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Serum lipid levels for a multicultural population in Auckland, New Zealand: results from the Diabetes Heart and Health Survey (DHAH) 2002–2003
Dudley Gentles, Patricia Metcalf, Lorna Dyall, Robert Scragg, Gerhard Sundborn, David Schaaf, Peter N Black, Rodney T Jackson

This study of approximately 4000 middle-aged Auckland adults, found that over 90% of people had high cholesterol levels. The study included 1006 Māori and 996 Pacific people (mostly of Samoan, Tongan, Niuean, or Cook Islands origin) and the data was gathered in the years 2002–03. Being overweight or obese increased the risk of having a poor lipid profile, as did being a current cigarette smoker. The main difference between Māori and Pacific compared to New Zealand Europeans was that Māori and Pacific people tended to have low HDL cholesterol (good cholesterol) and high triglyceride levels (a bad cholesterol).

The public hand hygiene practices of New Zealanders: a national survey
Claire Garbutt, Greg Simmons, Daniel Patrick, Thomas Miller

Hand hygiene practices of subjects after they had used the toilet were observed (by same gender observers) in the washrooms of shopping malls in Auckland, Hamilton, Wellington and Christchurch. 1200 subjects were observed. A higher percentage of females (92.4%) washed their hands than males (81.0%)—86.7% overall. Soap was used by 71.6% but less frequently by males (66.2%) than females (76.5%). Nine out of ten (91.2%) who washed their hands, dried them. Males washed (median 8.0 seconds) and dried (median 7.0 seconds) their hands for a shorter time than females. The median duration of hand washing (8.6 seconds) and drying with paper towels (12.0 seconds) was well below current recommendations of 20 seconds for each method. New Zealanders appear to practise suboptimal hand hygiene in public washrooms. Future hand hygiene promotion should focus on males; on achieving adequate hand washing (using soap) and drying times; and on promoting sufficient drying times.

Anaerobic bacteraemia in patients admitted to Auckland City Hospital: its clinical significance
Sharmini Muttaiyah, Sue Paviour, Leanne Buckwell, Sally A Roberts

Anaerobic bacteria are a group of bacteria that grow best when deprived of oxygen; some types are associated with serious human diseases. This study was undertaken to determine the clinical significance and outcomes for patients who have positive blood cultures with anaerobic bacteria over a 2-year period. Anaerobic bacteria accounted for 2.3% of all positive blood cultures in our laboratory. For the patients in whom the anaerobic bacteria was thought to be associated with clinically significant infection,
the most likely source was intra-abdominal, followed by neutropaenic sepsis (infection due to low white cell count secondary to chemotherapy), skin and soft tissue, pelvic, and oropharyngeal infections. Five patients died but only one death was directly caused by anaerobic bacterial infection.

**Colchicine prescribing and safety monitoring in patients with gout**

Jason Ly, Peter Gow, Nicola Dalbeth

Gout is a major cause of arthritis in New Zealand. Colchicine is frequently used to treat and prevent gout attacks, but can cause serious side effects. For this reason, dosing and monitoring guidelines have been formulated. This study assessed current colchicine prescribing and safety monitoring in patients with gout at Counties Manukau District Health Board. Prescribing of colchicine and safety monitoring were in accordance with current guidelines. Patients with gout are at high risk for colchicine toxicity, and safety monitoring does allow for early detection of drug toxicity.

**A successful nurse-led model in the elective orthopaedic admissions process**

Jennifer M Truscott, Joanne M Townsend, Edwin P Arnold

On the date of admission for a person requiring an operation, a clinical evaluation is undertaken to ensure the patient is fit for the operation and the anaesthetic. This task has traditionally been performed by a house surgeon. The present study was a trial of a nurse-lead process at Burwood Hospital. The process was developed in consultation with the surgeons, anaesthetists, nurses, and house surgeons, as well as with the nurses in a private hospital. This study showed that the nurse-led admission process was safe and effective. It incorporates the nurses as a part of the team and frees the house surgeons to perform other tasks including improving their educational experience.

**Implementing the universal routine-offer antenatal HIV screening programme in New Zealand: results from the first year**

Jane Morgan, Graham Mills

Uptake of human immunodeficiency virus (HIV) testing amongst pregnant women undergoing antenatal blood testing has been very high (99.7%) during the first year of the programme in Waikato District Health Board. The identification of two HIV infected women during the first year, enabling appropriate care for them and their families and significantly reducing their prospects of mother-to-child HIV transmission, confirms the value of the programme. The wider roll-out of antenatal HIV testing must be an urgent priority.

**Viewpoint article**

**Trans fats in New Zealand: time for labelling regulations?**

Patrick Gladding, Jocelyne R Benatar

Trans fats (trans fatty acids) are synthetic fats that are added to foods to improve shelf life and alter texture. They substantially increase the risk of heart disease even when
consumed in small quantities over long periods of time. They are more harmful than saturated fats. Although the content of trans fats in New Zealand food has reduced over the last 10 years, the increase in consumption of pre-prepared baked goods and fast foods is a concern. The public should be able to make informed choices about their eating habits and trans fat content should be adequately labelled on food items.
The randomised controlled trial to meta-analysis ratio: original data versus systematic reviews in the medical literature

Mark J Bolland, Andrew Grey, Ian R Reid

The meta-analysis and the randomised controlled trial (RCT) are considered two of the strongest forms of evidence in clinical medicine. Recently, we have noticed an increase in the number of meta-analyses published in the major medical journals. We sought to determine whether there was any evidence to support this anecdotal observation and, if there was, whether there had been a concomitant change in the number of studies available for meta-analysis.

We searched MEDLINE for articles indexed as meta-analyses or RCTs published in each year between 1996 and 2005 using the PubMed search engine (limits: human, meta-analysis, or randomised controlled trial). In addition, we repeated the search for articles published in 1996, 2000, and 2005 in each of the five general medical journals with the highest impact factor in 2005 (New England Journal of Medicine [NEJM], The Lancet, Journal of the American Medical Association [JAMA], Annals of Internal Medicine, British Medical Journal [BMJ]).

We used linear and non-linear curve fitting procedures to assess changes in the number of published studies indexed as RCTs or meta-analyses over time using GraphPad Prism version 4.00 for Windows (GraphPad Software, San Diego, USA).

To determine the subject of the meta-analyses, we reviewed the abstracts of 30 randomly selected meta-analyses for each year and categorised each meta-analysis according to the type of study reviewed (RCT or other). Finally, for comparison, we searched the Cochrane Database of Systematic Reviews and the Cochrane Central Register of Controlled Trials for studies published in each year between 1996 and 2005 and repeated the analyses.

In 1996, 478 studies were indexed in MEDLINE as meta-analyses and 10,019 as RCTs. In 2005, 2041 studies were indexed in MEDLINE as meta-analyses and 15,068 as RCTs. Figure 1 shows that the increase in meta-analyses over those 10 years was exponential with a doubling time of 2.1 years, whereas the increase in RCTs was linear with a 6% increase per year. There has been a steady decrease in the ratio of studies indexed as RCTs to studies indexed as meta-analyses (RCT:MET) from 21 in 1996 to 7 in 2005 (Figure 1).

Table 1 shows that there is substantial variation in the RCT:MET ratio between the leading general medical journals and that there has been a steady decline in the RCT:MET ratio across these journals, from 8.5 in 1996 to 3.9 in 2005. While the number of RCTs published in these journals has remained stable, there has been a substantial increase in the number of meta-analyses published.
Figure 1. Change in numbers of meta-analyses and randomised controlled trials published over time

The left panel shows the percentage increase from baseline with line of best fit in the number of articles indexed in MEDLINE as meta-analyses or randomised controlled trials (RCT).

The right panel shows the decline in the RCT:MET ratio (the number of studies indexed as RCTs to the number of studies indexed as meta-analyses for each year).

Table 1. Changes in the RCT:MET ratio over time in the five general medical journals with the highest impact factor in 2005

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MET is the number of articles indexed in MEDLINE as meta-analyses in each year.
RCT is the number of articles indexed in MEDLINE as randomised controlled trials in each year.
RCT:MET is the ratio of the number of articles indexed as randomised controlled trials to the number of articles index as meta-analyses for each year.
Articles are the total number of articles indexed in MEDLINE for each journal for each year.

In 1996, RCTs were meta-analysed in 15 of the 30 randomly selected meta-analyses. Over the following 9 years, the proportion of RCTs meta-analysed remained similar in the randomly selected meta-analyses, and in 2005 was 19/30.

In the Cochrane Database of Systematic Reviews, the number of reviews increased linearly by 150% per year from 36 in 1996 to 499 in 2005. In contrast, in the Cochrane Central Register of Controlled Trials, 23,250 trials were registered in 1996, and the number of trials registered each year remained stable thereafter.

The increasing rate of publication of meta-analyses in MEDLINE is exponential and far outstrips the linear increase in the rate of publication in MEDLINE of RCTs, despite stability in the proportion of meta-analyses that are of RCTs.

Similarly, the number of systematic reviews in the Cochrane Database increased substantially, whereas the number of controlled trials did not increase. The differential rate of publication of meta-analyses and RCTs led to a steady decline in the RCT:MET ratio. This trend suggests that future meta-analyses of RCTs will necessarily analyse a smaller number of new studies. This in turn is likely to lead to meta-analyses that are duplicates, or minimal updates of previous analyses, a phenomenon that is already occurring.

For example, in 2002, two meta-analyses comparing thrombolytic therapy with heparin for pulmonary embolism were published contemporaneously. Subsequently, two further meta-analyses have been published on this topic, yet only one new RCT providing novel data was published after the initial meta-analyses.

We found marked variation in the RCT:MET ratio within the leading medical journals, but a consistent decrease in the RCT:MET ratio in these journals over the past 10 years due to the increasing number of meta-analyses published.

It is disturbing that meta-analyses that provide little or no additional knowledge might be displacing original RCTs from the premier journals. We are concerned that continuation of this trend will provide a disincentive to the performance of RCTs.

A limitation to these findings is our assumption that all articles indexed in MEDLINE as meta-analyses or RCTs are in fact meta-analyses or RCTs respectively.

Meta-analyses and RCTs have essential and complementary roles in the advancement of scientific knowledge and well-designed, well-performed studies of either type can have a substantial impact on medical practice. However, there are large differences in the resources required to perform these studies (such as patient access, ethical approval, and level of funding), and, in general, carrying out a RCT requires substantially more resources than a meta-analysis.

In conclusion, we believe the RCT:MET ratio provides important and useful information for readers and prospective authors, since some journals publish one meta-analysis for every 1–2 RCTs. Therefore, we suggest that medical journals publish the RCT:MET ratio for both submissions received and papers published and that editors and readers alike, reflect on what the optimal ratio is for these two important types of medical evidence.

Competing interests: Collectively we have an RCT:MET of 39 but have nothing else to declare.
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Management of unilateral vestibular schwannoma/acoustic neuroma

Philip A Bird, Martin R MacFarlane

Vestibular schwannomas (VS) or acoustic neuromas (AN) are benign slowly-growing tumours of the vestibular nerve in the internal auditory canal (IAC) and cerebellopontine angle (CPA). The tumours are usually unilateral but can be bilateral in neurofibromatosis type 2 (NF 2) which we will not specifically discuss. These tumours grow from a Schwann cell of one of the vestibular nerves (usually the superior) within the IAC and are correctly classified as a neurilemmoma or schwannoma of a vestibular nerve, although they are commonly called an acoustic neuroma.

The growth of these tumours in the IAC and out into the CPA means that the order of involvement or neural and intracranial structures (and therefore the clinical course) is reasonably predictable—viz: an initial period of silent growth → loss of function of the vestibular nerve of origin and then the associated ipsilateral vestibular nerve, with subtle affects on balance; compression of the ipsilateral cochlear nerve in the IAC → gradual hearing loss (sensorineural) and variable tinnitus; pressure on the trigeminal nerve → ipsilateral facial numbness (hypoesthesia and hypoalgesia); gradual pressure on the cerebellum and pons → increasing ataxia and ipsilateral cerebellar signs; significant pressure on and stretching of the facial nerve → progressive facial paresis/palsy; significant pressure on and stretching of the glossopharyngeal and vagal nerves → hoarse voice and progressive difficulties with swallowing → aspiration; obstruction to CSF outflow from the 4th ventricle → hydrocephalus, and finally coma and death from a combination of aspiration pneumonia and raised intracranial pressure with coning.

Of course the goal in managing these tumours is to prevent this outcome whilst maintaining quality of life and function of neural structures, especially the nearby cranial nerves.

With increasing awareness of the possibility of unilateral ear symptoms being caused by these tumours, and with the increased availability and accuracy of MRI scanning, more smaller tumours are being diagnosed. Even so, people with unilateral ear symptoms have a <2% chance of actually having a tumour. There is almost certainly an apparent (rather than real) increase in the incidence of vestibular schwannoma from approximately one in 100,000 to one in 50,000.1–3 Prior to (and even with) MRI scanning it is likely that many people died/may die with their VS, rather than because of it.

The increase in diagnosed small and medium-sized VS and a better understanding of their natural history has influenced management over the last decade. Management may entail either observation with serial MRI scanning, focused/stereotactic radiotherapy (SR) using X-rays (linear accelerator) or gamma rays (Gamma knife, GN), or surgery incorporating microsurgical techniques. The particular management
modality/treatment selected will depend on the size of the tumour, the age and general health of the patient (and therefore an estimate of their longevity and the risks of surgery), the patient’s hearing, other neurological signs, and patient preference. For the purposes of this discussion we will divide the cases according to the size of the largest intracranial (CPA) diameter: small tumours <10mm, medium tumours 10–25mm, and large tumours >25mm.

Small tumours should usually be observed initially, as approximately 80% of these will demonstrate little or no growth over the medium term. Surgical removal when tumours are small (rather than when they are larger) does give the best chance of hearing preservation and excellent facial nerve results, but even the most experienced surgical teams are only able to preserve hearing to preoperative levels in about 60% of cases.

Overall hearing handicap is more strongly related to hearing in the better ear (which is usually very good in these patients) and therefore hearing needs are probably best met by not operating. SR/GN treatment of small tumours carries a very low morbidity and yields excellent results in terms of preventing tumour enlargement, but given the natural history of these tumours almost certainly represents over-treatment in the majority of cases. This treatment does also have an associated morbidity with regard to later deterioration in hearing and facial nerve function.

Medium-sized tumours usually warrant some form of active management in all but the elderly and infirm. A decision between surgery and SR/GN depends on patient age, general health and patient preference. Some patients prefer to have the tumour removed and thus avoid the ongoing monitoring (clinical and MRI) which is necessary after SR/GN.

Others prefer avoiding surgery and are content with ongoing surveillance. SR/GN has an advantage in that it is administered on an outpatient basis and may involve a single treatment or several (fractionated) treatments. In the short-term, this may be a more attractive option than a 4–6 hour operative procedure, a week long stay in hospital and 4–8 weeks off work.

SR/GN fails to halt tumour growth in about 5% of cases over the medium term; it is as yet unknown what the long term (>20 years) results are and there is a very small chance of malignant transformation after SR, but to put this risk in context, it is probably similar to the risk of peri-operative death in a medium-sized tumour.

If surgery is required for SR/GN failures, it is more difficult with worse facial nerve outcomes. If conservative management is undertaken it is important to understand that postoperative functional facial nerve results start to deteriorate when the tumour gets larger than 25mm.

Large tumours should usually be managed surgically to prevent the inevitable compression effects on the cerebellum, brainstem, and lower cranial nerves. SR/GN to lesions >30mm carries the risk of neurological deterioration over the first few months due to associated oedema.

