. However, there are also other childhood diseases which show similar unnecessary and avoidable differences between population groups. For instance, in a 2009 report from the Organisation for Economic Co-operation and Development (OECD), New Zealand ranked 29<sup>th</sup> out of 30 countries for child health and safety.<sup>13</sup>

Significant improvement is unlikely for rheumatic fever or our other "Third World diseases" unless child health is given higher priority and there is an increased proportion of health sector spending on services for children.

If rheumatic fever is still existent in New Zealand in another decade the shame will certainly remain. Conversely, if we eradicate rheumatic fever, then we will have made New Zealand a better place for our children.

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## Cursed rhetoric

Eric Crampton

Cursed rhetoric! If only they would stop calling our beneficent interventions “Nanny State”, we’d be able to get on with the important project of improving peoples’ lives by making their choices for them. Or so argue Crampton (no relation), Hoek and Beaglehole [henceforth CHB].<sup>1</sup> A paternalist by any other name would seem less meddlesome? Hardly.

Advances in public health have been one of the great triumphs of the last two centuries. The burden of mortality and morbidity has been greatly alleviated in no small part due to constructive government involvement in provision of basic public health services: sewerage, clean water, and subsidisation of basic health services like immunisation. These are the kinds of public health interventions advocated as positive rights by Amartya Sen in *Development as Freedom*.

It’s consequently interesting that CHB cite Sen in support of rather more intrusive interventions: Sen’s thoughtful work on the place of liberalism within welfare economics and on the importance of building individual capacity for enjoyment of freedom is far more easily squared with income transfers and public education than with bans on advertising.<sup>2</sup> But this is hardly the place to argue about what Sen really meant.

Rather, I wish to rebut two points made by CHB and defend an alternative position. Economic theory is not so fragile as to collapse in the presence of any minor market failure. Advertising is not as pernicious to the public interest, nor non-governmental organisations (NGOs) as beneficent, as CHB would have it. And, finally, individuals can rationally choose enjoyment or other objectives over health; if that’s the case, then we cannot call people irrational simply for choosing a well-seasoned fatty steak over mung beans.

Let’s begin with CHB’s case against efficient markets. They argue that because models of perfect markets require a set of conditions not found in the real world, extensive and comprehensive government intervention in individual health choices is necessary. You could just as reasonably argue that because Earth has an atmosphere, we needn’t worry about falling off of cliffs: theories of gravitational acceleration of 9.8 metres per second squared are derived for a vacuum and so do not here apply.

The conditions under which markets can be shown to maximise efficiency—the benchmark case against which market failure is measured—are sufficient rather than necessary. We can be at an optimum even if the conditions fail.<sup>3</sup> Under those idealised conditions, it is impossible to make any person better off without simultaneously making someone else worse off.

Where the idealised conditions fail, we have some guidance about policies that *may* improve outcomes, but do not necessarily do so. The market failure is necessary but not sufficient for policy to meliorate outcomes. Proving a particular failure does not

give us *carte blanche* to implement any intervention we like; rather, it tells us where an intervention might be targeted. And it also tells us when intervention isn't warranted.

As case in point, consider the potential for market failure caused by imperfect information about calorie counts. If consumers are mistaken about true calorie counts, they might eat more or less than they would under conditions of full information. Perhaps. Let's leave aside for the moment the ease with which any consumer could investigate calorie counts at most fast food restaurants simply by checking their websites—if he actually cared. But experiments making calorie counts really salient at point of fast food purchase show no effect on purchases.<sup>4</sup>

The rather mixed evidence on the effects of information provision suggests to me that there was no real information market failure. If your reaction to the evidence is “well, let's try a different intervention then and claim a different market failure as justification”, you're no longer making the case based on market failure; you're just being paternalistic. Public health activists have been abusing market failure theory to give a sciency flavour to what is actually just paternalism.<sup>5</sup>

Let's now consider the pernicious role of advertising and corporate influence. If the CHB contention is true—that we're all just pawns to advertising – why is it that newspapers and television are having such a hard time making a profit on advertising? If advertising were as influential as folks think, ad-funded free-to-air radio and television would be a goldmine. But it isn't, so it isn't. People sensibly discount claims made by advertisers, recognising that they have something of an interest in the message being conveyed. But if we're going to think about misleading messages sent by interested advocates, let's look also to our public agents.

The New Zealand Drug Foundation (NZDF), despite the weight of the epidemiological literature,<sup>6</sup> insists that there is little to no health benefit from moderate drinking. The concerns raised by NZDF in its *Mythbusters* article<sup>7</sup> may have been relevant 15 years ago but have been entirely addressed and dismissed by the subsequent literature. Correcting for all of the problems around former drinkers being included among non-drinkers and that moderate drinkers may have healthier lifestyles, low levels of regular alcohol consumption remain associated with a substantial reduction in overall mortality risk—the so-called J-curve.

The alcohol industry is prohibited from advertising this well established finding, and our publicly funded NGOs—both the NZDF and the Ministry of Health—do their best job of obfuscation. The Ministry of Health's *Nutrition Guidelines for Older People* is particularly egregious:<sup>8</sup> it cites an article as calling the J-curve into question due to methodological issues and uncontrolled confounding when in fact that article shows that the J-curve finding is very robust to those critiques.

The Ministry of Health cites an important part of the epidemiological literature in support of an argument that the article in fact disproves. This is academic dishonesty of the worst sort. I advised the Ministry of it in correspondence, I've blogged on it; the dishonest citation remains there today. I worry that people discount too heavily claims made by industry while not using enough skepticism in weighing claims made by public agents.

When the market failure claims are shown false, all that really remains is paternalism. Public health activists want you to be healthier, whether you want that or not. Why should they then be surprised if those who do not particularly appreciate their ministrations label the interventions “Nanny state”? It’s accurate. A nanny helps to guide children who haven’t yet learned to make their own choices; a nanny state infantilises us all by seeking to do the same.

There is a categorical difference between public health interventions that protect my health against others’ actions and those that seek to protect me against myself. I can, and do, rationally choose to consume more fat and salt than CHB might want for me. I like it and it’s none of their business.

If health is all that matters, can I force (tax, nudge, encourage, subsidise, regulate) CHB to consume their one drink per day too? It’s for their health after all.

**Competing interests:** See <http://offsettingbehaviour.blogspot.com/2010/12/pecuniary-interest.html>

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linked above. The discrepancy is discussed here:

<http://offsettingbehaviour.blogspot.com/2010/08/j-curve-science-versus-politics.html>



## Continuity of care in New Zealand primary health services

Jim Ross, Kristin Kenrick

In this issue of the *NZMJ* Santosh Jatrana, Peter Crampton and Ken Richardson present findings relating to their investigation into continuity of care in New Zealand.<sup>1</sup> Their research examines this in relation to individuals' experience and characteristics across a whole nation, which is relatively unique in the continuity of care literature. The article is part of a series of papers reporting from SoFIE-health, a set of national surveys conducted between 2002 and 2010, involving some 22,000 adult participants. Other papers in the series have dealt with affiliation with a primary care provider,<sup>2</sup> and access to primary health care in New Zealand.<sup>3</sup>

In this new paper, which uses survey data from 2004–5, the authors derive a measure of continuity of care from the strength of participant responses to the following four questions from the survey:

- Would the *same doctor* or nurse take care of you every time you go?
- If you called them, could you talk to the person that *knows you best*?
- Do you think they *know you very well as a person*?
- Do you think they *know what medical problems* are most important to you?

Somewhat reassuringly for general practice in this country, the authors find generally high scores on their measure of continuity of care, with an overall mean of 3.10 out of a possible 4. Furthermore, and also reassuringly, the data largely support the authors' hypothesis that those who have a greater need for care will have a higher mean continuity of care score.

Thus they have found that the elderly, those of Pacific and Asian ethnicities, those in lower income brackets and those with chronic diseases all experience greater degrees of continuity of care than their younger, wealthier, European-descended counterparts.

But why should we care?

As general practitioners and teachers of medical students, we see a number of implications arising from this work.

Continuity of care has long been regarded as one of the key features of successful primary care systems, and as a core value within General Practice/Family Medicine. Esteemed scholars of the discipline such as Ian McWhinney<sup>4</sup> and Barbara Starfield<sup>5</sup> include it in their definitions of what constitutes primary care, while the European Society of General Practice/Family Medicine (WONCA Europe) list "the provision of longitudinal continuity of care as determined by the needs of the patient" as one of the essential "characteristics of the discipline".<sup>6</sup> And while there is debate about how continuity of care might be most satisfactorily defined,<sup>7</sup> its benefits are readily experienced within the daily work of GPs.

Familiarity with one's patients saves time, reduces uncertainty, and contributes to more satisfying and nuanced consultations for both parties. In our teaching we place a great deal of emphasis on instilling in our students an appreciation of the patient in his or her context; a context which can readily be appreciated from both the cumulative knowledge of a patient and his or her history, circumstances and preferences, and also the trust built up in the long-term professional relationship between patient and GP.

There are both opportunities and threats to continuity of care arising from current trends in the health system. On the positive side some of the changes brought by the Primary Care Strategy would seem to support continuity, particularly the increased funding of patients enrolled with a primary care provider. The authors suggest continuing attention to the provision of incentives to support affiliation and continuity of care. It is encouraging to see continuity of care and personal service acknowledged as values which must be maintained in the move towards the current Government's model of larger Integrated Family Health Centres.<sup>8</sup>

On the other hand, emerging trends relating to providers and how they organise themselves may work against continuity. For example, after hours care is increasingly undertaken by organisations separate from the patient's practice, and GPs are less likely to become practice owners and work in one location for many years. Many practitioners prefer to work part-time, and increasing numbers of GPs develop sub-specialty practices (e.g. musculoskeletal or ENT GPSIs).<sup>9</sup> Larger medical centres and flexible hours of work make it harder to achieve continuity of care with a single doctor or nurse.

Jatrana et al comment that their model, which focuses on the individual receiving continuity of care, does not "account for much of the observed variation in continuity of care". We would suggest that perhaps at least some of that variability might be accounted for by provider factors, and that we should all think seriously about the implications for continuity of care of evolving models of health care provision.

The work of Jatrana, Crampton and Richardson provides a baseline for further investigation of the phenomenon of continuity of care in New Zealand. Questions which might be considered include those related to which aspects of continuity are the most crucial (e.g. continuity of information within a practice, versus continuity of the relationship with a single provider), an exploration of other settings in which it might be reasonable to try and improve continuity of care (e.g. secondary care provision of care to the chronically ill), and perhaps an examination of the relation of actual health outcomes to continuity of care measures in the New Zealand context.

**Competing interests:** None.

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## Continuity of care with general practitioners in New Zealand: results from SoFIE-Primary Care

Santosh Jatrana, Peter Crampton, Ken Richardson

### Abstract

Continuity of care has been defined as seeing the same health care provider over time, and has been shown to be associated with positive health outcomes, high quality care, high patient satisfaction with care and with lowering health care costs. While the benefits of continuity of care with a primary care provider are well documented, relatively little is known about those patients who receive or do not receive continuity of care. Using data from SoFIE-health, which is an add-on to the Statistics New Zealand-led Survey of Family, Income and Employment, this paper aims to construct a summary measure of continuity of care and to contribute to an enhanced understanding of the prevalence of continuity of care in New Zealand. We used the Primary Care Assessment Tools (PCAT) to create a mean score of continuity of care.

We found continuity of care is high in New Zealand. Overall, our data provide some support for the hypothesis that people with high health needs have higher mean continuity of care scores (e.g. the elderly, Pacific and Asian ethnic groups, those in the low income tertile, and those with one or more chronic conditions). The authors propose that continued incentives to develop and sustain affiliation with a primary care provider and continuity of care are important for maintaining the quality and cost-effectiveness of primary health care.

Continuity of care (COC) has been defined as seeing the same health care provider over time, and is one of the four main domains of primary care.<sup>1</sup> Continuity of care presupposes the existence of a regular source of care over time, regardless of the presence or absence of disease or injury. It is intended to help the provider and the patient build a long-term relationship in order to foster mutual trust between provider and patient, and knowledge of both parties' expectations and needs.<sup>2</sup>

Studies, mainly from the US, have shown that increased continuity of care is associated with positive health outcomes,<sup>3</sup> high quality care,<sup>4</sup> better medication and appointment compliance, enhanced physician recognition of the patient's health needs,<sup>5</sup> and high patient satisfaction with the care.<sup>6,7</sup> Research has also suggested that having a regular and consistent source of care is associated with lowering health care costs<sup>3</sup> by decreasing use of emergency services<sup>8,9</sup> and hospitalisations,<sup>10,11</sup> particularly for ambulatory-care-sensitive conditions (conditions that are more amenable to primary care interventions).

The hypothesized benefits of continuity of care with a primary care provider (PCP) are based on the accrued mutual knowledge, trust and communication between patients and providers that arises from repeated contact.<sup>1-3</sup> Hence, there is considerable policy interest in defining the characteristics of people who receive continuity of care from their PCPs.

While the benefits of continuity of care with a primary care provider are well documented, relatively little is known about those patients who receive continuity of care. Studies which have looked at patients who did not receive continuity of care noted that they were typically younger, female and had relationship problems.<sup>12,13</sup> Our goal in this study is to construct a summary measure of continuity of care and to enhance understanding of the prevalence of continuity of care in New Zealand (NZ).

While defining the characteristics of those who receive continuity of care is of interest in its own right, it is particularly important in the NZ context, mainly because the different attributes of primary care have not been studied to the same extent as in countries such as the US, leading to a paucity of evidence that grounds the NZ experience in the international context. Moreover, studies from the US mainly focus on a single State, clinic/provider or hospital, or non-elderly population thus restricting the generality of the results.

Other studies focus on continuity of care at the level of the whole system, rather than at an individual patient level. This may, in part, be due to the challenge of collecting information at the individual level about aspects of primary care, or the inability of consumers to be valid judges of primary care quality.<sup>14</sup>

This study extends the current literature on continuity of care by using a large national survey and by including a variety of demographic, socioeconomic, health behaviour and health variables. We hypothesise that those who have greater need for care will experience a higher mean continuity of care score.

## Methods

### Data

This research used SoFIE-Health data, which is part of the Statistics New Zealand-led Survey of Family, Income and Employment (SoFIE). SoFIE is a single fixed panel and is the largest longitudinal survey ever run in New Zealand. It is a nationally representative study of about 22,000 adults, drawn by random sampling of households, interviewed face-to-face. All adults in the original sample are followed for a maximum duration of eight years starting from October 2002, even if their household or family circumstances change. It collects information once a year from the same individuals on income levels, sources and changes; together with the major influences on income such as employment and education experiences, household and family status and changes, demographic factors and health status.

The SoFIE-Health module is comprised of 20 minutes of questionnaire time in waves 3 (2004-05), 5 (2006-07) and 7 (2008-09), in the following health-related domains: SF-36 (Short-Form health survey), Kessler-10 (K-10), perceived stress, chronic conditions (heart disease, diabetes, and injury-related disability), tobacco smoking, alcohol consumption, health care utilisation, access and continuity of primary health care, and an individual deprivation score. The health module is administered to the original sample members (OSM).

### Main outcome variable

The main outcome measure used for this work was an index of continuity of care which is assessed by the following four questions in SoFIE-Health.

Q1: Would the *same doctor* or nurse take care of you every time you go?

Q2: If you called them, could you talk to the person that *knows you best*?

Q3: Do you think they *know you very well as a person*?

Q4: Do you think they *know what medical problems* are most important to you?

The response categories include definitely, probably, probably not and definitely not and are coded/scored as 4,3,2,1 respectively so that a higher total score indicates higher continuity of care. We based our method on the Primary Care Assessment Tools (PCAT) in order to translate the concept of continuity of care into characteristics that can be measured.<sup>15,16</sup>

The Primary Care Assessment Tools were developed to collect and analyse information needed to describe primary care services needed, provided and experienced by the population. Following PCAT, we excluded those individual observations that were either coded 99 (refused) or if more than 50% of questions with individuals were coded as 88 (not sure, don't remember). However, if less than 50% of questions with individuals were coded 88 (not sure, don't remember), we replaced 88 by 2 (probably).

The mean continuity of care score for an individual was calculated by summing the score of the four questions for each individual and dividing this sum by the number of questions (4 in this case). For a detailed example of the creation of the score, see Jatrana et al (2008a).<sup>17</sup>

## Independent variables

We included sociodemographic, health risk behaviour and health status variables as covariates. Independent variables chosen for analyses were based on our review of the literature and our research questions served as a guide in the selection of variables to include in the model of continuity of primary care. Sociodemographic variables in this analysis are age, gender, marital status, ethnicity, family structure, household equivalised income, labour force status, highest level of education achieved, NZDep (area deprivation), and NZiDep (individual deprivation). Health behaviour and health included current smoking status, Kessler-10 and number of chronic conditions. Categories for the various measures are shown in Table 1. A description of these variables is as follows:

**Age**—Age was calculated at the Wave 3 interview date and categorised into the following age groups: 15-24, 25-44, 45-64, and 65+.

**Ethnicity**—This paper uses the 'prioritised' concept of ethnicity. With the 'prioritised' concept, each respondent was assigned to a mutually exclusive ethnic group by means of a prioritisation system commonly used in New Zealand: Māori, if any of the responses to self-identified ethnicity was Māori; Pacific, if any one response was Pacific but not Māori; Asian, if any one response was Asian but not Māori/Pacific; the remainder non-Māori non-Pacific non-Asian (nMnPnA). The nMnPnA category mostly comprises New Zealanders of European descent, but strictly speaking is not an ethnic group.

**Marital status**—Marital status relates to legal marital status and is categorised into currently married, previously married (separated/divorced/widowed) and never married.

**NZDep2001**—NZDep2001 is a census-based small-area index of socioeconomic deprivation [24]. The Deprivation index score of dwelling location is derived from NZDep and assigned to the small area of the dwelling. NZDep2001 deprivation scores apply to *areas* rather than individual people. The index scale used here is from 1 to 5, where 1 = the least deprived 20% of areas and 5 = the most deprived 20% of areas.

**NZiDep**—The NZiDep index is a tool for measuring socioeconomic deprivation for individuals and is based on eight simple questions which take about 2 minutes to administer [25]. The final deprivation score was coded into the following five ordinal categories. (Relatively few people have the largest number of deprivation characteristics.)

- 1 = no deprivation characteristics
- 2 = one deprivation characteristic
- 3 = two deprivation characteristics
- 4 = three or four deprivation characteristics
- 5 = five or more deprivation characteristics

**Income**—In SoFIE, income is collected from every individual over 15 years at every wave. Household income was derived by totalling adult annual personal income (before tax) from all sources received, consumer price index (CPI) adjusted for the quarter ending December 2001 (the first reference quarter of the study), equivalised for household economies of scale using a NZ-specific equivalisation Index [26], and categorized into tertiles: low (<\$26,109), medium (\$26,109 to \$43,015) and high (≥\$43,016). For the analyses in this paper, equivalised household income at wave 1 was used.

**Education**—The education variable used in this analysis was the highest level of education at Wave 3, categorised as no qualification, school qualification, and post-school qualification.

**Smoking**—A current smoking status variable was created from responses to questions “Do you smoke cigarettes”, and “Have you ever been a regular smoker” and is coded into three categories: current smoker, ex-smoker and never smoker.

**Kessler-10 scale**—The Kessler-10 (K-10) is a scale measuring non-specific psychological distress [27, 28]. The K-10 consists of ten questions about non-specific psychological distress and seeks to measure the level of current anxiety and depressive symptoms based on questions about negative emotional states a person may have experienced in the four weeks prior to interview. The scores were grouped into four levels according to the criteria developed by Andrews and Slade (2001): low (10-15), moderate (16-21), high (22-29), and very high (30+) [29, 30].

**Chronic diseases**—As part of the health module each respondent was asked “have you ever been told by a doctor that you had”: Asthma, High Blood Pressure, High Cholesterol, Heart Disease, Diabetes, Stroke, Migraines, Chronic Depression, Manic Depression or Schizophrenia.

These data were coded into a co-morbidities index: 0, 1-2, >2 co-morbid diseases.

## Statistical analysis

This paper provides cross-sectional analyses of wave 3 data. The sample used in the analyses consist of 18,320 adult (15 years and above) original sample members (OSMs). Analyses were carried out using means and 95% confidence intervals (CI) to evaluate the bivariate associations between continuity of care scores and other variables. Ordinary Least Square (OLS) regression was used to adjust for covariates, including age, sex, marital status, ethnicity, household equivalised income, labour force status, small area deprivation, individual deprivation, education, smoking and health (self-assessed health, K-10 and number of chronic conditions).

The population used in the regression analyses was 11,915 adult OSMs at wave 3 who had complete information on all the socioeconomic, health behaviour and health characteristics. All counts presented in this paper are random rounded (up or down) to the nearest multiple of 5, with a minimum value of 10, as per the Statistics New Zealand confidentiality protocol. But all analyses were performed on unit level data using SAS version 8.2 within the Statistics New Zealand data laboratory.

## Results

Table 1 presents the associations between mean continuity of care scores and demographics, socioeconomic, health and health behaviour characteristics of the respondents. The mean score for continuity of care was 3.10 (95%CI: 3.09–3.11) with a range of 1.0–4.0. As the age of the respondents increased, so did the mean continuity of care score, with older respondents aged 75 and above reporting a mean score of 3.48 (95%CI: 3.45–3.51) as compared to younger respondents aged 15–24 (2.86, 95%CI: 2.83–2.89). There was little variation in the mean score for continuity of care with respect to sex, however, sex CIs do not overlap. Statistically significant variability of continuity of care was also observed for marital status and ethnicity.

Income was negatively associated with continuity of care score. For example, those in the lowest income tertile had a mean continuity of care score of 3.23 (95%CI: 3.21–3.25) and those in the highest income tertile had a mean continuity of care score of 3.02 (95%CI: 3.00–3.04). Statistically significant variability of continuity of care was observed for labour force status, with those not working had a higher mean continuity of score (3.24, 95%CI: 3.22–3.26) as compared to those who were working (3.02, 95%CI: 3.01–3.03). There was little evidence for significant variation of continuity of care with NZDep, NZiDep, or education. In contrast, significant variability was observed for the smoking covariate.

**Table 1. Demographic, socioeconomic and health characteristics of study population by mean continuity of care score: SoFIE-Health, 2004–05<sup>1</sup>**

Characteristics	N	Mean (95% CI)
<b>All</b>	16630	3.10 (3.09–3.11)
<b>Age</b>		
15-24	2255	2.86 (2.83–2.89)
25-44	5550	2.95 (2.93–2.97)
45-64	5725	3.17 (3.15–3.19)
65-74	1695	3.38 (3.35–3.41)
75+	1400	3.48 (3.45–3.51)
<b>Sex</b>		
Male	7365	3.07 (3.05–3.09)
Female	9270	3.13 (3.12–3.14)
<b>Marital status</b>		
Currently married	8980	3.16 (3.15–3.17)
Previously married	3020	3.24 (3.22–3.26)
Never married	4625	2.91 (2.89–2.93)
<b>Ethnicity</b>		
NZ/European	13160	3.11 (3.10–3.12)
Māori	1780	3.01 (2.98–3.04)
Pacific	695	3.20 (3.15–3.25)
Asian	725	3.11 (3.06–3.16)
Others	270	2.97 (2.88–3.06)
<b>Income tertiles</b>		
1	5835	3.23 (3.21–3.25)
2	4650	3.05 (3.03–3.07)
3	6150	3.02 (3.00–3.04)
<b>Employment status</b>		
Working	10700	3.02 (3.01–3.03)
Not working	5925	3.24 (3.22–3.26)
<b>NZDep</b>		
NZDepQ1 (least deprived)	3220	3.08 (3.06–3.10)
NZDepQ2	3255	3.10 (3.08–3.12)
NZDepQ3	2970	3.10 (3.08–3.12)
NZDepQ4	3490	3.11 (3.09–3.13)
NZDepQ5 (most deprived)	3160	3.13 (3.11–3.15)
Missing	540	
<b>NZiDep</b>		
No Dep	11935	3.12 (3.11–3.13)
1 Dep	2540	3.10 (3.07–3.13)
2 Dep	990	3.02 (2.98–3.06)
3-4 Dep	880	2.98 (2.93–3.03)
5 + Dep	275	3.08 (2.99–3.17)
<b>Education</b>		
No education	215	2.83 (2.74–2.92)
School	4415	3.06 (3.04–3.08)
Post-school vocational	5730	3.11 (3.09–3.13)
Degree or higher	2260	2.97 (2.94–3.00)
<b>Smoking</b>		
Current	3285	3.06 (3.04–3.08)
Ex	4400	3.17 (3.15–3.19)
Never	8935	3.08 (3.07–3.09)
<b>Kessler 10 groups</b>		
Low (10-15)	12820	3.11 (3.10–3.12)
Moderate (16-21)	2495	3.11 (3.10–3.12)
High (22-29)	880	3.07 (3.04–3.10)
V. High (30+)	285	3.13 (3.08–3.18)
<b>Co-morbidity index (%)</b>		
0	7155	2.99 (2.97–3.01)
1-2	7685	3.15 (3.14–3.16)
>2	1790	3.35 (3.32–3.38)

**Note:** Total N may not sum up to 16630 because of random rounding.

Ex-smokers had the highest mean continuity of care scores (3.17, 95%CI: 3.15–3.19) while current smokers had the lowest score (3.06, 95%CI: 3.04–3.08). Mean scores for continuity of care do not differ with the levels of psychological distress (Kessler-10). However, there is an increasing trend in continuity of care with increasing numbers of co-morbid diseases.

Those reporting no co-morbid conditions had a lower mean continuity of care score (2.99, 95%CI: 2.97–3.01) than those reporting 2 or more co-morbid conditions (3.35, 95%CI: 3.32–3.38).

To check the effect of controlling simultaneously for all covariates, we performed an OLS regression analysis. Table 2 presents results from the OLS regression analysis, in which different predictors are regressed on continuity of care simultaneously controlling for demographic, socioeconomic, health behaviour and health factors. We also conducted with sequentially adding demographic, socioeconomic and health and health behaviour variables in the model. However, for brevity only the results from the final model are presented.

Results from this analysis shows that the estimated coefficients for all the demographic factors were significant. Individual coefficient estimates suggested that age was significantly associated with an increase in continuity of care, while male sex and never married was associated with a reduction in continuity of care. Continuity of care increased by 0.19 and 0.06 points for the Pacific and Asian ethnicities, by 0.09 points for those in the lowest income tertile, by 0.06 for those not working, and by 0.14 points for those with 1 or more co-morbid conditions compared with their respective reference categories (see Table 2). However, continuity of care decreased with an increase in individual deprivation characteristics. It is important to note that OLS results are consistent with the bivariate results shown in Table 1.

**Table 2. Estimates from OLS for continuity of care, adjusting for effects of demographic, socioeconomic, health behaviour and health variables: SoFIE-Health, 2004-05<sup>1</sup>**

Characteristics	Estimates	Standard error	p-value	Type III p-value
<b>Age</b>				<b>&lt;.0001</b>
15-24	0.00			
25-44	0.03	0.022	0.142	
45-64	0.22	0.025	<.0001	
65+	0.40	0.0308	<.0001	
<b>Sex</b>				<b>&lt;0.0001</b>
Male	-0.06	0.012	<.0001	
Female	0.00			
<b>Marital status</b>				<b>&lt;0.0001</b>
Currently married	0.00			
Previously married	-0.01	0.017	0.465	
Never married	-0.08	0.017	<.0001	
<b>Ethnicity</b>				<b>&lt;0.0001</b>
NZ/European	0.00			
Māori	-0.02	0.021	0.258	
Pacific	0.19	0.032	<.0001	
Asian	0.06	0.027	0.014	
Others				

<b>Income tertiles</b>				<b>&lt;0.0001</b>
1	0.09	0.017	<.0001	
2	0.02	0.014	0.072	
3	0.00			
<b>Employment status</b>				<b>&lt;0.0001</b>
Working	0.00			
Not working	0.06	0.016	<.0001	
<b>NZDep</b>				<b>0.9709</b>
NZDepQ1 (least deprived)	0.00			
NZDepQ2	0.002	0.017	0.889	
NZDepQ3	0.008	0.018	0.652	
NZDepQ4	-0.002	0.018	0.886	
NZDepQ5 (most deprived)	0.008	0.021	0.683	
<b>NZiDep</b>				<b>&lt;0.0001</b>
No Dep	0.00			
1 Dep	-0.046	0.017	0.010	
2 Dep	-0.108	0.027	<.0001	
3-4 Dep	-0.177	0.030	<.0001	
5 + Dep	-0.093	0.053	0.078	
<b>Education</b>				<b>0.2276</b>
No education	-0.045	0.049	0.364	
School	0.016	0.013	0.206	
Post-school vocational	0.00			
<b>Smoking</b>				<b>0.3793</b>
Current	0.023	0.016	0.171	
Ex	0.002	0.014	0.891	
Never	0.00			
<b>Kessler 10 groups</b>				<b>&lt;0.5580</b>
Low (10-15)	0.00			
Moderate to V. High (16+)	0.008	0.015	0.558	
<b>Co-morbidity index</b>				<b>&lt;0.0001</b>
0	0.00			
1 or more	0.104	0.012	<.0001	
R-Square (Max-rescaled)	0.10			

Note: <sup>1</sup>SoFIE= Survey of Family, Income and Employment; \*\*\*p<0.0001.

## Discussion

Overall, our data provide some support for the hypothesis that people with high health needs have higher mean continuity of care score (e.g., the elderly, Pacific and Asian ethnic groups, those with low incomes, and those with one or more chronic conditions). The finding that older people had a higher continuity of care mean score probably reflects an increase in chronic conditions and other morbidities with age.

Although this research raises several important findings related to continuity of care to primary health care using national survey data, there are several limitations to this study that must be considered when interpreting the results. First, this study reports cross-sectional associations which prohibit drawing causal inferences. Follow up data (Wave 5) may allow more progress in deducing causal relations. Second, given that continuity of care was measured on self-reported data not confirmed by a physician/administrator, our estimates may be subject to reporting error and recall bias not accounted for by statistical adjustments. Third, Asian and Pacific ethnicity did not take into account cultural variations within these large, heterogeneous groups.

Another limitation is attrition in the data. In Wave 3 of the SoFIE study, 83% of the original sample members were re-interviewed,<sup>18</sup> which combined with the household response rate at Wave 1 of 77% gives an estimated effective response rate of 64%.

While the attrition within the SoFIE study is low compared with other population-based longitudinal panel surveys,<sup>19 20</sup> selection bias might arise in our analyses if individuals drop out of the survey in a non-random manner (i.e., the more unhealthy may be more likely to not participate in follow-up years). It is not possible to estimate whether such bias occurred. But for any selection bias of results in final model to occur would require variation in the association of independent variables with continuity of care within strata of all covariates, which seems unlikely.

It is also important to note that the coefficient of determination for the continuity of care estimator was small,  $R^2=0.10$ , indicating the model did not account for much of the observed variation in continuity of care. Hence, the model has little predictive power. The same caveats apply to models applied separately to each of the questions that comprise the continuity of care measure. This may be due to the overall high and relatively invariant levels of continuity of care in New Zealand.

Despite these limitations, the results presented here are important in several ways. This study uses a large, original, national survey in creating a continuity of care index at individual patient level. Few previous studies in New Zealand have focussed on primary care attributes at an individual patient level. This may, in part, be due to the challenge of collecting information at the individual level about aspects of primary care or the inability of consumers to be valid judges of primary care quality.<sup>14</sup>

Our results have important implications for health care policy, especially as cost containment and cost effectiveness has become increasingly important. Continuity of care has been found to be associated with lowering health care costs<sup>3</sup> among patients by decreasing use of emergency services<sup>8 9</sup> and hospitalisation.<sup>10 11</sup> and also because primary care physicians provide care that is less costly than secondary care.<sup>21</sup> Thus it can be argued that encouraging and motivating patients to form a consistent relationship with their PCP may result in reducing costs of health care.

The current Primary Health Care Strategy requires individuals to be enrolled/registered with a Primary Health Organisation (PHO)/ General Practitioner (GP) in order to be eligible for lower GP consultation fees. In 2003-04, nearly 92% of the NZ adult population was affiliated with a PCP.<sup>23</sup> High affiliation with a PCP may lead to high continuity of care. The authors propose that continued incentives to develop and sustain affiliation with a PCP and continuity of care are important for maintaining the quality and cost-effectiveness of primary health care.

**Competing interests:** None.

**Statistics New Zealand Security Statement:** Access to the data used in this study was provided by Statistics New Zealand in a secure environment designed to give effect to the confidentiality provisions of the Statistics Act, 1975. The results in this study and any errors contained therein are those of the authors, not Statistics New Zealand.

**Disclaimer:** Opinions expressed in this report are those of the authors only and do not necessarily represent the views of the peer reviewers or the University of Otago.

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## Rheumatic Fever Programme in Samoa

Satupaitea Viali, Puleiala Saena, Vailogoua Futi

### Abstract

Rheumatic fever is very common in Samoa. The following paper describes the Rheumatic Fever Programme in Samoa and looks at the incidence of acute rheumatic fever (ARF) and rheumatic heart disease (RHD). The incidence of ARF has decreased to 30 per 100,000 in 2005, 12.8 per 100,000 in 2007, 7.3 per 100,000 in 2008, and 9.5 per 100,000 in 2009. The incidence of RHD has decreased to 40.2 per 100,000 in 2007, 34 per 100,000 in 2008, and 31.8 per 100,000 in 2009. Cardiac surgery in New Zealand is expensive, but is cheaper to perform in Samoa. RHD screening with echocardiogram at schools may be the best way to reduce the burden and suffering from RHD.

Acute rheumatic fever results from an autoimmune response to infection with a group A streptococcus resulting in multi-organ involvement., Except for carditis, none of its manifestations lead to permanent damage.

Rheumatic fever and its consequences (rheumatic heart disease) remain one of the devastating diseases affecting the Pacific people wherever they are around the world.<sup>1-9</sup> There are nearly 16 million people worldwide who suffer from rheumatic heart diseases (RHD). More than 200,000 deaths each year are due to the disease and its sequelae.<sup>10</sup> The vast majority of the burden is borne by the developing countries.

Acute rheumatic fever (ARF) and RHD are becoming less common in developed countries as living conditions, hygiene, access to medical care, nutrition and socioeconomic standards improve. Unfortunately within some of the developed countries like USA, Australia, New Zealand and Hawaii, the presence of ARF and RHD are still quite prevalent amongst its indigenous and migrant populations particularly those with origins in the Pacific. With ARF and RHD so prevalent amongst the Pacific people living in the islands or in other countries, this suggests a genetic link or predisposition. Unfortunately the genetic link has not yet been established.<sup>11</sup>

Data collection to assess the burden of ARF and RHD in any country is always a challenge because of the history of the disease and the health infrastructure. This is especially true in the Pacific and Samoa. The Jones Diagnostic Criteria for ARF is difficult to apply to rheumatic fever cases in Samoa because people present late, with recurrent symptoms. In our experience, many of our people present at the stage of established RHD rather than at the sore throat and ARF stage.

### Epidemiology of acute rheumatic fever (ARF) and rheumatic heart disease (RHD)

In Samoa the reported incidence of ARF was 16.1 per 100,000 in 1985 and the prevalence of RHD was 2.3 per 1000 in 1986.<sup>3</sup> In 2000 the incidence of ARF was 35

per 100,000<sup>1</sup> from those who were referred from all the clinics and hospitals with the diagnosis of ARF. In Hawaii the incidence of ARF in Samoans was 206 per 100,000 in 1984.<sup>8</sup> The incidence of RHD in Samoa was 66 per 100,000 in 2005 and 68 per 100,000 in 2007 using the Echocardiogram Register.<sup>1</sup>

The Echocardiogram Register recorded everyone who had had an echo study including all those who were diagnosed with ARF, those who were referred because of murmurs, and those who were referred for cardiac assessment for other reasons like heart failure, ischaemic heart disease, and congenital heart diseases. The School Auscultation Survey for Heart Murmurs by Steers and Adams in 1996<sup>12</sup> implied a RHD prevalence of 77.8 per 1000 in schools. Unfortunately there was no echocardiogram used.

In 2000 and 2001, our Rheumatic Fever Team under NZAID funding performed an auscultation study for RHD in schools on 2828 kids from age 5 to age 13. Those who presented with murmurs were referred for echocardiography. The prevalence of heart murmurs was 18 per 1000, and after echocardiography the prevalence of new RHD was 3 per 1000.<sup>13,14</sup> ARF and RHD are common in other Pacific countries.

Tonga had RHD prevalence in school children of 33.2 per 1000 in 2008, and the prevalence increased with age peaking at 42.6 per 1000 in children 10–12 years old.<sup>4</sup> This survey of 5053 of primary school children was initially conducted with auscultation and those with heart murmurs progressed to echocardiography. Auscultation will miss about 20–30% of RHD<sup>15</sup> and therefore the actual RHD prevalence may be higher than reported if all the children were scanned.

Fiji had an ARF incidence of 15.2 per 100,000 from 2005–2007 in children age 5–15 years.<sup>5</sup> The prevalence of RHD in school children age 5–15 years old was 4.1 per 1000 for definite RHD and 8.4 per 1000 for definite and probable RHD.<sup>6</sup> This survey of 3462 of primary school children was initially conducted with auscultation and those with heart murmurs progressed to echocardiography.

During the 1950s and 1960s there were 20–30 per 100,000 cases of ARF in New Zealand. The prevalence of ARF amongst Pacific people in New Zealand was high. The incidence of ARF in New Zealand had declined to 2.8 per 100,000 from 1995–2000, 1.9% per 100,000 in 2005, and 2.5 per 100,000 in 2006.<sup>7,16</sup>

Pacific people comprise about 30% of cases where ethnicity was recorded and Māori was 62%. The highest rate of ARF was in the 10–14 year old age group amongst the Pacific people (16.1 per 100,000) residing in Auckland. Some of the reported RHD prevalence was 18.6 per 1000 in Cook Island, 8.0 per 1000 in French Polynesia, and 10 per 1000 in New Caledonia.<sup>2,3,17</sup>

As many people in Samoa have relatives in New Zealand there is a high incidence of migration between Samoa and New Zealand every year. This may affect the epidemiology of rheumatic fever and RHD in New Zealand and may have huge implications in the management and the control of this disease.

## **Rheumatic Fever Programme in Samoa**

The Rheumatic Fever Programme in Samoa started in the mid-1970s and was re-established in 1984. In 2000 the NZAID organisation assisted with 2–3 year funding

which enabled a school-based rheumatic fever prevention pilot programme. In 2006 funding was secured from Vodafone Foundation for establishing a RHD Project from 2007 to 2009 mainly to employ dedicated staff to oversee the Rheumatic Fever Programme. The funding was administered through the World Heart Federation with technical advice from Menzies Research Centre. The Samoan Cabinet and the Ministry of Health appointed Professor S Viali (Dean of the Oceania University of Medicine) as director, RN Puleiala Saena as the nurse, and Vailogoua Futi as the secretary and field assistant.

The Project was coordinated from the main National Hospital Tupua Tamasese Meaole (TTM) in the Rheumatic Fever Centre (RFC). People with RF and RHD were seen in the TTM Paediatric Clinic (if <13 years), TTM Medical Clinic (if ≥13 years), Tuasivi District Hospital (in Savaii), Safotu District Hospital (Savaii), and the RFC. Echocardiograms were mainly performed by Dr S Viali in adults and kids with RF and RHD in the RFC, and in the Paediatric Clinic by Dr F Fatupaito, and sometimes by Dr L Fiu in the Medical Clinic.

The information on people diagnosed with RF or RHD from all centres was regularly collected by our secretary to enter into our database. Intramuscular (IM) penicillin was delivered mainly through the RFC by RN Pule, Paediatric Clinic, Tuasivi District Hospital and Safotu District Hospital. Medical, cardiac and echocardiogram follow-up were mainly done in the RFC, TTM Paediatric Clinic and TTM Medical Clinic.

There has been strong focus on public awareness and education regarding ARF and RHD.

Multiple workshops on rheumatic fever were carried out for the medical and nursing staff in 2007 and 2008 using local and overseas experts. Mobile clinics and echocardiograms were done by Dr S Viali in the outer villages of Upolu and Savaii, and he was occasionally accompanied by an overseas cardiologist. Several rheumatic fever prevention programmes were frequently aired on national television (TV1 and TV3) between 2007–2009 and many articles on rheumatic fever prevention have been published in several popular local newspapers.

NZAID also supported a rheumatic fever primary prevention programme for 2006 and 2007 under the Ministry of Health. This focused on health education and health promotion in rheumatic fever.

## **Rheumatic Fever Register**

Register-based rheumatic fever programmes have been successful in countries like New Zealand, Australia, India, Cuba and Egypt.<sup>7,18–21</sup> To ensure efficient delivery of services and prophylaxis, and to monitor service delivery, it is crucial that the Register be accurate and up-to-date with people with ARF (known and past) and RHD. It is also a very important epidemiological tool. The most important outcome is the improvement of the status of rheumatic fever and rheumatic heart disease control.

The Rheumatic Fever Programme in Samoa kept a manual register since 1984 which was described earlier.<sup>1</sup> This manual register was well kept from 1984 to 2002 but unfortunately this register was lost. The rheumatic fever work and clinics continued with less coordination between the various centres in both islands looking after

rheumatic fever patients. During this time the patients presenting with ARF and RHD were recorded in the hospital health information data base.

The recent RHD project provided an electronic rheumatic fever register and all the rheumatic patients have been recorded in this database. The RHD project officially started in the beginning of 2007 hence a lot of the old rheumatic fever and RHD patients that were not known were entered, resulting in large numbers entered in 2007 into the electronic register. There were 133 people recorded with RHD in 1974,<sup>22</sup> and 354 recorded with RHD in 1986<sup>3</sup>, and about 708 were recorded with RHD in the current register in 2009.

**Table 1. Rheumatic Fever Register 2003–2009**

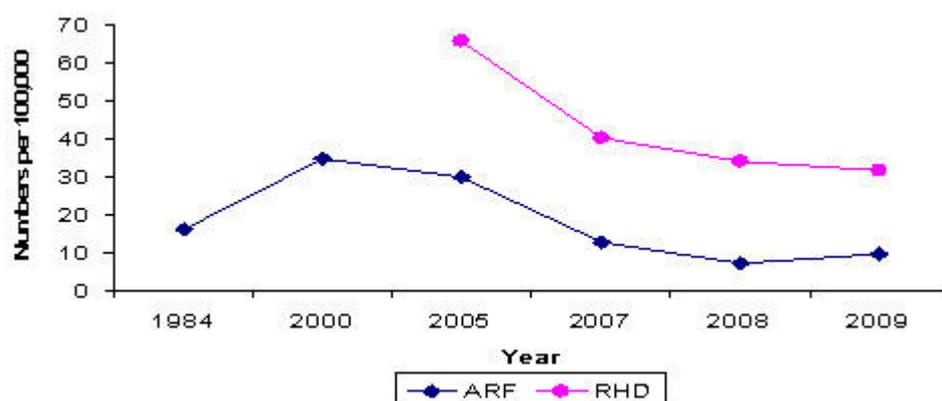
Disease	2003	2004	2005	2006	2007	2008	2009
ARF	4	3	7	3	23	13	17
New RHD	121	87	46	43	63	55	49
Known RHD & ARF					188	20	11
<b>Total</b>	<b>125</b>	<b>90</b>	<b>53</b>	<b>46</b>	<b>273</b>	<b>88</b>	<b>77</b>

ARF=acute rheumatic fever; RHD=rheumatic heart disease.

Those with ARF either presented or referred to the clinics from GPs or hospitals and some were admitted to the hospitals with acute symptoms of rheumatic fever. The new RHD were those who were referred because of a heart murmur and were found to have RHD, or were admitted for something else and were found to have RHD. Patients with known diagnosis of ARF or RHD were recorded in the year they were identified. The register recorded 314 people from 2003–2006 and 438 people from 2007–2009 (Table 1), 42% were males, and 6.8% have died.

The incidence of ARF in Samoa has steadily reduced from 35 per 100,000 in 2000,<sup>1</sup> to 30 per 100,000 in 2005, 12.8 per 100,000 in 2007, 7.3 per 100,000 in 2008 and 9.5 per 100,000 in 2009 (Figure 1).

**Figure 1. Incidence of acute rheumatic fever (ARF) and rheumatic heart disease (RHD) in Samoa**



For those who presented with ARF, about half had already developed carditis. This may mean that some of these presentations were of recurrent rheumatic fever instead of their first attack. About 1–3% of those with the first ARF attack presented with carditis and with subsequent attacks 25–75% would develop carditis.<sup>23,24</sup> The most common age group that presented with ARF was 10–14 years old (57.7%), followed by 15–19 years old (19.2%) and 5–9 years old (17.2%), and none were recorded below the age of 4.

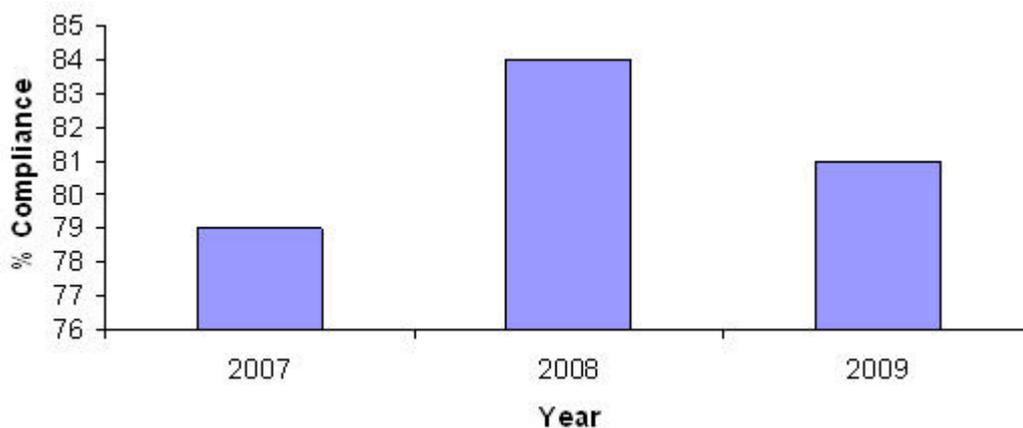
The incidence of RHD per 100,000 has steadily decreased from 66 in 2005, to 40.2 in 2007, 34 in 2008, and to 31.8 in 2009 (Figure 1). The most common age group with RHD was 10–14 years old (35.7%), followed by 15–19 years old (26.8%), followed by 5–9 years old (12.1%) and 20–24 years old (10.2%), with only one RHD case recorded below the age of 4. The villages with the most ARF and RHD were in the Upolu urban areas in Apia (Vaitele, Vaiusu, Siusega, Lotopa, Sinamoga, Faatoia, Vaivase) with low numbers in Savaii.

The Register has also shown the many undiagnosed RHD presenting in other ways and without ARF symptoms. It is always assumed that the presence of RHD meant that ARF must have occurred at some point in time, whether it was symptomatic or not. The acquiring of symptoms of ARF depended on many factors. The manifestations of major and minor Jones criteria vary in different countries which led to the original Jones criteria changing to the current form. From the current register, for every patient that had been diagnosed with ARF symptoms, there would be another 3–4 with undiagnosed RHD.

### Penicillin injections compliance

Compliance to IM penicillin from 2001–2006 was estimated to be <50% according to the staff working with rheumatic patients, with many patients declining follow-up visits. Compliance was assessed by the numbers of injections per year per patient. With more focus on rheumatic fever by the Ministry of Health, National Health Services and the new Rheumatic Project, the compliance to IM penicillin improved to 74–84% in the four injection centres (RFC TTM, Paediatric Clinic TTM, Tuasivi District Hospital, Safotu District Hospital) (Figure 2).

**Figure 2. Compliance to IM penicillin in the four injection centres**



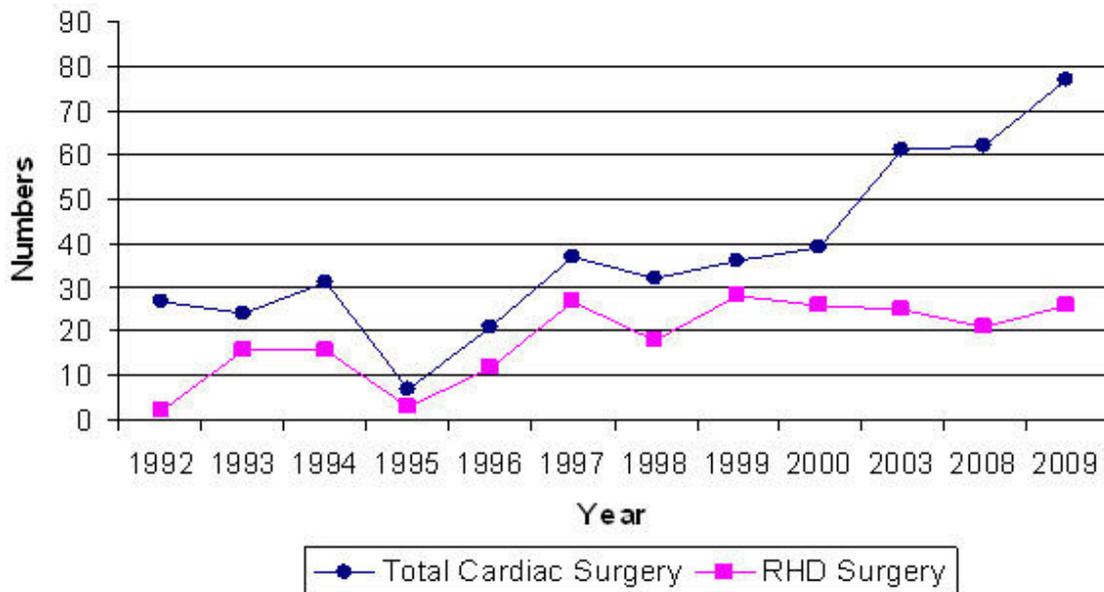
Those who did not turn up for their injections were phoned by the nurse. Previously the rheumatic fever nurse would take the penicillin injections to the homes of the rheumatic fever patients when they did not turn up.

Due to better access to hospitals and improved transportation infrastructure around the island, it is now considerably easier to get the IM penicillin injections. The key to better compliance was enthusiastic, dedicated staff in the Rheumatic Fever Programme and the reminder phone call to remind the patients of the injections. In Savaii the reminder messages were relayed by health staff in the various villages.

### RHD cardiac surgery

Cardiac surgery is very expensive, and small island economies find it difficult to afford these prices.<sup>25,26</sup> Samoa has sent the majority of its cardiac patients to New Zealand for surgery since the 1970s. Prior to 1996 less than 20 RHD operations per year were performed in New Zealand on our patients. From 1997 to 2009 between 20 and 28 RHD operations per year (NZ\$28,000–NZ\$44,000 per valve operation) were performed (Figure 3). The total cost ranged from NZ\$560,000 to NZ\$1,300,000 per year (>ST\$1.9 million tala per year).

**Figure 3. Cardiac surgery 1992–2009**



In 2003 there were 184 referrals to New Zealand for treatment including 61 (33.3%) referrals for cardiac surgery. For cardiac surgery in 2003, 41% of these were for RHD, 26% for ischaemic heart disease (IHD), 20% for congenital heart disease (CHD) with 15% for others. The 25 RHD surgeries done in 2003 cost about NZ\$1.1 million dollars (>ST\$1.65 million tala)—a significant dent in the Samoan health budget. In 2008 there were 227 referrals to New Zealand including 62 referrals for

cardiac surgery—34% were for RHD, 40% for IHD, 21% for CHD, and 5% for others.

In 2009 there were 288 referrals including 84 referrals for cardiac surgery—31% were for RHD, 43% for IHD, 18% for congenital heart disease, and 8% for others. Though RHD surgery has declined there is a noticeable rise in IHD surgeries as there is a rise in non-communicable and lifestyle diseases in Samoa and the Pacific. Samoa's overseas treatment scheme funded by the Government of Samoa, increases annually and has peaked at ST\$10 million tala in 2009. In addition to the above budget, New Zealand AID annually provides about NZ\$500,000.

There have been ongoing discussions regarding reducing prices for cardiac surgery for Samoa but the recent recession has deferred these discussions. The alternative was to perform these surgeries in Samoa by visiting cardiac teams. In 2007 the cardiac medical mission started with 10 RHD cases operated in Samoa with no fatalities. In 2008, 14 RHD cases were done in Samoa. Unfortunately 50% developed significant pericardial effusion and 3 patients died in Samoa from cardiac tamponade. There are more cardiac operations planned for 2011. There is no question that it is economical to perform cardiac surgery (valve surgery) in Samoa..

Cardiac surgery in New Zealand is very expensive and Samoa's health budget would not be able to sustain the number of surgeries needed. The key to continued success of the good-will cardiac medical mission would be the selection of low risk cases to do safely in Samoa, because the complex infrastructure needed for post-surgical care is not available. The enthusiasm and commitment of the medical team and everyone involved from New Zealand and Samoa is commendable.

## **Echocardiogram screening for RHD in schools**

People in Samoa usually do not present with acute rheumatic fever symptoms, similar to Fiji,<sup>5</sup> but present with RHD symptoms, most commonly heart failure. RHD is the dreaded complication of ARF that may influence the prognosis. This has prompted the screening programme in schools. The main purpose is to quickly identify as many RHD as possible, begin early intervention with penicillin and prevent the progression of the RHD and recurrence of ARF. Most of the early survey in schools for RHD was with auscultation.