Surgery is generally performed by two surgeons, one an otolaryngologist trained in skull base surgery and the other a neurosurgeon also experienced in such surgery. The operative approach can be translabyrinthine (an incision behind the ear and drilling through the temporal bone with loss of any residual hearing), posterior...
fossa/retrosigmoid (an incision a little more posterior behind the ear with the chance of preserving hearing), or by a superior approach (via a small craniotomy through the squamous temporal bone above the ear, also with a chance of preserving hearing).

In the elderly or infirm, elective partial/subtotal removal of tumour rather than complete removal may be indicated, such surgery removing the tumour compressing the brainstem, cerebellum, and lower cranial nerves, but leaving tumour in the internal auditory canal and attached to the facial nerve thus preserving facial nerve function.

In younger patients, complete removal or near complete tumour removal is generally indicated, although if the tumour is particularly adherent to the facial nerve the surgeons may well elect to leave such a small tumour fragment adherent to the nerve rather than risk irreparably damaging or dividing the facial nerve.

Currently in New Zealand SR via a linear accelerator is provided by the Stereotactic Radiosurgery Unit at Dunedin Hospital while Surgery is undertaken in Auckland, Wellington, and Christchurch. An important feature in the assessment and best practice management of patients with VS is that it be undertaken by a team involving both neurosurgeon and otolaryngologist both trained and proficient in the surgical techniques necessary in operating on these tumours.

There has been some publicity in the media over the last few years regarding overseas treatment of these lesions with gamma rays (“Gamma Knife”/GN) but current evidence has not shown this modality to be any more effective than SR using X-rays provided by a linear accelerator (as used in Dunedin).

We do not believe there is significant benefit in New Zealanders seeking overseas treatment, either surgical or SR/GN, for these tumours. In addition to this, there is of course much information on the Internet. Unfortunately, and as all doctors are aware, a lot of the information also relates heavily to advertising and thus the Internet can be an extremely confusing source of information for patients.

Decisions about management of these uncommon benign tumours should be undertaken in centres where they are actively managed. We always endeavour to give patients a full and complete range of information about their tumour including the natural history, expected progression and neurological sequelae and the range of treatment options—i.e. observation/serial imaging, stereotactic radiotherapy and surgery, and this includes information based on our own personal results.

In summary, the treatment of unilateral vestibular schwannoma involves either observation, stereotactic radiotherapy, or surgery. With the larger number of smaller tumours being increasingly diagnosed, more observation is now undertaken.

There is a role for stereotactic radiotherapy, which appears to be effective in the short and medium term, however there are still some unanswered questions about long-term results. For medium-sized tumours in younger people and for large tumours, surgery remains the mainstay of treatment.

Although quite a large number of people with unilateral ear symptoms may be screened to exclude this benign tumour, the majority of scans in these people will be normal.

**Competing interests:** None.
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References:

Serum lipid levels for a multicultural population in Auckland, New Zealand: results from the Diabetes Heart and Health Survey (DHAH) 2002–2003

Dudley Gentles, Patricia Metcalf, Lorna Dyall, Robert Scragg, Gerhard Sundborn, David Schaaf, Peter N Black, Rodney T Jackson

Abstract

Aims To describe mean serum lipid concentrations for Māori, Pacific people (mostly of Samoan, Tongan, Niuean, or Cook Islands origin), and Others (mostly New Zealand-born Europeans), and to identify risk factors for an adverse lipid profile.

Methods A cross-sectional survey of adults aged between 35–74 years within the Auckland area. There were 1006 Māori, 996 Pacific people, and 2021 ‘Others’ Fasting blood samples were collected from participants, and total cholesterol, high-density lipoproteins (HDL), low-density lipoproteins (LDL), and triglycerides were measured.

Results Māori and Pacific people had similar mean serum total and LDL cholesterol levels but lower HDL levels and higher total to HDL cholesterol ratios compared to Others (adjusted for age and gender). Māori also had higher triglycerides than Others. High BMI and cigarette smoking were positively associated with unfavourable lipid profiles, while current alcohol drinking and vigorous leisure time activity were associated with increased HDL cholesterol and lower total to HDL cholesterol ratios. Over 90% of all ethnic groups had total cholesterol levels above currently accepted optimal levels (>4 mmol/L) and two-thirds were above 5 mmol/L. While 30% of Others had a total to HDL cholesterol ratio above the ‘optimal’ threshold of 4.5, 40% of Māori and 44% of pacific people were above this level.

Conclusions This is the first study to simultaneously assess lipid levels in Māori, Pacific people, and Others in one population-based study. Despite similar total and LDL cholesterol levels in all ethnic groups; overweight, obesity, and current cigarette smoking were the main risk factors for their adverse lipid profiles. Engaging in leisure-time activity and alcohol consumption (and not surprisingly lipid-lowering drugs) were associated with better lipid profiles. We confirm that the main lipid-related cardiovascular disease risk in Māori and Pacific people is due to their low HDL and high triglyceride levels.

Serum lipids are important risk factors for cardiovascular disease (including death from heart attack or stroke).1–3 Favourable trends in blood cholesterol have been estimated to account for approximately 12% of the fall of coronary heart disease mortality in Auckland between 1982 and 1993—second only to smoking (30%) for risk factor reductions.4

Previously published data from the Auckland Diabetes, Heart and Health Survey showed that total cholesterol levels have declined in European New Zealanders and HDL increased from the years 1982 to 2002–03; both favourable trends.5,6
No previous Auckland Heart Risk factor surveys have measured risk factors in Māori and Pacific people. Worldwide, total cholesterol levels have been declining. Meta-analyses indicate that a reduction of 0.6 mmol/L in total serum cholesterol results in about a 27% lowering of death from coronary heart disease and for every 1.0 mmol/L reduction in LDL cholesterol there is about a 20% reduction in risk of heart attacks and strokes over 5 years. Either increasing HDL or lowering LDL cholesterol is associated with a reduction in heart disease risk. This dual effect can be captured by using the ratio of total cholesterol to HDL cholesterol. The total to HDL cholesterol ratio is seen to be a better indicator of cardiovascular events than using the individual lipids separately. Elevated triglyceride levels have also been confirmed as an independent risk factor for cardiovascular disease in recent meta-analyses.

A workforce-based study has shown different lipid profiles in Māori, Pacific people (mostly of Samoan, Tongan, Niuean, or Cook Islands origin; hereafter termed ‘Pacific’), and Others (mostly New Zealand-born Europeans). However, no single population study has examined lipids by ethnic group.

The aim of this paper was to describe the plasma lipid levels and prevalences of dyslipidaemia by ethnicity in a population-based study, and to investigate the contributory risk factors that might influence ethnic differences in these levels.

Methods

The Diabetes, Heart and Health Survey 2002/2003 was conducted in the Auckland area and was a cross-sectional survey, the fourth one in a series measuring cardiovascular risk factors of Aucklanders aged between 35 and 74 years. The previous surveys were carried out in 1982, 1986-88, and 1993-94.

The Māori sample was reasonably large (N=1006) as was the Pacific (N=996) enabling adequate power for statistical analyses. Ethnicity was self-reported. The Other participants (N=2021) comprised mainly of Europeans (1742) and Asians (279). The health profile of the Asian participants have been described elsewhere. Two sampling frames were used (sometimes called a dual frame survey), one being the Auckland region with cluster start points allocated by Statistics New Zealand, and the other was the Auckland Electoral Roll. Each participant was randomly selected either through age and ethnicity strata via the electoral roll (response rate 65%) or by their residence being randomly selected via a cluster area method (response rate 61.3%).

Participants were invited to come to a local centre to be interviewed and to fill out a general questionnaire which included questions on age, sex, ethnicity, alcohol drinking habits, cigarette smoking, and health matters including past history of medical conditions and current medications. Weight and height were measured to the nearest 0.1 kg and 0.5 cm, respectively.

Body mass index (BMI) kg/m² was calculated as weight (kg) divided by the square of height (m). Ethnic-specific BMI thresholds were used to define overweight and obesity. Overweight was defined as BMI ≥25 for Others and BMI ≥26 for Māori or Pacific. Obese was defined as BMI ≥30 for Others and BMI ≥32 for Māori or Pacific.

Fasting blood samples were also taken to measure cholesterol and triglyceride levels by enzymatic methods. LDL cholesterol was estimated by the Friedewald formula:

$$LDL = \frac{total - HDL - \text{triglyceride}}{2.2}$$

which is valid for triglyceride levels less than 4.5 mmol/L.
The hyperlipidaemia lipid thresholds were:

- High cholesterol $\geq 4.0$ mmol/L
- Low HDL $< 1.0$ mmol/L
- High LDL $\geq 2.5$ mmol/L
- High triglycerides $\geq 1.70$ mmol/L
- High cholesterol to HDL ratio $\geq 4.5$

For comparison, we also included the older National Heart Foundation thresholds$^{23}$ and added where applicable the 2001 ATPIII metabolic syndrome cut-offs.$^{24}$

For the alcohol-drinking variable, three dummy variables were created (the reference was “lifetime non-drinker”):

- Current drinker—defined as a person who drank at least once a month or occasionally,
- Ex-drinker—a person who used to drink at least once a month, and
- Occasional drinker—a person who drank less than once a month.

For cigarette smoking status, two dummy variables were created (the reference was “never smoker”):

- Current cigarette smoker”, and
- Ex-smoker.

Leisure-time activity, was defined as vigorous if it made a participant breathe hard or sweat, or moderate if it did not make one breathe hard or sweat. The leisure-time activity had to be done at least weekly within the past 3 months. The reference category was no leisure activity.

Statistical analyses was carried out using SAS (version 9.1) version. The significance level was set at 5%. SAS survey procedures were used to take into account the sampling design. Mean lipid levels were calculated using multiple linear regression with the PROC SURVEYREG statement. We also included a gender*age interaction term when it was statistically significant.

**Results**

The proportions of participants on lipid-lowering medication were: Māori 4.8% (SE=0.59%; 95%CI: 3.73%–6.07%), Pacific 5.0% (SE=0.92%; 95%CI: 3.44%–7.11%) and Others 6.0% (SE=0.50%; 95%CI: 4.99%–6.62%). There were no significant ethnic differences in the use of lipid-lowering medication (Rao-Scott $\chi^2=1.2471$; p=0.29).

Mean concentrations for total cholesterol (Table 1), LDL (Table 2), HDL (Table 3), triglycerides (Table 4), and Total to HDL ratio (Table 5) adjusted for age and/or gender are shown.

Total cholesterol concentrations and LDL cholesterol (age and gender adjusted) did not differ significantly between ethnic groups, Māori and Pacific had significantly lower HDL, higher triglyceride concentrations and higher total to HDL cholesterol ratios compared to Others.

Table 6 shows ethnic-specific prevalence of dyslipidaemia. Both Māori and Pacific had significantly higher prevalence of low HDL and high total cholesterol to HDL ratio compared to Others. Also, Māori had a significantly higher prevalence of high triglycerides than Others and Pacific.

Table 7 shows five multiple linear regressions with the different lipids as the response variable and lifestyle variables (i.e. BMI, cigarette smoking, alcohol drinking, leisure activity) as the independent ones. Lipid-lowering drug use was also included as a covariate, to account for people on medications.
For total cholesterol (adjusted for all the model variables), Māori were on average 0.14 mmol/L lower than Others, while Pacific people were 0.19 mmol/L lower than Others. Men were 0.09 mmol/L higher than women.

Total cholesterol increased with age from 35–44 year group to the 55–64 year group but then declined in the older 65–74 year group. There was a steady increase in total cholesterol with increasing body size. Overweight and obese participants had significantly higher total cholesterol than participants with normal BMI. Current cigarette smokers had significantly higher average total cholesterol than never-smokers.

**LDL cholesterol**—Māori had on average 0.12 mmol/L significantly lower LDL cholesterol than Others. Men were 0.19 mmol/L higher than women. LDL increased from age group 35–44 years to the 55–64 year group and then declined in the 65–74 age group—a similar pattern to total cholesterol.

Overweight and obese participants had significantly higher LDL than those with normal BMI—with obese having higher LDL than overweight. Those engaging in vigorous leisure activity had significantly lower LDL than those who did no leisure activity.

**HDL cholesterol**—Māori had significantly lower HDL than Others. Also, men had significantly lower HDL than women. HDL increased with increasing age. HDL showed an inverse association with increasing BMI.

Current cigarette smokers had significantly lower HDL than never-smokers, however ex-smokers had significantly higher HDL than never-smokers. Current alcohol drinkers had significantly higher HDL than lifetime non-drinkers.

Those who engaged in vigorous leisure activity had significantly higher HDL than those who did not do any leisure activity whether vigorous or moderate.

**Triglycerides**—Māori had significantly higher triglyceride levels and Pacific people significantly lower levels compared to Others (Table 7). Men had significantly higher triglyceride levels than women. Triglycerides increased with age and BMI. However, current alcohol drinkers and those engaged in vigorous leisure activity had lower average triglyceride levels than lifetime non-drinkers and those who did no leisure activity respectively. Those on lipid-lowering medication had significantly higher triglyceride levels than those without such medication.

**TC:HDL ratio**—Men had significantly higher total cholesterol to HDL ratio than women. The ratio increased with increasing BMI. Also, current cigarette smokers had a significantly higher ratio than never-smokers.

On the other hand, current alcohol drinkers had significantly lower total cholesterol to HDL ratio to lifetime non-drinkers, as did those engaging in any leisure time activity whether vigorous or moderate compared to those who did no such activity.

Not surprisingly, those on lipid-lowering medication had significantly lower total cholesterol to HDL ratio compared to those not on the medication.
Table 1. Total cholesterol (mmol/L): mean and 95% confidence intervals by age, gender, and ethnicity

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Others</th>
<th>Māori</th>
<th>Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Both Genders</td>
</tr>
<tr>
<td>35–44</td>
<td>5.60</td>
<td>4.95</td>
<td>5.27</td>
</tr>
<tr>
<td>45–54</td>
<td>5.63</td>
<td>5.49</td>
<td>5.56</td>
</tr>
<tr>
<td>55–64</td>
<td>5.66</td>
<td>5.94</td>
<td>5.80</td>
</tr>
<tr>
<td></td>
<td>(5.53–5.80)</td>
<td>(5.82–6.06)</td>
<td>(5.72–5.90)</td>
</tr>
<tr>
<td>65–74</td>
<td>5.35</td>
<td>5.91</td>
<td>5.63</td>
</tr>
<tr>
<td></td>
<td>(5.20–5.49)</td>
<td>(5.77–6.05)</td>
<td>(5.53–5.74)</td>
</tr>
<tr>
<td>All</td>
<td>5.57</td>
<td>5.59</td>
<td>5.52</td>
</tr>
</tbody>
</table>

Table 2. LDL cholesterol concentration (mmol/L): mean and 95% confidence intervals by age, gender, and ethnicity

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Others</th>
<th>Māori</th>
<th>Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Both Genders</td>
</tr>
<tr>
<td>35–44</td>
<td>3.54</td>
<td>2.96</td>
<td>3.24</td>
</tr>
<tr>
<td>45–54</td>
<td>3.62</td>
<td>3.34</td>
<td>3.48</td>
</tr>
<tr>
<td>55–64</td>
<td>3.55</td>
<td>3.67</td>
<td>3.61</td>
</tr>
<tr>
<td>65–74</td>
<td>3.28</td>
<td>3.57</td>
<td>3.43</td>
</tr>
<tr>
<td>All</td>
<td>3.53</td>
<td>3.31</td>
<td>3.42</td>
</tr>
</tbody>
</table>
### Table 3. HDL cholesterol (mmol/L): mean and 95% confidence intervals by age, gender, and ethnicity