Many recent RHD surveys have been done with auscultation before progressing to echocardiogram<sup>4,6</sup> but there were significant numbers of RHD that were missed. Some surveys were done with echocardiogram which had good identification rates of RHD in asymptomatic people.<sup>27</sup> The skill of auscultation is cheaper and more accessible than echocardiogram machines, but the identification rate for RHD using auscultation is far inferior to echocardiography.<sup>15</sup>

For auscultation, years of experience are required before being able to diagnose with certainty. Echocardiography also requires time to acquire the necessary skills to be able to diagnose adequately.. There is no doubt that echocardiography is superior to auscultation in diagnosing RHD, other heart diseases and normal flow murmurs. Though the role of echocardiography in screening is controversial at present, its specificity and application to the natural history and time course of rheumatic fever is currently being revised.

On the other hand our patients in Samoa mostly present to health facilities in the advanced heart disease stage and hence screening with echocardiography in schools will certainly pick up those with significant RHD early.

There is a current echocardiogram screening programme for RHD in Primary Schools in Samoa for ages 5–13 years old (year 1 to year 8) which will be completed in another 12 months. To date, 3200 kids have been screened from public and private schools in the urban region of Upolu, and the prevalence rates of RHD were similar to Tonga.<sup>4,28</sup> There were more RHD in the public schools compared to private schools, and many children with RHD were living in the urban areas of Upolu.

The Rheumatic Fever Register suggested that this screening programme should also involve secondary schools (age 14–19 years). Those that were picked up with RHD received penicillin prophylaxis, since penicillin is very effective in preventing progression of RHD.<sup>29</sup> The definition of RHD is based on the new diagnostic criteria (morphological changes and Doppler findings).<sup>30–32</sup>

## Summary

The incidence of rheumatic fever and rheumatic heart disease in Samoa has decreased. Though it is still 5 times higher than the incidence in New Zealand, it is similar to the situation in Tonga and Fiji. Disease patterns have changed from the early 1900s from infectious disease to non-communicable diseases. Living standards and socioeconomic status have certainly improved which could explain the decline in the incidence of ARF and RHD. None of the ARF presented under the age of 4. About 5% of ARF could occur below the age of 5 years<sup>33</sup>.

The current rheumatic fever programme is making a difference to the follow-up of patients with ARF and RHD, and the compliance to the IM penicillin prophylaxis programme. The compliance has certainly improved with simple and inexpensive measures. The prevention programmes have also been strengthened. These measures may have also contributed to the decreasing incidence of this disease.

The costs of RHD are very high for a small country like Samoa and it is not sustainable in the long term, hence the prevention of the development of ARF and early identification of RHD are some of the important strategies to reduce the burden and suffering of RHD. It is also unfortunate that many of our patients do not present with acute symptoms but with established RHD, hence screening for RHD in schools may be the most effective way of reducing the overall burden of RHD.

By treating the many undiagnosed RHD with penicillin, this will prevent the progression of cardiac valve damage thus reducing suffering to the patients and the cost for cardiac surgery.

**Competing Interests:** None known

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## Consumer demographics and expectations of probiotic therapy in New Zealand: results of a large telephone survey

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### Abstract

**Background** Knowledge regarding the possible health benefits of probiotic preparations has been increasing, but clinical trials have largely produced non-significant results. In contrast, the open market for probiotics is expanding worldwide despite little research of consumer characteristics.

**Aim** We aimed to survey the availability of probiotic preparations, the recommendation patterns of general practitioners (GP) and the characteristics of consumers.

**Methods** Pharmacies were visited and the types of probiotic supplements were reviewed. A telephone survey was conducted to identify and characterise users and non-users. A questionnaire was sent to GPs.

**Results** We found 31 probiotic products containing 16 different strains of bacteria. The majority of GPs were unable to clearly define a probiotic. Of 1512 random phone numbers called, 873 were answered. The prevalence of probiotic use was 25.4% of respondents. More females than males had ever used probiotics (30.6% vs 17.2%;  $p < 0.0001$ ). The highest rate of use was found in those with tertiary qualifications (34.2%;  $p < 0.001$ ). Of users, 75.2% said they had used probiotics on a recommendation, 80.5% of non-users said they would consider taking a probiotic if it was recommended by the GP. Probiotics were mainly used alongside antibiotic treatment (23%) and gastrointestinal disorders (27.5%). Significantly more users than non-users believed in the benefits of probiotic without concern for possible side effects.

**Conclusion** The majority of participants would consider taking a probiotic if it was recommended by their GP, but GPs exhibited a lack of knowledge in the use and indications for probiotic therapy. There was a general lack of concern regarding potential side-effects.

The health potential of probiotic bacteria was first recognised by Elias Metchnikoff in 1907<sup>1</sup> but only recently has probiotic therapy gained wider acceptance. In most countries, probiotic products are classified as foods or food supplements and are freely available through supermarkets, pharmacies, health stores and on the internet. Despite a lack of clinical trials, probiotics have been reported to be efficacious in patients suffering from a wide spectrum of mainly gastrointestinal diseases and atopic disorders.

While there is considerable discrepancy across legislations<sup>2</sup>, the lack of valid efficacy data, but more so the classification as a food supplement, prohibits the manufacturer from making specific health claims about any product on the product packaging, but some are known to do so indirectly either on web sites or promotional material<sup>3</sup>.

While generally regarded as safe, reports of serious, even fatal, adverse effects and drug interactions are beginning to appear in the literature.<sup>4,5</sup> Despite these facts, the probiotic market is lucrative and fast growing. Californian market researcher, Global Industry Analysts, predicts the functional food and beverage market will reach US\$109bn by 2010 with the United States being the largest single domestic market followed by Europe and Japan. (Changing lifestyles drive functional food growth by Clarisse Douaud, 25-Jul-2007, <http://www.foodnavigator-usa.com/Financial-Industry/Changing-lifestyles-drive-functional-food-growth>.)

Recent data state that in New Zealand, approximately \$US 4.3 million/year is spent on probiotics, compared to Japan with \$US29.7 million and Sweden with \$US6.5 million

([http://www.datamonitor.com/store/Product/opportunities\\_in\\_digestive\\_immunity\\_health\\_consumer\\_attitudes\\_behaviors?productid=DMCM4663](http://www.datamonitor.com/store/Product/opportunities_in_digestive_immunity_health_consumer_attitudes_behaviors?productid=DMCM4663), accessed through Fonterra, NZ).

While most research is directed toward understanding of mechanisms by which probiotic organisms mediate their beneficial effects, there is little data either on what influences consumers to use probiotics or what they expect of them. It has been suggested that the consumption of fermented milk is closely linked to the acceptance of probiotic products. In this regard, Finland is leading with 183.9 L per capita consumption of liquid milk drinks compared to New Zealand with 90 L (Professor Douglas Goff, Dairy Science and Technology Education, University of Guelph, Canada, [www.foodsci.uoguelph.ca/dairyedu/home.html](http://www.foodsci.uoguelph.ca/dairyedu/home.html), assessed 18/02/09).

New Zealand is a mostly rural country with a growing dairy industry but there is no data on the availability of probiotics, why people decide to use them and what they expect them to do. Our survey was conducted in Dunedin, an urban centre in Southern New Zealand. The aim was to describe the availability of probiotic products, identify the health claims attributed to them, and find out who recommends them and why they are used.

## Methods

We carried out an omnibus survey of pharmacies, retail shops and general practitioners and a random cross sectional telephone survey of households. The study was approved by the chairperson of the Lower Regional South Ethics Committee.

**Probiotic availability and related health claims**—Pharmacies and Health Food Shops within a 10km radius of the city centre were identified through the phonebook and were visited individually. Product ingredients and health claims were obtained from the products' packaging, pamphlets and official manufacturers' websites.

**Survey questionnaire to general practitioners**—General practitioners (GP) within a 10km radius of the city centre were identified through the phonebook. A one-page survey questionnaire was compiled and posted, investigating their overall knowledge on probiotic therapy and also if, and why, they recommended them to patients.

**Telephone survey of households**—The Dunedin white pages were used to randomly select households to be included in the study. To ensure randomisation within households, each phone call requested that

the respondents should be the person in the household at the time was over 18 and with the next birthday.

A computer assisted questionnaire was designed to answer the main aims of identifying respondent demographics, with the prevalence and reasons for use of probiotics.

The sample size of 1500 was selected based on the estimation of probiotic use in the general population of 5%, assuming a 66% response rate and in order to estimate the prevalence with a confidence interval (CI) of  $\pm 3\%$ .

**Data collection**—The telephone survey was conducted over three weeks in March 2008. The calls were made between 5pm and 8:30pm over all seven days of the week, and each number was tried three times in case of no answer. Anonymity was maintained for analysis by not recording any names at any time and assigning to each subject a study number. Each subject was asked to provide basic demographics such as age, sex, ethnicity and highest qualification. The address of each study subject was matched with a New Zealand Deprivation score (NZDep score) to determine socio-economic status.

**Data analysis**—SPSS (v16, SPSS Inc., Chicago, IL, USA) software was used to carry out descriptive data analyses and perform the appropriate parametric and non-parametric inferential tests.

## Results

**Probiotic availability in Dunedin and related health claims**—The products in 22 out of 25 pharmacies and 4 out of 5 health food stores were reviewed. 31 products contained 16 different strains either alone or in combination, mostly lactobacilli and bifidobacteria. Neither specific bacterial strains nor their numbers in the formulation were mentioned on packaging. 29 different health claims were made, mainly regarding the gastrointestinal system and restoration of normal bowel flora, but with references to immunity and even cancer. In line with legislation, claims on packages were, in general, nonspecific however information supplied through pamphlets or on websites did contain specific health claims (e.g. reduction of sick days by 55%).

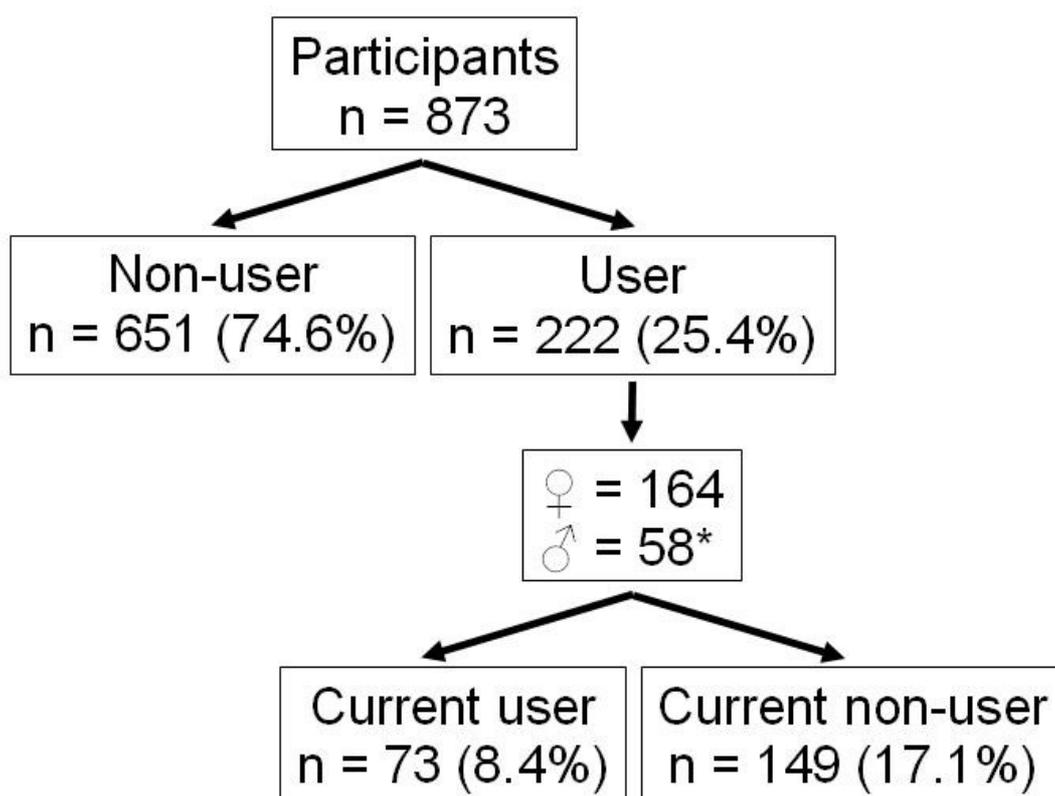
**Survey of recommendation pattern by general practitioners**—Of 110 GPs approached by mail, 45 returned the completed survey questionnaire. Only 9% of GPs were able to define the term “probiotic” and only 3.3 recommendations for probiotic supplementation were made by GPs during the previous 6 months. Probiotic products were recommended for diarrhoea (44.4%), oral health (24.4%), post antibiotic therapy (22.2%), Irritable Bowel Syndrome (IBS; 20%), Inflammatory Bowel Disease (IBD; 17.8%), immunity (15.6%), halitosis (13.3%), urinary tract infections (UTI; 13.3%), constipation (11.1%) and allergies (2.2%).

**Telephone survey**—1512 phone numbers were randomly selected and called. Of these, 107 had been disconnected and there were 177 “no answers” leaving 1228 eligible numbers. Three hundred and ten individuals declined the survey, leaving 873 participants (74% of called numbers) in the survey. Of those >97% completed the survey in full, answering every question.

**Overall demographics of participants**—The range of participants’ ages was 18 to 93 with a mean age of 52.2 years. 61.4% of participants were female. 73.8% of participants identified themselves as New Zealand European. The next most common ethnicity was Other-New Zealander (15.8%) and 4.4% Europeans, 2.2% Asian, 1.8% Maori and 0.9% Pacific Islanders participated. Four participants did not specify their ethnicity. 45.2% of participants had a tertiary degree and 18.6% had no qualification. 4 participants did not answer this question. Participating households were evenly distributed among the NZDep score.

**Prevalence of probiotic use**—Of the 873 participants in the survey, 25.4% (95% C.I. 22.6-28.5) have ever used probiotics but there are far less ‘current users’ with 8.4% (95% C.I. 6.6-10.4) of people having used probiotics in the last 7 days (Figure 1). Most users (19.1%) preferred yoghurt formulations containing probiotics and 5.8% currently consume yoghurts.

**Figure 1. Prevalence of probiotic use in Dunedin, New Zealand**



**Demographics of users**—Significantly more females (30.6%) than males (17.2 %) have ever used probiotics ( $p < 0.0001$ ) and users were significantly younger than non-users (mean age 49.3 years vs. 53.2 years;  $p < 0.001$ ). Analysis indicated an overall significant difference in ethnicity and probiotic use ( $p = 0.015$ ). Those identifying as European (excluding NZ European) had the highest rates of probiotic use at 42.1% compared with the overall usage rate of 25.4%. Although there was only a small sample size, no Pacific Islanders had ever used probiotics. Analysis showed an omnibus significant difference ( $p = 0.001$ ) in education level and use of probiotics.

The highest rate of use was found in those with tertiary degrees (34.2%) compared to those with no qualifications (13.0%). In contrast, the study showed no significant trend between rates of probiotic use and ordered NZDep01 scores ( $p = 0.932$ ). The rates of probiotic use do vary from 29.9% in NZDep01 “6” to 17.2% in NZDep01 “10,” this was not statistically significant ( $p = 0.932$ ).

**Recommendation pattern**—75.2% of patients used probiotic products upon recommendation, mainly by media, the family doctor or family members (Table 1). Of the 651 non-users, 80.5% stated that they would consider taking probiotics if a doctor recommended they should, compared to 10.3% who showed no interest. Just under half (49.2%) of non-users would take probiotics if a pharmacist recommended that they do. Of the non-users, 38.6% stated no indication for probiotic treatment and 26.1% had never heard of probiotics. Only 0.9% were worried about side effects.

**Table 1. Main source of recommendation for users of probiotics**

Source of recommendation	Number of users	Percentage of users
Not recommended	55	24.8
Doctor	38	17.1
Family	24	10.8
Friend	22	9.9
Health shop	5	2.3
Lecturer	4	1.8
Media	48	21.6
Naturopath	2	0.9
Nurse	4	1.8
Other	3	1.4
Pharmacist	17	7.7
<b>Total</b>	<b>222</b>	<b>100.0</b>

**Perception of probiotic treatment**—Users reported a wide range of indications for probiotic use. The most common indication was following a course of antibiotics (23%). Other common uses included other gastrointestinal disorders (10.4% for GI balance and 17.1% for GI upset) and throat and oral health. Some of the more innovative answers included using probiotics for musculoskeletal purposes, to prevent bowel cancer and to lose weight. 9.9% did not know of any conceivable benefit of probiotic supplementation and 2.7% stated that there are no benefits.

Perceived benefits were analysed for both users and non-users (Table 2).

**Table 2. Perceived benefits of probiotic products**

Benefit	Non-user	User
No response	0.0%	0.5%
Don't know	61.1%	9.9%
No benefit	2.6%	2.7%
Gastrointestinal tract	16.4%	45.1%
General health	9.7%	13.1%
Immunity	2.5%	5.9%
Musculoskeletal	0.5%	0.0%
Post antibiotic therapy	2.2%	9.9%
Energy	0.8%	0.5%
Supplement	0.9%	0.0%
Throat/oral	1.2%	4.5%
Urogenital	1.1%	6.3%
Weight loss	0.6%	0.0%

61.1% of non-users did not know of any benefits but 2.6% stated that there are no benefits. Most common perceived benefits were an improvement of the gastrointestinal balance and the general health status. The omnibus P-value ( $<0.001$ ) demonstrates that there is a significant difference between the user and the non-user groups' beliefs regarding the benefits of probiotics.

The majority of users (67.1%) and non-users (89.4%) were not aware of any side effects by probiotic treatment and 22.5% of users stated that there are no side effects compared to 5.7% non-users. The omnibus P-value ( $<0.000$ ) shows that the beliefs of the user and the non-user groups differ significantly with regard to potential side effects.

**Other characteristics of probiotic users**—In our study, a question was also asked with regards to other non-prescription health supplements use. Among the survey respondents, the rate of use of non-prescription health supplements in Dunedin is 45.8%. There is a significant correlation between the use of non-prescription health supplements and probiotic use with 68.5% of users currently taking other supplements, compared with only 38.1% of non-users ( $p<0.001$ ).

Participants were also asked how much control they have over their own health. Answers were given according to a scale from 1 to 10 with 1 representing no control and 10 representing full control. The mean value for all participants was 7.55, with a user mean of 7.62 and non-user mean of 7.52 ( $p=0.504$ ). However, an omnibus p-value demonstrates a difference between in the responses of users and non-users in favour of users ( $p=0.041$ ).

## Discussion

The liberal interpretation of beneficial effects in marketing strategies has forced legislation to regulate labelling. However, this is being done inconsistently throughout the world and Internet information crosses borders.

In Japan, a country with a long tradition in probiotic therapy (e.g. Yakult, a fermented milk drink containing *Lactobacillus casei* Shirota bacteria), more than 20 health claims are approved in contrast to Canada where no health claim can be legally linked with a probiotic product.<sup>6</sup> This leaves the consumer confused when asking for guidance from authorities such as family practitioners and pharmacists. Our study is the first large analysis of probiotic availability in Australasia and an extensive characterisation of probiotic consumers.

One-quarter (25.4%) or 222 of the 873 participants in the telephone survey had ever used probiotics, with 73 (8.4%) having used them in the past week. Females under 50 years of age, of European ethnicity, and possessing a tertiary degree were more likely to be consumers. The most common formulation “ever” used was yoghurt, with a smaller proportion of people using capsules, but only 6% of respondents had used yoghurt and 1.5% tablets or capsules in the past week.

The majority of consumers had been recommended to use probiotic supplements, most frequently by the media, but also commonly by doctors and friends, with 80% of non-users saying that they would use probiotics if recommended by a doctor,

compared to just under half who would do so on a pharmacist's recommendation. Many people would take probiotics if their GP recommended it, but we found that practitioners' knowledge of probiotics was limited.

The main indications for use were post-antibiotic therapy, other GI conditions and for "general health". Non users had either not heard of probiotics, or did not see a need for them. They were also less likely than users to have heard either of benefits or side effects.

The strengths of the study were the large sample size, the random nature of the sampling and the 74% response rate, which was good for a telephone survey.

Weaknesses lay in the source population being limited to households having a telephone, being listed in the telephone book and fulfilling the inclusion criteria. Compared to Dunedin census values, responders were older (54 vs 34) and had a higher ratio of females to males, 61%:39% compared to census values of 52%:38%.

Women seem more likely to be at home and answer the phone at the time of the survey, which may have increased the overall prevalence estimate. The fact that a limited number of Māori and Pacific Island peoples were included may also limit generalisability to the rest of New Zealand, with a similar overestimate of prevalence.

There were few similar studies conducted overseas, mostly of smaller sample size. The results of this study do compare with those of four overseas studies, in that probiotic users are more likely to be female,<sup>7</sup> educated,<sup>7,8</sup> use other non-prescription supplements,<sup>8</sup> and of European origin.<sup>9</sup> However, compared to overseas data, our study showed probiotic users to be younger and we found no association between income and use.

Consumers who are aware of probiotics tend to be more accepting of their potential benefits.<sup>10</sup> Attitudes toward probiotics range from knowledgeable and believing, to unaware and even repulsed.<sup>10</sup> These attitudes were reflected in our study.

The survey did indicate that if non-users were recommended probiotics by their GP, the majority (80%) would consider taking them. A study undertaken by McConnon et al<sup>11</sup> in Leeds, UK showed that people feel that GPs and health professionals are the most trustworthy sources of health information.

We found extensive availability and advertising of probiotic products in Dunedin, and individuals were most strongly influenced by advertising (media), but more strongly influenced by doctors than pharmacists and health shops. Mostly unspecific claims were made on the packaging but we found 29 specific claims in related brochures, pamphlets and web pages.

It seems evident that health professionals should be more aware of the benefits and potential risks of these products, however this information should be evidence-based and research into the area needs to be ongoing. Particular areas that seem to be lacking in the current literature are direct comparisons of efficacy between different probiotic formulations, and the long-term benefits and risks of probiotic use.

Until this evidence becomes available, apart for information on the packaging, consumers should be urged to adopt a healthy scepticism regarding the efficacy of probiotics.

**Competing interests:** None.

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## The epidemiology of giant cell arteritis in Otago, New Zealand: a 9-year analysis

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### Abstract

**Aims** To study the epidemiology of biopsy proven giant cell arteritis (GCA) in patients in the Otago region, New Zealand.

**Materials and Methods** Records of 363 consecutive patients who underwent temporal artery biopsy at Dunedin Hospital between 1996–2005 were reviewed. Annual incidence of biopsy-proven GCA was estimated, epidemiologic characteristics of the biopsy-positive group was compared with the biopsy-negative group.

**Results** Among the 363 patients who underwent temporal artery biopsy there were 105 (29%) males and 258 (71%) females; biopsy-proven GCA was diagnosed in 70 (19%) patients. The mean age of biopsy-positive group was 72.8 years (range 57-91 years, SD 8.2), which was comparable to the biopsy-negative group 73.4 years (range 50–97 years, SD 9.5),  $p < 0.2$ . The mean annual incidence of GCA in Otago was 12.73/100,000 CI (11.7–14.3,  $p < 0.5$ ) for patients  $\geq 50$  years over the 9 years of observation

**Conclusions** The first large study of GCA from Australasia demonstrated that a variation in the annual incidence rate for giant cell arteritis in Otago, New Zealand showed a cyclic pattern. The overall incidence seems to reflect the ethnic origins of the majority of the population from Britain.

The epidemiologic characteristics of giant cell arteritis (GCA) have been studied in large populations from the United States,<sup>1–4</sup> United Kingdom,<sup>5,6</sup> Sweden,<sup>7–9</sup> Denmark,<sup>10</sup> Norway,<sup>11</sup> Israel<sup>12,13</sup> and Saudi Arabia<sup>14</sup> where incidences have been estimated mainly through retrospective study designs. These studies have demonstrated that GCA occurs more commonly in populations of Nordic descent,<sup>15</sup> fluctuations in incidence with distinctive peaks were reported by some investigators;<sup>2,5,13,16–18</sup> however this was not observed by others.<sup>16,19</sup>

The epidemiologic characteristics of this disease have never been studied in Australasia. We present the first epidemiological study evaluating clinical and laboratory characteristics of biopsy proven GCA in the population of Otago, New Zealand; comparing the characteristics of the biopsy positive with the biopsy negative group and the annual incidence rate in Otago, New Zealand to internationally reported figures.

### Materials and Methods

A retrospective analysis of the clinical presentation, management and postoperative course of 363 consecutive patients obtained from the surgical database at Dunedin Hospital, Otago, New Zealand between 1996–2005 was undertaken. All cases of suspected giant cell arteritis in the Otago region are referred to this centre for a temporal artery biopsy. Patients who underwent or were evaluated for a

temporal artery biopsy (TAB) were included in the study, cases lacking sufficient medical information were excluded.

Of a total of 369 cases, 6 cases had insufficient medical information and were excluded from this study. A total of 363 cases fulfilled the inclusion criteria. Variables documented from the medical records included demographic factors such as age and gender, and major symptoms and signs. An ophthalmic trainee or ophthalmologist evaluated all cases within 1 week of starting systemic steroids and temporal artery biopsies were conducted within 2 weeks of starting steroids.

Inflammatory markers were requested for all cases at the time of referral. The decision to undertake a TAB was based on clinical criteria and raised inflammatory markers and / or platelet count. Trainees performed biopsies within 1 week of clinical assessment.

A repeat biopsy was performed within 1 week in histologically negative cases if clinical features were judged to be sufficiently suggestive, inflammatory markers were raised inexplicably or the initial biopsy was shorter than 2 mm.

An experienced pathologist examined all histological specimens. Temporal artery biopsies were processed and cut at 4–5  $\mu\text{m}$  thickness from at least 3 levels. Hematoxylin and eosin stains slides were produced from each paraffin block. Cases with visual involvement were admitted to hospital and biopsy was performed within 24 hours and methylprednisone 1mg/kg/day was administered intravenously for 3 days. Follow-up within 1 week was arranged after the biopsy to ensure the improvement of symptoms, compliance with treatment and wound assessment.

Major features assessed to determine the presence of GCA were giant cells in the intima and the media, lymphocytes and histiocytes in the media, reduplication/fragmentation of the internal elastic lamina and intimal thickening. Healed GCA was diagnosed in the presence of intimal fibrosis, media scarring with eccentric and segmented disruption of the internal elastic lamina or chronic media inflammation with neovascularisation. However, if one or more of these features were absent, healed arteritis or atherosclerosis was considered<sup>20</sup>. Biopsy positive cases were placed on oral prednisone 1mg/kg/day immediately upon receiving the biopsy results.

Statistical analysis was performed on the Statistical Package for the Social Sciences (SSPS) v16.0. The Exact method was used in calculating the confidence interval for the incidence of GCA. An independent-sample t-test was used to compare mean differences in clinical characteristics and laboratory findings between the GCA positive and negative groups.

Annual age and gender specific incidence rates were calculated / 100,000 population aged  $\geq 50$  years using the number of incident cases as the numerator and population estimates based on census counts as the denominator. Linear interpolation was used to estimate population size for intercensal years<sup>21</sup>. Ninety five percent confidence intervals (95% CI) were computed for incidence rates.

## Results

**Patient demographics**—The population in Otago consists ethnically of Europeans (85.9%), Māori (7.1%), Pacific Islanders (1.8%), Asians (4.5%), Middle Eastern and African (0.7%). Over the 9 years of observation there was an estimated increase in total population numbers by 6265 (3.3%), an increase in the population age group  $\geq 50$  years by 9484 (16.1%) and a decrease in the population  $< 50$  years by 3219 (2.4%).

Temporal artery biopsies were performed on a total of 363 patients, of which 105 (29%) were males and 258 (71%) were females. The mean age of the population was 73.2 years (range 50–97 years, SD 9.3). The average follow up was 51.9 months (range 1–120, SD 24.9).

A total of 70 (19%) patients with biopsy proven GCA (GCA+ve) were identified. The mean age at diagnosis was 72.8 years (range 57–91 years, SD 8.2). There were 52 (74%) females and 18 (26%) males giving a ratio of 2.9:1.

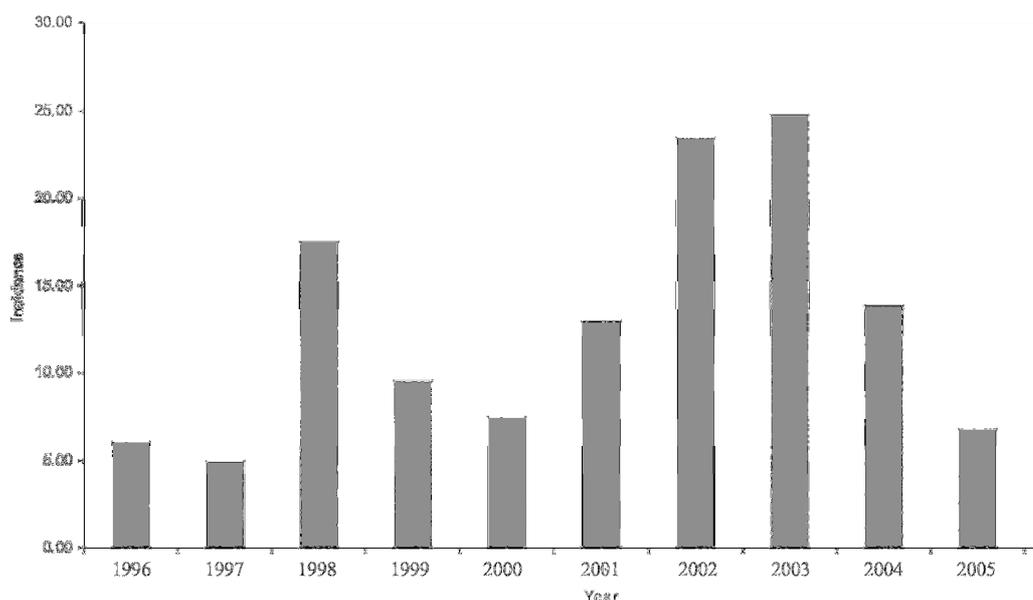
The annual incidence of GCA/100,000 population aged  $\geq 50$  years adjusted for gender and age is shown in Table 1, the mean annual incidence in the population  $\geq 50$  years was 12.7/100,000 over the 9 years of observation.

**Table 1. Incidence of giant cell arteritis/100,000 population in the Otago region for the population age  $\geq 50$  years. CI, confidence interval**

Variables	Incidence /100,000	95% CI (P<0.5)
All patients	12.7	11.7–14.3
Females	21.3	19.8–24.2
Males	8.8	8.3–10.2
Age 50–64	21.0	20.9–21.5
Age 65–74	144.3	143.2–146.4
Age $\geq 75$	342.7	340.2–347.3

The variation in annual incidence is shown in Figure 1. We observed a cyclic annual incidence with 2 peaks 5 years apart.

**Figure 1. Annual incidence of giant cell arteritis/100,000 population in the Otago region 1996–2005 for the population age  $\geq 50$  years. The distribution is cyclic with a peak in 1998 and 2003**



The incidence rates increased with age and there was a female: male ratio of 2.8:1. Seasonal variations were observed with more cases of GCA diagnosed in the spring 23 (32.8%) than the summer 17 (24.3%), autumn 16 (22.9%), and winter 14 (20%), however the difference between the seasons was not statistically significant (P<0.9).

Among the biopsy positive cases 5 (1.4%) showed lesions consistent with healed giant cell arteritis. Unilateral biopsies were performed on 335 patients. These were positive in 67 cases (18.5%). In 28 cases bilateral sequential biopsies were performed of which 2/28 (7.2%) demonstrated active arteritic lesions and the other case was a lesion consistent with GCA.

There were no reported postoperative complications from the procedure.

A total of 293 (81%) patients were biopsy negative (GCA-ve). The mean age in this group was 73.4 years (range 50–97 years, SD 9.5). There were 88 (30%) males and 205 (70%) females. Discharge diagnoses included autoimmune conditions polymyalgia rheumatica, rheumatoid arthritis, systemic lupus erythematosus and other vasculitides in 54 (18.4%), optic neuropathies in 6 (2%), malignancies in 5 (1.7%), non-vasculitic cerebrovascular accident in 4 (1.4%), septicaemia in 3 (1.0%) and other diagnoses 15 (5.1%). No definite diagnosis was recorded in the medical notes of 206 (70%) cases.

**Clinical and laboratory differences between the biopsy positive and negative groups**—There was no difference in mean age between the GCA +ve and –ve groups ( $p < 0.2$ ) or gender ( $p < 0.6$ ). The major presenting symptoms and signs are summarised in Tables 2 and 3 respectively.

Headache was the commonest symptom occurring in 198 (54.5%) patients. Fever was the commonest sign occurring in 38 (10.5%) of patients. In analysing the clinical difference in the GCA +ve and –ve groups, jaw claudication, anorexia and scalp tenderness were the most significant discriminating symptoms (Table 2).

**Table 2. Major symptoms in the study population**

Symptom	GCA +ve cases	GCA -ve cases	Total cases (%)	P value
Headache	47 (67.1%)	156 (53.2%)	198 (54.5%)	0.1
PMR symptoms	22 (31.4%)	69 (23.5%)	91 (25%)	0.1
Jaw claudication	17 (24.3%)	17 (5.8%)	34 (9.4%)	0.0001
Scalp tenderness	16 (22.9%)	39 (13.3%)	55 (15.2%)	0.003
Malaise	12 (17.1)	39 (13.3%)	51 (14.1%)	0.4
Anorexia	10 (14.3%)	22 (7.5%)	32 (8.8%)	0.005
Weight loss	9 (12.9%)	30 (10.2%)	39 (10.7%)	0.6
Permanent visual loss	10 (14.3%)	31 (10.6%)	41 (11.3%)	0.3
Transient visual loss	7 (10%)	24 (8.2%)	31 (8.5%)	0.7

PMR=Polymyalgia rheumatica, GCA+ve= patients with giant cell arteritis, GCA-ve=patients without giant cell arteritis. The P value indicates the statistical significance of the difference in the prevalence of the symptom in the biopsy positive versus the biopsy negative population.

Among the signs abnormalities of the superficial temporal arteries, a clinical diagnosis of arteritic anterior ischemic optic neuropathy (AAION) and raised inflammatory markers without suggestive clinical symptoms and signs were significant discriminators (Table 3).

**Table 3. Major signs in the study population**

Signs	GCA +ve cases	GCA -ve cases	Total cases (%)	P value
Fever	9 (12.9%)	29 (9.9%)	38 (10.5%)	0.4
STA tenderness	9 (12.9%)	18 (6.1%)	27 (7.4%)	0.002
STA reduced pulse	6 (8.6%)	1 (0.3%)	7 (1.9%)	0.001
CVA	4 (5.7%)	11 (3.8%)	15 (4.1%)	0.3
Anemia	2 (2.9%)	4 (1.4%)	6 (1.7%)	0.2
Raised inflammatory markers without suggestive clinical symptoms and signs	1 (1.4%)	14 (4.8%)	15 (4.1%)	0.004

STA=superficial temporal artery, AAION=arteritic anterior ischemic optic neuropathy, CVA=cerebrovascular accident, GCA+ve= patients with giant cell arteritis, GCA-ve= patients without giant cell arteritis. The P value indicates the statistical significance of the difference in the prevalence of the sign in the biopsy positive versus the biopsy negative population.

**Table 4. The distribution of inflammatory markers in the study population**

ESR mm/hr	GCA +ve cases	GCA -ve cases
≤20	3 (4.3%)	34 (11.6%)
21–70	31 (44.3%)	160 (54.6%)
71–120	30 (42.9%)	84 (28.7%)
121–170	6 (8.6%)	14 (4.8%)
≥171	3 (4.3%)	1 (0.3%)
<b>Total</b>	<b>70</b>	<b>293</b>
CRP mg/dl	GCA +ve cases	GCA -ve cases
≤5	3 (4.3%)	43 (14.7%)
6–50	18 (25.7%)	64 (21.8%)
51–95	31 (44.3%)	150 (51.2%)
96–140	10 (14.3%)	17 (5.8%)
≥141	8 (11.4%)	19 (6.5%)
<b>Total</b>	<b>70</b>	<b>293</b>

ESR=erythrocyte sedimentation rate, CRP=C-reactive protein, GCA+ve=patients with giant cell arteritis, GCA-ve=patients without giant cell arteritis.

The mean erythrocyte sedimentation rate (ESR) was 80.4mm/hr (range 14–137, SD 30.1) in the biopsy positive group compared to 66.2 mm/hr (range 1–217, SD 37.9) in the biopsy negative group (P<0.01). The mean C-reactive protein (CRP) was 86.5mg/dl (range 1–441, SD 75.1) in the biopsy positive group compared to 54.2 mg/dl (range 1–328, SD 66.3) in the biopsy negative group (P<0.98).

Table 5 shows the distribution of selected systemic diseases in this series; only polymyalgia rheumatica (PMR) reached statistical significance.

**Table 5. Past history of systemic diseases in the study population**

Systemic diseases	GCA +ve cases	GCA -ve cases	Total cases (%)	P value
CVA	8 (11.4%)	28 (9.6%)	36 (7.7%)	0.5
Neoplasia	6 (8.6%)	31 (10.6%)	37 (8.5%)	0.2
Diabetes	11 (15.7%)	37 (12.6%)	48 (10.1%)	0.2
IHD	16 (22.8%)	71 (24.2%)	87 (19.6%)	0.6
Hypertension	25 (35.7%)	94 (32.1%)	119 (32.8%)	0.4
PMR	10 (14.3%)	20 (6.8%)	30 (8.3%)	0.0001

CVA=cerebrovascular accident, IHD=ischemic heart disease, PMR=polymyalgia rheumatica, GCA+ve= patients with giant cell arteritis, GCA-ve= patients without giant cell arteritis.. The P value indicates the statistical significance of the difference in the prevalence of the disease in the biopsy positive versus the biopsy negative population.

**Visual loss**—The cause of permanent visual loss in the GCA +ve population was mainly due to AAION in 9 eyes (8 unilateral cases and 1 bilateral case). The presenting and final visual acuities of these cases ranged between hand movements to no light perception. The optic disc showed a chalky white swollen optic disc in all cases. Central retinal artery and branch retinal artery occlusion were diagnosed in 1 case each. There were no reported cases of improvement in vision in those that presented with AAION.

## Discussion

We present the first large epidemiological study in Australasia of patients referred for temporal artery biopsy. The mean annual incidence rate in this study is intermediate between studies reported in populations of European origin<sup>22,23</sup> and those rates reported in studies from Mediterranean countries.<sup>18,24,25</sup> Although the predominant ethnic origin of the population in the Otago province is from the United Kingdom, incidence rates were nearly half of those reported in a population in the United Kingdom by Smeeth et al.<sup>5</sup>

Factors influencing the incidence rates such as the high proportion of ethnic Europeans in Otago, the increasing population age group  $\geq 50$  years and increase in awareness of this disease among referring practitioners are likely to be relevant factors.

A cyclic nature of annual incidence was noted in our series; Salvarani et al noted over an observation period of 50 years on the population of Minnesota five peaks in the incidence rate, each of which lasted about 3 years with peaks occurring approximately every 7 years.<sup>2</sup> A close concurrence between the observed incidence peaks of PMR/GCA and epidemics of *Mycoplasma pneumoniae*, parvovirus B19, and *Chlamydia pneumoniae* has been found in different areas of Denmark<sup>23</sup> A possible link to parvovirus B19 was found in the Olmsted population.<sup>2</sup> We did not investigate this possibility in our study.

The seasonal variation is also suggestive of an environmental factor, this has been reported by other investigators,<sup>5,16</sup> Smeeth et al reported higher rates of both GCA and PMR in during late spring and early summer.<sup>5</sup> Other studies, as ours, did not find any seasonal effect or this effect did not achieve statistical significance.<sup>18,19,26</sup>

Headache was the most common presenting manifestation of GCA as it is in other major epidemiological studies. Jaw claudication was the symptom most characteristic of the GCA+ve versus -ve group. This is in keeping with the traditional clinical teaching that jaw claudication, although somewhat insensitive, is a relatively specific feature for GCA.<sup>27</sup>

Gonzalez-Gay et al in a series of 240 patients reported differences in isolated PMR and PMR associated with GCA. Patients with isolated PMR were significantly younger than those with PMR associated with biopsy-proven GCA and had a lower frequency of anorexia, malaise and weight loss.<sup>28</sup> In our series the age difference was not statistically significant. This may reflect the limited numbers of patients with these symptoms or the limitation of a retrospective study design in which information regarding clinical variables was neither always available nor complete. This could also account for the large proportion of biopsy negative patients without a recorded discharge diagnosis.

ESR and CRP were highly correlated in our study ( $P < 0.0001$ ) but only ESR was significantly different in comparing GCA +ve and -ve groups. Both ESR and CRP are sensitive tests for the diagnosis of GCA and their combination increases the sensitivity further<sup>29</sup>. Costello et al in a retrospective analysis of 121 GCA+ve patients compared the sensitivity and specificity of tests used in the diagnosis of GCA and found ESR achieved a sensitivity of 94.2% and a specificity of 80.5%. For CRP these values were 98.6% and 75.7% for the sensitivity and specificity respectively. The failure of CRP to achieve statistical significance in the GCA +ve group may be attributed to the lower specificity of the latter test.<sup>30</sup>

Table 3 demonstrates a statistically significant difference in the prevalence of a positive TAB in the subgroup of 15 cases presenting with a raised inflammatory markers in the absence of suggestive clinical symptoms and signs of GCA; this indicates the low possibility of a positive biopsy in this clinical setting; although high inflammatory markers are a hallmark of GCA, are a nonspecific indicator of inflammation.<sup>28</sup>

The results of the study should be interpreted with caution, as potential sources of bias are detection and collection bias, increasing awareness of GCA among clinicians could increase referral and biopsy rates. In addition the retrospective design of this study limits its yield; however the long period of observation, inclusion only of biopsy proven cases in the GCA +ve group, clinical and laboratory comparisons drawn from the GCA-ve group and the first large epidemiologic study on this disease from a population in Australasia generates interest in its findings.

## Conclusion

The first large study of GCA from Australasia demonstrated that a variation in the annual incidence rate for giant cell arteritis in Otago, New Zealand showed a cyclic pattern. The overall incidence seems to reflect the ethnic origins of the majority of the population from Britain.

**Competing interests:** None.

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## An audit of venous duplex ultrasonography in patients with lower limb cellulitis

Michael J Maze, Alan Pithie, Timothy Dawes, Stephen T Chambers

### Abstract

**Aims** To audit the use and value of venous duplex ultrasound in patients hospitalised for cellulitis at Christchurch Hospital, New Zealand.

**Methods** The case notes of all patients with the discharge diagnosis of lower limb cellulitis admitted between January 2002 and December 2004 were reviewed for evidence of having undergone lower limb duplex ultrasonography. The presence of deep vein thrombosis (DVT) at this time was recorded and those who had thrombosis were reviewed in more depth to assess the presence of known risk factors.

**Results** 240 of the 1515 patients with lower limb cellulitis underwent ultrasonography of the lower limb. Of these, 15 demonstrated deep venous thrombosis; in only 3 of these 15 were the two conditions thought to have occurred concurrently. Two of the three patients with concurrent DVT and cellulitis had active malignancy, and the third had injected battery acid into the affected leg.

**Conclusions** Concurrent DVT and cellulitis is rare and this study suggests that investigation with ultrasonography in the absence of risk factors for DVT has a low yield.

Cellulitis and deep vein thrombosis (DVT) have multiple common clinical features. In patients with clear-cut cellulitis there can still be concern that there is concurrent deep venous thrombosis due to this overlap in clinical features, especially if the clinical course is thought to be atypical.

There are very few studies reporting the rate of investigation for DVT in patients with cellulitis by ultrasound examination, or the yield from this investigation. In studies looking at assessment of DVT, the rates of DVT have been between 10–40% in those fulfilling the Wells criteria,<sup>1</sup> but it is likely that the rates of DVT in patients with cellulitis may be substantially lower than this.<sup>2,3</sup>

The aim of this audit was to review the use of duplex ultrasonography in the population of patients admitted to hospital with lower limb cellulitis.

### Method

**Study population**—All patients discharged from Christchurch Hospital (Christchurch, New Zealand) with a coding diagnosis of lower limb cellulitis (ICD code L03.11 ) between January 2002 and December 2004, were identified from the hospital database. The electronic records for that admission, which includes all radiological investigations, were reviewed. All those undergoing ultrasonography of the lower limb for any reason were identified and results recorded in a data sheet.

**Definitions**—A diagnosis of lower limb cellulitis was accepted if the patient had been reviewed by a physician who recorded a diagnosis of cellulitis and treated the patient with antibiotics. Deep venous thrombosis was diagnosed by non-compressibility of the femoral and popliteal veins by ultrasonography.

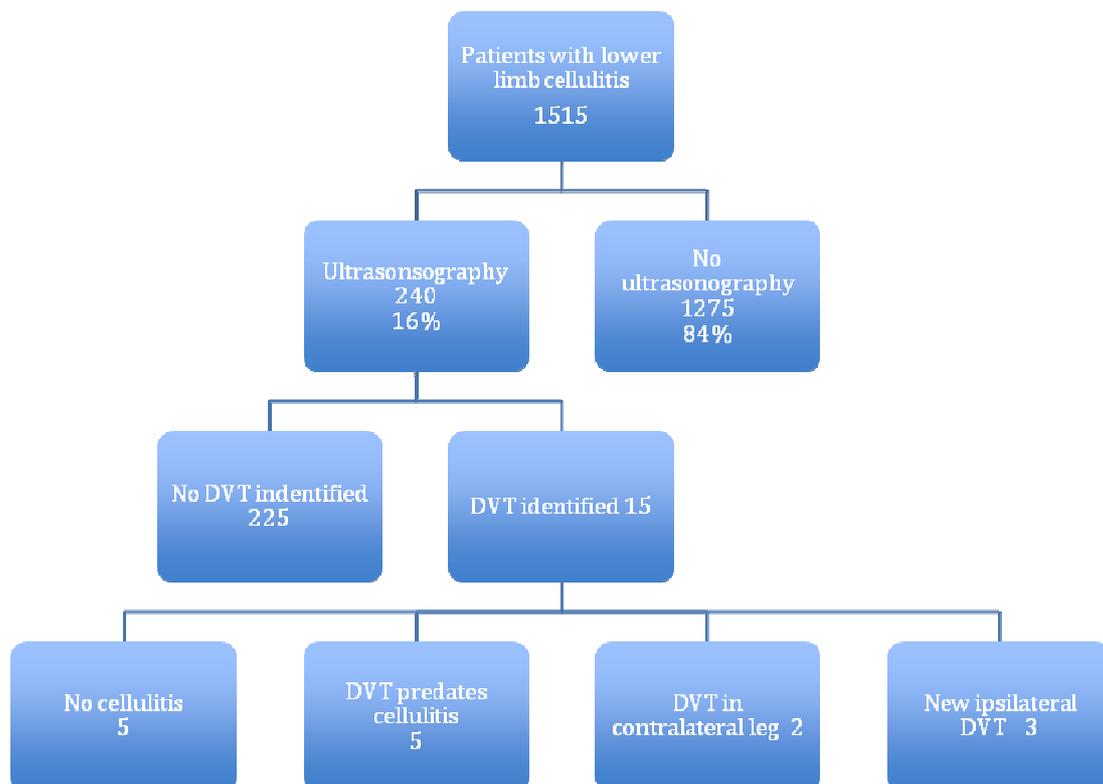
**Clinical notes review**—The clinical records of those that had DVT were reviewed to determine whether the DVT was previously unrecognized, and ensure the cellulitis and DVT were present in the same leg. The records were searched for known clinical risk factors for DVT which included malignancy, prolonged travel, recent surgery or immobilization, paralysis and previous DVT and results recorded on a data sheet. Cases that were coded as cellulitis but not recorded as such in the clinical notes were excluded.

## Results

A total of 1515 patients were identified by their coding as being admitted with cellulitis. 240 of these patients had undergone duplex ultrasonography and 15 scans reported as showing evidence of DVT. In five cases the physician responsible for the case did not confirm the diagnosis of cellulitis, although this was recorded as a possible diagnosis on admission. In another five patients the DVT had been diagnosed before the onset of cellulitis and these were excluded. In two patients the DVT was present in the contralateral leg only. In only 3 of the 240 patients scanned was a new DVT diagnosed in the cellulitic leg.

The pre-test probability of DVT was not able to be calculated systematically in review of the case-notes and rationale for ultrasonography in the subset that underwent scanning could not always be identified from the notes.

**Figure 1. Flow chart of results of ultrasonography of lower limb of patients with cellulitis**



The first patient with a newly diagnosed DVT was a 71-year-old man with melanoma of the same leg. He had undergone removal and skin grafting as well as radiotherapy.

The second patient was a 66-year-old man with a recent diagnosis of Dukes C colonic adenocarcinoma that had been treated surgically.

The third patient was a 53-year-old man who was an injecting drug user and had injected battery acid into the foot of the affected leg.

## **Discussion**

The rate of co-incident cellulitis and DVT was extremely low in this study, and those in whom a DVT was newly diagnosed had clear risk factors for DVT. There is likely to be a small group of patients whose DVT may not be diagnosed if a single duplex ultrasound assessing only the femoral veins is done.

Ultrasonographic assessment of DVT at Christchurch Hospital involves femoral and popliteal vein insonation and a phasicity assessment of the ipsilateral common femoral vein. Repeat ultrasonography is unlikely to meaningfully alter the diagnostic yield. This prevalence of 0.66% is similar to previous studies into the rate of hospitalized patients.

Stein et al found a prevalence of 0.78% in general medical inpatients and Schuurman et al found a higher rate of 3.17%.<sup>4,5</sup> This result is higher than some studies, such as Klatsky et al who found a prevalence of 0.10% in Kaiser Permanente Hospitals in California.<sup>6</sup> The very low rate in this study has been attributed to the fact that only patients with a primary discharge diagnosis of DVT were included. Our findings suggest that despite clinical findings that are clinically suspicious of DVT the prevalence rate is similar to general hospital inpatients.

These results raise the question as to the usefulness of ultrasound scans to assess DVT in the presence of cellulitis unless there are unequivocal risk factors present and suggests that the clinicians perceive the risk of DVT as much higher than reality as judged by the number of negative scans recorded.

It is possible that the perceived risk of DVT is influenced by the current approach to the assessment of DVT risk by the use of Wells score. This tool includes a combination of clinical characteristics and risk factors and a D-dimer measurement, and was in use at Christchurch Hospital during the study period.<sup>7,8,9</sup> These criteria have been well validated in populations of patients presenting with symptoms and signs consistent with DVT as the primary diagnosis in which the rate of DVT was over 10%.<sup>1,4</sup> However, the value of the Wells score is much less certain if there is a primary diagnosis of infection of the lower limb which can produce many of the same features of DVT and inevitably causes a rise in D-dimer as this is an acute phase protein.

This study has inherent limitations because of its retrospective nature and because we could not determine the reasons why the scan was performed as these were not systematically recorded in the hospital records. It is possible some scans were performed to exclude other complications such as abscess formation or to assess risk factors for recurrent cellulitis such as venous incompetence although DVT assessment was included in the report from radiology.

While some cases of DVT may have been missed because of coding errors, the number is likely to be small and not unduly influence the overall results.

Within these limitations, the study suggests that the risk of co-incidental DVT with lower limb cellulitis is likely to be overestimated and leads to low-yield ultrasound scanning. A prospective study is needed to address this further and should include the calculated pre-test probability of DVT in those undergoing ultrasonography. If these findings are confirmed then new criteria may need to be developed to minimize the number of unnecessary scans performed.

**Competing interests:** None

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## Steroid therapy for problematic proliferating haemangioma

Beryl H Tan, Philip Leadbitter, Neil Aburn, Swee T Tan

### Abstract

**Aim** To evaluate the effectiveness and the safety of systemic and intralesional steroid therapy for problematic proliferating haemangioma.

**Method** 233 patients with haemangioma were identified from our vascular anomalies database 1996–2007. 46 (36%) out of 129 patients with proliferating haemangioma required intervention. 24 of these patients received steroid therapy. Indications for steroid therapy, the response and side effects of treatment and the need for other treatment were recorded. Intralesional triamcinolone up to 4 mg/kg/injection was preferred for small, localised non-periorbital lesions in 5 patients and oral prednisolone 2.0–2.5 mg/kg/day was used for larger lesions, especially around the periorbital region in 19 patients.

**Results** Accelerated regression of the haemangioma was observed in four of the five patients who received intralesional triamcinolone and there was no complication. Overall, the haemangioma in 17 (89%) of the 19 patients responded to high dose oral prednisolone with accelerated regression noted in 10 (53%) patients. Rebound growth was observed in 5 patients during dose tapering, requiring dose increment in three patients and debulking surgery in one patient. Three patients developed growth retardation during treatment but this normalised 3–10 months following cessation of steroid therapy. Other side effects included mild Cushingoid features (n=2), irritability (n=2), increased appetite (n=3).

**Conclusion** Intralesional and systemic steroid are relatively safe and effective in treating problematic proliferating haemangioma. Systemic steroid therapy is associated with few short-term side effects. A multidisciplinary management is essential. Propranolol is likely to replace steroid as the first-line treatment for problematic proliferating haemangioma.