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Others</th>
<th>Māori</th>
<th>Pacific</th>
<th>Both Genders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>N=440</td>
<td>Women</td>
</tr>
<tr>
<td>35–44</td>
<td>1.28</td>
<td>1.52</td>
<td>1.00</td>
<td>1.22</td>
</tr>
<tr>
<td></td>
<td>(1.24–1.32)</td>
<td>(1.48–1.57)</td>
<td>(1.37–1.44)</td>
<td>(1.15–1.29)</td>
</tr>
<tr>
<td>45–54</td>
<td>1.27</td>
<td>1.59</td>
<td>1.43</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>(1.23–1.31)</td>
<td>(1.54–1.64)</td>
<td>(1.40–1.47)</td>
<td>(1.13–1.27)</td>
</tr>
<tr>
<td>55–64</td>
<td>1.35</td>
<td>1.67</td>
<td>1.51</td>
<td>1.27</td>
</tr>
<tr>
<td></td>
<td>(1.30–1.40)</td>
<td>(1.61–1.72)</td>
<td>(1.48–1.55)</td>
<td>(1.23–1.31)</td>
</tr>
<tr>
<td>65–74</td>
<td>1.39</td>
<td>1.66</td>
<td>1.53</td>
<td>1.33</td>
</tr>
<tr>
<td></td>
<td>(1.33–1.44)</td>
<td>(1.60–1.72)</td>
<td>(1.49–1.57)</td>
<td>(1.26–1.39)</td>
</tr>
<tr>
<td>All</td>
<td>1.31</td>
<td>1.59</td>
<td>1.45</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>(1.29–1.33)</td>
<td>(1.57–1.62)</td>
<td>(1.44–1.47)</td>
<td>(1.20–1.28)</td>
</tr>
</tbody>
</table>

**p<0.01; ***p<0.001.

### Table 4. Triglyceride concentration (mmol/L): mean and 95% confidence intervals by age, gender, and ethnicity. Data were transformed by log (value + 1) and then back transformed to obtain mean values and 95% confidence intervals

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Others</th>
<th>Māori</th>
<th>Pacific</th>
<th>Both Genders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>N=440</td>
<td>Women</td>
</tr>
<tr>
<td>35–44</td>
<td>1.59</td>
<td>0.94</td>
<td>1.24</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
<td>(1.45–1.75)</td>
<td>(0.88–1.00)</td>
<td>(1.16–1.31)</td>
<td>(1.39–1.86)</td>
</tr>
<tr>
<td>45–54</td>
<td>1.50</td>
<td>1.15</td>
<td>1.31</td>
<td>2.05</td>
</tr>
<tr>
<td></td>
<td>(1.39–1.60)</td>
<td>(1.08–1.22)</td>
<td>(1.25–1.37)</td>
<td>(1.74–2.40)</td>
</tr>
<tr>
<td>55–64</td>
<td>1.53</td>
<td>1.27</td>
<td>1.39</td>
<td>1.58</td>
</tr>
<tr>
<td></td>
<td>(1.42–1.65)</td>
<td>(1.19–1.35)</td>
<td>(1.32–1.46)</td>
<td>(1.42–1.74)</td>
</tr>
<tr>
<td>65–74</td>
<td>1.39</td>
<td>1.40</td>
<td>1.40</td>
<td>1.35</td>
</tr>
<tr>
<td></td>
<td>(1.28–1.50)</td>
<td>(1.32–1.49)</td>
<td>(1.33–1.46)</td>
<td>(1.22–1.48)</td>
</tr>
<tr>
<td>All</td>
<td>1.52</td>
<td>1.13</td>
<td>1.31</td>
<td>1.69</td>
</tr>
<tr>
<td></td>
<td>(1.46–1.59)</td>
<td>(1.09–1.17)</td>
<td>(1.28–1.35)</td>
<td>(1.55–1.84)</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001.
Table 5. Total to HDL cholesterol ratios: means and 95% confidence intervals by age, gender, and ethnicity

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Others</th>
<th>Māori</th>
<th>Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Both Genders</td>
</tr>
<tr>
<td>45–54</td>
<td>4.62 (4.47–4.78)</td>
<td>3.64 (3.51–3.76)</td>
<td>4.12 (4.02–4.22)</td>
</tr>
<tr>
<td>65–74</td>
<td>4.07 (3.90–4.23)</td>
<td>3.77 (3.62–3.92)</td>
<td>3.91 (3.80–4.03)</td>
</tr>
<tr>
<td>All</td>
<td>4.50 (4.41–4.59)</td>
<td>3.60 (3.53–3.67)</td>
<td>4.04 (3.98–4.10)</td>
</tr>
</tbody>
</table>

***p<0.001.
Table 6. Ethnic-specific age and gender-adjusted prevalence of abnormal lipids for adults aged 35–74: comparisons between Māori or Pacific versus Others

<table>
<thead>
<tr>
<th>Abnormal lipids</th>
<th>Others</th>
<th>Māori</th>
<th>Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High cholesterol</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥4.0 mmol/L†</td>
<td>94.8%</td>
<td>94.1%</td>
<td>92.5%</td>
</tr>
<tr>
<td>≥5.0 mmol/L</td>
<td>67.8%</td>
<td>64.5%</td>
<td>63.4%</td>
</tr>
<tr>
<td><strong>Low HDL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1.0 mmol/L †</td>
<td>9.4%</td>
<td>16.8%</td>
<td>20.9%</td>
</tr>
<tr>
<td>men &lt;1.04 mmol/L or women&lt;1.29 mmol/L‡</td>
<td>22.1%</td>
<td>33.4%</td>
<td>36.2%</td>
</tr>
<tr>
<td><strong>High LDL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 2.5 mmol/L†</td>
<td>84.8%</td>
<td>82.1%</td>
<td>85.8%</td>
</tr>
<tr>
<td>≥ 3.0 mmol/L</td>
<td>66.3%</td>
<td>62.5%</td>
<td>67.8%</td>
</tr>
<tr>
<td><strong>High triglycerides</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 1.70 mmol/L†</td>
<td>26.2%</td>
<td>37.7%</td>
<td>30.5%</td>
</tr>
<tr>
<td>&gt; 2.0 mmol/L</td>
<td>17.3%</td>
<td>27.4%</td>
<td>20.5%</td>
</tr>
<tr>
<td><strong>High cholesterol to HDL ratio</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 4.5†</td>
<td>30.1%</td>
<td>40.1%</td>
<td>44.0%</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001; †From 2003 New Zealand Guideline Group guidelines; ‡From definition of metabolic syndrome in the 2001 ATPIII definition.

Table 7. Associations between lipid measures and other variables: multiple linear regression

<table>
<thead>
<tr>
<th>Lipid measures</th>
<th>Total cholesterol (mmol/L)</th>
<th>LDL (mmol/L)</th>
<th>HDL (mmol/L)</th>
<th>Triglycerides† (mmol/L)</th>
<th>TC:HDL ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.05***</td>
<td>3.02***</td>
<td>1.52***</td>
<td>1.00***</td>
<td>3.49***</td>
</tr>
<tr>
<td>Others=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Māori</td>
<td>-0.14*</td>
<td>-0.12*</td>
<td>-0.07***</td>
<td>0.04*</td>
<td>0.07</td>
</tr>
<tr>
<td>Pacific</td>
<td>-0.19**</td>
<td>-0.06</td>
<td>-0.01</td>
<td>-0.09***</td>
<td>-0.11</td>
</tr>
<tr>
<td>Female=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.09*</td>
<td>0.19***</td>
<td>-0.27***</td>
<td>0.16***</td>
<td>0.83***</td>
</tr>
<tr>
<td>35-44 years=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-54 years</td>
<td>0.27***</td>
<td>0.22***</td>
<td>0.04*</td>
<td>0.03</td>
<td>0.10</td>
</tr>
<tr>
<td>55-64 years</td>
<td>0.51***</td>
<td>0.34***</td>
<td>0.13***</td>
<td>0.05**</td>
<td>0.01</td>
</tr>
<tr>
<td>65-74 years</td>
<td>0.41***</td>
<td>0.25***</td>
<td>0.14***</td>
<td>0.05*</td>
<td>-0.08</td>
</tr>
<tr>
<td>Normal=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>0.26***</td>
<td>0.30***</td>
<td>-0.19***</td>
<td>0.16***</td>
<td>0.68***</td>
</tr>
<tr>
<td>Obese</td>
<td>0.33***</td>
<td>0.36***</td>
<td>-0.32***</td>
<td>0.28***</td>
<td>1.10***</td>
</tr>
<tr>
<td>Never-Smoker=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current cigarette smoker</td>
<td>0.15*</td>
<td>0.11</td>
<td>-0.05**</td>
<td>0.10***</td>
<td>0.32***</td>
</tr>
<tr>
<td>Ex-cigarette smoker</td>
<td>0.05</td>
<td>-0.02</td>
<td>0.05**</td>
<td>0.01</td>
<td>-0.05</td>
</tr>
<tr>
<td>Lifetime non-drinker=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current alcohol drinker</td>
<td>0.07</td>
<td>0.02</td>
<td>0.14***</td>
<td>-0.07**</td>
<td>-0.32***</td>
</tr>
<tr>
<td>Ex-alcohol drinker</td>
<td>-0.07</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.04</td>
<td>-0.07</td>
</tr>
<tr>
<td>No leisure activity=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate leisure activity</td>
<td>-0.07</td>
<td>-0.03</td>
<td>0.02</td>
<td>-0.03</td>
<td>-0.12*</td>
</tr>
<tr>
<td>Vigorous leisure activity</td>
<td>-0.09</td>
<td>-0.11*</td>
<td>0.09***</td>
<td>-0.06**</td>
<td>-0.31***</td>
</tr>
<tr>
<td>No medication=ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lipid lowering medication</td>
<td>-0.66***</td>
<td>-0.75***</td>
<td>-0.02</td>
<td>0.09**</td>
<td>-0.43***</td>
</tr>
<tr>
<td>R²</td>
<td>8%</td>
<td>9%</td>
<td>29%</td>
<td>17%</td>
<td>27%</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001; TC=total cholesterol; ref=reference; R²=coefficient of determination; † triglycerides were transformed using the (log + 1) transformation and then back-transformed to obtain the coefficients.
Discussion

There are two main findings reported in this study. First, only 5–6% of New Zealand adults, in all major ethnic groups, have blood cholesterol levels below the current internationally accepted optimal level of 4 mmol/L. Second, Māori and Pacific people have lower HDL cholesterol levels, higher triglyceride levels, and less favourable total to HDL cholesterol ratios compared with Other New Zealanders. These less favourable lipid profiles were most consistently associated with overweight, obesity, cigarette smoking, and lack of vigorous leisure-time physical activity.

The key strength of the study was its large number of Māori and Pacific participants. Previous research into blood lipid level differences among Māori and Pacific people had sampled participants only from the workforce thereby potentially introducing a healthy worker effect. However, the present study was population-based.

A limitation of the present study was its relatively low response rate compared to previous studies. However, it has been shown in the Atherosclerosis Risk in Communities Study that differences between respondents and non-respondents tended to exaggerate real differences between respondents and the eligible population sampled. Therefore despite response rates of around 60–65%, our prevalence estimates are likely to be reasonably close to total population prevalence levels.

Our survey did not include a question on a person’s family history of high cholesterol (which could be used a proxy for a genetic predisposition to hyperlipidaemia), therefore we could not adjust for this in our regression models. However, it is doubtful that respondents would have been able to answer such a question accurately. One technical limitation of the study was that LDL cholesterol levels were estimated (from the Friedewald formula,) rather than by direct measurement, but this is the standard approach used in clinical practice.

In addition, as this study was cross-sectional, any associations observed between variables cannot be considered to be causal.

Prevalence of hypercholesterolemia—Approximately 94% of participants had a total cholesterol above 4.0 mmol/L, which is considered to be the optimal cholesterol goal by the National Heart Foundation and similar international organisations. There was no significant difference between the Māori and Pacific prevalence with Others (Table 6). Therefore nearly all adults aged 35-74 years have high cholesterol by this definition.

Total and LDL cholesterol—Māori and Pacific people had slightly lower mean total cholesterol and LDL cholesterol level compared to others in most age and gender categories. This is consistent with the 1992–3 Fletcher Challenge Study, but not with the 1997 National Nutrition Survey—which found that Māori had significantly higher total cholesterol than New Zealand Europeans. Being overweight or obese was positively associated with total and LDL cholesterol, while not surprisingly people on lipid-lowering drugs had lower levels.

HDL cholesterol—Māori and Pacific people had significantly lower mean HDL cholesterol levels than Others. This has been previously described by Scragg and colleagues in the workforce studies. In addition, men had significantly lower HDL levels than women, which is consistent with previous New Zealand studies.
As demonstrated in the multivariate model (Table 7) being overweight or obese was significantly inversely associated with HDL level. Current cigarette smokers had lower average HDL than never-smokers, while ex-smokers had higher average HDL than never-smokers, which has been reported elsewhere.\textsuperscript{30}

Current alcohol drinkers had significantly higher HDL than non-drinkers (Table 6), consistent with a previous study that showed that alcohol consumption is known to increase HDL.\textsuperscript{31} Similarly, those who engaged in regular vigorous leisure activity had higher average HDL than those who didn’t. This also agrees with previous studies that have shown that exercise increases HDL.\textsuperscript{32}

**Triglycerides**—Both Māori and Pacific people had significantly higher average triglyceride levels than Others. After adjustment (Table 7), most of the associations were similar to those for HDL cholesterol albeit in the opposite directions. The inverse associations between HDL cholesterol and triglycerides are well known.\textsuperscript{33}

Overweight or obese participants had significantly higher triglycerides than those of normal BMI. Current cigarette smokers had higher triglycerides than never-smokers, which was consistent with previous research.\textsuperscript{15,34} Current alcohol drinkers had lower average triglycerides than non-drinkers—this contrasts with previous research which showed that heavy alcohol drinkers had higher triglycerides.\textsuperscript{15,31}

**Total to HDL cholesterol ratio**—The lower HDL levels in Māori and Pacific people accounted for their higher total to HDL cholesterol ratios compared with others, as all ethnic groups had similar total cholesterol levels.

**Conclusions**

This study highlights the importance of lipid-related risk factors as a focus for further coronary heart disease prevention activities targeted to all New Zealanders. With well over 90\% of the adult population having a total cholesterol level above optimal levels, there is clearly a need to further reduce saturated fat consumption, the main determinant of population levels of total and HDL cholesterol levels. However, for individuals, the major drivers may be genetics, smoking, exercise, and triglycerides.

The study also identifies that the main difference in lipid profiles between Māori and Pacific people compared with others relates more to their less favourable ‘metabolic scores’ (we prefer this ‘continuous’ term to the arbitrarily dichotomous ‘metabolic syndrome’).

Both Māori and Pacific people have higher triglyceride levels, lower HDL cholesterol levels, and are more likely to be overweight or obese than Others and these factors are the main determinants of the various metabolic scores that have been developed. While these factors may be more common in Māori and Pacific people their prevalences are high in all ethnic groups in New Zealand.

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References:


The public hand hygiene practices of New Zealanders: a national survey
Claire Garbutt, Greg Simmons, Daniel Patrick, Thomas Miller

Abstract

Aim To survey hand hygiene practices of the New Zealand public.

Method Hand hygiene practices of subjects after they had used the toilet were observed in the washrooms of shopping malls in the cities of Auckland, Hamilton, Wellington, and Christchurch. The frequency and duration of hand hygiene were recorded by gender-appropriate observers.

Results A total of 1200 subjects were observed. The overall frequency of hand washing was 86.7% (95% Confidence Interval [CI] 84.6–88.5). Significant (p<0.0001) gender differences were found with males (81.0%, 95% CI 77.6–84.0) having a lower frequency of hand hygiene than females (92.4%, 95% CI 89.9–94.4). Soap was used by 71.6% (95% CI 68.7–74.3) of subjects but less frequently by males (66.2%) than females (76.5%). Nine out of ten (91.2%, 95% CI 89.3–92.9) subjects who washed their hands, dried them. Males washed (median 8.0 seconds) and dried (median 7.0 seconds) their hands for a shorter period of time than females who washed and dried for medians of 8.8 and 8.0 seconds respectively. The median duration of handwashing (8.6 seconds) and drying with paper towels (7.9 seconds) was well below current recommendations of 20 seconds for each practice. The median duration of use of air towels at 16 seconds was far short of the recommended time of 45 seconds.