High-dose steroid has been the mainstay treatment for problematic proliferating haemangioma since it was serendipitously discovered to induce accelerated regression in the 1960s.<sup>1</sup> The mechanism of action of steroid in haemangioma is largely unknown although it is associated with increased mast cell density, reduction of a number of cytokines and enhanced expression of mitochondrial cytochrome b gene.<sup>2</sup>

The recommended starting dose of systemic steroid is oral prednisolone at 2–3 mg/kg/day, as higher dosage (5 mg/kg/day) is associated with increased risk of complications.<sup>3</sup>

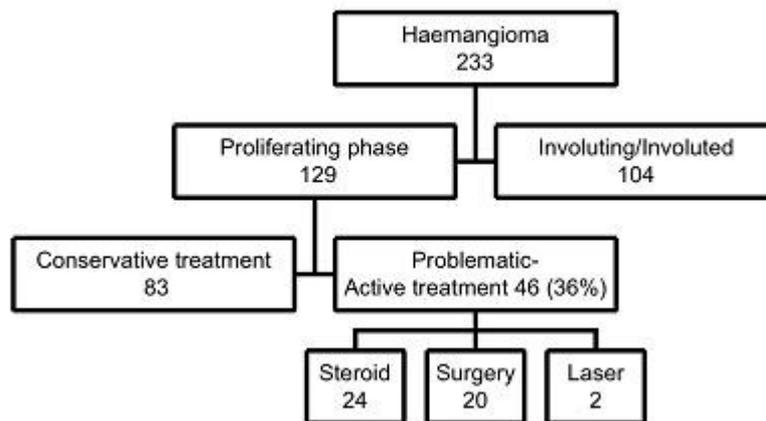
Over the last 4 decades, several studies have reported conflicting effectiveness of steroid on haemangioma. One study shows dramatic response occurs in 30%, equivocal result in 40%, with ongoing progression in the remainder.<sup>4</sup>

We report the results and assess the safety profile of steroid therapy as the first-line treatment for problematic proliferating haemangioma, between 1996 and 2007, in our Vascular Anomalies Centre.

## Methods

233 consecutive patients referred to the Centre for the Study & Treatment of Vascular Birthmarks were identified from our prospective vascular anomalies database 1996–2007. The management of these patients is outlined in Figure 1.

**Figure 1. Management of the 233 patients with haemangioma**



Forty-six (36%) of the 129 patients presented with proliferating haemangioma were problematic and required active treatment. 24 patients (20 females, 4 males) received systemic (n=19) or intralesional (n=5) steroid therapy. The mean age was 10 (range 4–29) weeks. The patients were of European (n=16), Maori (n=2) and Pacific Island (n=3) descent. Haemangioma was located in the head and neck region in 19 (79%) patients.

Intralesional triamcinolone, up to 4 mg/kg per injection, was used for localised non-periorbital haemangioma in five patients. Treatment was carried out under general anaesthesia using 30 G needle with multiple intralesional injections with small aliquots, as a day case. A repeat injection was performed at 6-weekly intervals as necessary. Oral prednisolone at 2.0–2.5 mg/kg/day was used for diffuse and/or periorbital haemangioma in 19 patients. The dosage was reduced monthly by 0.5 mg/kg/day until a dose of 0.5 mg/kg/day was reached, followed by tapering over 2 weeks. Since 2007, concurrent omeprazole or ranitidine was also given, due to relatively high incidence of gastroesophageal reflux noted during treatment.

All patients were jointly assessed by a plastic surgeon and a paediatrician. Patients with periorbital haemangioma threatening vision also underwent ophthalmological assessment. The patients treated with systemic steroid were seen 2 weeks after commencement of treatment and then 4-weekly. Routine blood pressure, weight, height and head circumference measurements, assessment of developmental milestones, as well as cardiorespiratory and abdominal examination were performed. The dose of steroid was adjusted as necessary and any side effect was noted. For those treated with intralesional steroid, follow-up was arranged 2 weeks after treatment and then 4–6 weekly thereafter to assess the response to treatment and the need for further treatment.

The response to the treatment was defined as “dramatic” if there was visible reduction of size, palpable softening, and reduction of the colour of the lesion within 6 weeks of treatment. The result was ‘unequivocal’ if the lesion was unchanged. The treatment was considered a ‘failure’ if the lesions continued to grow despite treatment.

## Results

The patients were followed up for a mean of 30.2 months (range, 3 months–6.5 years). Two patients in the intralesional steroid group were lost to follow up after a period of 3 and 6 months. A further patient moved overseas shortly after treatment.

**Intralesional steroid injection**—Five female patients with ulcerated proliferating haemangioma in the axilla, upper lip, submental area, forearm, and labia majora underwent intralesional triamcinolone injection.

Four of these patients required a second injection, with one also received concurrent Pulsed Dye Laser therapy for optimal result. Accelerated regression with healing of the ulcerated proliferating haemangioma occurred in these patients (Figure 2). The remaining patient underwent debulking surgery because of continued growth of the haemangioma in the upper lip following one injection. No side effect of intralesional steroid therapy was noted during the follow-up period. Overall, the haemangioma in four (80%) of the five patients responded adequately to intralesional steroid therapy.

**Figure 2. An ulcerated proliferating haemangioma in the axilla of a 5 month-old baby (A) before and (B) 6 weeks after first intralesional triamcinolone injection.**



**Systemic steroid therapy**—Nineteen patients were treated with oral prednisolone for the indications listed in Table 1. The mean age of commencement of steroid therapy was 10 (range 4–29) weeks with the mean duration of treatment of 21.6 (range, 11–38; median, 21) weeks.

Fifteen (79%) patients responded to oral prednisolone at 2 mg/kg/day with accelerated regression occurring in 10 (53%) patients and the haemangioma stabilised in 5 (26%) patients. Three of the four patients who failed to respond prednisolone at this initial dose of 2 mg/kg/day responded to an increased dose to 2.5 mg/kg/day with stabilisation of their haemangioma. These three patients received 9–13 weeks of high dose steroid compared to 4–6 weeks of treatment for those who responded well to an initial dose of 2 mg/kg/day. The remaining patient required debulking surgery for a large haemangioma on the glabella region that caused partial visual axis obstruction.

**Table 1. Indications for systemic steroid therapy**

Indications for treatment	No. of patients
Threat to vision	9
– direct globe compression 1	
– corneal deformation 4	
– visual axis obstruction 6	
Nasal airway obstruction	3
Obstruction of auditory meatus	1
Ulceration ± bleeding	5
Tissue (facial) distortion	10

Rebound growth during dose tapering was observed in five patients. In one patient, this was transient and required no further action. Three patients responded well to dose increment of 0.5 mg/kg/day and the remaining patient underwent debulking surgery.

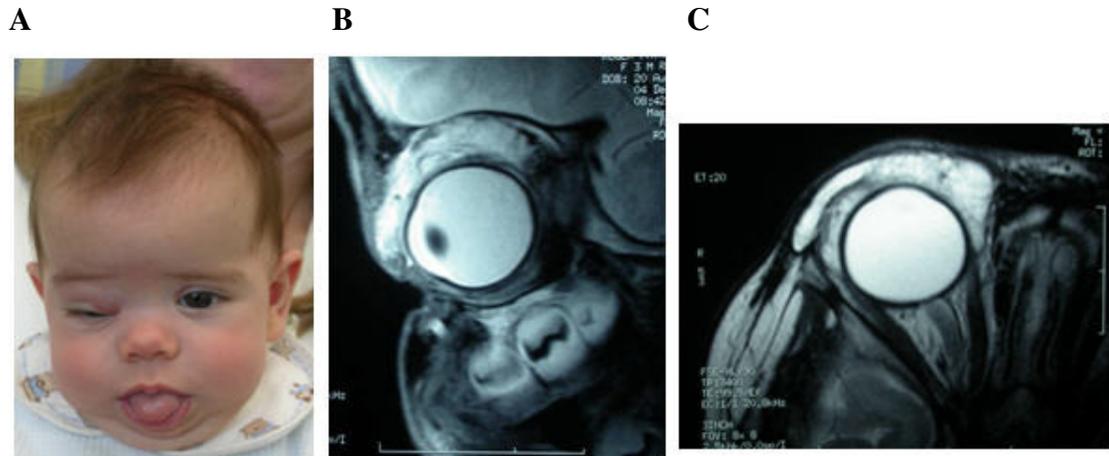
Overall, the haemangioma in 17 (89%) patients responded to high dose oral steroid but failed in 2 (11%) patients.

**Effects on vision**—Nine patients with periorbital haemangioma threatening vision with astigmatism due to corneal deformation (n=5) and/or visual axis occlusion (n=5) and/or globe compression (n=1). At completion of treatment, astigmatism and visual axis obstruction were resolved in all patients (Figure 3). One patient subsequently developed symmetrical hypermetropic astigmatism, unrelated to the haemangioma. There was also an incidental finding of optic nerve coloboma on the affected side.

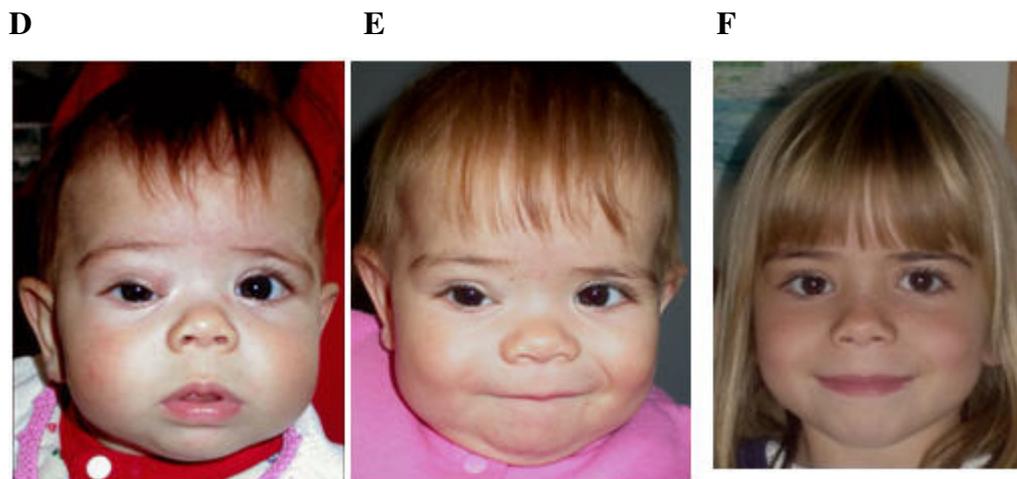
**Side effects of steroid therapy**—One patient developed adrenal crisis during an intercurrent otitis media requiring hospitalisation and responded well to intravenous hydrocortisone with no long-term sequelae. There was dramatic regression of the haemangioma. Three patients had significant growth retardation during systemic steroid therapy. Their length and weight dropped by 25–50 percentile during initial treatment but this gradually reversed during or after steroid dose tapering and normalised within 1 year of cessation of therapy (Figure 4).

Other side effects included mild Cushingoid features (n=2), irritability (n=2), increased appetite (n=3) with one patient having significant weight gain. As some patients had pre-existing gastroesophageal reflux and some were given concurrent omeprazole or ranitidine, the true incidence of steroid-induced gastro-oesophageal reflux is difficult to be ascertained. None of the patient developed hypertension.

**Figure 3. (A) A 14-week old girl with a right periorbital haemangioma causing globe compression, corneal deformation with mild astigmatism and partial visual axis occlusion, confirmed on (B) sagittal and (C) axial MRI scan. The haemangioma responded dramatically to high-dose prednisolone.**

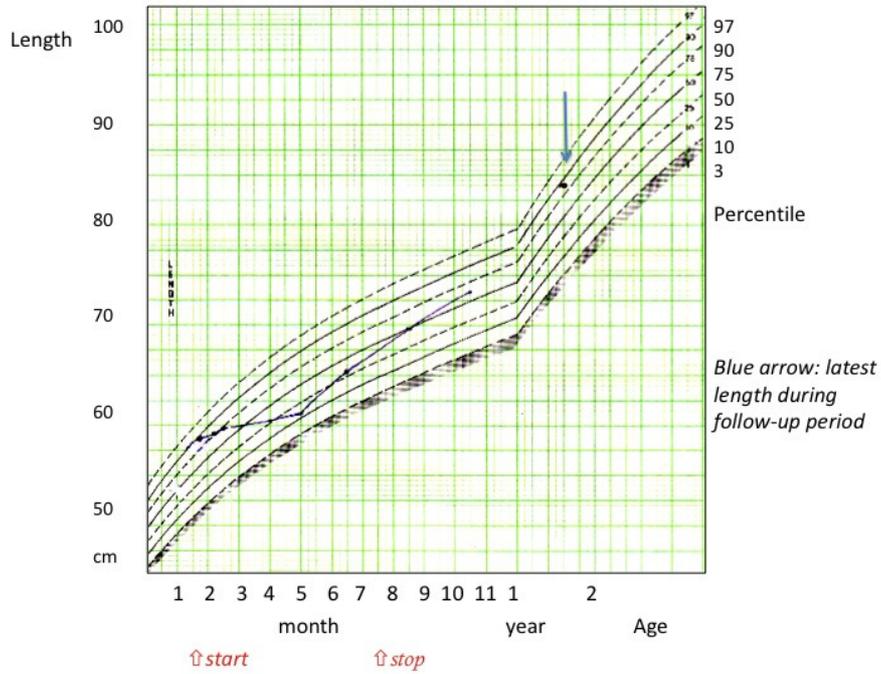


**Photographs at (D) 4 weeks, (E) 7 months and (F) 4 years after treatment. One year following commencement of treatment, she had equal refraction and visual acuity in both eyes.**

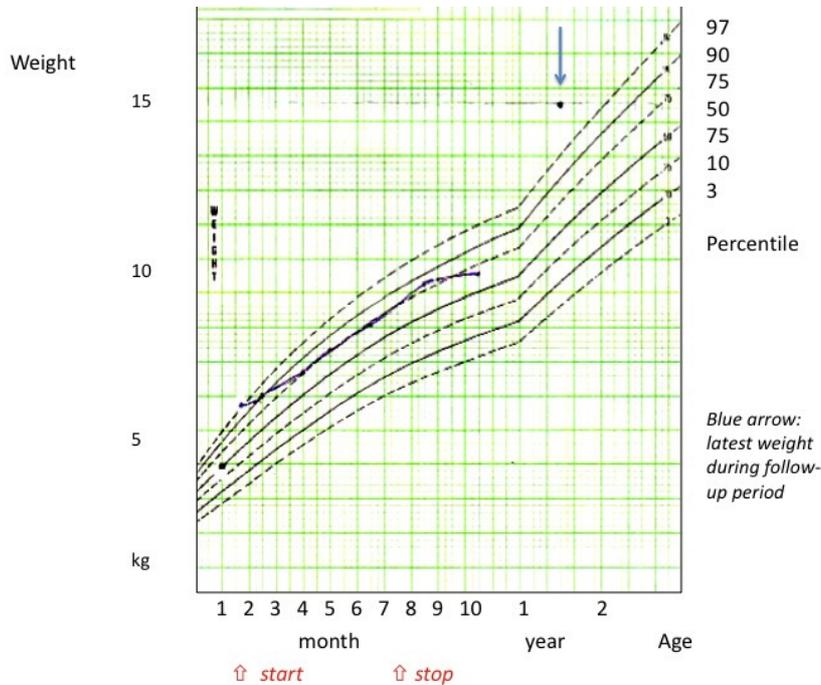


**Figure 4. Growth charts of a patient with growth retardation during high-dose steroid treatment (A – length; B – weight)**

**A**



**B**



## Discussion

Over the last 4 decades, there have been several studies reporting the effectiveness of steroid on haemangioma with conflicting results. This is due to the confusion of the nomenclature leading to use of steroid on vascular malformations such as venous malformation. Some studies also include involuting haemangioma. The dosage and duration of steroid therapy also differ widely between studies.

The overall 89% response rate in our study compares favourably to that (75%) reported in the meta-analysis<sup>4</sup> of the studies that used similar dosage regime of 2–3 mg/kg/day. The higher response rate in our study including a 53% dramatic response rate compared with previous studies of 30%<sup>4</sup> supports the suggestion that ‘immature’ haemangioma would respond better to steroid therapy.

In the studies using this dosage regime included in the meta-analysis by Bennett M et al,<sup>4</sup> there is a 14–37% (mean, 25%) of rebound rates. Rebound growth observed in five of the 15 (33%) patients in our study suggests the need to maintain therapy for longer in younger patients. Three of five patients with rebound growth during dose tapering and those who initially failed to respond were successfully treated with a dose increment. The need of dose increment resulted in an increase of the total duration of treatment from 4–6 to 9–13 weeks.

Our study concurs with the findings by Boon et al<sup>3</sup> that most complications of high dose systemic steroid therapy for haemangioma are minor and transient. However, our results do not support these authors’ suggestion that the risk of growth retardation is 4–5 times more likely in children less than 3 months of age or if the duration of treatment is more than 6 months.

Only 3 of the 13 (23%) patients in our series who were commenced on steroid therapy aged 3 months or younger developed transient growth retardation. They received 6, 9, and 12 weeks of high dose steroid at 2.0–2.5 mg/kg/day and for a total duration of 19, 21, and 26 weeks of steroid treatment respectively. Furthermore, growth retardation was not observed in the other four patients who had received 26 weeks or more of steroid therapy. Nevertheless, it is pertinent to monitor the growth and development during therapy and the dose of steroid should be tapered as soon as possible.

Despite the wide variations in the dosages used and different selection criteria, an overall good response rate of 35–90% to intralesional steroid therapy has been reported.<sup>6</sup> The haemangioma in four out of five patients in our study responded dramatically after two intralesional steroid injections and we did not encounter any complication. Chen et al<sup>6</sup> reports a 6.4% complication rate including cutaneous atrophy, Cushingoid appearance, and anaphylactic shock.

Although intralesional steroid therapy has been used for periorbital haemangioma,<sup>5–7</sup> caution is needed because of the risk of central retinal artery occlusion,<sup>8</sup> eyelid necrosis<sup>9</sup> and orbital cellulitis. The small number of patients treated with intralesional steroid in our series reflects the small number of cases, i.e., localised and non-periorbital haemangioma, suitable for this treatment.

In 2008, Léauté-labrèze et al<sup>10</sup> serendipitously discovered the dramatic effect of propranolol in inducing accelerated regression of haemangioma. The results of the empirical dosage of 2–3 mg/kg/day of propranolol has been supported by a further report of 30 patients.<sup>11</sup> We have confirmed the safety and efficacy of propranolol using a slow dose escalation regimen and shown that the optimal dosage required is a sub-cardiovascular dose of 1.5–2.0 mg/kg/day and that the treatment should be continued until 1 year of age.<sup>12</sup> Propranolol has replaced steroid therapy as the first-line treatment for problematic proliferating haemangioma in our Vascular Anomalies Centre.

The processes leading to accelerated involution of proliferating haemangioma induced by propranolol is unknown. We have recently shown that haemangioma is a developmental anomaly of the haemogenic endothelium with a neural crest derived phenotype<sup>13,14</sup> governed by the renin-angiotensin system and speculate the possibility of using inhibitors angiotensin converting enzyme and that of angiotensin II receptor 2.<sup>15</sup> Our Vascular Anomalies Centre is currently conducting a clinical trial using an ACE inhibitor for the treatment of problematic proliferating haemangioma, with promising results.

**Competing interests:** None.

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## Leadership for health: developing a canny nanny state

Peter Crampton, Janet Hoek, Robert Beaglehole

### Abstract

Health leadership comes from government, non-governmental organisations (NGOs), commercial organisations, and the community as a whole. Government has an obligation to act to protect the health of its citizens, both in respect of traditional threats to health, such as infectious diseases, and in response to newer threats, such as diet. Leadership requires the recognition and rejection of strategies that attempt to replace evidence with rhetoric.

We recommend that health policy decisions have a clear evidence base and equity rationale, where the proposed interventions have been balanced against the freedom of individuals to act on their own account without undue influence from marketing. We recommend that government draws on the experience and expertise of the NGO and public health sectors, and communities to promote responsiveness to local priorities and needs. We recommend that public health practitioners strengthen their links with communities and build constituencies so public health decision-making does not occur predominantly in the bureaucratic domain.

Our health and wellbeing are largely determined by underlying social, economic, cultural and environmental factors, and the effectiveness of health services.<sup>1</sup> Improving health equitably requires strong leadership from all relevant sectors to encourage (nudge) individuals and groups to make healthy choices. Although this leadership comes primarily from government, with much of it expressed through the Ministry of Health, it also comes from other stakeholders such as the education, finance and transport ministries, non-governmental organisations (NGOs), commercial organisations, and the community as a whole.

The perception that health is predominantly a matter of individual choice or personal responsibility presents a barrier to government leadership. Governments may be accused of interfering in individuals' freedom to choose their own behaviours, irrespective of their health impacts. No one likes authoritarian restriction of their choices, especially when the rationale for restrictions is not adequately explained. Criticism of so called 'nanny state' intervention can resonate with governments and reduce their resolve to act in the best interests of the population, especially the most vulnerable members—children, marginalised ethnic groups, and socioeconomically deprived groups. The 'nanny state' label inhibits the constructive debate required to reach agreement on the best way of promoting the health of all New Zealanders.

The public health community must promote discussion of the balance between protecting public liberties and improving the health of the population. This debate has much in common with discussions over the desirability of free markets and government intervention in the economy; a balance of roles is usually indicated.<sup>2</sup> In promoting debate the public health community must build strong community links so that public health interventions are perceived as being warranted.

This paper analyses the role of the state and other key sectors in providing strong and balanced health leadership. It also explores how language is used to frame debates about competing models of health leadership, and makes recommendations about the leadership required to address the major health challenges facing New Zealand.

## **The roles of the state, non-government organisations and the commercial sector**

**Role of the state**—Most New Zealanders would agree with Nobel laureate Amartya Sen that the state has fundamental responsibilities to protect the political rights and liberties of its citizens, as well as their health and wellbeing.<sup>3</sup> In the exercise of health leadership, these two duties may come into conflict. This issue is at the heart of public and political debates. In a vibrant democracy the boundaries of legitimate state action should be under constant scrutiny and negotiation.

For example, unhealthy diets increase the risk of heart disease, stroke, cancer and diabetes, all of which are key causes of premature death in New Zealand.<sup>4</sup> Although the role of government in promoting healthier dietary choices is debated, arguments that individuals exercise complete personal autonomy in their eating choices are flawed.

Food production, marketing, and promotion exert powerful influences on individuals' choice and consumption patterns. The eating environment shapes and constrains behaviour, particularly among young people, who are more vulnerable to marketing promotions.<sup>5,6</sup> To balance these influences, the state has an essential role in creating a context that simplifies and facilitates healthy choices.

The state also has an essential role in ensuring equitable health outcomes and addressing inequities. In New Zealand this duty applies, for example, to Māori and Pacific populations, and low-income groups.

**Role of NGOs**—In New Zealand's pluralistic democracy, the government sometimes struggles to respond fully to minority and local needs because of the political constraints imposed by the 'median voter' (the pressure for government to respond to the apparent wishes of the majority).<sup>7(p111),8(p5)</sup> Furthermore, government policy is vulnerable to capture by powerful industry interest groups, such as the food, tobacco and alcohol industries.<sup>9,10</sup>

NGOs have a special role in identifying and resisting the capture by vested interests of regulatory bodies charged with protecting the public interest. By contracting with the voluntary sector, government may achieve health gains which may not be possible through direct state intervention. New Zealand's experience with HIV/AIDS illustrates the mutual dependence and co-operation of the state and the NGO sector through the Ministry of Health, the dominant funder of the AIDS Foundation. Gay men and women initiated a community-based response to the epidemic to conduct effective education and health promotion and political lobbying of the government for funds to support the AIDS Foundation.<sup>11(p221-227)</sup>

The NGO sector has a complementary role to government—it represents a vehicle for indigenous self-determination, caters for minority populations, and can experiment with policy options. Nevertheless, there are potential weaknesses of the NGO sector: it may serve as an ineffective 'convenient solution' for government; its activities may

loosen democratic accountability, and it may serve as a vehicle for disguised profit making.<sup>7(p11)</sup> A fuller account of the respective roles of government, the private for-profit sector and the private non-profit sector can be found elsewhere.<sup>12,13</sup>

## Role of the commercial sector

What role does the commercial sector have in providing public health leadership? While the ‘median voter’ may constrain government’s pursuit of equity, shareholders’ interests and the drive to maximise profit constrain for-profit organisations. In particular, major commercial interests are generally blind to the special needs of minority groups and vulnerable populations. Further, the existence of market failures in health, and the consequent need for government corrective action via regulation, limits the role of the commercial sector in health leadership.<sup>13</sup>

Economic theory argues that perfect markets permit the free exchange of goods and services between consumers and producers. Optimal outcomes depend on certainty (consumers must know what they want, and when and where they can obtain it); no externalities (unintended consequences of people’s production or consumption of services); perfect knowledge (patients must know about their diagnoses and the full range of prevention or treatment options); the absence of self-interested advice from health care professionals; and the presence of numerous small producers with no market power.<sup>14(p24–28)</sup> These conditions are rarely, if ever, met in health care, thereby justifying the comprehensive government intervention that occurs in many countries.<sup>14(p24–28),15(p4816,p272)</sup>

Notwithstanding problems with market failure, in some circumstances it is desirable (as with food safety), for the public health community to work with the commercial sector to promote independently monitored public health goals.

## When should governments intervene?

We support the arguments made by the Nuffield Council on Bioethics, which describe when government intervention is justified.<sup>17</sup> The Council’s principles suggest an ‘intervention ladder’ to inform government actions (Table 1). The Council notes that the higher up the ladder government intervention occurs, the stronger the evidence needs to be.

**Table 1. Government leadership for health—an ‘intervention ladder’**

<b>Eliminate choice.</b> Regulate to entirely eliminate choice, for example through compulsory wearing of seatbelts and cycle helmets.
<b>Restrict choice.</b> Regulate to protect people by reducing options; for example, restricting the sale of cigarettes and alcohol to protect minors.
<b>Guide choice through disincentives.</b> Fiscal and other disincentives can influence people not to pursue certain activities, for example imposing taxes on cigarettes, or limiting parking spaces to discourage the use of cars in inner cities.
<b>Guide choices through incentives.</b> Regulations can guide choices by fiscal and other incentives, such as the provision of subsidised public transport and building high quality cycle lanes with cycle and pedestrian-friendly road layout to promote greater use of public and active transport.
<b>Guide choices through changing the default policy.</b> For example, through the ABC smoking cessation programme the default interaction of New Zealand health practitioners with people now

should involve specific questions about smoking and, if relevant, cessation advice. <sup>18</sup>
<b>Enable choice.</b> Enable individuals to change their behaviours, for example by offering participation in a ‘stop smoking’ programme, building cycle lanes, or providing free fruit in schools.
<b>Provide information.</b> Inform and educate the public, for example as part of campaigns to encourage people to walk more or eat five portions of fruit and vegetables per day.
<b>Do nothing</b> or simply monitor the situation as was the case for many years with campylobacter infection sourced from chicken. <sup>19</sup>

**Adapted from:** Nuffield Council on Bioethics (2007). Public Health: ethical issues. London, Nuffield Council on Bioethics.

## Deconstructing ‘nanny state’ language

As Table 1 makes clear, health leadership may take many forms; ranging from observation and monitoring at one end, to restriction and elimination of choices at the other.<sup>20</sup> The former options rely on personal responsibility and assume individuals acquire and assess information, apply it to their own circumstances, and make a decision about how they will act. However, this presumes that people have free access to easily understood information, understand the longer-term consequences of competing actions, and are willing to trade short term benefits off against future costs. Furthermore, it assumes information will be sufficiently powerful to outweigh other factors, such as marketing incentives, that discourage healthier behaviours.

Lang and Rayner highlight the logical absurdity of extreme ‘individual responsibility’ arguments: “*circumstances of free information circulation, people ‘choose’ to be overweight simply because they eat too much and do too little... In fact, such propositions are deeply flawed... Population weight gain is occurring in conditions of growing ‘health consciousness’*”.<sup>21</sup>

Because of the difficulties individuals may have in locating relevant and useful information, and the factors that may impede their use of it, the other end of the leadership continuum involves greater action by governments. Here, regulators will intervene to create environments that encourage healthier choices, typically by making these more visible or accessible, or eliminate unhealthy choices, normally by removing their availability.<sup>22</sup>

Governments have constrained choices and even coerced behaviours in several situations, particularly where these would pose serious risks to others. Thus regulations have modified environments (smokefree laws), imposed limits on behaviour (permissible blood alcohol levels for driving), restricted access to products (cold medications able to be made into pseudoephedrine), and required the adoption of new behaviours (mandatory use of cycle helmets) and the relinquishment of existing behaviours (cellphone use while driving). These examples illustrate changes that reduce third party risk to individuals and, while not all were initially widely accepted, each has achieved high levels of public acceptance and satisfactory compliance.

Although the evidence indicates that regulation brings about more rapid behaviour change, critics argue that these measures reduce the role individuals play in charting their own destiny, and make them little more than “*just a pawn in a societal game*”.<sup>23</sup> This may explain why governments have been more reluctant to introduce regulatory initiatives that would reduce risks individuals may pose to themselves.<sup>24 25</sup>

## **Framing the debate; the power of language**

Instead of debating the evidence relating to public health measures, recent discussions have focussed more on framing the debate than they have on analysing its premises or the likely effect of different measures. For example, policies that altered school food supply were described as ‘nanny statist’, and therefore undesirable, when introduced to New Zealand schools in 2007. The media carried surprisingly little discussion about the likely benefits these policies could bring.

Advertisers and marketers have always known that language exerts a powerful influence.<sup>26</sup> It is not surprising that metaphors such as the ‘nanny state’ are used to shape consumers’ views on government actions, particularly when these could constrain marketers’ freedoms.<sup>27</sup> The ‘nanny state’ metaphor is now widely used in attempts to discredit initiatives that propose intervening in or constraining ‘the market’, such as the removal of junk food from schools. A nanny state has been equated to one governed by despots no longer satisfied with issuing regulations, but bent on acquiring autocratic powers that enable them to become ‘*the food police*’.

Jochelson was alert to these problems when she warned of the need to recognise rhetorical strategies, which she claimed were the antithesis of logical debate: “*Dismissing government intervention as nanny-statist limits debate about the possible benefits of state intervention*”.<sup>28, p. 1151</sup> The nanny state metaphor may simplify a complex political debate, but does so by distorting familiar images and impeding a detailed understanding of the claims advanced.

## **Conclusion and recommendations**

Government has an obligation to act to protect the health of its citizens, both in respect of traditional threats to health, such as infectious diseases, and in response to newer threats, such as diet.

We recommend that government uses all steps on the intervention ladder where these are supported by compelling public health evidence. We recommend that health policy decisions have a clear evidence base and equity rationale, where the proposed interventions have been balanced against the freedom of individuals to act on their own account without undue influence from marketing.

In exercising its health leadership for the general population and in addressing the health needs of under-served or marginalised groups, we recommend that government draws on the experience and expertise of the NGO and public health sectors as well as communities, thus ensuring responsiveness to local needs.

We recommend that public health practitioners place strong emphasis on communication links with communities thereby building constituencies so that public health decision-making does not occur predominantly in the bureaucratic domain.

Government, the public and civil society should actively reject debates where complex issues are over-simplified or reduced to polemical and manipulative sound bites. We recommend that government actively promote wide-ranging debates that draw on and test the available evidence.

**Competing interests:** None.

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## **Obesity and health—new perspectives from bioscience research suggest directions for clinical practice**

Suzi Penny, Jenny Carryer

### **Abstract**

This viewpoint is written from the dual perspectives of a metabolic biochemist and a nurse academic who met at the Oxford University Round Table Forum on Obesity in 2008. Forty invited participants from around the world spent a week presenting and debating research and practice in the area of obesity. A unique feature of this forum was that it was cross-disciplinary with participants ranging from those working in public health with a background in medicine, paediatrics, nutrition, nursing, education, policy analysis, behaviour and social sciences, and exercise physiology to those working in the food industry and health insurance. The link between our current affluent lifestyle and increasing obesity, cardiovascular disease, type 2 diabetes mellitus and the associated morbidity and mortality is well established.

Interventions have involved individual patient clinician encounters aimed at weight loss and broader public health interventions with the goal of prevention and management of obesity. However, what is often overlooked is the need to also understand the psychosocial implications and issues for those living with a large body in a society where the prevailing culture, including that of health professionals, espouses a lean body as the ideal and excess weight as a testimony to greed, sloth and lack of will power. In this paper we share observations and learning from Round Table participation together with some of our own research interests.

### **Obesity—the challenge—how effective are current strategies?**

Cheap readily accessible energy dense food in generous portions and a sedentary life style in conjunction with socioeconomic factors such as food insecurity have been the subject of much research and are certainly important contributing factors to obesity.<sup>1</sup>

Frustratingly limited or lack of long term success, and weight regain after a period of weight loss, are predominant outcomes in most intervention programmes.<sup>2,3</sup> Weight loss is presumed to be a simple matter of reducing intake and increasing energy expenditure highlighted in the public mind by frequent references to excessive consumption of “fast” or junk food. This, more than anything else, sets the scene for a high level of covert and sometimes overt blaming of fat people. However, this simplistic view does not explain why in all societies there are those who manage to stay lean while others in the same obesogenic environment do not.

Some instead become locked into a demoralising cycle of dieting and weight regain while some acquire eating disorders.<sup>3-5</sup> The proportion who struggle with their weight, are restrained eaters or have undiagnosed binge eating disorders compared to those who stay slim with very little effort or awareness is not known. What is apparent is

that obesity cannot be explained by psychosocial factors alone and occurs in all social strata.

## The bioscience: new insights into factors that cause weight gain and regain

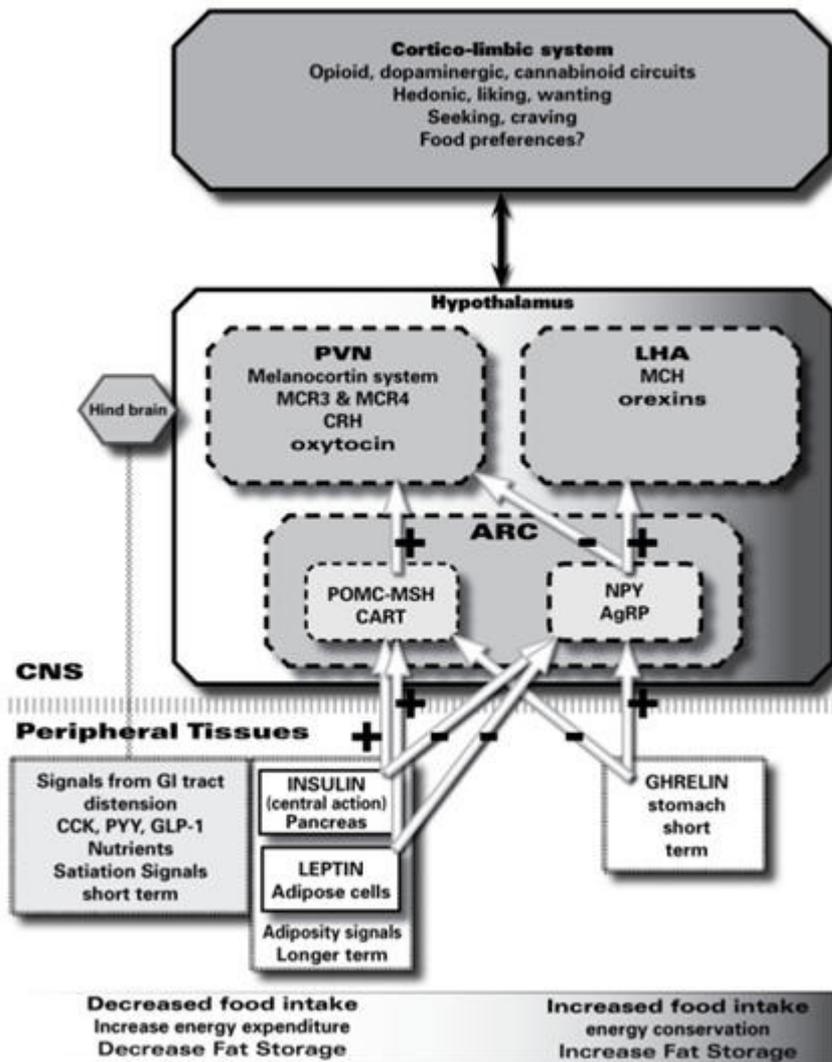
Kennedy’s proposal (over 50 years ago) that difficulty in maintaining a normal weight might be due to physiological factors, that determine—and defend—body fat stores was received with a considerable amount of scepticism at the time. However, a vast amount of research involving animal models and human data has validated this core concept. An overview summary that illustrates the complexity of energy homeostasis and the many physiological factors that are involved is summarised in Figure 1 and Table 1.

**Table 1. Non-psychosocial factors that affect energy turnover and fat storage**

<p><b>Genetic factors</b> Genes that influence obesity risk Genes that affect weight loss and its maintenance</p>	<p><b>Physiological responses to environmental factors</b> Epigenetics Neural plasticity Transcription factors e.g. PPARs and PGC-1<math>\alpha</math> which are important in regulating energy metabolism by regulating gene expression in muscle, liver and adipose tissue <i>in response to environmental factors such as diet and exercise.</i></p>
<p><b>Neuroendocrine factors in the hypothalamic regulation of food intake</b> Hypothalamic orexigenic peptides:  <ul style="list-style-type: none"> <li>• neuropeptide Y (NPY)</li> <li>• agouti-related peptide(AgRP)</li> <li>• orexin, galanin</li> <li>• melanin concentrating hormone (MCH )</li> </ul> Hypothalamic anorexic peptides:  <ul style="list-style-type: none"> <li>• cocaine &amp; amphetamine regulated transcript (CART)</li> <li>• pro-opiomelanocortin (POMC)</li> <li>• <math>\alpha</math>-melanin stimulating hormone(MSH )</li> <li>• corticotrophin releasing hormone (CRH)</li> <li>• thyrotrophin releasing hormone (TRH)</li> </ul> </p>	<p><b>Neuroendocrine factors that modulate the hypothalamic regulation of food intake and/or affect energy turnover and fat storage</b> GI tract hormones e.g. Cholecystokinin (CCK), grehlin, glucagon-like peptide 1 (GLP-1 ) Adipokines e.g. leptin, adipoectin Insulin- central satiety action and peripheral actions that promote glucose uptake and lipogenesis Opioid, dopaminergic, serotonergic and cannabinoid systems HPA axis and adrenal corticosteroid action Circadian clock Adrenergic stimulation Thyroid function Sex steroids Oxytocin—insensitivity to its anorexic effect is important for weight gain during pregnancy</p>
<p><b>Metabolic factors</b> Raised blood glucose, lipids Nutrients, e.g. folate Oxidative stress Low grade inflammatory activation Oxidative metabolism Basal metabolic rate Body composition, e.g. low muscle/high central fat mass Mitochondrial function Thermogenesis Uncoupling proteins Transcription factors e.g. PPARs, SREBPs that regulate gene expression and fat metabolism <i>in response to metabolic states</i></p>	<p><b>Environmental factors</b> Impacts of energy dense processed foods on physiological appetite regulation mechanism Low dietary fibre—satiating factors High glycemic index carbohydrates High fat diet—causes leptin resistance Other nutrients, e.g. vitamins, antioxidants, phytochemicals Toxins, e.g. endocrine disrupters Side effects of medications—e.g. Atypical antipsychotics, De-Provera, Tricyclic antidepressants Prevailing temperature</p>

- PPAR = Peroxisome proliferator –activated receptors— the antidiabetic thiazolidinediones drugs such as such as ACTOS act as highly selective PPAR agonists; PGC-1 $\alpha$  = PPAR gamma coactivator-1  $\alpha$ ; SREBP = sterol regulatory element binding proteins
- Refs 6-23, 25, 26,29—32, ,41, 42.

**Figure 1. Schematic representation of the hypothalamic regulation of the input side of energy homeostasis**



**Note:** Consumption of food results in the release of satiety signals that limit meal size such as *cholecystokinin* (CCK), *glucagon-like peptide 1* (GLP-1) and vagal stimulation that act in the hypothalamus to reduce food intake. Conversely *ghrelin* released by gastric cells stimulates eating via activation of *neuropeptide Y* (NPY) and *Agouti-related peptide* (AgRP) neurons in the *lateral hypothalamic area* (LHA) and inhibits the *pro-opiomelanocortin* (POMC) and *cocaine & amphetamine regulated transcript factor* (CART) neurons in the *arcuate nucleus* (ARC). Ghrelin levels rise during fasting but also anticipated meal times and its suppression after eating depends on the kilojoules consumed. Leptin and insulin can reduce food intake by activating the POMC and CART neurons via  $\alpha$ -melanocyte stimulating hormone (MSH) acting on *melanocortin receptors* (MCR3 and MCR4) in the *paraventricular nuclei* (PVN) while inhibiting the ghrelin-NPY/AgRP neurons.

These composite pathways involved in energy homeostasis have many neural/hormonal links which respond to varying physiological demands such as growth and pregnancy and to the environment. Ultimately body fat stores are defended at a level determined by an interaction of genetic, epigenetic, early developmental and environmental factors. Relevance to obesity is that the effect of decreasing levels of leptin and insulin with weight loss and dietary restriction trigger an increase in food intake via these mechanisms. The same applies with impaired central signalling that occurs with insulin and leptin resistance<sup>6-10,30</sup>

More detail can be found in many recent reviews.<sup>6-10,30</sup> Energy homeostasis involves a two-way interchange of information between the brain, particularly the

hypothalamus, and peripheral tissues. There are short term signals released by the digestive system that decrease food intake such as cholecystokinin (CCK) released in response to food consumption. Conversely, ghrelin, a potent stimulus for eating, is produced during the fasting state.

The central effects on food consumption are integrated with longer term adiposity signals, such as leptin, released by adipose cells, and insulin, that reflect body energy stores. Reward pathways including the opioid, dopaminergic and cannabinoid system may modulate or override the hypothalamic energy homeostasis pathway, particularly with respect to the consumption of energy dense food and may make some inherently more vulnerable to compulsive overeating.<sup>9,11</sup>

The important point we want to highlight is that a complex circuitry of physiological pathways regulate energy intake, metabolism, storage and basal energy output - and therefore body fat stores. Physiological factors as well as environmental factors are important. This is verified by the fact that drugs such as amphetamines, Rimonabant (a specific cannabinoid antagonist of CB-1 receptors, recently withdrawn as an anti-obesity agent after post marketing monitoring revealed adverse psychological effects) act directly on these central pathways in the brain (Figure 1) to depress appetite and can exert their effects even in an obesogenic environment.

To date, the bioscience research has not been able to provide a simple pharmacological solution to a complex problem since side-effects and/or the development of tolerance limits their use. This is perhaps not surprising in view of the multifaceted nature of the physiological factors involved in energy intake, turnover and storage in the body. However, insights gained from the bioscience research have provided a deeper understanding for the limited long-term success of many intervention programmes.

## **The role of early development and epigenetics**

Research into the developmental origins of adult disease and epigenetics is providing further insight, and revealing health concerns. Following on from the classical epidemiological studies by Barker and Osmond, much subsequent research in animal models and human populations has linked a compromised intra-uterine environment with an increased risk for central and visceral obesity, hypertension, raised fasting plasma glucose and triglycerides and decreased high density lipoprotein-cholesterol—a common definition of the metabolic syndrome.<sup>12,13</sup> Insulin insensitivity, hyperinsulinaemia and salt-sensitivity hypertension, pro-inflammatory status, oxidative stress are also commonly found together with the metabolic syndrome and imply a high risk for type 2 diabetes mellitus and cardiovascular disease in adult life.<sup>14,15</sup>

The Oxford Round Table Forum shared concerns about an escalating obesity problem among previously nutritionally deprived communities around the world with nutritional transition. Of more relevance to communities with abundant processed food supplies is that maternal gestational diabetes and obesity likewise creates a significant increased risk for obesity in offspring, with metabolic compromise such as insulin resistance already apparent at birth.<sup>16</sup>

Recent research at the molecular level has identified permanent changes in gene expression (epigenetic changes) as mediators for these effects.<sup>17</sup> Of particular concern is that these epigenetic changes may be carried through to the next generation of children born into an obesogenic environment.

### **The metabolic syndrome: an anomaly of metabolism that pre-disposes to obesity and the associated health risks**

Key features of the metabolic syndrome are insulin resistance, a low grade chronic inflammatory state and visceral obesity.<sup>12,13</sup> Peripheral insulin resistance is linked with obesity and markedly improves with weight loss. However, insulin resistance and other components of the metabolic syndrome, including an increased tendency towards abdominal obesity, may occur *before* the onset of obesity as a result of intra-uterine exposure to either a deprived or overabundant energy supply in animal models as well as from human data.<sup>14-17</sup>

As well as its peripheral effects, insulin also acts in the brain as an important satiety signal in conjunction with leptin and, since human obesity is commonly linked with both leptin and insulin resistance<sup>18,19</sup> this may result in a vicious spiral of escalating weight gain, and problems with shedding the extra kilograms gained. There are other physiological factors that also operate to make some people more susceptible than others to obesity, and the metabolic syndrome including cortisol and the hypothalamic-pituitary axis (HPA),<sup>20</sup> mitochondrial dysfunction,<sup>21</sup> uncoupling proteins<sup>22</sup>, and sex hormones<sup>23</sup> (see Figure 1, Table 1).

This rapidly expanding body of basic research provides further support of the evidence that some people are inherently more vulnerable. What also emerges is that the increased propensity for central fat gain is part of the metabolic syndrome and may arise early in development. This highlights the importance of early screening and implementation of appropriate interventions for those at increased risk of the metabolic syndrome and becoming obese.

For obesity-related health risks, fat distribution is the critical factor. It is visceral fat that is linked with the release of pro-inflammatory cytokines such as tumour necrosis factor (TNF $\alpha$ ) and interleukin-6 (IL-6), chronic inflammation and oxidative damage and the classic risk factors of hypertension and dyslipidaemia for cardiovascular disease, insulin resistance and type 2 diabetes mellitus as well as obesity-linked malignancies.<sup>24,25</sup> Conversely, adiponectin is linked with anti-inflammatory, anti-oxidative, insulin-sensitising and anti-cancer properties and low levels of this protective cytokine are associated with the metabolic syndrome.<sup>26</sup>

It is interesting to note that Roux-en-Y gastric bypass surgery is able to reverse the metabolic effects of obesity virtually immediately, often before significant weight reduction.<sup>27</sup> This is possibly due to enhanced nutrient sensing and stimulation of lower intestinal hormones such as GLP-1 or decreased production of ghrelin.<sup>27</sup> However, energy deprivation in the obese prior to/at bypass surgery also contributes to rapid metabolic normalisation.

## The role of genetics

The importance of genetic factors in obesity initially arose from twin and population studies and, more recently, from the human genome data. Cases of obesity linked to a single gene mutation have been identified in recent years, such as the FTO (fat mass and obesity associated gene) but human obesity is predominantly polygenic in nature.<sup>29-31</sup>

Currently more than 70 genes that may contribute to obesity have been identified, and genetic factors may account for 30-70% variability in BMI and waist/hip ratio, variations in energy homeostasis, eating behaviour, weight loss maintenance and ethnic differences in susceptibility to obesity.<sup>29,31</sup> It is the interplay of these genetic differences with socioeconomic and cultural differences and psychosocial factors that predisposes to obesity risk and re-affirms the value of early interventions.

## The bioscience: suggested directions for clinical practice

Debates and presentations at the Round Table had several themes which could inform clinical practice:

- Obesity results from a chronic disruption of innate energy homeostasis mechanisms which may arise as a result of genetic, epigenetic or environmental factors, resulting in an increased risk for obesity for some people when faced with the same obesogenic environment as their leaner counterparts. The achievement and maintenance of a supposedly “ideal” BMI of 19–25 is not only elusive but an impossible challenge for some,
- Dieting, and ‘diet’ induced behaviours, generally do not lead to lasting weight loss or health benefits,<sup>3-5,10,29</sup> may predispose to weight regain and sensitise the brain’s reward circuitry and function,<sup>30</sup> lead to an upward cogwheel ‘resetting’ of energy homeostasis<sup>10</sup> and may promote redistribution and increased visceral fat deposition with its related health risks.<sup>20,33</sup> Peripheral hip and thigh fat is not just neutral but may be protective<sup>34</sup> and it is essential to distinguish between weight loss and fat loss<sup>34</sup> and health. Some sources consider long term successful outcomes can be seen with Bariatric surgery<sup>27</sup> but clearly this is not a general option, and has risks at surgery and often post surgery nutrition issues.<sup>28</sup>

In view of these considerations perhaps we would achieve better health for all if we were to modify our interventions and attitudes appropriately. Too often attempts to lose weight lead to frustration, guilt and ultimately failure and pre-occupation with food and an upward spiral of weight cycling. What is apparent is a need for early, realistic, achievable interventions with an emphasis on health rather than a narrow focus on weight loss. The protective effects of a healthy diet in conjunction with physical activity as part of a healthy lifestyle are seen even with quite modest effects in weight loss.<sup>35</sup> Enabling people to do this in an obesogenic environment with cheap over-palatable food and which is not conducive to physical activity are major barriers.

There has been some debate and confusion over what really constitutes “healthy eating” by consumers, epidemiological and health workers as information available contains many contradictions. In NZ fat intake decreased from 37.5% to 35% of the

kilojoules between 1989 to the 1997 in response to health messages to cut back fat. However, over the same time period, obesity levels increased from 11% to 17%<sup>36</sup>. Unsaturated fats, such as olive oil and omega-3, are healthy alternatives to saturated fats but just as energy dense. The only nutritional advantage that pasta has over white bread is its low glycemic index.

Epidemiological studies that link higher intakes of individual nutrients such as carotenoids, dietary fibre, folic acid, and potassium with reduced health risks often miss the significant point that higher intakes of these nutrients are indicators of a higher intake of fruit, vegetables, whole grains and the significance of other health promoting substances found in these foods.

The one certainty seems to be the value of a varied and generous intake of fruit and vegetables, whole grain cereals (in moderation and with consideration of other starchy staples), dairy foods, fish and modest servings of animal derived protein, and unsaturated fats instead of saturated and trans fat found in processed foods.

It is important to eat foods that are not just energy dilute but provide generous supplies of many nutrients as well as antioxidants, cancer-protecting phytochemicals and dietary fibre and are satisfying and enjoyable. An example is the Mediterranean type diet, which has beneficial metabolic effects, established benefits for overall health and wellbeing and is conducive to longer term sustained weight loss.<sup>35</sup>

In contrast, dietary regimes are often nutritionally unbalanced and not adhered to in the long term and may have undesirable side effects.<sup>29,33,35</sup> Therefore, for sustained long term health benefits, a more productive emphasis should be on healthy eating (rather than weight loss per se) as part of a healthy life style, and on public education that facilitates and promotes informed food choices that appeal<sup>37</sup> ideally with wider community and food industry involvement.

Debates at the Round Table about exercise noted that there was no evidence to show that exercise reliably caused weight loss but there is a great deal of evidence to show the beneficial effects of increased movement of any form with incremental benefits as exercise increases.<sup>35,38,39</sup> This is an area where our current focus on weight loss may be counterproductive as many people begin an exercise programme to achieve weight loss and abandon it when weight loss does not occur.

Health professionals could show leadership in promoting the intrinsic benefits of exercise entirely removed from a focus on weight loss and supporting persistence and enjoyment instead. Creating a clinical environment in which the person does not feel judged or criticised is critical to fostering attendance and participation.

Another area of importance to clinical practice is advice about sleep habits. Multiple epidemiologic studies have shown an association between short sleep and higher BMI even when other confounders are controlled for.<sup>40-41</sup> Studies of healthy volunteers in laboratory settings have shown that sleep restriction is associated with an adverse impact on glucose homeostasis and is also related to alterations in appetite and satiety.

## Conclusions

What is apparent from a body of research over the last decade is that there are no short cuts or simple solutions to the obesity issue at the individual level and it is

unrealistic to expect these. Obesity is a field in which leading researchers “*repeatedly concede an alarming lack of knowledge about even the most fundamental questions while, often within the same article, making bold and unsupported generalisations about the causes and cures for obesity*” (Gard, p.36).<sup>2</sup> Such uncertainty was clearly evident at Round Table discussions and whilst many clinicians may be well aware of the scientific uncertainty it has not yet translated into more appropriate, sensitive public or clinical responses to those who live with obesity.

At the community level there is much to be achieved. Community embedded processes which increase access to safe exercise and increase equitable access to good nutrition are valuable and vitally important, and need to be long term. It is unfortunate that we will not be able to assess the long term outcomes of the Healthy Eating Healthy Action initiatives due to changes in government policy.

For individuals, we could move from a tendency to blame towards acknowledging that some may be disadvantaged because of biological factors. Simply concentrating on BMI focuses our attention away from inactivity and unhealthy dietary choices which are empirically recognised as a far more accurate predictor of disease than body weight per se.

For many people the current cheap, processed highly palatable and energy dense food environment makes it more difficult to acquire, ‘choose’ and eat healthier options. Regular physical activity is better for health than pure weight loss and is hard for many people, especially in an urban environment that discourages this.

Dealing with obesity at a community or individual level needs supportive long-term commitment and investment better served by interventions that are realistic, achievable and with an overall focus on health in its fullest sense, and for people of any size.

**Competing interests:** None

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## Gastritis cystica polyposa mimicking gastric malignancy

Ian Bloomfield, Jeremy Rossaak

Gastritis cystica polyposa (GCP) is a rare condition, characterised by the formation of a large polypoid structure seen in the stomach, most frequently after a partial gastrectomy. It is most frequently seen in the operated stomach on the gastric side of any anastomosis.

In the postoperative stomach, the suggested pathogenesis revolves around chronic inflammation due to either reflux of small bowel content or a reaction to sutures.<sup>1,2</sup> The polyp frequently appears endoscopically and radiographically similar to gastric malignancy. Histologically is characterised by polypoid hyperplasia of gastric mucosa with cystically dilated glandular structures.<sup>1</sup>

We present to our knowledge the first reported case of GCP in Australasia in a patient with an intact stomach.