Conclusion The New Zealand public appear to practise suboptimal hand hygiene in public washrooms. Future hand hygiene promotion should focus on males; on achieving adequate hand washing (using soap) and drying times; and on promoting drying times appropriate to the chosen method.

Hand hygiene has been shown to prevent the spread of infectious diseases since the 19th century and its public health benefits have been well documented in the international literature.

Local research has identified that the time spent on both washing (Personal Communication Tom Miller, 10 September 2007) and drying hands are key determinants of the effectiveness of hand hygiene. While hand hygiene practices in the New Zealand healthcare environment have been studied, to date, those of the public have not. We report a multi-centre survey documenting the hand hygiene habits of New Zealanders in public washrooms.

Method

Survey facilities—The survey was conducted in the toilet facilities of a large shopping mall chain in Auckland, Hamilton, Wellington, and Christchurch between 16 October 2006 and 1 December 2006. Washrooms were selected in each mall based on a high number of patrons (usually in close proximity to the food halls), and where the washroom area permitted observation of patrons’ hand hygiene from a
suitable distance and without directly viewing the toilet facilities. All sites provided liquid soap, warm running water, and an option of either paper or air towels.

**Observation methods**—Observers were either staff of local public health services or local authorities. Observations were made on the hand hygiene practices of 150 males and 150 females in each of the four centres. Those patrons who entered the area of the toilet facilities (cubicles or urinals) were eligible for inclusion in the study.

Observers were instructed not to initiate communication with patrons. If asked the nature of their business, observers stated that they were conducting a hygiene survey. If there was more than one person carrying out hand hygiene practices at one time, data were recorded for the person who commenced hand hygiene first.

Recordings included: gender, estimated age-group by subjective judgment of the observer (child [under 16 years], adolescent [16–20 years], adult [21 years and over]), whether hands were washed, the use of soap, how long hands were washed, whether hands were dried, and the method and duration of hand drying.

Durations were timed using a stopwatch. All observers were trained in the use of the study protocol including timing and recording observations. Observers were encouraged to collect data on a number of different days and times, and also to perform observations on the mall’s late shopping night.

Washing was defined as the instant that the hands were rubbed together creating friction—with or without the presence of water. If hands were placed under the faucet without friction this was not considered to be hand washing. Drying was defined as contact of the hands with paper towels or an operating air towel within the washroom area.

Wiping hands on trousers/dress or any other surface was not considered to be drying for the purposes of the study.

**Data analysis**—Data were analysed using Epi Info 2002 statistical software. Point estimates of proportions with 95% confidence intervals (95% CI) were calculated. For continuous variables, mean and median values were calculated.

**Results**

The hand hygiene practices of a total of 1200 subjects were observed. The ages of 1198 subjects were estimated at 7.6% children (<16 years of age), 16.9% adolescents (16–20 years of age), and 75.5% adults (21 years and over).

**Hand washing**

1039 (86.7%) of the 1200 subjects washed their hands (see Table 1).

**Table 1. The proportion of subjects undertaking three main components of hand hygiene**

<table>
<thead>
<tr>
<th>Hand hygiene practice</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Hand washing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>92.4</td>
<td>81.0</td>
</tr>
<tr>
<td>CI</td>
<td>(89.9–94.4)*</td>
<td>(77.6–94.0)</td>
</tr>
<tr>
<td>Applied soap to hands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>76.5</td>
<td>66.2</td>
</tr>
<tr>
<td>CI</td>
<td>(72.6–79.9)</td>
<td>(61.8–70.3)</td>
</tr>
<tr>
<td>Hand drying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>93.1</td>
<td>89.2</td>
</tr>
<tr>
<td>CI</td>
<td>(90.5–95.0)</td>
<td>(86.0–91.7)</td>
</tr>
</tbody>
</table>

*95% Confidence Interval.
No significant differences were noted in the frequency of hand washing between the four survey cities. The median duration of hand washing overall was 8.6 seconds (Table 2). The duration of hand washing for the subjects in Hamilton (median of 9.5 seconds) was longer than for those in any of the other cities. In all four cities a higher proportion of females washed their hands than males.

Table 2. Time that people spent washing and drying their hands

<table>
<thead>
<tr>
<th>Hand hygiene practice</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time spent washing hands (seconds)</td>
<td>Female n = 548</td>
<td>Male n = 491</td>
</tr>
<tr>
<td>Mean</td>
<td>10.0</td>
<td>10.2</td>
</tr>
<tr>
<td>Median</td>
<td>8.8</td>
<td>8.0</td>
</tr>
<tr>
<td>Time spent drying hands on paper towels (seconds)</td>
<td>Female n = 406</td>
<td>Male n = 311</td>
</tr>
<tr>
<td>Mean</td>
<td>8.8</td>
<td>8.7</td>
</tr>
<tr>
<td>Median</td>
<td>8.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Time spent drying hands using air towel (seconds)</td>
<td>Female n = 125</td>
<td>Male n = 155</td>
</tr>
<tr>
<td>Mean</td>
<td>17.9</td>
<td>16.3</td>
</tr>
<tr>
<td>Median</td>
<td>16.9</td>
<td>15</td>
</tr>
</tbody>
</table>

For all cities, 92.4% (95% CI 89.9–94.4) of females washed their hands compared to 81.0% (95% CI 77.6–84.0) of males. Females also washed hands for longer than males with a median duration of 8.8 seconds compared to 8.0 seconds for males. Only 8.1% (95% CI 6.5–9.9%) of subjects washed their hands for at least 20 seconds.

No relationship was found between the estimated age group of subjects and the length of time for which hands were washed. However, there was a marginal increase in the frequency of hand washing with increasing age group. In all cities the facilities each had one lower sink to enable children to wash their hands. In some instances, however, these were still too high and too deep for young children to access without the assistance of an adult.

Use of soap

A total of 71.6% of subjects used soap when washing their hands. Overall, males used soap 66.2% (95% CI 61.8–70.3) of the time compared to 76.5% (95% CI 72.5–79.9%) for females, hence males used soap almost 10% less frequently than females.

Females used soap with greater frequency than males in all locations except in Hamilton where females used soap 77.7% of the time (95% CI 69.9–84.3%) compared to 87.1% for males (95% CI 79.9–92.4%). Soap use varied between locations, with males and females using soap less frequently in Auckland than all other locations.

Using soap was associated with a longer length of time of hand washing in all locations. The median length of time spent washing for those who used soap was 10.0 seconds compared to 5.0 seconds for those who did not (p<0.0001). Those who used soap also dried their hands significantly more frequently (94.4% (95% CI 92.4–95.9%)) than those who did not use soap (83.4% (95% CI 78.6–87.5%)). There were no significant age group differences in the use of soap.
Hand drying

91.2% of those subjects who washed their hands also dried them. Females dried their hands more often than males. Paper towels were the hand drying method preferred by three-quarters of subjects (75.6% [95% CI 72.8–78.3%]). Among children, the preferences for drying method was split between air and paper towels, with 49.2% (95% CI 36.4–62.1%) using air towels.

While both females and males preferred to use paper towels to dry their hands, females (79.6% [95% CI 75.8–83.0%]) used them significantly more frequently than males (71.0% [95% CI 66.5–75.2%]).

Only 4.6% (95% CI 3.2–6.4%) of subjects dried their hands using paper towels for the recommended 20 seconds or more.

Adults were observed to dry their hands more frequently than children or adolescents. Of the 280 subjects (29.5% [95% CI 26.7–32.6%]) who used air towels to dry their hands, the median drying time was 16.4 seconds). Only one subject (0.4%, 95% CI 0.0–2.0%) dried their hands with an air towel for 45 seconds—the period recommended for optimal dryness with this method.

The use of soap was associated with longer drying times for both air towels and paper towels. Those who washed with soap used air towels for a median of 17.8 seconds compared to 10.7 seconds for those who did not. Those who washed with soap dried their hands on paper towels for a median of 8.0 seconds compared to 6.0 seconds for those who did not.

A small proportion (4.7%, 95% CI 3.5–6.2%) used both paper and air towels. Of the 49 subjects who used both air and paper towels, 11 (22.5% [95% CI 11.8–36.6%]) washed their hands for at least 20 seconds—a much higher proportion than the general sample of 8.1%.

Discussion

This survey represents the largest observational study of public hand hygiene practices conducted in New Zealand. The only major population centre not included was Dunedin as no mall with suitable space for observation was identified.

The finding that 13.3% of those observed did not practise any form of hand hygiene after going to the toilet is of concern, although this percentage is similar to overseas surveys.6–8

The finding of a lower frequency of hand hygiene in males compared to females including hand washing, soap use, hand drying, and less time spent in handwashing and drying is also consistent with the international literature on hand hygiene compliance.

Few studies have investigated hand hygiene in community settings. The most comparable survey to ours in terms of sampling frame and observational methods was conducted in Australia in 2002.8 That survey of 200 subjects, conducted in the washrooms of an Australian shopping mall food hall, found that 92% of females and 71% of males carried out some form of hand hygiene after visiting the toilet. The observation that 8% of females and 29% of males failed to wash their hands at all after going to the toilet in that study compares to 8% of females and 19% of males not
practising hand hygiene in ours. Only 31% of males and 41% of females used soap in the Australian study compared to 66% and 76% in our survey.

A United States study based in the washrooms of six international airports observed that 17% of females and 26% of males failed to wash their hands. A further US survey conducted in the toilet facilities of six public events showed that 10% of females and 25% of males failed to wash their hands.

The only other community-based hand hygiene survey published in New Zealand was conducted by Townsend and Simmons; it found that 22.9% of female and 49.1% of male pupils of an Auckland primary school (children aged 11 years and under) failed to practise hand hygiene after going to the toilet, a lower compliance with hand hygiene than those in the ‘child’ age category (<16 years) of our study—at 13.0% and 35.1% respectively.

Our study estimated the mean time spent washing hands of 8.6 seconds (8.8 seconds for females and 8.0 seconds for males) which was significantly lower than the 20 seconds recommended by the New Zealand Ministry of Health and the New Zealand Food Safety Authority (NZFSA). Only 84 subjects (7.8%) who washed their hands did so for at least 20 seconds and only 15 (1.3% of all subjects) met the recommended hand hygiene duration of washing for at least 20 seconds and drying using a paper towel for a further 20 seconds. Only one subject (0.2%) who washed their hands for 20 seconds, dried them for at least 45 seconds using an air towel.

Of the 49 (4.1%) subjects who used a combination of both paper and air towels to dry their hands only in 2 of these did the total drying time equal or exceed the recommended 30 seconds (10 seconds using paper towel and 20 seconds using air towel). Those who used soap washed on average for 5 seconds longer than those who did not.

The use of soap use was higher for females and varied between locations, with males and females using soap less frequently in Auckland than all other locations, although the reason for this is unclear. In all locations, liquid soap dispensers were available, having been maintained regularly to ensure that soap was always available during the time subjects were observed.

Paper towels were the most popular method of hand drying in all locations. Of the 947 people in all locations who dried their hands 76% used paper towels in preference to air towels, although both methods of hand drying were equally available. The strongest preference for paper towels was noted in Wellington where 88.8% of patrons used this method.

Paper towels appear to have advantages over air towels due to the reduced time required to achieve dryness. Subjects who used air towels did so for an average of 16.4 seconds while those who used paper towels dried for an average of 7.6 seconds. For both methods this is less than half the time recommended to effectively reduce manual translocation of bacteria to other surfaces following washing.

For small children, air towels could often only be accessed when an adult lifted and held the child, and therefore the length of time spent washing and their drying hands was determined by the adult rather than the child.

Those who used soap to wash their hands had a higher frequency (94% versus 83%) and duration of hand drying using both methods than those who did not use soap. This
finding suggests that for some of the public there is a higher level of understanding of hand hygiene. Those who use soap may have an increased focus on hand hygiene and therefore recognise the need for thorough drying.

The survey suffered a number of limitations including the subjective assessment of age and the inability to assess any relationship of ethnicity on hand hygiene behaviour. All surveys are prone to biases and direct observational surveys are particularly influenced by the ‘Hawthorne effect’\textsuperscript{12} whereby the subjects’ behaviour is affected by the knowledge that they are being studied. In previous studies demonstrating a significant Hawthorne effect, the subjects were usually aware of the outcomes being measured.\textsuperscript{13}

In this study the subjects were not made aware of the reason for which they were being observed, and in some cases it is likely that they did not realise that they were being observed. Subjects very rarely (less that 5\%) approached the observer to ask them why they were present, however a few comments received by observers from subjects such as \textit{oh did I pass?} or \textit{oops I should probably have washed for longer} indicates some level of awareness. The use of more covert observation methods in future surveys such as video surveillance may reduce the Hawthorne effect.

There is still a significant gap between current hand hygiene recommendations and observed practice in our largest urban communities. It is clear from the findings of this study, and those previously carried out, that there is a significant disparity between males and females for hand hygiene compliance. These differences highlight the need for a shift in the health education strategies to specifically target males.

One proposed mechanism for increasing the length of time spent washing hands (as well as reducing the potential for faucet contamination) is to promote the use of sensor taps and to set them to run for 20 seconds, the time required to effectively wash hands. The implementation of a similar strategy with air towels may also encourage patrons to dry for the recommended duration.

This survey, despite a number of limitations, used simple reproducible methods and provides useful baseline data against which to compare future trends in hand hygiene behaviour.

While the findings show that the frequency of hand hygiene among New Zealanders is relatively high, the duration is much lower than recommended by the Ministry of Health\textsuperscript{10} and the New Zealand Food Safety Authority\textsuperscript{11} and there are significant behavioural differences between males and females.

Males were observed to have significantly poorer results in all aspects including the frequency of hand hygiene, use of soap, frequency of hand drying, and the duration of both washing and drying.

Future hand hygiene promotion needs to focus on the importance of the duration of hand washing and drying and in particular to target males.

**Competing interests:** None.

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Anaerobic bacteraemia in patients admitted to Auckland City Hospital: its clinical significance

Sharmini Muttaiyah, Sue Paviour, Leanne Buckwell, Sally A Roberts

Abstract

Aim To determine the clinical significance and outcomes for patients with anaerobic bacteraemia at our institution over a 2-year period.

Method The isolates were identified from the laboratory database and patient information obtained from clinical records.

Results Anaerobes were isolated from 140 blood culture sets taken from 114 patients. For 59 patients, the isolates were considered to be contaminants. Of note, all Propionibacterium spp. were considered contaminants. For the patients with true bacteraemias, the most likely source of infection was intra-abdominal, 26 (50%), mucositis associated with neutropaenia contributed to by cytotoxic therapy, 11 (19%), skin and soft tissue, 4 (8%), pelvic, 5 (9%) and oropharyngeal, 4 (8%). Thirty-five patients were on appropriate therapy prior to the availability culture results. Five patients died but only one death was directly attributable to anaerobic bacteraemia.

Conclusion At our institution, anaerobes accounted for 2.3% of all positive blood cultures. Excluding Propionibacterium spp., most isolates were considered clinically significant. The most common source for the bacteraemia was intra-abdominal infection, followed by mucositis in neutropaenic patients. Empiric antimicrobial therapy provided appropriate cover for two-thirds of the patients. One death was directly attributable to anaerobic bacteraemia.

Anaerobic organisms are commonly found as normal flora in various sites in the body, predominantly over mucosal surfaces. Many anaerobes grow slower than aerobic bacteria and polymicrobial infection is not uncommon in clinical specimen yielding anaerobic bacteria. Recent studies have reported the incidence of anaerobic bacteraemia around 5%, although older studies have reported an incidence of up to 15%.