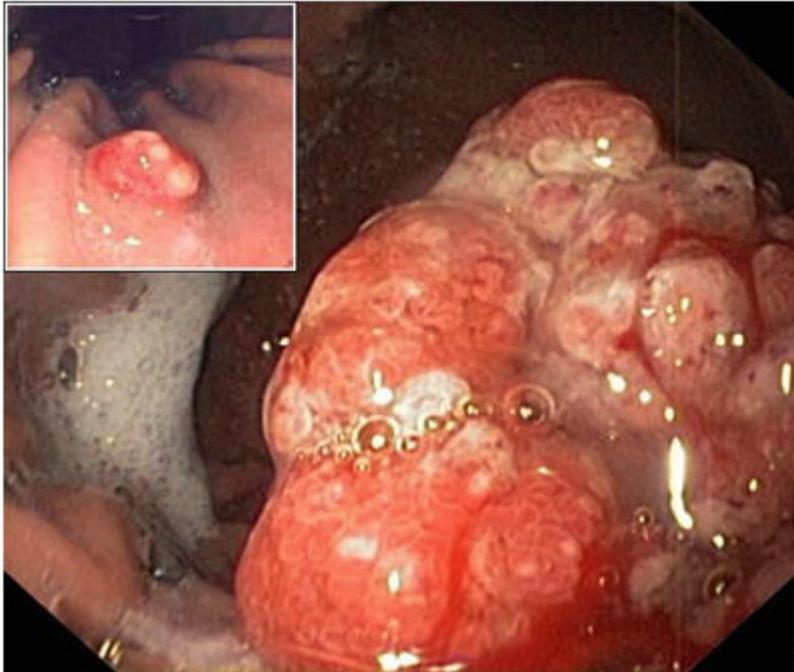
### Case report

This 62-year-old lady with shortness of breath and epigastric pain was referred from her general practitioner. Investigations revealed an iron deficiency anaemia, Hb 106 MCV 69 and positive faecal occult blood screen. She underwent colonoscopy, which was normal, and gastroscopy which revealed a small hiatus hernia, a short segment of Barrett's oesophagus and a large polypoid mass in the antrum of the stomach with superficial ulceration, and multiple satellite lesions (Figure 1). *Helicobacter pylori* urease test was negative.

Initial histology returned as benign ulcerated lesion but in the context of the clinical scenario further tissue was required to exclude a malignancy. This lady was referred for surgical follow-up and staging CT, on the presumption of gastric malignancy. The CT demonstrated the polypoid lesion on the greater curvature of the stomach with no associated lymphadenopathy (Figure 2).

After numerous biopsies the lesion was removed with a snare polypectomy. Histology was confirmed as gastritis cystica polyposa profunda (Figure 3) with incomplete excision and a further polypectomy required for complete clearance. After 12 months of quarterly then two 6-monthly endoscopies, our patient continues on omeprazole 40 mg OD and annual endoscopy as potential for recurrence is unknown.

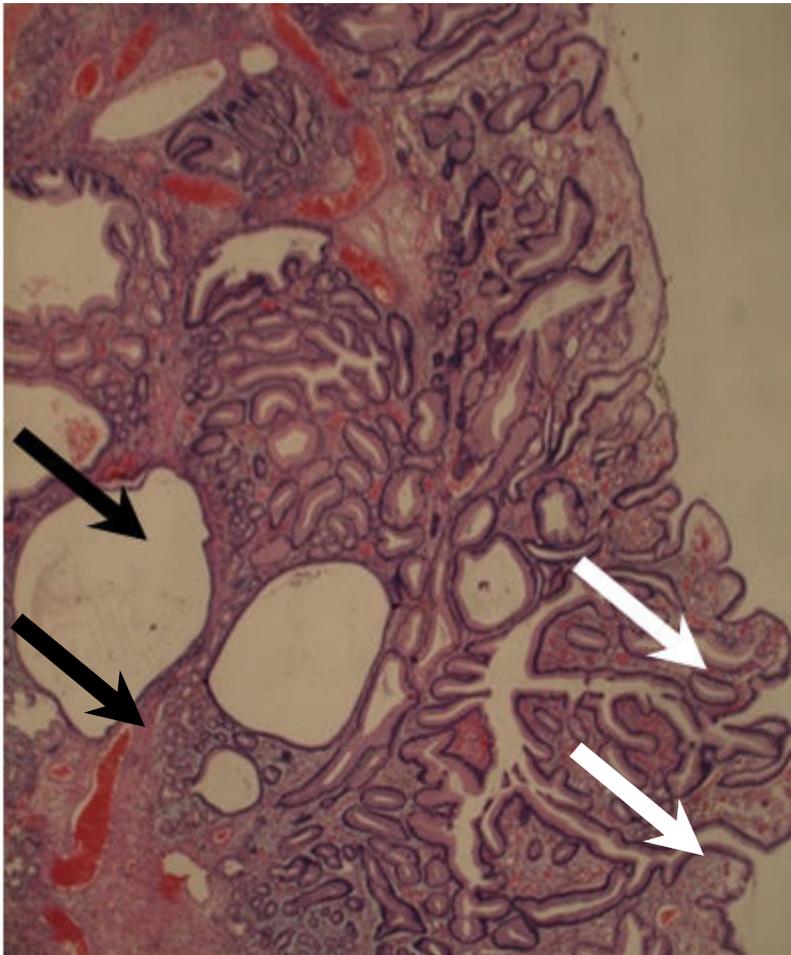
**Figure 1. Endoscopic appearance of gastritis cystical polyposa greater curvature of the stomach (main image) with satellite lesions (inset image)**



**Figure 2. CT image demonstrating polyp attached to greater curvature of the stomach (arrows), reversed prone image**



**Figure 3. Histological appearance of lesion, demonstrating cystic regions confined to the mucosa and sub-mucosa (arrow) with distorted mucinous glands (white arrow)**



## Discussion

In the case reported we have demonstrated the difficulty in accurately diagnosing a lesion with appearances endoscopically and radiographically of an early gastric cancer but which is histologically benign. The natural history of this lesion is unclear and a number of gastroscopies were needed to be confident of accurate diagnosis.

GCP remains a rare diagnosis and aside from a few reported cases in intact stomachs,<sup>3-6</sup> seems confined to those with any form of gastro-enterostomy.<sup>2,7</sup> This leads to the suggestion that it is secondary to chronic mucosal irritation from reflux of small bowel content.<sup>1,2,7</sup> Because GCP has been identified alongside early gastric cancer, it has been suggested to be a pre-cancerous lesion, but remains difficult to prove.<sup>4,8</sup>

Histologically GCP is confined to the sub-mucosa, and as such is amenable to endoscopic resection.<sup>4-6</sup> Identifying histological features are of polypoid mucosal

hyperplasia with cystic dilatation of the gastric glands and localised infiltration with inflammatory cells.<sup>1,7</sup>

In this case the initial diagnosis was uncertain and numerous attempts at biopsy were performed before a snare polypectomy was performed to complete excision. With a certain diagnosis of GCP follow up endoscopies have not found evidence of recurrence. There is limited experience of management of GCP lesions and further reporting is necessary to characterise the disease progression. In centres where endoscopic ultrasound and endoscopic sub-mucosal resection are more routinely available this is an attractive lesion to resect and successful resection has been performed up to 20 mm in size.<sup>4</sup>

From a management perspective it would not be surprising to hear of surgical resection being performed for such lesions as endoscopically and radiographically it has features of gastric malignancy.<sup>2,8</sup> In this instance it was detected after investigation for symptomatic iron deficiency anaemia which is associated with gastrointestinal lesions, both benign and malignant.

Further reports are necessary to determine the disease progression to clarify its potential as a pre-malignant lesion as well as to identify causative factors in the un-operated stomach.

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## **Cervical swelling following cardiac surgery: the hidden menace**

Calvin S H Ng, Yee Eot Chee, Randolph H L Wong, Anthony M H Ho, Micky W T Kwok, Innes Y P Wan, Malcolm J Underwood

Iatrogenic oesophageal injury during transoesophageal echocardiography (TOE) is rare. In patients with reduced sensorium under general anaesthesia, the risk may be increased. Following TOE, the presence of pneumothorax, hydropneumothorax, pneumomediastinum or cervical subcutaneous emphysema should alert to the possibility of oesophageal injury. This article highlights subtle presentations of this potential life-threatening condition, and the importance of early diagnosis and treatment.

### **Case report**

A 61-year-old gentleman with symptomatic severe rheumatic mitral stenosis and tricuspid regurgitation underwent mitral valve replacement and tricuspid ring annuloplasty. He has no other significant past medical history. In the anaesthetic room, the patient had a straight-forward endotracheal intubation. However, the cardiac anaesthetist commented on some difficulty in locating the jugular vein for central venous cannula insertion at the right cervical area. Subsequently, cannulation was smoothly accomplished with ultrasound guidance. No air or arterial blood aspiration was reported during the procedure.

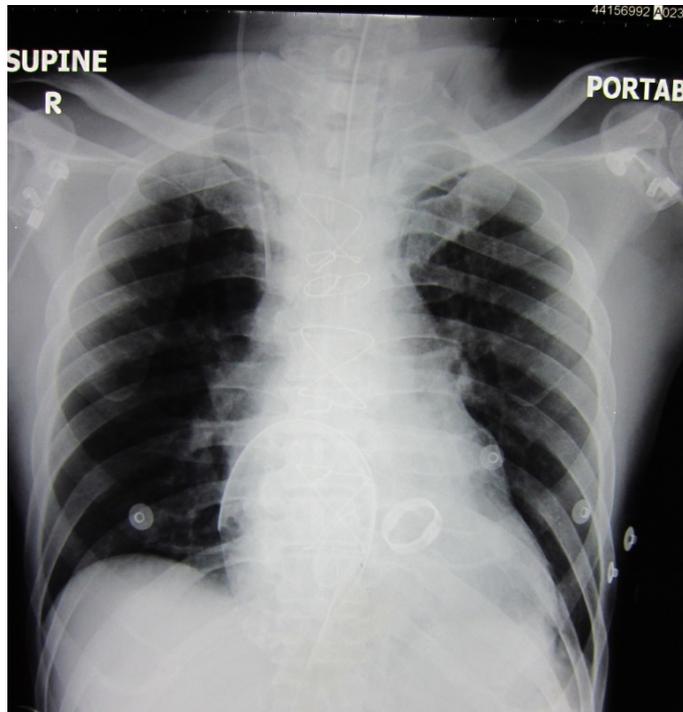
TOE probe insertion was achieved with guidance by a laryngoscope after an initial attempt with manual manipulation failed. The surgery was uneventful, and satisfactory haemostasis was achieved.

In the intensive care unit, the patient was propped up and followed our “wake and extubate” protocol. Shortly afterwards, increasing swelling was noted at the base of the neck, initially prompting suspicion of a growing haematoma originating from the surgical site or central venous cannulation. On further examination, cervical crepitus associated with subcutaneous emphysema was demonstrated which was confirmed on chest radiograph (Figure 1). Urgent computed tomography scan showed extensive pneumomediastinum, cervical subcutaneous emphysema, and small paraoesophageal lower neck haematoma (Figure 2).

Urgent flexible bronchoscopy was unremarkable, and oesophagogastroduodenoscopy (OGD) confirmed the presence of a hematoma and tear at the level of cricopharyngeus. Endoscopic-guided nasogastric tube was inserted and the patient was managed conservatively with intravenous antibiotics.

Computed tomography scan and contrast swallow performed 2 weeks following the injury demonstrated no oesophageal leakage, and complete resolution of subcutaneous emphysema. Oral diet was gradually resumed and he remained well at 6 weeks postoperative follow-up.

**Figure 1. Chest radiograph showing mild swelling at base of neck, and cervical subcutaneous emphysema**



**Figure 2. Computed tomography scan demonstrating extensive cervical subcutaneous emphysema**



## Discussion

Complications from TOE is rare, with the most serious being oesophageal perforation which has a reported frequency of 0.019 to 0.008%.<sup>1,2</sup> The mortality rate from the use of TOE is 0.0098%.<sup>2</sup> TOE may cause injury by direct oropharyngeal and oesophageal trauma usually related to probe insertion, active manipulation, or tip flexing to acquire images. Prolonged retention of probe in the oesophagus has also been associated with oesophageal perforation.<sup>3</sup>

TOE should be avoided in patients with extensive oesophageal or gastric diseases as it carries higher risk of injury. Furthermore, it is quite plausibly that patients who are heavily sedated or under general anaesthesia with reduced sensorium may be more prone to oesophageal perforation. A less common mechanism for oesophageal injury is by thermal energy produced from the probe tip. Modern probes are designed to automatically shut off when high temperatures are reached to reduce the risk of such injury.

Oesophageal perforation can be life-threatening and should be diagnosed and treated urgently, because delay is well-known to result in high mortality (16 to 35%) and morbidity.<sup>1,4</sup> Following TOE, the presence of pneumothorax, hydropneumothorax, pneumomediastinum or cervical surgical emphysema should alert to the possibility of oesophageal injury.

Chest radiograph may show the "V" sign of Naclerio, which is a V-shaped collection of air in mediastinum and along the diaphragm, indicating presence of pneumomediastinum and pneumothorax.<sup>4</sup> Pleural effusion may also be found particularly when there is a delay in diagnosis. Computed tomography is usually diagnostic, although an oesophagram can confirm and demonstrate extravasation of contrast and the level of perforation.<sup>4</sup> OGD may also be helpful but is not often necessary.

Most reports of TOE oesophageal perforations have presented relatively late with infective complications of the mediastinum and pleural space.<sup>1-3</sup> Fortunately, the oesophageal tear was diagnosed very early in this patient, which led to immediate damage limiting management. More commonly, the perforations have occurred at the lower third of the oesophagus.<sup>1-3</sup> Our case of an upper oesophageal tear is rare, and the level of injury explains the unusual presentation of neck swelling and subcutaneous emphysema.<sup>1-3</sup> Treatment of oesophageal perforations can be conservative and surgical, involving thoracoscopic or open repairs. More recently, endoscopic stenting has been successfully employed to seal off the leak in selected cases.<sup>1</sup>

Early recognition and treatment of oesophageal perforation is paramount in achieving the best clinical outcome. Clinicians should have a high index of suspicion for oesophageal injury following TOE, particularly when the clinical presentation may be quite variable depending on the time interval to diagnosis and level of tear.

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## Progressive dysphagia in a 32-year-old woman—what is your call?

Pazhanivel Mohan, Jayanthi Venkataraman

A 32-year-old woman presented with difficulty in swallowing for 1 year. The dysphagia was progressive and was predominant for solid foods. There was no nasal regurgitation, choking or coughing during swallowing. Her appetite and weight was preserved. She complained of easy fatigability and tiredness at work for the last 6 months.

General examination revealed anaemia with glossitis, angular cheilitis and flattening of the finger and toe nails.

Barium swallow was done and is shown in Figure 1.

**Figure 1. Barium swallow**



*What is your diagnosis?*

## Answer

Barium swallow shows the appearance of a cervical web (black arrow).

The web got accidentally ruptured during an upper gastrointestinal endoscopy. A haemogram done confirmed the presence of iron deficiency anaemia.

The unifying diagnosis would be *Plummer-Vinson syndrome* characterised by the classic triad of dysphagia, iron-deficiency anaemia and oesophageal webs. She was maintained on iron supplements and remained symptom-free on follow up.

The importance of recognising this condition is that such patients are at increased risk of squamous cell carcinoma of the pharynx and the oesophagus.<sup>1</sup>

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## On some principles of hospital management: part 3

*Third part of an article by Dr Colquhoun, Dunedin, published in NZMJ 1910;9(36):33–37. Continued from part 2 at <http://www.nzma.org.nz/journal/124-1328/4523>*

Such an institution [secondary hospital] would take in all those cases which are now disadvantageously placed at the Benevolent, and many which are left to die miserably in unsuitable homes. It would be at once a humane home for incurables and a convalescent station. In its grounds it could accommodate the few infectious cases which from time to time arise in Dunedin, and also the more frequently occurring cases of tuberculosis. Dunedin is fortunate in having in its immediate neighbourhood land suited for this purpose which can be obtained at a moderate figure.

It is well known than the late Dr. McGregor, Inspector of Hospitals, was always opposed to continuing the Hospital on its present site. He held that the site was swampy, dusty, and contracted in extent and unsuited for an expanding institution. On the other hand it was contended that the true place for a Hospital is where it is most wanted, and that the present site, however objectionable from hygienic reasons, was the only possible one for supplying the wants of the city. Both views were reasonable, and both would be met by the recognition of the fact that a city Hospital should consist of two departments—a Primary and a Secondary. The Primary Hospital, besides providing accommodation and treatment for acute cases, would still retain the out-patient department.

Another much-needed reform which would be made possible would be the establishment of an observation ward for mental cases. At present suspected lunatics are sent either to gaol or to the Magistrate's Court for examination. These are humiliations which the State has no right to inflict on the honest poor. We might as well send a consumptive patient to prison as treat by the methods of the criminal court those unfortunates whose disease happens to be in their brain cells. Their proper place, until duly certified as insane, is in the public hospital.

It may be objected to these proposals that they will cost money. Certainly they will, but not as much as the present system. It is in the long run the truest and best economy to deal with all cases of sickness the most effectual way that can be devised. No one can assent truthfully that we are doing so at present.

To sum up the imperfections of the present arrangements, we may say :

1. No provision is made for many infectious diseases.
2. No provision is made for consumptives.
3. No provision is made for Mental Cases.
4. No provision is made for Alcoholic Cases.
5. No provision is made for Epilepsy.
6. Acute and Chronic and Convalescent cases treated in the same wards.

7. No provision is made for very young children.

The general principle enumerated above—that a Primary and a Secondary Hospital are required—is not new. It has been successfully carried out in New York and other American cities, in the field during war, and is obviously destined to govern the work all great hospitals everywhere in the future.

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Since the above was written, Dunedin has been supplied with a Hospital for Infectious Diseases and a Sanatorium for cases of Early Consumption. The other conditions are unaltered.



## **Is there an association between adiposity in childhood and cardiovascular risk factors in adolescence?**

This prospective cohort study involved 5235 children who attended the assessment at ages 9–10 or 11–12 and the assessment at 15–16. Their initial body mass index (BMI), waist circumference, and fat mass in childhood was correlated with their systolic and diastolic blood pressure and concentrations of fasting low density lipoprotein cholesterol, high density lipoprotein cholesterol, triglycerides, glucose, and insulin measured at age 15–16.

As might be expected there was a positive association between childhood obesity and the presence of adolescent cardiovascular risk factors. The researchers felt that they had adequately adjusted for possible confounding factors. However, as the children were predominantly of European origin and all were born in the UK they caution that their results may not be generalisable to other ethnic groups.

BMJ 2010;341:c6224.

## **Long-term effect of low-dose aspirin on colorectal cancer incidence and mortality**

Most colorectal cancers develop from adenomas, and trials have shown that aspirin and cyclo-oxygenase-2 enzyme (COX-2) inhibitors reduce the recurrence by about 20%. It is not feasible to use COX-2 inhibitors for such a purpose because of the increased risk of cardiovascular adverse effects. Long-term use of aspirin in daily dosage of 500 mg or more has been shown to be fraught with the adverse effects of bleeding. The long-term effectiveness of lower doses (75–300 mg) daily is unknown and the authors of this meta-analysis set out to throw some light on this topic.

They report on results from four trials comparing aspirin versus control which involve many thousand patients. None of these trials were designed to study colorectal cancer but, fortunately, data on such cancers was collected.

The results showed that long-term dosage of 75–300 mg/day did reduce the incidence of colorectal cancer. The benefit increased with longer usage and there was no increase in benefit with dosage greater than 75 mg/day. The beneficial effects were greater for cancers of the proximal colon.

Lancet 2010;376:1741–50.

## **Appropriately prescribing antibiotics for patients with pharyngitis**

Pharyngitis is common. Most patients probably have a viral infection but about 20% will have a streptococcal infection. Should the patient be treated with antibiotics? This paper from Wisconsin, USA is of interest. Apparently patients in Wisconsin may opt for nurse-only triage when seeking treatment.

This retrospective observational study compares antibiotic use in patient with pharyngitis between those subjects treated by a physician and those who opted for nurse-only triage. The nurses used an algorithm which purports to indicate the likelihood of bacterial infection and the physicians used clinical judgement and adherence to antibiotic prescribing guidelines. 28.5% of patients opted for the nurse-only triage and treatment algorithm.

Physicians adhered to their guidelines in 92.7% of cases whereas the nurses adhered to their guidelines in 99.7% of their cases. The authors conclude that "instituting a simple nurse-only triage and treatment algorithm for patients presenting with pharyngitis appears to reduce unnecessary antibiotic use."

Mayo Clin Proc 2010;85(11):1011–15.

### **Prevention of atrial fibrillation after cardiac surgery—metoprolol versus amiodarone**

Atrial fibrillation (AF) is the most common arrhythmia after cardiac surgery. Apparently current guidelines recommend  $\beta$ -blockers, usually metoprolol, should be used prophylactically by intravenous infusion to prevent such AF. However, some recommend oral amiodarone.

This randomised prospective study from Finland sets out to elucidate. 316 postoperative patients were randomised to either metoprolol or amiodarone. AF occurred postoperatively in 23.9% of the metoprolol cohort and 24.8% of the amiodarone developed post-op AF.

Obviously inconclusive and the researchers recommend a trial with larger numbers. In the meantime they feel that the current guideline—i.e. metoprolol prophylaxis—should be followed. There were predictable adverse effects in both groups but generally both treatments were well tolerated.

Ann Intern Med 2010;153:703–9.

### **B-type natriuretic peptide testing in the emergency department**

The accuracy of B-type natriuretic peptide (BNP) testing for diagnosing acute decompensated heart failure has been generally accepted. The authors of this paper are interested in the use of this test in the emergency department in patients who are acutely dyspnoeic, when the question arises whether their dyspnoea is of cardiac or respiratory origin. Their systematic analysis involves 5 trials in 5 countries, and involved 2513 patients. The question posed in the trials was whether those tested had better outcomes over those not tested.

The conclusions reached were that those tested had a decreased length of stay in hospital by about 1 day. The rate of admission to hospital might possibly be reduced but there was no conclusive effect on their hospital mortality rate.

Ann Intern Med 2010;153:728–35.



## **ACC response on rotator cuff tears**

The 17 December 2010 issue of the *New Zealand Medical Journal* contains an editorial from Michael Caughey and a review article from Khalid Mohammed et al,<sup>1,2</sup> regarding rotator cuff tears and their cause with regard to the scrutiny that ACC is applying to requests for support of funding for surgery.

There is, and will continue to be, discussion regarding the aetiology of rotator cuff tears. However, there is no argument that both degenerative change and trauma play a role.

New Zealand is unique, although there is a similar discussion in Germany, in that the ability to attribute a substantial or wholly traumatic contribution to pathology requiring treatment determines the funding stream and the waiting time for the appropriate operation. The constraints of the public health system mean that most rotator cuff tears will not generate enough “points” to support surgery in a public hospital.

The determination of a traumatic tear in scientific papers and referred to in the editorial is largely dependent upon the history. In most countries where the aetiology does not determine access to funding, this may be regarded as a credible criterion.

In New Zealand, however, patients and providers are clear that access to ACC support requires the history to involve an “accident”. It can come as little surprise, then, that 90% of the highly selected patients in the Rotator Cuff Registry reply “yes” to the question “Is your shoulder problem the result of an accident?”.

There are repeated demonstrations of the history evolving with time seen in the clinical notes from the various providers involved with these cases. In addition it is difficult to reconcile the not uncommon statement in the Assessment Report and Treatment Plan (ARTP) submitted by a surgeon that “the shoulder was completely normal prior to the accident” with a record of prior pathology at the same body site.

Thus other measures are needed to assist with the assessment of the substantial cause of such pathology, as required by the legislation, which has led to a search for objective criteria.

As both Dr Caughey and Dr Mohammed have commented, such criteria are difficult to find, and the histology of the tendon which is torn, which could possibly be the gold standard, is never examined outside of clinical trials.

However, this difficulty does not justify a nihilistic approach to the issue and the Clinical Advisory Panel of ACC is in active discussions with representatives of the Shoulder and Elbow Society of the NZOA to come to a consensus of which factors should be assessed in the consideration of the causal relationships related to individual requests for rotator cuff surgery.

Scientific contributions, such as the review from Dr Mohammed et al, are useful for these discussions. Regrettably, your editorial is not.

The assessment of causation does not require a specialist surgical qualification, since the provider's diagnosis and proposed management is accepted, but does depend on an understanding of the legislation, sound clinical training, an understanding of pathology and mechanisms of injury, and the ability to keep up with and appraise the relevant and current literature.

ACC is taxpayer funded to provide rehabilitation for injuries caused by an accident. While initial assistance and entitlements are correctly funded by the Corporation, surgery for conditions that are age-related or degenerative is specifically excluded under the Act. ACC is a resource which we, as doctors and patient advocates, have a duty to treat with respect.

The Medical Council of New Zealand in its "Statement on safe practice in an environment of resource limitation" of August 2008 notes that "*Doctors must support research, study and discussion so that the allocation of health resources is rational, based on need and evidence of benefit.*"

It is incumbent on all of us to work constructively to ensure the maximum benefit to the population which the legislation is designed to assist. The recent intemperate and easily disproved contributions to the popular media from a number of our colleagues have been unhelpful in progressing the debate about the clinical issues.

ACC's data indicates that funding for the majority of requests for elective surgery across all age groups and all body sites is approved.

The future viability of New Zealand's unique taxpayer support for the injured depends on minimising abuse of the system and a constructive, ethical and professional relationship between the providers and their patients, and the Corporation. Anything else will not do.

#### Clinical Advisory Panel

ACC Elective Service Centre, Dunedin

Members include:

- Dr Michael Austen, Medical Advisor
- Dr Ray Fong, Medical Advisor
- Dr Peter Hunter, Medical Advisor
- Dr Patrick Medlicott, Medical Advisor
- Dr Ian Murphy, Medical Advisor
- Ms Karen Rasmussen, Clinical Advisor (Chairperson)
- Dr Michael Sexton, Medical Advisor

**Statement of interest:** The members of the Clinical Advisory Panel are salaried employees of ACC and receive no remuneration related to their support or otherwise of elective surgery requests. The medical members are vocationally registered in their specialties with current Practising Certificates.

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## Non-melanoma skin cancer

In their paper on non-melanoma skin cancer (NMSC) Brougham et al raise a number of important issues.<sup>1</sup> Their paper is very timely, given recent upwardly revised estimates of the scale and substantial cost burden on the health system of treatment,<sup>2</sup> for a problem that is, largely, considered potentially preventable through control of excessive exposure to UV radiation.<sup>3</sup>

In addition to treatment issues, Brougham et al. identify the need for ‘community-wide preventive measures.’ One of the challenges with these is to ensure that resources are allocated to implementing interventions for which there is evidence of effectiveness.

With respect to interventions implemented to reduce harmful UVR exposure, a systematic review found ‘sufficient evidence’ for the effectiveness of only two classes of interventions: education and policy approaches in (a) primary schools and (b) recreational and tourism settings.<sup>4</sup> It is, therefore, fortunate that a national SunSmart Schools Accreditation Programme has been implemented by the Cancer Society in New Zealand,<sup>5</sup> and it is important that the SSAP continues to receive adequate resourcing.

Greater attention to recreational and tourism settings is warranted. However, the review found insufficient evidence to determine the effectiveness of interventions in other settings, including workplaces, or interventions focused on healthcare settings and providers, parents or caregivers of children, media campaigns alone or community-wide multi-component interventions.

Since that review was undertaken, substantial numbers of additional interventions have been implemented and plans to up-date the review are under way. An up-dated review would provide an important guide for decisions made in New Zealand. In the meantime, planning for interventions in New Zealand should take into account not only existing evidence for effectiveness, but identified international research needs, which include better design, measurement and description of interventions and studies among multi-ethnic populations.

Although it is currently not possible to quantify their NMSC burden, one population group which clearly deserves greater attention is those who work outdoors, potentially 14% of the workforce.<sup>6</sup> There is evidence that outdoor workers in NZ can be exposed to high levels of real-time UVR at work,<sup>6</sup> that better workplace sun protective behaviours are found where there is perceived workplace support,<sup>7,8</sup> and perceived prioritisation of sun protection at work.<sup>8</sup>

Another area for increased attention should be sun-bed regulation, given the increased skin cancer risks associated with their use,<sup>9</sup> their wide distribution in NZ<sup>10</sup> and a recent Australian report of their sometimes very high emissions (up to a UVI of 48, or about four times higher than the midday summer sun in NZ).<sup>11</sup> Taken together, these factors provide strengthened support for arguments about the need for better controls

on this potential hazard in New Zealand, which would bring us more into line with existing regulations in Australian states.

So, in addition to the immediate need for adequate treatment services and surveillance there is also a need to plan for long term reduction in the scale of the skin cancer burden through targeted, carefully evaluated, often settings-based interventions while maintaining the overarching context of population health-promotion messages about the need for sensible UVR protection. This should not only help to reduce the substantial NMSC burden, but also the around 300 deaths from melanoma in NZ every year – given that excessive UVR exposure is also currently the only potentially readily modifiable risk factor for melanoma.

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## **Movies with public health themes at a medical school library: interest and uptake**

To study the potential role of movies in medical student education, a list of 15 movies with strong public health themes was selected.<sup>1 2</sup> These movies were then made available in a medical school library in 2009 and we studied student acceptability of watching these movies in their leisure time (manuscript of study under review). At the end of 2009 we supplemented the collection with another five movies, using a similar method as per the original selection process. Here we briefly describe usage data of these movies for the 2010 year.

**Methods**—DVDs of 20 commercial movies with public health-related content (Table 1) were made available for free use from the medical school library (University of Otago, Wellington). For 16 of the DVDs, two copies were available in different formats to facilitate viewing on different machines.

The viewing of the movies was encouraged among fourth-year medical students during their public health module in the 2010 academic year. Students were requested to select a movie of their choice, view it, and then to verbally report back on the public health themes in a dedicated (but not formally assessed) session at the end of the module. This session was facilitated by one of us [PG]. Data were collected on DVD loans for the 2010 year from the library's electronic records.

**Results and Discussion**—Based on the number of DVDs loaned during the 2009 year (Table 1), there was reasonable interest in watching these movies. Loans were mainly by fourth-year students (65%, 137/211) with the rest by other library users (staff and other students). Of all registered fourth-year students enrolled in 2010, most (55%, 48/87) withdrew at least one DVD. Of those who loaned a DVD, a majority (73%) withdrew more than one (mean = 2.9, range = 1–11). However, all of these data on usage are likely to be underestimates since for each DVD loaned there could be viewings by multiple students or additional people (including other household members not affiliated with the University of Otago). This pattern is likely to dominate over the instances of the loaned DVD not being viewed at all, or incompletely viewed.

Out of all the DVDs, the most popular for all users and for fourth-year students, was *Sicko* followed by *Born into Brothels* (Table 1).

To ensure good access of the DVDs to fourth-year students, we did not actively promote the availability of movies to other library users. However, this additional promotion may be considered in the future since the loaning scheme had worked well in 2010 with manageable demand and no loss or damage of DVDs reported.

Based on the presentations by the students in the scheduled “teaching” session, it was apparent that most students were able to provide a reasonable synopsis of the movie. Nevertheless, some were less able to tease out the key public health message(s) in the movie. Further work is required to better understand the educational value of watching such movies for medical students, as opposed to just entertainment value.

**Conclusions**—The loan data indicate reasonable levels of usage and likely interest in these movies with public health themes by students and other medical school library users. Continuing with this approach appears worthwhile, though further work is required to better understand the actual educational value of such movies with public health themes.

**Table 1. Loans of movies (DVDs) with public health themes from a medical school library during the period 1 January to 8 December 2010 (University of Otago, Wellington)**

Movie title (year)—ordered by popularity for “all users”	Loans by fourth-year medical students	Loans by all registered library users (students & staff)
<i>Sicko</i> (2007)	16	21
<i>Born into Brothels</i> (2004)	15	19
<i>Dark Days</i> (2000)	8	17
<i>Milk</i> (2008)	11	16
<i>Food Inc</i> (2008)	9	15
<i>The Insider</i> (1999)	8	15
<i>Super Size Me</i> (2004)	11	14
<i>The Yes Men</i> (2005)	9	14
<i>Motorcycle Diaries</i> (2004)	9	13
<i>The Constant Gardener</i> (2005)	8	12
<i>Amazing Grace</i> (2006)	4	10
<i>An Inconvenient Truth</i> (2006)	6	10
<i>Erin Brockovich</i> (2000)	7	9
<i>The Corporation</i> (2003)	4	8
<i>Who Killed the Electric Car?</i> (2006)	4	6
<i>And the Band Played On</i> (1993)	4	5
<i>Bright Leaves</i> (2003)	1	3
<i>A Civil Action</i> (1998)	1	2
<i>Bowling for Columbine</i> (2002)	2	2
<i>Michael Clayton</i> (2007)	0	0
<b>Total</b>	<b>137</b>	<b>211</b>

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## Consistently cheap alcohol: national data on discounts for an 8-week period

Previous research has highlighted the availability of relatively cheap alcohol in New Zealand and has demonstrated that the affordability of alcohol has increased over time.<sup>1</sup>

Despite Justice Minister Simon Power stating that this is of concern,<sup>2</sup> the issue of price has been avoided in the Alcohol Reform Bill, which is currently before a Parliamentary Select Committee. This is regardless of evidence for both the effectiveness and cost-effectiveness of price as a means of reducing consumption and reducing alcohol-related harm, especially in young people and in heavier drinkers.<sup>3-7</sup>

The National Institute for Health and Clinical Excellence, in its report, *Alcohol use disorders: Preventing the development of hazardous and harmful drinking* makes this statement: “Making alcohol less affordable is the most effective way of reducing alcohol-related harm.”<sup>3</sup> Modelling work from Australia even suggests that alcohol tax interventions will save health sector funds.<sup>8</sup>

The Government’s approach to cheap and affordable alcohol has been to rule out any increase in alcohol excise tax and to give retailers a year in which to volunteer data on price and sales of alcohol, to be used in investigating a minimum pricing regime.<sup>9</sup> This proposed approach is puzzling and has not been clearly justified, given the existing evidence that price interventions are effective in reducing alcohol-related harm and that increasing affordability of alcohol has already been shown using Statistics New Zealand data.<sup>1</sup>

Indeed, the Review of Liquor Laws undertaken by the Law Commission recommended almost the exact opposite approach—an increase in tax, reduction in tax of low alcohol beverages, and full investigation of a minimum pricing scheme that included a *requirement* for retailers and producers to provide sales and price data.<sup>10</sup> Nevertheless, to further understand this issue we examined additional contemporary evidence by collecting data on discounted alcohol in late 2010. To provide context, these data were compared with the prices of other commonly consumed non-alcoholic beverages.

**Methods**—We monitored discounted alcoholic beverage prices from 29 October to 20 December 2010, using data detailed on a national service for providing such information to the commercial sector. This service is the “LIPS” (Liquor Information Pricing Search) search engine ([www.lips.co.nz](http://www.lips.co.nz)), a partially free service established since 2003. LIPS compiles advertised alcohol beverage prices from newspapers, circulars, mailers and email offers from all types of outlets that sell alcohol throughout New Zealand.

The purpose of LIPS is to facilitate the ready identification of the cheapest offers, promotions and specials on beer, wine, ready-to-drink premixed spirit drinks (RTDs) and spirits, making this a useful resource for both consumers and the alcohol industry.

As Bruce Priddy, the Brand Manager for Jim Beam comments on the site: "*LIPS provide accurate, up to date liquor information beneficial to our everyday business.*"

We examined this website for the cheapest alcohol advertised twice weekly (on Mondays and Fridays, to account for possible variation in discounting at different times of the week). We monitored prices for cask wine (previously found to be the cheapest alcohol per standard drink),<sup>1</sup> RTDs and cider (as these latter drinks are often favoured by youth drinkers). For comparison, we also monitored discounted soft drink (*Coca-Cola*), apple-based fruit juice and sparkling grape juice, as these are frequently offered as alternative beverages to alcohol, and milk, as a staple household beverage, particularly for children, as advertised online by a supermarket chain (at <http://www.woolworths.co.nz/>).

We compared standard drinks of alcohol (one standard alcoholic drink being equivalent to 10g of alcohol), taking into account the volume and percentage alcohol of the type of alcohol (e.g., one standard drink of wine at 13% alcohol is 100ml; a standard drink of 4% beer is 330ml; a standard drink of spirits at 40% alcohol is 30ml; a 250ml bottle of RTD spirits at 5% alcohol is approximately one standard drink). Not accounting for volume and percentage alcohol would make comparisons among different alcohol types meaningless.

Comparing standard drink per alcohol type (not volume of drink) is commonsense research practice. The number of standard drinks per alcohol unit being sold was calculated by using the formula: "volume of container (litres) × % alcohol by volume (ml/100ml) × 0.789 = number of standard drinks" (obtained from: <http://www.nzfsa.govt.nz/consumers/food-safety-topics/food-processing-labelling/food-labelling/fact-sheets/fs-2003-04-alcohol-labelling.htm>). The price per standard drink was then calculated by dividing the cost of the alcohol by number of standard drinks.

A few RTDs, where the alcohol content was not readily available, were omitted from the analysis. Similarly, to compare alcoholic to non-alcoholic beverages, this was done using standard drinks not volume comparisons. For non-alcoholic beverages, a glass or cup (250ml) is a commonly accepted serving size and is the serving size for which nutritional information is given on the label for most soft drinks and juices, and is the recommended serving size for milk.<sup>11</sup> Hence, 250ml was chosen as the standard drink comparison for non-alcoholic beverages (milk, juice and soft drink).

**Results**—Table 1 shows the price per standard drink (one unit of alcohol for cask wine, cider and RTDs and 250ml for non-alcoholic drinks) for the most discounted brand of each beverage type over the study period. For example, on the first day of sampling, 2.25L of *Coca-Cola* cost \$2.50, giving a cost per 250ml of 28c; 12 × 330ml bottles of *Mac's Isaac's pear cider* (at 5% alcohol) cost \$15, giving a cost per standard drink of 96c and 3L of Chasseur Classic Red cask wine (13% alcohol) cost \$18.89, giving a cost per standard drink of 61c.

Over the two months of twice weekly data collection, cask wine generally provided the cheapest alcoholic standard drink, although certain RTDs provided slightly cheaper standard drinks on occasions (as low as \$0.53). The prices of RTDs and cider increased in December, perhaps due to fewer pre-Christmas specials. The prices of the non-alcoholic drinks remained fairly static, with the cheapest milk still more

expensive than the cheapest cola and fruit juice by glass. A glass of the cheapest non-alcoholic sparkling grape juice was more than twice as expensive as a standard drink of discount cask wine.

**Table 1. Lowest price per standard drink (one unit for alcoholic drinks, 250ml for non-alcoholic drinks), alcohol beverage data from the LIPS website; *Coca-Cola*, juice and milk from the online supermarket website**

Date	Alcoholic beverages			Non-alcoholic comparison drinks			Milk*
	Cask wine	Cider	RTDs	<i>Coca-Cola</i>	Apple-based juice	Sparkling grape juice	
29/10/2010	\$0.61	\$0.96	\$0.53	\$0.28	\$0.37	\$1.43	\$0.44
1/11/2010	\$0.62	\$0.96	\$0.65	\$0.41	\$0.31	\$1.40	\$0.44
5/11/2010	\$0.62	\$0.96	\$0.63	\$0.28	\$0.33	\$1.40	\$0.44
8/11/2010	\$0.58	\$0.96	\$0.63	\$0.40	\$0.42	\$1.43	\$0.51
12/11/2010	\$0.58	\$0.96	\$0.63	\$0.40	\$0.42	\$1.43	\$0.31
15/11/2010	\$0.62	\$0.96	\$0.63	\$0.30	\$0.36	\$1.43	\$0.44
19/11/2010	\$0.62	\$0.96	\$0.63	\$0.30	\$0.36	\$1.43	\$0.30
22/11/2010	\$0.62	\$0.96	\$0.63	\$0.40	\$0.25	\$1.43	\$0.44
26/11/2010	\$0.62	\$0.96	\$0.63	\$0.25	\$0.25	\$1.43	\$0.44
29/11/2010	\$0.62	\$0.96	\$0.80	\$0.33	\$0.42	\$1.43	\$0.44
3/12/2010	\$0.60	\$1.60	\$0.75	\$0.28	\$0.42	\$1.46	\$0.44
6/12/2010	\$0.60	\$1.84	\$0.75	\$0.28	\$0.25	\$1.33	\$0.34
10/12/2010	\$0.60	\$1.11	\$0.80	\$0.28	\$0.25	\$1.33	\$0.44
13/12/2010	\$0.60	\$1.66	\$0.80	\$0.40	\$0.39	\$1.33	\$0.44
17/12/2010	\$0.58	\$1.41	\$0.80	\$0.40	\$0.39	\$1.33	\$0.44
20/12/2010	\$0.68	\$1.47	\$0.80	\$0.28	\$0.33	\$1.16	\$0.44
<b>Average</b>	<b>\$0.61</b>	<b>\$1.17</b>	<b>\$0.69</b>	<b>\$0.33 (0.25–0.41)</b>	<b>\$0.35</b>	<b>\$1.39</b>	<b>\$0.42</b>
<b>(range)</b>	<b>(0.58–0.68)</b>	<b>(0.96–1.84)</b>	<b>(0.53–0.80)</b>		<b>(0.25–0.42)</b>	<b>(1.16–1.46)</b>	<b>(0.30–0.51)</b>

\*Cheapest out of homogenised, trim etc, but excluding flavoured milks. Brands of products and workings to calculate table are all available from authors on request.

**Discussion**—After 2 months of monitoring discounted alcohol data and comparing this to discounted non-alcoholic beverage data, we demonstrated consistently low prices for several alcohol beverage categories. At the lowest prices (e.g. 0.53 per standard drink for one RTD), some light weight adults could exceed the legal driving limit for blood alcohol after consuming just over a dollar’s worth of alcoholic beverage. We found a wider range of prices for cider, although there were fewer specials advertised for cider on the LIPS website than for RTDs. Throughout the time period of monitoring, the number of cider specials ranged from three to 26 per day, but the number of specials recorded for RTDs were in the hundreds on each day of monitoring.

We found that for cask wine, the discounting was not merely for one advertised product or brand but even the top five most discounted wines gave a similarly cheap price per standard drink. We also found that the difference between the cost per standard discounted (alcoholic) drink and the cost per glass of discounted non-alcoholic drink was relatively small. For example, on average the cost of a glass of cask wine was 61c, the cost of a glass of milk was 42c and the cost of a glass of sparkling grape juice was \$1.39. The comparison with grape juice is notable as it suggests that the current alcohol excise tax is nowhere near high enough to make the

wine substantially more expensive than this other product derived from the same source (and presumably grape juice costs less to process than wine does).

We know from the Law Commission's detailed report that alcohol is causing substantial harm to New Zealanders<sup>10</sup> and that this harm is often a burden to children, to other adults,<sup>12</sup> and to tax-payers in general. Given the data presented here in our study, it seems clear to us that consumers of alcohol should do more to pay their way (in terms of the true health and social costs of alcohol) and that alcohol prices need to therefore include a much higher excise tax component. A law against alcohol beverage discounts may also be a worthwhile part of the policy response.

If adequately informed of the problems associated with cheap alcohol, we believe it is likely that New Zealand society will favour higher alcohol taxes. Indeed, most drinkers themselves may favour such taxes if the tax revenue gained was directed toward increased health spending (e.g. improvements in emergency care in all of New Zealand's public hospitals). Such linkages have been shown to be relevant in determining the support for higher tobacco taxes by New Zealand smokers.<sup>13</sup>

Ongoing monitoring of alcohol prices by official agencies is also important, but collecting such additional data should not be used to delay action at a time when the public appetite for progress on alcohol control has reached new highs.

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**Competing interests:** While we do not consider it a "competing interest", we note that two of the authors (FI and NW) have performed work on alcohol issues for health sector agencies. However, this particular study had no funding. All the authors are regular/occasional alcohol consumers.

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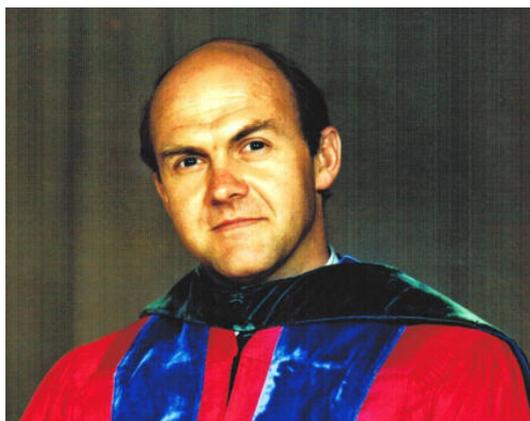
# THE NEW ZEALAND MEDICAL JOURNAL

Journal of the New Zealand Medical Association



## Wilhelm Frederick Lubbe

Wilhelm Lubbe was born in South Africa in 1938. Always a high achiever, he gained the Alec Brook Bequest Scholarship from Grey High School, Port Elizabeth, for his 6 years of medical study at the University of Cape Town. There he was always amongst the top students, gaining the Abe Bailey Travelling Fellowship, and the much coveted Frank Forman Prize in Medicine in his final year in 1962.



He represented his University as an accomplished athlete.

After internships in medicine and surgery at Groote Schuur Hospital, he left for the USA where he was resident in Internal Medicine at the Jewish Hospital, Cincinnati, Ohio in 1964, and then Hermann Blumgart Fellow in Cardiology at Beth Israel Hospital and Harvard Medical School, Boston, from 1965 to 1968.

In 1969 he returned to South Africa as a Registrar in Medicine and Cardiology, at Groote Schuur Hospital. That year he was awarded an MD degree for his thesis *Actions of thyroid hormone on the myocardium*. He gained his Fellowship of the College of Medicine of South Africa in 1971. He took over as Head of the Hypertension Clinic in 1971, and appointment as a Senior Lecturer and Consultant soon followed in 1972.

This was a heady time in Cardiology in Cape Town with much publicity from the pioneering work of the Cardiology and Cardiac Surgery teams in heart transplant and the speciality in general. It was about that time that Wilhelm started a most productive research association with Professor Lionel Opie, and by 1976 he was Associate Director of that world renowned Unit. He gained a Fellowship of the American College of Cardiology in 1978. By 1978 he had been promoted to Associate Professor and Principal Specialist.

However, these were stormy days in South Africa's history. Typical of Wilhelm, he and his family took a stand against the injustices of apartheid. This led to unpleasant and distracting interactions with the authorities and, like many up-and-coming young people, they decided to leave the country. Fortunately for us, Wilhelm and his former wife, Elizabeth, and their young family chose New Zealand.

Wilhelm came to Auckland in 1978. He was appointed as Associate Professor in Medicine in the Department of Medicine, and worked as a Consultant Physician at Greenlane Hospital. In 1987 he was appointed as the inaugural National Heart Foundation Chair in Cardiovascular Studies. He continued his clinical and research work at the Greenlane site, later transferring to Auckland Hospital.

Wilhelm had an outstanding research career and was internationally recognised for his work on hypertension, mechanisms of cardiac arrhythmogenesis and medical disorders of pregnancy. He was a superb general physician and cardiologist, much loved by his patients, and an inspiring and committed clinical teacher. Although demanding high standards from them, he was a great mentor and champion for his students and junior staff.

Wilhelm retired from his University position in 1995, but continued to work as a General Physician at Auckland Hospital. With his wife, Julie, he bought a small farm near Warkworth, and in 1999 he retired completely from clinical practice to take up farming, bringing to it the enthusiasm and passion that he did to all aspects of his life.

He loved the countryside, the animals and the creative outlet of carpentry and, eschewing the Internet and email, he found a deep contentment that had previously eluded him.

He died as he would have chosen; suddenly, hard at work on the farm on a beautiful morning, after an enjoyable evening spent with family and friends. He is survived by his three children, Andre, Tom and Catherine, and his wife, Julie.

Gil Barbazet (University of Otago) and Tim Cundy (University of Auckland) wrote this obituary.

# THE NEW ZEALAND MEDICAL JOURNAL

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## Reviewers for the New Zealand Medical Journal in 2010

The Editorial Board (F Frizelle, T Buckenham, R Mulder, R Beasley, J Connor, J Reid) and Editorial Team (F Frizelle, B Edwardes, S Bagley) thank all those who generously gave their time and expertise in reviewing papers for the *New Zealand Medical Journal* in 2010.

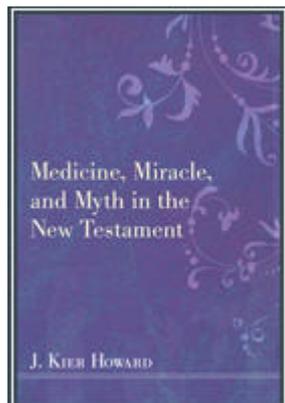
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## Medicine, Miracle, and Myth in the New Testament

J Keir Howard. [Wipf and Stock Publishers](#), 2010. ISBN-13: 9781608992447.  
Contains 132 pages. Price US\$12.80 (web price)

Dr J Keir Howard, a retired consultant physician and now an active Anglican priest in Wellington with doctorates in both disciplines, is truly a physician of both body and soul.



In *Medicine, Miracle, and Myth in the New Testament*, Howard gives a fresh understanding of the healing ministry of Jesus. Healing the cripple, giving sight to the blind, cleansing the leper, raising the dead: does our knowledge of medicine today help us understand these miracles?

Aided by his years as a missionary in Zambia, Howard gives thought-provoking interpretations of these miracles, suggesting that Jesus acted as a prophetic folk healer in the tradition of the Old Testament prophets such as Elijah and Elisha.

Howard, carefully dissecting the limited clinical information given in the Gospels and Acts, divides the New Testament miracles into three groups. The first and largest group includes those with illnesses that can be considered psychosomatic. Paralysis, for example, can be a manifestation of conversion disorders. The first words Jesus spoke to the paralyzed young man let down through the roof were, 'Son, thy sins be forgiven thee.' Having dealt with his underlying anxiety and feelings of guilt, the man regained the use of his limbs. The second group were those with genuine physical problems. Touching the blind man's eyes, Jesus used the long-established practice of manual couching to deal with over-ripe cataracts. The third group were people afflicted with 'leprosy', an ill-understood diverse group of skin disorders, whom Jesus declared to be ritually cleansed.

Amongst other subjects discussed, Howard gives fresh insights into the raising of the dead, the virginal conception of Jesus and His death on the cross, and Paul's thorn in the flesh.

This book will appeal to students of medicine and should be compulsory reading for ministers and preachers, for it provides an intelligent framework to interpret medical mysteries in the Gospels that cannot readily be found elsewhere.

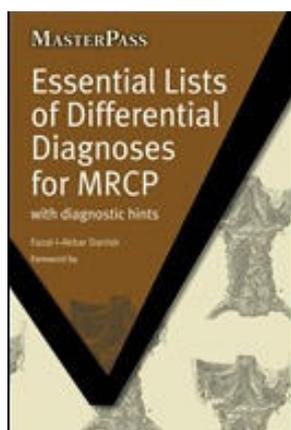
H Bramwell Cook  
Christchurch, New Zealand



## Essential Lists of Differential Diagnoses for MRCP with diagnostic hints

Fazal-I-Akbar Danish. [Radcliffe Publishing](#), 2010. ISBN-13: 9781846194214. Contains 272 pages. Price £24.99

The book is laid out by specialty—e.g. cardiology, rheumatology, psychiatry etc. There are additional chapters covering ENT, paediatrics and a chapter dedicated to the differential diagnosis of ECGs.



The preface of the book defines the intended audience as those sitting the MRCP (UK) (both Part I and Part II) and FCPS (Pakistan) (Part II) examinations. Indeed the author is a graduate from Army Medical College in Pakistan, but currently working in the UK. His four other contributors all currently practise medicine in Pakistan. Therein lies what is perhaps the key weakness of a book like this, namely the environment in which medicine is practised. Whilst some things remain the same, one can expect to see different presentations of familiar illnesses and entirely different disease states practising in Pakistan as compared to New Zealand.

There is a much greater infectious disease flavour to the differentials for example the first item on the list for “Diarrhoea alternating with constipation” is “Intestinal TB”, and the third “Chronic amoebic dysentery”. Even bulbar polio merits a mention as a differential for bulbar palsy.

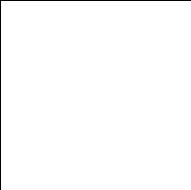
There are some good points to the book; the various lists can prompt consideration of a broader range of differentials for the challenging diagnostic dilemma and the ophthalmology chapter is particular useful for the various eye signs.

The index whilst a lengthy 11 pages, had me frustrated by the absence of hypocalcaemia, a topic eventually located in the nephrology chapter amongst the other electrolyte disturbances.

Overall whilst an impressive collection of lists and “differentials”, and with an admirable chapter on ECG differentials, this book is difficult to recommend to those in New Zealand who may be studying for examinations such as the FRACP. This is not only because of the different diagnoses to be seen in medical practise here but also because of the different focus of the FRACP vs MRCP examination. Instead local candidates would be better directed to a book such as *Examination Medicine: A Guide to Physician Training (6<sup>th</sup> Ed.)*—recently reviewed in this journal.<sup>1</sup>

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**Reference:**

1. Examination Medicine: a guide to physician training (6th edition; Nicholas J Talley, Simon O'Connor), reviewed by Christina McLachlan and Lutz Beckert. NZMJ 28 May 2010, Vol 123 No 1315. <http://www.nzmj.com/journal/123-1315/4145/content.pdf>