This study retrospectively looks at the incidence of anaerobic bacteraemia at 1000-bed tertiary referral university affiliated institution over a 2-year period, from 1 January 2004 to 31 December 2005. Its aim was to determine the percentage of positive blood cultures growing anaerobic organisms and to assess the clinical significance of this by reviewing medical records. The most likely source of infection, appropriateness of empiric antibiotic choice, and patient outcome following treatment of anaerobic bacteraemia were determined.

Methods

Anaerobic organisms isolated in peripheral and catheter blood cultures in our laboratory, LabPlus, Auckland District Health Board, from January 2004 to December 2005 were identified from the laboratory database. The commercial blood culture system utilised was the BACTEC® 9240 system (Becton Dickinson, Sparks, MD). BACTEC™ culture vial types PEDS PLUS™/F Medium were used...
for paediatric blood cultures; BACTEC™ Plus Aerobic/F Medium, and BACTEC™ Plus Anaerobic/F Medium were used for adult aerobic and anaerobic culture respectively.

Blood culture vials were incubated for 5 days. Positive blood cultures were subcultured onto Tryptic Soy Agar with 5% Sheep Blood (Fort Richard) which were not pre-reduced and incubated in 5% carbon dioxide and anaerobically until growth was detected. The MACS Anaerobic Workstation (Don Whitley Scientific, Ltd.) was used for the purpose of anaerobic incubation. The blood culture isolates were identified by routine phenotypic means; if an acceptable identification was not obtained by conventional methods, isolates were referred for 16S rDNA sequencing. In our laboratory, susceptibility testing is not routinely performed on anaerobic isolates.

Using the laboratory information, the patients’ National Health Index (NHI) numbers were obtained. The NHI numbers were then entered onto the patient clinical management database and relevant clinical information was obtained. Patient demographics that were obtained included age, gender and admitting service.

All patients in our hospital are reviewed by the bacteraemia service provided by the Infectious Diseases and Microbiology Units. The assessment provided by the Bacteraemia Service was reviewed to ascertain the significance, likely source of infection and the antibiotic regimens that were used for treatment of the anaerobic bacteraemia. The antibiotic regime was considered to be appropriate or inappropriate based on its effectiveness against anaerobic infections. This was determined by previously published local susceptibility data.17

**Results**

Over the 2-year period, 42,376 sets of blood cultures were received in the laboratory; 6072 (14.3%) were positive. Anaerobes were isolated from 140 blood culture sets, accounting for 2.3% of all positive blood cultures in our laboratory; 124 of these isolates were non-duplicate isolates.

The blood cultures were obtained from 114 mostly adult patients (111); 60 patients were male (53%) and 54 patients were female. The mean age ± SD was 52.3 ± 22.3 years. The admitting services were: medical 49 (43%); surgical 52 (46%); maternity/gynaecology 6 (5%); intensive care 6 (5%); and unknown 1 (1%).

Commercial and in-house phenotypic identification methods identified the isolates to genus or species level for 126 (90%) of isolates. The remaining 14 (10%) isolates required 16S rDNA sequencing for identification.

The 124 non-duplicate isolates were: *Propionibacterium* spp. 46; *Bacteroides* spp. 35; *Clostridium* spp. 18; *Fusobacterium* spp. 12; anaerobic Gram-positive cocci not further speciated 4; *Prevotella* spp. 4; *Dialister pneumosintes* 4; and *Leptotrichia* spp. 1.

Just under a half of the episodes, 52 (46%), represented true bacteraemia and just over half, 59 (52%), were considered to be contaminants. For 3 patients, it was uncertain whether or not the bacteraemia was significant. Seven patients had polymicrobial anaerobic infection.

Seven patients (13%) had aerobic pathogens isolated at the same time: 3 grew *Escherichia coli* (*E. coli*); 2 grew *Enterococcus faecalis* (*E. faecalis*); 1 grew *Morganella morganii*; and 1 patient (with a liver abscess and a background history of advanced cholangiocarcinoma) grew *E. coli*, *Klebsiella oxytoca*, *E. faecalis*, and *Clostridium perfringens*.

All *Propionibacterium* spp. isolates were considered contaminants. The number of isolates representing contaminants and true bacteraemia are illustrated in Figure 1.
For the patients with true bacteraemias, the most likely source of infection was intra-abdominal 26 (50%); mucositis 11 (19%); skin and soft tissue 4 (8%); pelvic 5 (9%); and oropharyngeal 4 (8%). In 2 (4%) patients, the likely source of infection was not identified.

Of those who had significant infection, 35 (67%) were on appropriate therapy prior to culture results being available, and 17 (33%) were not on appropriate therapy or not on antibiotics.

Of those who did not receive appropriate initial therapy, four patients died: two patients died of complications associated with underlying malignancy, one patient with underlying cardiac disease died of a cardiac arrest following ventricular tachycardia, and one patient died following perforation of an abdominal viscus.

Complications occurred in two patients in this group. One patient with acute myeloid leukaemia who developed neutropenic sepsis with *Clostridium tertium* was initially treated with cefepime and gentamicin, followed by amoxycillin monotherapy, to which the isolated organism was resistant. This patient had to be readmitted due to persisting febrile neutropaenia. Another patient developed a collection in the splenic bed following a post-splenectomy wound infection with *Bacteroides fragilis* (*B. fragilis*). He was initially treated with intravenous gentamicin, which was changed to metronidazole following organism identification.

Among patients receiving appropriate initial therapy, one patient died of *B. fragilis* septicaemia secondary to severely infected skin ulcers. One patient who received appropriate initial therapy developed recurrent abdominal collections with *B. fragilis* which required the placement of intra-abdominal drains.
Anaerobic culture results resulted in modification of therapy in 11 (21%) patients with clinically significant anaerobic bacteraemia. Three of the six patients whose therapy was not modified died, and the remaining three recovered. All three patients who died had underlying metastatic malignancy and these deaths were not attributable to the episode of anaerobic bacteraemia.

**Discussion**

Anaerobic bacteraemia is reported to account for 0.5–9% of all positive blood cultures in hospitals and is associated with significant mortality. Risk factors for increased mortality include advanced age, underlying disease, inappropriate antimicrobial treatment, or a delay in starting appropriate treatment. The rate of anaerobic bacteraemia in our institution was found to be 2.3%.

In our series, there were five fatal cases but only one death was directly attributable to anaerobic bacteraemia. The crude mortality rate (10%) among our patients is lower than that previously described (25–38%). Thirty-five (67%) of our patients were already on appropriate therapy prior to the availability of culture results and this may in part, explain the low mortality rate.

Studies have reported malignancies and previous gastrointestinal surgery as risk factors for anaerobic bacteraemia. Likewise, we found that 33 (63%) of the patients had an underlying malignancy and 24 (46%) had recent gastrointestinal surgery. One-third of patients who had an underlying malignancy had received chemotherapy during or prior to the episode of anaerobic bacteraemia.

Patients on chemotherapy are at high risk for bacterial infection because intensive regimens cause both profound neutropaenia and disruption of physical barriers. The oral cavity, because of mucositis, was the most frequent presumed source of anaerobic bacteraemia in neutropaenic patients, while the gastrointestinal tract was the most common source in other patients.

*B. fragilis* was the most common pathogen-causing anaerobic bacteraemia in one study, and was found mainly in association with gastrointestinal tract infections or in the context of infected decubitus ulcers. Similarly in our study, 21 of the 27 (78%) *B. fragilis* isolates were found in the context of gastrointestinal tract infections or infected ulcers. The other six isolates were attributable to oncology patients with neutropaenic sepsis. Interestingly, no haematology patients with neutropaenic sepsis developed *B. fragilis* bacteraemia.

Episodes of bacteraemia involving *Leptotrichia* spp. and *Clostridium* spp. have been reported to occur exclusively among neutropaenic bone marrow transplant recipients. However, we found these organisms both in neutropaenic and non-neutropaenic patients.

There has been much debate about whether routine anaerobic cultures are necessary as previous reports have argued that routine use did not provide clinically relevant results and that the incidence of anaerobic bacteraemia was decreasing. More recent studies, however, have reported increasing incidence of anaerobic bacteraemia.

For instance, in a study comparing two time periods (1993–1996 vs 2001–2004), there was a 74% increase in the incidence of positive blood culture results for anaerobic organisms. The authors postulated that the reason for this increase may be due to an
increase in patients with complex underlying disorders, especially patients who were immunosuppressed due to cancer therapy or an underlying disease process. In our series, we found that one third of our patients were on inappropriate antimicrobial therapy prior to culture results.

In summary, anaerobes accounted for 2.3% of all positive blood cultures at our institution. Excluding Propionibacterium spp., most isolates were considered clinically significant. B. fragilis was the most common pathogen isolated and was found in the context of gastrointestinal infections and infected ulcers. Most patients with anaerobic bacteraemia had an underlying malignancy or had undergone recent gastrointestinal surgery. Only one death was directly attributable to anaerobic bacteraemia.

Competing interests: None.

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References:


Colchicine prescribing and safety monitoring in patients with gout

Jason Ly, Peter Gow, Nicola Dalbeth

Abstract

Aim To assess current colchicine prescribing and safety monitoring in patients with gout.

Methods Colchicine dosing was analysed by chart review of 50 consecutive patients presenting to Middlemore Hospital (South Auckland, New Zealand) with acute gout. The dose of colchicine was compared with the New Zealand Rheumatology Association · (NZRA) consensus statement on colchicine use for acute gout. Safety monitoring was analysed by chart review of a separate group of 50 patients attending rheumatology clinics on long-term prophylactic colchicine and with renal impairment (creatinine ≥0.17 mmol/L or creatinine clearance ≤0.83 ml/sec). Monitoring of creatine kinase (CK) and full blood count (FBC) was compared with published quality of care indicators regarding safety monitoring of colchicine. Risk factors for colchicine toxicity were recorded; age >75 years, statin use, renal transplant, haemodialysis, and renal impairment.

Results Forty-eight (96%) patients treated for acute gout received colchicine at doses ≤2.5 mg/24 hours, in accordance with the NZRA statement. In this group, 60% had at least one risk factor for colchicine toxicity. For the long-term prophylactic colchicine treatment group, 76% had CK and FBC monitoring in accordance with the quality of care indicator. Additional risk factors for colchicine toxicity were present in 58% of patients on long-term colchicine. Laboratory monitoring identified colchicine-related adverse drug reaction in one patient.

Conclusions Current prescribing of colchicine for acute gout is in accordance with the NZRA consensus statement. For long-term colchicine use, there is reasonable adherence to the quality of care indicator for safety monitoring. These patients are at high risk for toxicity, and safety monitoring has an acceptable yield.

Colchicine, an extract of the Colchicum autumnale plant, has been used for over a 1000 years in the treatment of gout. The precise mechanism by which colchicine relieves the intense pain of gout is unknown. However, it is believed that the most important action resulting in pain relief involves blockade of the inflammatory response to uric acid crystals, through inhibition of crystal phagocytosis and neutrophil migration.¹

Colchicine is frequently used for treatment of acute gout attacks and also as prophylaxis against acute gout attacks in patients with chronic disease.²–⁴ The optimal dose of colchicine for acute gout is uncertain despite its widespread use. Previously, it was common practice for colchicine to be prescribed at an initial dose of 1.2 mg followed by 0.6 mg tablet every 2 hours until the gouty pain was relieved or gastrointestinal symptoms developed. However, this dosing regimen was associated...
with significant toxicity, including renal impairment, myopathy, severe diarrhoea, and vomiting.\textsuperscript{4–6} Common risk factors in case reports of colchicine toxicity include renal dysfunction, renal transplantation, concomitant use of statins, and old age.\textsuperscript{7–10}

In November 2005, the New Zealand Rheumatology Association (NZRA) published a consensus statement on the safe use of colchicine in the treatment of acute gout. This statement was endorsed by New Zealand Medicines and Medical Devices Safety Authority (Medsafe) who said:

The use of large doses of colchicine to treat acute gout is no longer appropriate, especially in older patients, because of the serious adverse effects arising from large doses. The recommended dose for colchicine in the treatment of acute gout is 1.0 mg stat, followed by 0.5 mg 6 hourly, up to a maximum dose of 2.5 mg per 24 hours.\textsuperscript{11}

Colchicine is of proven benefit in patients with chronic gout, as prophylaxis therapy to prevent acute attacks, particularly when establishing urate-lowering therapy.\textsuperscript{2,3,10} However, long-term use of colchicine may also lead to side-effects such as myopathy and bone marrow suppression, particularly in patients with renal impairment.

The recently published quality of care indicators for gout management have included guidelines regarding safety monitoring for patients on long-term colchicine:

If a gout patient receives long term prophylactic oral colchicine (defined as a minimum daily dose of 0.5mg for a duration of 6 months or longer) and has significant renal insufficiency (a serum creatinine level $\geq$0.17 mmol/L or measured/estimated creatinine clearance $\leq$0.83 ml/sec), THEN a complete blood cell count and creatine kinase (CK) should be evaluated a minimum of one time for every 6 months of continued use, BECAUSE the risk of colchicine related myopathy and myelosuppression appears to be substantially increased in the context of reduced renal function.\textsuperscript{12}

The aim of this study was to determine whether colchicine prescribing and monitoring within our institution (Counties Manukau District Health Board, South Auckland, New Zealand) is in accordance with current practice guidelines.

**Methods**

This was a retrospective study of 100 patients with gout. All patients included in the study met the American College of Rheumatology preliminary diagnostic criteria for gout.\textsuperscript{13} There were two components to this study; analysis of colchicine dosing in acute gout, and analysis of colchicine safety monitoring in chronic gout.

The analysis of colchicine dosing involved chart review of 50 consecutive patients presenting to Middlemore Hospital, South Auckland with acute gout between 1 January 2004 and 30 December 2005. Patients were identified using the ICD 10 hospital database. The dose of colchicine was compared with the NZRA consensus statement on colchicine use for acute gout.\textsuperscript{11}

The analysis of safety monitoring for patients treated with long-term colchicine involved chart review of a separate group of 50 patients attending rheumatology clinics at Counties Manukau District Health Board (CMDHB) between 1 January 2004 and 30 December 2005. All of these patients were on long-term prophylactic colchicine and had renal impairment (defined as creatinine $\geq$0.17 mmol/L or creatinine clearance $\leq$0.83 ml/sec). Monitoring of creatinine kinase (CK) and full blood count (FBC) was compared with published quality of care indicators regarding safety monitoring of colchicines.\textsuperscript{12}

Data were collected primarily from paper and computerised clinical records. Baseline information included age, gender, ethnicity, presence of tophi, weight, height, and serum uric acid (SUA). The colchicine dose and any associated side effects were recorded. Serum creatinine and the creatinine clearance based on Cockcroft-Gault equation\textsuperscript{14} were also recorded.

Recognised risk factors for colchicine toxicity were identified; age $>75$ years, statin use, renal transplant, haemodialysis, and renal impairment.\textsuperscript{7–10} The community laboratory was contacted for blood test results if these were not available from the hospital laboratory. For patients taking an
increasing dose of colchicine, the final dose was recorded. Ethical approval and permission to access results were obtained from the Northern X regional ethics committee.

**Results**

**Baseline patient characteristics**—The clinical characteristics of patients in the study are summarised in Table 1. Māori and Pacific people were over-represented compared with the CMDHB catchment area (17% and 21% respectively). This is in keeping with the high prevalence of severe gout that is well-recognised within these populations.

**Table 1. Baseline characteristics of the 100 patients with gout**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Acute gout group, n=50</th>
<th>Chronic gout group, n=50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years, median (range)</td>
<td>58 (24–88)</td>
<td>66.5 (35–84)</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>45 (90%)</td>
<td>37 (74%)</td>
</tr>
<tr>
<td>Ethnicity, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pacific Island†</td>
<td>30 (60%)</td>
<td>25 (50%)</td>
</tr>
<tr>
<td>Māori</td>
<td>14 (28%)</td>
<td>13 (26%)</td>
</tr>
<tr>
<td>European</td>
<td>5 (10%)</td>
<td>10 (20%)</td>
</tr>
<tr>
<td>Indian</td>
<td>1 (2%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Serum creatinine, mmol/L, median (range)</td>
<td>0.20 (0.08–0.29)</td>
<td>0.28 (0.13–1.2)</td>
</tr>
<tr>
<td>Creatinine clearance, mL/s, median (range)</td>
<td>0.97 (0.35–2.11)</td>
<td>0.58 (0.20–0.93)</td>
</tr>
<tr>
<td>Serum uric acid, mmol/L, ** median (range)</td>
<td>0.56 (0.30–0.90)</td>
<td>0.51 (0.27–1.19)</td>
</tr>
<tr>
<td>Tophaceous disease, n (%)</td>
<td>24 (48%)</td>
<td>32 (64%)</td>
</tr>
</tbody>
</table>

*Normal creatinine range: 0.04–0.10mmol/L; **Normal serum uric acid range: 0.2–0.42mmol/L; †Mostly of Samoan, Tongan, Niuean, or Cook Islands origin.

**Colchicine prescribing in acute gout**—Patients were admitted under a variety of clinical services at Middlemore Hospital for management of acute gout; 20 (40%), were treated by general medicine, 13 (26%) by the emergency department, 7 (14%) by orthopaedic surgery, 6 (12%) by rheumatology, and 4 (8%) by plastic surgery.

All 50 patients received colchicine as part of the management of acute gout. Colchicine was prescribed at doses ≤2.5 mg/24 hours in 48 (96%) patients, in accordance with the NZRA guidelines. There were 30 (60%) patients with at least one risk factor for colchicine toxicity, and 16 (32%) had more than one risk factor (Table 2). Four (8%) patients developed diarrhoea while on low-dose colchicine; three of these patients had no recognised risk factors for colchicine toxicity. No patient in this group developed severe toxicity.

**Table 2. Risk factors for colchicine toxicity in patients with acute gout**

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Number (%) of patients, n=50</th>
</tr>
</thead>
<tbody>
<tr>
<td>No risk factor</td>
<td>20 (40%)</td>
</tr>
<tr>
<td>Renal impairment†</td>
<td>22 (44%)</td>
</tr>
<tr>
<td>Statin use</td>
<td>16 (32%)</td>
</tr>
<tr>
<td>Age &gt;75 years</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Renal transplant</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Haemodialysis</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

*Creatinine ≥ 0.17 mmol/L or creatinine clearance ≤0.83 ml/sec.
Safety monitoring in rheumatology outpatients on long-term colchicine—Of the 50 patients with renal impairment treated with long-term colchicine, 45 (90%) had FBC monitoring, 39 (78%) had CK monitoring, and 38 (76%) had both CK and FBC monitoring in accordance with the quality of care indicator; 5 (10%) patients had no safety monitoring during this period.

In addition to renal impairment, further risk factors for colchicine toxicity were present in 29 (58%) patients (Table 3). Laboratory monitoring identified a colchicine-related adverse drug reaction in one patient; this patient had a colchicine myopathy with raised CK levels to 3809 U/L which normalised after stopping colchicine. This patient had renal impairment with serum creatinine of 0.21 mmol/L as his only recognised risk factor for colchicine toxicity.

Table 3. Additional risk factors for patients with renal impairment on long-term colchicine therapy

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Number (%) of patients, n=50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statin use</td>
<td>22 (46%)</td>
</tr>
<tr>
<td>Age &gt;75 years</td>
<td>7 (14%)</td>
</tr>
<tr>
<td>Haemodialysis</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Renal transplant</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

Discussion

This study examined adherence to both dosing and monitoring guidelines for the use of colchicine in gout. We demonstrated that prescribing of colchicine for acute gout in our institution is generally in accordance with the NZRA consensus statement.

Although diarrhoea did occur in a few patients (even at low doses of colchicines), severe toxicity was not observed, thus supporting the use of the NZRA consensus statement. The presence of serious comorbid conditions place patients with gout at higher risk of drug-related toxicity.

Our study indicated that risk factors for colchicine toxicity are present in the majority of patients with acute gout treated in secondary care. This observation further emphasises the importance of safe dosing in preventing serious toxicity.

Colchicine has been demonstrated to have efficacy as prophylaxis against acute gout attacks, particularly in those commencing urate-lowering therapy and with tophaceous disease. Non steroidal anti inflammatory drugs (NSAIDs) may also be used as prophylactic agents, but are contraindicated in patients with renal impairment; a frequent finding in patients with gout.

A recent large retrospective claims data study from the US studied compliance to the gout quality of care indicators; it reported that only 3.1% of patients with renal impairment on long-term colchicine had appropriate laboratory monitoring. Safety monitoring for these patients was more widely adopted in our study, although almost a quarter did not have adequate monitoring for drug-induced myopathy. This is an important side-effect related to colchicine, and is responsive to drug withdrawal. It
occurs rarely but is well described in the literature with a recent report reviewing 82 reported cases of colchicine induced myotoxicity.\(^5\)

Most of the patients in this review were male and in most cases, symptoms abated with laboratory abnormalities resolving within weeks of colchicine discontinuation. Muscle toxicity may occur in the absence of gastrointestinal symptoms. In our 39 patients with CK results, one case of colchicine myotoxicity was detected by laboratory monitoring, thus indicating that such safety testing does have an acceptable yield.

We recognise that our study has some limitations. This was a retrospective study collected from a single secondary care institution. It would be interesting to assess the primary care setting where many patients with gout are treated. Patient compliance may be difficult to assess in a retrospective manner. Safety monitoring data were only collected for one 6-month-period, and the yield of detecting bone marrow suppression and myopathy among patients on long-term colchicine may be higher if data were collected for a longer period.

In summary, in our population of patients with gout, the current prescribing of colchicine for acute gout is in accordance with the NZRA consensus statement. For long-term colchicine use, there is reasonable adherence to the quality of care indicator for safety monitoring. These patients are at high risk for toxicity, and safety monitoring does allow for early detection of significant drug toxicity.

**Competing interests:** None.

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A successful nurse-led model in the elective orthopaedic admissions process

Jennifer M Truscott, Joanne M Townsend, Edwin P Arnold

Abstract

**Aim** To document a nurse-led admissions process for same day orthopaedic surgery, on relatively fit patients under 70 years of age.

**Methods** Patients undergoing minor surgery, under 70 years of age, and with a body mass index (BMI) of <35, were selected from the total of patients being admitted for elective orthopaedic surgery under the Accident Compensation Commission (ACC) contract. The nurse-led project relied primarily on an admission questionnaire, on physician consultation notes, and on previous clinical records.

**Results** During the 6-month study, 331 patients with a median age of 38 years were categorised into 3 streams. 252 patients (76%) underwent a nursing-admission process without the need for further consultation with a junior medical officer or an anaesthetist. The remaining patients not included in the study were admitted and clerked by a house officer. No safety issues arose and the surgeons and anaesthetists were satisfied with the process. The junior medical officers described improved job satisfaction by being able to attend theatre, other educational opportunities, and working more closely with the consultant.

**Summary** The process was safe; it improved the patient journey and job satisfaction among house surgeons; and it extended the skill base and job satisfaction of the nurses. It also allowed the hospital to cope better with the reduced number of house surgeons available. The process has now been incorporated into elective orthopaedic admissions at Burwood Hospital.

The Surgical Orthopaedic Unit (SOU) at Burwood Hospital (Canterbury District Health Board [CDHB], Christchurch) has a capacity of 29 beds with 13 beds in the Admitting Unit (AU). Annually, over 2000 procedures are carried out at Burwood Hospital, including 670 primary hip and knee joint replacements, in the 2005–2006 financial year.

The orthopaedic medical team consists of 16 orthopaedic surgeons, 5 registrars, and 3 house surgeons in the ward plus a 0.2 full time equivalent (FTE) house surgeon for pre-admitting in the Orthopaedic Outpatient Department.

As part of an exercise in process-mapping that followed the elective orthopaedic patient journey from GP referral to discharge after surgery, several issues were identified that could provide opportunities for improvement in the journey.

One of the ‘bottlenecks’ in the patient journey was the admission phase of the process. A suggested option to unblock the bottleneck was the development of Nurse Led Admission (NLA) practices in the SOU.
Historically, the house surgeon’s role in the admission process on the day of surgery admission (DOSA) was to record the patient’s clinical details in the case notes.

During 2005, the number of house surgeons (junior medical staff) available for the orthopaedic run was frequently reduced (as a result of a CDHB-wide shortage of house officers) from the normal three down to two and sometimes only one house surgeon. This problem was most acute in winter. Consequently, this compromised the delivery of elective orthopaedic surgery and resulted in expressions of job dissatisfaction for a variety of staff.

In the UK, in 1991, the NHS Management Executive introduced the Junior Doctors: the New Deal document which resulted in a reduction in junior doctors’ hours and the subsequent re-allocation of some routine medical duties to nursing staff. Following its publication, the United Kingdom Central Council for Nursing, Midwifery and Health Visiting (UKCC) facilitated the expansion of nursing roles within their own and organisational capabilities with the dissemination of the document The Scope of Professional Practice (UKCC, 1992).

Harvey and Gaudoin (2005) identified a reduction in patient waiting-time and an increase of 25% of patient throughput in nurse-led clinics. Nurse-led clinics also resulted in a 40% financial saving for the health service provider. Indeed, the increasing role in day surgery units has led to increased patient satisfaction and improvements in cost-effectiveness.

House surgeons at Burwood Hospital have experienced frustration when they were often needed in the admissions area, operating theatre, and outpatients at the same time. This led to insufficient experiential learning (i.e. learning through action) throughout the elective orthopaedic run.

These difficulties led to the proposal to do a pilot study on nurse-led admissions, along lines similar to those followed in the private sector.

**Methods**

**Working party**—A working party responsible for the governance of the project was established led by the medical advisor. The working party included the Director of Nursing, Clinical Charge Nurses (CCNs) of the Surgical Orthopaedic Unit, Orthopaedic Outpatients, the Post Anaesthetic Care Unit, Operating Suite, and the Anaesthetic Nurse Co-ordinator.

Consultations were held with the Anaesthetists; Clinical Directors of Orthopaedics, Health Care of the Elderly, and the Burwood Spinal Unit; and The Resident Medical Officer (RMO) Unit.

A house surgeon representative, on behalf of the Resident Doctors Association (RDA), attended meetings in the development phase and informed the central RDA of the process of the pilot study.

**Patient selection**—All patients being admitted to Burwood Hospital under the ACC Orthopaedic Contract were included (800 patients/year). The triaging into categories described below was undertaken by the experienced anaesthetic clinical nurse specialist.

These patients tend to be younger, relatively fit, and usually require a short time in hospital either as day surgery cases, or for a stay of only 1–2 nights.
The patients were allotted to one of three categories, on the following basis. If there were any doubts in a particular case concerning the triaging, nurses could consult with a house surgeon or an anaesthetist.

**Category A** Any patient having major surgery. These include those having major joint replacements, spinal fusions, and revision surgery.
- Clinical assessment recorded in the case notes by the house surgeon in the standard way.

**Category B** Patients having minor surgery but who also had significant comorbidity, or who were over 70 years of age, or who had a BMI>35*.
- Clinical assessment recorded in the case notes by the house surgeon in the standard way.

**Category C** Patients having minor surgery and who were relatively young and fit. These included those having removal of orthopaedic internal fixation, surgery on the hand, shoulder, knee, ankle and foot, and spinal decompressions. About 30% had day surgery but the remainder were in hospital for 1 night. The majority of patients were considered by the anaesthetists to be in ASA categories 1 or 2.
- These patients were included in the nurse-led admission process.

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*BMI information*—Evidence showing that obese patient is more prone to respiratory problems and other anaesthetic hazards is not well substantiated in the literature. However, to assist nursing staff triaging, our anaesthetists advised <35 BMI as an arbitrary cut-off point.

**Admission process and documentation**—The admission documentation, was based on what is currently used in the private sector, so the anaesthetists. And surgeons were familiar with it, and confident in the process. This documentation included a patient medical history questionnaire, and a health assessment form completed by the registered nurse. ECGs, and any blood tests organised by the surgeon, were included in the case record along with any other test report arranged by the surgeon preoperatively.

The type of anaesthesia was decided by the attending anaesthetist; mostly (70%) it was general anaesthetic and the remainder was by local or regional block.

The CDHB Corporate Solicitor confirmed there was no legal requirement that it should be a medical officer who records the admission details. The audit of the process was undertaken with the advice of the Clinical Audit Facilitator at Burwood Hospital. The areas audited included:
- Pre-admission nursing staff.
- Anaesthetists.
- Orthopaedic surgeons.
- Operating theatre nurses.
- Recovery room staff.
- House surgeons.

Patients were also asked in a survey if they thought their clinical evaluation was adequate, whether they felt well prepared for surgery, and whether they had any comments on how things could have been done differently.

The pilot study commenced in July 2005. After the first 3 months it was decided to continue the NLA process for ACC cases but also to include all CDHB elective admissions, for a further 3 months.

The results of the audit were analysed under the following headings:
- Demographic details.
- Compliance with completion of documentation.
- Stakeholders’ satisfaction (including doctors, nurses, and patients).
- Retrospective clinical record review.
Results

Demographic details

During the 6-month period of the pilot study, 348 patients (i.e. 317 ACC and 31 DHB contract patients) were scheduled for operations; 17 patients had their operations cancelled for a variety of reasons during the pilot study, thus leaving 331 for categorisation in the current process.

Categorisation

<table>
<thead>
<tr>
<th>Category</th>
<th>Number (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A</td>
<td>9 (3%)</td>
</tr>
<tr>
<td>Category B</td>
<td>70 (21%)</td>
</tr>
</tbody>
</table>

Twenty-one of the 70 Category B patients had a BMI >35.

Those in categories A and B were not included in the study.

Category C | 252 (76%)

These formed the basis of this current NLA study.

The median age of the patients was 38, and the age distribution is demonstrated in Figure 1.

Figure 1. Distribution of patients’ ages

Compliance with completion of documentation

By the time the patient arrived for admission on the day of surgery, the surgeon’s clinic note was present in 208/242 (86%) (10 forms were never returned out of the total of 252 cases). The pre-anaesthetic questionnaire was available in 178/242 (74%), and the signed consent form in 168/242 (70%). The remaining forms were completed before the procedure by the surgeon concerned.

Stakeholders’ satisfaction (including doctors, nurses, and patients)

Stakeholder satisfaction was assessed qualitatively. Each group was asked if there were issues identified that meant in their view that clinical examination and notes by a house-surgeon would have been better than the forms completed by the admitting nurse.
Stakeholders included admitting nurses, anaesthetists, orthopaedic surgeons, theatre and recovery nurses, and the house surgeons dealing with the patients in the ward post-op. Patients were also asked to make comments on the fact they did not see a house surgeon before theatre.

**Nursing pre-admission process and triaging: nurse competency**—Apart from one case (who subsequently was found to have a BMI of 40), all patients were categorised by the nursing staff without need for further consultation with the house surgeon or anaesthetist.

Nurses relied primarily on the questionnaire and to some degree on previous clinical records—or if a previous operation had been done, then on that anaesthetist’s comments.

**Anaesthetist perception of the nurse-clerking**—Of 242 cases, the anaesthetist made no comments in 205 (85%) cases, and in a further 35 (14.5%) cases indicated positively that in their view if the records had been made by a house surgeon this would not have been additionally helpful. Therefore the anaesthetist considered that the processes were considered quite satisfactory in 240 out of 242 cases.

For the other two patients (0.8%), the anaesthetist considered it might “possibly” have been preferable for a house surgeon admission process to have been followed. One of these patients was a known diabetic (NIDDM), but the oral medication doses were not recorded in the notes, and she had not had a blood sugar checked on the morning of surgery. This was rectified by the anaesthetist.

The second patient had had a full medical assessment at the Cardiology Department at Christchurch Hospital because of atrial ectopics. A copy had not been filed for the hospital record. Both the surgeon and the anaesthetist had seen a copy of the opinion previously, and were happy to proceed with the operation.

Both patients had uneventful upper limb surgery.

As the nurse-led procedure was congruent with procedures undertaken in the private hospital, the anaesthetists were satisfied with these arrangements.

**Orthopaedic surgeons, operating theatre nurses, and recovery staff**—No adverse comments were received from the surgeons. The surgeons and anaesthetists had already worked out an effective process for themselves in the private sector without using house surgeons. The process instituted here reflected what applied in the private sector.

Theatre nurses made some suggestions on the layout of the forms and on completeness of the data. Although most anaesthetists complied with the charting of post-op medications, house surgeons were required to do this in the Recovery Ward in some instances.

**Patient opinion**—A patient satisfaction survey form was provided to each patient but only 44 (17.5%) out of 252 were completed. There were no adverse comments and their tone was very positive.

**House surgeon opinion**—Several comments mentioned the reduction in workload, and that the process was helpful. Nine house surgeons felt that when called postoperatively to see a nurse-clerked patient, it did not mean more work for them,
compared to what would have been necessary if they had been clerked by a house surgeon.

Retrospective clinical record review

103 records were reviewed during first 3-month audit period. Although not part of this pilot study, it was interesting that orthopaedic protocols (standing orders) were used by the nursing staff on 84 (82%) occasions. Nurses’ involvement in clinical decision-making was enhanced by the NLA process; indeed it had a positive impact on the patient journey from admission to postoperatively and through to discharge, and it also enfranchised job satisfaction among the nurses involved.

The 19 (18%) instances where the house surgeon was called postoperatively to discuss management issues were mainly for prescribing drugs or intravenous (IV) fluids.

Discussion

Collaboration between nurses and doctors in patient care has increased in recent years and has been well received and beneficial.4,5

The nurse-led admission process for elective orthopaedic patients worked well and proved to be effective and efficient. The process now includes all ACC cases and CDHB cases not pre-admitted. The patient was seen preoperatively by a registered nurse and a consultant anaesthetist—there was no house surgeon involvement pre-surgery. This streamlined the patient journey.

There has been a financial saving as one house surgeon FTE (0.2) previously dedicated to the pre-admission clinic was no longer required.

Initial concerns regarding the process of NLA before the study were unfounded, as shown by the following positive outcomes:

- Legal opinion reassured us that there was no necessity for a medical employee to write in the case records before surgery.
- Anaesthetists were accustomed to the process in the private sector and had no concerns in following similar processes in public at Burwood Hospital.
- Orthopaedic surgeons were unconcerned, as they too were familiar with the processes. Their own medical notes were available to them.
- Patients. Only 17% of the patients responded (to the survey), but they were enthusiastic and positively accepted the process. No negative comments were received. Indeed, nurse-led clinics are usually received positively by patients.6
- Nurses noted an increase in workload but were able to accommodate this additional workload without the need for any increased staffing. Their comments were generally very favourable to the extent that the process has been used now for a range of patients on the standard DHB waiting list, as well as continuing with the ACC cases.

The nurses have benefited by increasing their skill levels, having greater autonomy, and enjoying increased respect from clinical colleagues.2 It has also resulted in a respect for the different roles that are needed for completion of
the elective orthopaedic surgical procedure. Effective utilisation of nursing
time has resulted in no increase in the nursing resource during the trial and this
situation still remains.

• The house surgeons considered that the lack of a house surgeon’s note did not
result in any increased effort in evaluating adverse events in patients to whom
they were called postoperatively. There has been increased job satisfaction,
especially from the house surgeons working on the elective orthopaedic run.
There is not the early morning rush to admit patients but more time to focus on
ward patients.

The favourable outcomes listed above have led to the nurse-led process being
incorporated into hospital routines at Burwood Hospital. The process should also be
applicable to other clinical service units.

(Further detail of the questionnaires and documentation used can be obtained from the
lead author, Jennifer Truscott.)

Competing interests: None.

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Implementing the universal routine-offer antenatal HIV screening programme in New Zealand: results from the first year

Jane Morgan, Graham Mills

Abstract

Aims The Ministry of Health in New Zealand announced implementation of antenatal HIV screening in June 2005, to begin in Waikato District Health Board and progressively roll-out to other health boards over 3 years. The implementation approach and experiences of the first implementation area are described.

Methods A local multidisciplinary collaborative team facilitated implementation. Targeted antenatal healthcare provider education sessions and written resources were evaluated and testing outcomes were monitored.

Results The approach to implementation appears to have been successful. Pre-implementation evaluations of written materials and targeted education sessions were very positive. Uptake of HIV testing amongst pregnant women undergoing antenatal blood testing has been very high (99.7%) during the first year of the programme.

Conclusions The antenatal HIV screening programme has been introduced successfully in the first district health board and wider national roll-out should now be a priority.

Knowledge of a woman's human immunodeficiency virus (HIV) status during pregnancy allows interventions to improve her health and substantially reduce the risk of transmission of HIV to her child from 25–33% to <1%.1-3

In 1997, the Ministry of Health developed interim guidelines recommending all pregnant women be asked about risk factors for HIV infection and that women at risk, or where risk is unclear, be offered an HIV test.4

Heterosexual HIV seroprevalence in New Zealand remains low with estimates of 1.5 to 4 per 10,000 amongst antenatal women.5 Yet, since 1999, there have been 12 reports of HIV-infected children born in New Zealand to women whose HIV status was unknown during pregnancy.6 Although women favour a routine offer of HIV testing during pregnancy for all women,7 it was found less than 10% of healthcare providers carried out antenatal HIV risk assessments and fewer offered HIV testing.8

A policy review was undertaken by the National Health Committee5,9 and the National Screening Unit. In June 2005, the Ministry of Health recommended a policy of routinely offering antenatal HIV screening as part of standard antenatal care. The policy change was to be implemented first in Waikato District Health Board (DHB) before being progressively introduced to other district health boards over a 3-year period.

The aim of this paper is to describe our experiences, and initial outcomes, which will hopefully help guide the wider national roll-out.
Methods

Implementation—A local multi-disciplinary group (the Group*) was convened in Waikato DHB. The Group reviewed literature on implementation of antenatal HIV testing in other jurisdictions.

Several factors emerge as key influences on antenatal HIV testing rates, including:

- The use of an ‘opt-out’ HIV testing strategy (in which women are offered and recommended to have an HIV test as part of the antenatal blood tests already routinely-offered) rather than an ‘opt-in’ testing strategy (in which women are simply offered an HIV test in a context where HIV screening is seen as non-routine);\(^{10,11}\)
- Access to appropriate information on HIV;\(^{12}\) and
- Strong healthcare provider endorsement.\(^{11}\)

Routine voluntary antenatal testing was felt to be acceptable to New Zealand women\(^7\) but there were conflicting opinions about consent requirements in the New Zealand context. Liaison with the Health and Disability Commissioner ensued to ensure standards of informed consent and care met the Health and Disability Commissioner Code of Health and Disability Services Consumers’ Rights Regulation 1996.

It was agreed that there would be a universal offer of HIV screening to all pregnant women at their confirmation of pregnancy visit, that all women should be provided with information, that verbal consent for testing was acceptable, and that all women could decline to be tested.

To improve access to appropriate HIV information, local written materials were developed; one booklet for women contains information about all initial antenatal blood tests, including HIV, and a second booklet for health professionals, provides more detailed information on HIV in pregnancy as well as outlining standards of informed consent.

Changes to maternity services within New Zealand over recent years means that the majority of maternal health care is provided by midwives. However, views of the Group were that confirmation of pregnancy occurs in a variety of healthcare settings and local laboratories affirmed up to 60% of first antenatal bloods within Waikato DHB are requested by GPs. Therefore, education and written resources were offered to all local GPs, as well as community and hospital midwives, to ensure that all those offering testing had up-to-date information including discussion and consent standards for HIV testing, HIV management, and information about local referral networks.

Negotiations with local private community and public hospital laboratories added HIV as a sixth test to the five already routinely offered as part of first antenatal bloods undertaken on confirmation of pregnancy. Local laboratory processes for those declining an HIV test and arrangements for data reporting towards ongoing evaluation and monitoring were put in place.

Policies regarding handling of any reactive, indeterminate, or positive results and referral pathways to the local HIV clinical team and support agencies were agreed. This included a consensus by all local laboratories not to advise preliminary results until confirmed results were available.

A local project co-ordinator was appointed to assist with project planning, policy and resource development, training, and data monitoring. Waikato DHB policies and guidelines were either updated or developed to cover a range of issues including standards of consent, addressing inequalities, and management of pregnancies amongst HIV-positive women.

An additional barrier to HIV testing in New Zealand centred on immigration issues, which was addressed by a change in New Zealand immigration policy in late 2005. Previously, disclosure of known HIV status to immigration services was mandatory but there was no requirement for HIV testing, hence discouraging testing.

Since the end of November 2005, health requirements have been revised for anyone applying for permanent residency or any visa status of longer than 12 months’ duration and now includes HIV testing amongst other tests. Further, the New Zealand Government’s Cabinet agreed to a special exemption policy allowing a health waiver to certain groups already in New Zealand provided they met other standard requirements and applied by early 2007.

The National Screening Unit of the Ministry of Health has responsibility for the development of a national programme for antenatal HIV screening. A National Antenatal HIV Implementation Advisory Group (NAHSIAG), which includes consumer advocates and community representation of women living with HIV, was established in late 2005 to assist with the development of policy, protocols, and national quality and policy standards for the effective operation of a national programme.
Plans from the first implementation area were presented to the NAHSIAG prior to implementation. To increase awareness of the policy change, the Group planned an extensive local information campaign as well as encouraging national media coverage. A universal routine offer of HIV screening to pregnant women began in Waikato DHB on 20 March 2006.

**Evaluation of resources and education**—A database of Waikato antenatal healthcare providers was created from information provided by HealthPAC (the payment agency for the Ministry of Health) of all Waikato healthcare professionals claiming under the current Section 88 Maternity Notice. Contact details were updated using local resources. The database was used to offer and monitor uptake of education. Education sessions were planned within existing primary care continuing education networks. Further invites were sent to those not recorded as having attended a session, with the offer of additional small group or individual discussion groups with the project co-ordinator if unable to attend formal sessions.

Evaluations of the education sessions were undertaken either by the project co-ordinator or by the session facilitators, for example, primary health organisation staff, and then collated by the project co-ordinator.

A pre-implementation pilot of the written resources was undertaken in a primary care setting with evaluation completed by the health professionals and pregnant women after a consultation.

**Outcome evaluation**—At the time of implementation, national monitoring, and evaluation was not yet in place so the Group adopted an interim data collection approach. A database was created to store information for evaluation and monitoring, using antenatal testing data from all three local laboratories. Data included details pertaining to requested first antenatal bloods, first antenatal bloods where HIV testing was excluded, reactive tests, and women referred for specialist care as a result of antenatal HIV testing. National Health Index numbers were provided when available. It was anticipated more detailed data about HIV positive women identified through antenatal HIV screening would be collected by the AIDS Epidemiology Group, University of Otago, as part of ongoing HIV surveillance in New Zealand.

## Results

**Evaluation of education and resources**—Arranging GP education sessions was relatively straightforward because of an existing local continuing education program and a series of 10 evening sessions were undertaken over 3 weeks by the HIV clinical team.

Based on a rating scale of 1–6 with 6 being ‘strongly agree’, all sessions evaluated highly with average ratings of over-5. Independent community and hospital midwives were very responsive to the training invitation but had quite differing needs around attending education sessions.

Much more flexibility in the timing of sessions was required and the project co-ordinator offered one-to-one training for those unable to attend scheduled group sessions. Evaluations from midwifery sessions were very positive. Of 76 who completed questions rating their HIV knowledge on a scale of 0–5, average ratings increased from 2.4 to 4.3 after the sessions.

Overall, 161 (60%) general practitioners and 106 (67%) midwives attended training. In response to feedback, a self-directed training package was developed to assist those unable to attend face-to-face meetings.

In the pre-implementation primary care pilot of written resources, 41 post-consultation evaluations were completed by pregnant women at their initial confirmation of pregnancy visit and by their health practitioner.

The average age of the 41 women was 23 years (15–44 years), with self-rated ethnicities of 64% NZ European, 28% Māori, 4% Pacific Islander, and 4% other. All were in the first trimester of pregnancy and were offered antenatal blood tests,
including HIV testing. 85% of women felt the written materials were easy to understand, with none rating them difficult, and 93% felt it provided enough information and all their questions were answered.

In a final question about testing, 86% responded they had been asked if they agreed to being tested, with 14% being unsure; none responded they had not been asked. Their health practitioners rated the materials as easy to use (98%) with 78% reporting content as sufficient information for the testing discussion and any questions raised. Times for HIV testing discussion were estimated; most reported these as taking 3 minutes (range 1–7 minutes).

Outcomes—From 20 March 2006 until 31 March 2007 there was a 99.7% uptake of HIV testing amongst pregnant women undergoing antenatal blood testing in Waikato DHB (Figure 1). However, true antenatal population coverage is unknown as it is not known how many pregnant women did not undergo antenatal blood testing or did not receive antenatal care.

There are approximately 4600 deliveries in Waikato DHB each year yet there were 9193 first antenatal screens in just over 1 year, with 625 (6.8%) attributable to duplicate testing. It is assumed miscarriages and termination of pregnancies account for the rest of the discrepancy.

Low-level reactive EIA results are estimated to occur in approximately 1 in 1000 tests. However, in the first year, the combined specificity of 99.6% (Figure 1) has been slightly lower, largely attributable to one of three HIV assays used locally. This assay is a third-generation test that detects anti-HIV-1 and anti-HIV-2 antibodies; the other two assays in use are fourth generation tests which also detect p24 antigen.

All reactive samples were sent to one of the two centres in New Zealand that perform confirmatory testing. Samples were re-tested using Serodia HIV1 PPA and Murex HIV1/2 Ab/Ag EIA, different HIV assays from those used locally, as well as HIV-1 Western Blot. From 20 March 2006 to 31 March 2007, 5471 antenatal HIV samples were tested on the third-generation assay.

There were 37 reactive tests but only 1 confirmed HIV infection, giving a specificity of 99.3% and a reactive rate of 1 in 152 tests. This compares with a specificity of >99.9% (4 reactive with 1 confirmed HIV infection in 2696 tests and 0 in 995 tests) for the combined data from the fourth generation tests.

Two women, both of whom presented for initial antenatal care at 24 weeks’ gestation, were diagnosed with previously unknown HIV infection. Repeat HIV testing confirmed both initial results and appropriate care was instigated. One was heterosexually infected in New Zealand. The other woman was heterosexually infected overseas in a high prevalence country. She was not tested during a previous pregnancy in New Zealand.

Early investigations suggest perinatal transmission has not occurred with the first of the two pregnancies, with the second woman only recently delivered. The new diagnoses of HIV infection in two women resulting from performing 9162 tests supports previous estimates of low HIV prevalence in New Zealand’s antenatal population.
Figure 1. Waikato DHB first antenatal bloods 20 March 2006–31 March 2007

9193 1st Antenatal Bloods

31 declined HIV testing

9162 HIV test included

41 HIV EIA reactive tests

39 low level reactive HIV EIA

2 high level reactive HIV EIA

Western Blot tests positive

Re-bleeds confirm positive results

36 low level reactive HIV EIA on a single assay

3 low level reactive HIV EIA on one other assay

Other HIV EIA assay and Western Blot test negative

Likely false positives; re-bleeds requested

Re-testing excludes HIV infection

9119 HIV EIA negative tests

Other HIV EIA assays and Western Blot test negative

Reported as HIV negative without need for re-bleed
Discussion

Antenatal HIV testing within the first DHB reached more than 99% uptake amongst women having antenatal blood tests taken. This is encouraging, as high coverage will almost certainly decrease the incidence of mother-to-child transmission of HIV infections.

Others introducing a similar strategy, for example Hong Kong, Northern Ireland, and Ukraine also report very high antenatal HIV testing uptake rates of 97–99.6%.\textsuperscript{12–14} However, although universal screening for HIV in early pregnancy is promoted in the United Kingdom, the majority of antenatal clinics have not yet achieved >90% uptake.\textsuperscript{15}

Likewise, an Australia antenatal clinic reports uptake of less than 90%.\textsuperscript{16} In Canada, areas using an ‘opt-out’ strategy appear to have markedly higher rates of antenatal HIV testing than areas using the ‘opt-in’ approach.\textsuperscript{10} Clinics in Singapore report uptake increasing from 45% to 99% when their policy changed from ‘opt-in’ to ‘opt-out’.\textsuperscript{17}

Introducing a national, rather than a local or regional, policy was crucial to resolving the previously perceived major barriers to a successful New Zealand programme, namely, immigration issues and eligibility for healthcare services.

In terms of the implementation itself, it is unclear which aspect contributed most to our initial success, as implementation occurred on a non-comparative basis. As well as a universal routine-offer voluntary testing strategy, considerable effort went into raising awareness amongst the wider community and amongst healthcare providers about HIV and the potential benefits of introducing this policy change.

GP and midwifery education and training sessions had very positive feedback and flexibility in arranging these proved pivotal to their success. To date, the small numbers of antenatal screens without HIV tests are from an array of providers suggesting declined tests were the women’s choice, and not the result of undue influence from one or two providers. Updates about the Waikato screening programme have been widely disseminated, including local and national media coverage, which will hopefully encourage ongoing participation.

However, there are several outstanding issues. Firstly, although other jurisdictions have achieved similarly high testing rates, healthcare providers need to ensure that New Zealand women understand the revised policy, including their right to decline testing, and that appropriate informed consent standards are being met. This is particularly important in situations where communication may be a barrier, for example for those where English is not their first-language.

Our pre-implementation primary care pilot, planned to evaluate written resources, highlighted that although 86% of participating women reported they had been asked if they agreed to being tested, 12% were unsure. This issue was discussed at length during our implementation and considerable emphasis placed on raising awareness of informed consents standards, with practitioners encouraged that written documentation of the consent process should occur.

Another issue is assessing how many women deliver without known HIV status. Are those who decline to be tested at most risk of HIV infection? Reassuringly, experience
from UK data suggests this is not so,\textsuperscript{18} with those declining testing correctly identifying themselves at very low HIV risk. This needs to be assessed in the New Zealand situation.

Furthermore, some may decline all antenatal tests, may not access any antenatal care or may present late in pregnancy or in labour, with concern being that that they may be at most risk of HIV infection. Early antenatal testing greatly exceeds live births, because of pregnancy losses through miscarriage and termination, and is not a reliable tool for assessing population coverage. Auditing how many women have delivered with unknown HIV status needs to be considered.

With suggested specificities of $>99.8\%$,\textsuperscript{9} low-level reactive EIA results occurred more frequently than expected in the first year but most were in relation to one particular assay. This has been thoroughly investigated. Also, other laboratory changes may see this assay being phased out in the near future. Specificities with the other two assays were as predicted.

Indeterminate results are thought to occur slightly more frequently in pregnancy\textsuperscript{19,20} but, in our experience, this was related to only one assay. There are a number of different HIV antibody tests available in New Zealand so the experiences of other laboratories during the wider rollout should help clarify this issue.

Whilst nearly all who have repeat HIV testing to exclude true infection will not be infected, re-testing may lead to considerable anxiety and stress. Therefore, the approach to date has been to employ at least two different HIV assays as well as Western Blot testing, following an initial low level reactive screening test, with a re-bleed only recommended for those reactive on another assay.

Because fourth-generation assays include p24 antigen, and may react before antibodies develop and seroconversion occurs, a single reactive fourth-generation test prompts a recommendation to re-bleed. Discussions around optimal testing protocols are ongoing and a nationally consistent testing algorithm is in development.

The initial success and high uptake support our approach to local implementation; namely, a universal routine-offer voluntary ‘opt-out’ testing strategy, a multidisciplinary team to identify local issues, development of HIV resources, targeted education to local health care providers and working with local media to disseminate antenatal HIV information to the wider community. Support for our plans from the National Advisory Group, NAHSIAG, and the National Screening Unit was essential.

Other changes in government policy, particularly around immigration and eligibility for healthcare services, undoubtedly played a role. Many issues have been addressed, or are currently being addressed, which should facilitate easier national roll-out.

The identification of two HIV-infected women during the first year (enabling appropriate care for them and their families and significantly reducing their prospects of mother-to-child HIV transmission) confirms the value of our programme. At June 2007, the Waikato DHB remains the only DHB to have commenced screening. The wider roll-out of antenatal HIV testing must be an urgent priority.
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Dumping syndrome presenting three decades after vagotomy

Catherine Patton, Onyebuchi E Okosieme, L Marc Evans

The development of postprandial symptoms in a patient with a previous vagotomy should raise a suspicion of dumping syndrome. We describe a patient who developed symptoms of dumping syndrome 32 years after vagotomy.

Case report

A 65-year-old man was referred to our clinic in July 2005. He had presented to his general practitioner with complaints of unexplained weakness of 6 months duration. An elevated random blood glucose (13.2 mmol/L) had raised the possibility of diabetes. Upon being questioned, however, the patient described episodes of debilitating weakness and dizziness which were usually triggered by meals.

Maximal symptoms occurred between 2 and 3 hours after food and were aggravated by eating a high carbohydrate breakfast or by indulging in fizzy (carbonated) drinks and chocolates. On occasion, he spent whole mornings in bed feeling drained and unable to move.

Figure 1. Prolonged oral glucose tolerance test with a 75g-gram glucose challenge

Weight loss followed from fear of eating. He had no symptoms of polyuria or polydipsia and gave no family history of diabetes. He had undergone a vagotomy 32 years earlier for a duodenal ulcer but had otherwise remained in excellent health. He
was not receiving any medications and neither smoked cigarettes nor consumed alcohol. Physical examination was unremarkable; body mass index was 24 kg/m^2 and blood pressure was 135/74 mmHg. Renal, liver, lipid, thyroid, and haematological profiles were normal. Haemoglobin A1c was 5.4%.

Based on a suspicion of late dumping syndrome, we performed a prolonged oral glucose tolerance test (Figure 1). This showed a normal fasting blood glucose, early postprandial hyperglycaemia, and subsequent hypoglycaemia. A peak insulin rise was observed at 60 minutes and a blood glucose nadir was associated with reproduction of symptoms after 2 hours (Figure 1).

We made a diagnosis of late dumping syndrome and advised the patient to avoid carbohydrate-rich foods and to eat small frequent meals. His symptoms resolved with these dietary modifications and he remains in good health as at his last review in September 2006.

**Discussion**

Dumping syndrome is a recognised complication of most forms of gastric surgery.\(^1\) It is classified into an early and a late form depending on the time interval between food intake and the onset of symptoms. Early dumping occurs within 2 hours of a meal and consists of vasomotor symptoms such as sweating, palpitations, and dizziness as well as gastrointestinal symptoms like nausea, vomiting, and diarrhoea. Late dumping as in this case occurs 2 to 4 hours after food, presenting mainly with symptoms related to hypoglycaemia.\(^1\)

The pathophysiology of the syndrome is poorly understood but is believed to relate to accelerated gastric emptying with rapid absorption of fluids and osmotic substances like glucose leading to hyperglycaemia, a reactive insulin response and subsequent rebound hypoglycaemia.\(^1\) Release of the gut hormone glucagon-like peptide-1 appears to play a role in mediating hyperinsulinaemia and hypoglycaemia.\(^3\)

Symptoms of hypoglycaemia occur 2 to 4 hours after food, are worsened by eating carbohydrate-rich foods, and can be improved by dietary modifications, like reducing carbohydrate intake and eating small frequent meals. Where diet is inadequate to control symptoms, drug therapy with the \(\alpha\)-glucosidase inhibitor, acarbose,\(^3\) or the somatostatin analogue, octreotide,\(^4\) have proven to be beneficial.

The diagnosis of late dumping syndrome is confirmed with a prolonged oral glucose tolerance test which characteristically shows a profile of early postprandial hyperglycaemia, an exaggerated insulin response, and subsequent hypoglycaemia with reproduction of symptoms.\(^1\) The random hyperglycaemia in this case was thus consistent with dumping rather than diabetes which was effectively excluded by the glucose tolerance profile.

Although the symptoms of dumping are easily recognisable in the period following gastric procedures, the diagnosis may not always be apparent especially when symptoms arise many years after surgery. Clinicians should therefore be alert to the possibility of dumping even in patients who present decades after surgery. A careful history and an oral glucose challenge will clarify the diagnosis in most cases.
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Gynaecomastia in a man and hyperoestrogenism in a woman due to ingestion of nettle (*Urtica dioica*)

Mustafa Sahin, Hamiyet Yilmaz, Alptekin Gursoy, Asli Nar Demirel, Neslihan Bascil Tutuncu, Nilgun Demirag Guvener

Abstract

Nettle (*Urtica dioica*) is commonly sold as a herbal tea in Turkey. We report a case of gynaecomastia in a man (in which the only aetiologic factor identified was nettle tea consumption) and a case of galactorrhoea in a woman (in which the only aetiologic factor identified was also nettle tea ingestion).

The term gynaecomastia describes the enlargement of the male breast so that it mimics the female breast in appearance.¹ Gynaecomastia is the commonest condition affecting the male breast.² Breast enlargement in men can occasionally be a sign of serious endocrine or systemic disease and deserves evaluation.

Galactorrhoea (due to hyperoestrogenism) is inappropriate secretion of milk from the breast.³ By definition, it occurs in the absence of parturition or greater than 6 months postpartum in a non-lactating woman.³ Galactorrhoea may also be a reflection of an underlying endocrine disorder.⁴ Herbal products can be associated with galactorrhoea in women.⁵ Nettle tea is a commonly used commercial herbal tea in Turkey. We report one case of gynaecomastia in which the only aetiologic factor identified was nettle tea and another case with galactorrhoea in which the only aetiologic factor identified was also nettle ingestion.

Case 1

A 33-year-old man was admitted to our clinic in September 2006 with unilateral breast enlargement. He had no medical history of smoking or alcohol abuse. The enlargement was elastic and painful upon palpation. He had no galactorrhoea or lymph node enlargement. Results of the rest of the physical examination were normal. Results of all renal, liver, and hormonal function tests (including FSH, LH, oestradiol, β-HCG, AFP, PSA, total and free testosterone levels, and thyroid function) were also normal. These tests ruled out malnutrition, hepatic and renal diseases, gonadal insufficiency, testicular tumours, paraneoplastic syndromes, and hyperthyroidism.

Ultrasound examination of the testes and computerised tomography (CT) of the chest showed no signs of testicular or bronchogenic carcinoma. Breast examination, mammography, and ultrasonography confirmed marked enlargement of the left breast (18×9×9 mm) with a retroareolar glandular component.

There was no traumatic (castration, trauma) aetiology. The patient had drunk nettle tea (2 cups/day) since 1 month before gynaecomastia onset; no other herbal product or drugs were taken.
Consumption of nettle tea was stopped after the diagnosis (September 2006). As a result, ultrasonographic and physical examination revealed a significant decrease in the gynaecomastia (8x5x5 mm) in the 2 months without nettle tea ingestion.

No previous reports of this reaction had been reported. Gynaecomastia simply appeared after the nettle tea was taken. Gynaecomastia was still present but subsided 1 month after stopping nettle tea.

**Case 2**

A 33-year-old woman presented with a history of galactorrhoea for 1.5 years. Her menses had always been regular before the onset of galactorrhoea. A physical examination revealed nothing abnormal apart from the galactorrhoea. She did not have hirsutism, and her Ferrimann-Gallway score was less than 4. She had never taken any medication known to affect prolactin levels or cause galactorrhoea (dopamine antagonists, monoamine oxidase inhibitors, oestrogen-containing pills). Her liver and renal function tests as well as her thyroid function tests were normal.

Early follicular phase oestradiol was very high: 543 pg/ml; FSH and LH levels were low: 1.2 mIU/ml and 1.7 mIU /ml, respectively. Total and free testosterone levels (45.1 ng/dL and 3.02 ng/dL) were within normal limits. And prolactin was 27 ng/ml.

Ultrasound of mammary glands revealed complicated cysts in the right mammary gland. Pituitary imaging was also normal. Then when she was asked in detail, it was discovered that she had consumed stinging nettle (*Urtica dioica*) tea for 1 month before her admission to our clinic.

After 6 weeks of withdrawing the nettle tea, her blood tests were reevaluated. Her oestradiol level decreased to 45 pg/ml, and FSH and LH increased to 5.9 mIU/ml and 2.9 mIU, respectively. Total and free testosterone levels were normal: 51.2 ng/dl and 3.20 ng/dl. Prolactin was 32.6 ng/ml and galactorrhoea decreased.

**Discussion**

While there was no clear relationship between hormone levels and gynaecomastia in Case 1, physicians should be aware that nettle consumption may cause gynaecomastia.

Some herbal remedies have significant oestrogen bioactivity especially soy, clover, licorice, hops, and fo-ti. But no studies about the oestrogenic activity of *Urtica dioica* have been reported in the literature. One aetiology may be the local oestrogenic bioactivity of *Urtica dioica* in the breast tissue of males and females.

In previous studies, *Urtica dioica* was found to have beneficial effects in the treatment of symptomatic benign prostatic hyperplasia (BPH) and no side effects were observed. The postulated mechanism underlying this treatment was inhibition of the binding of sex hormone-binding globulin (SHBG) by polar extracts of stinging nettle to its receptor on human prostatic membranes.

To the best of our knowledge, Case 1 is the first case reported in which *Urtica dioica* may have been responsible for gynaecomastia in a male. Furthermore, Case 2 is the first known case in which the hyperoestrogenic effect of *Urtica dioica* was observed. The possible mechanism for Case 2 may be the binding affinity of polar extracts of
Urtica dioica to SHBG that causes elevated serum oestrogen levels.\textsuperscript{18} A different mechanism may be involved in breast enlargement due to nettle ingestion.

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Trans fats in New Zealand: time for labelling regulations?

Patrick Gladding, Jocelyne R Benatar

Abstract

Trans fats (trans fatty acids) are commonly used for deep frying in restaurants and in the fast food, snack food, fried food, and baked goods industries, often to extend the shelf life of foods. However they are widely considered to be harmful to health. Trans fats were banned in New York City restaurants from 1 July 2007, and there is growing vocal opposition to trans fats in the European Union. Denmark became the first country, in March 2003, to introduce laws regulating the content of trans fats in food (maximum of 2% of edible fats and oils). What are trans fats, what harm do they cause, and should New Zealand also consider imposing mandatory regulations on their use in food? This article explores the issues.

Trans fats have been in the news recently, with trans fats being banned in New York City restaurants from 1 July 2007 and with growing vocal opposition to trans fats in the European Union.¹

Trans fats occur naturally in meat and dairy products at a level of up to 10% of total fat. They are produced by bacterial activity in the guts of ruminants such as sheep and cattle.² Previously this was the only source of trans fats consumed by humans until the process of partial hydrogenation of unsaturated fats was discovered in the early 1900s.³

Partial hydrogenation alters the structural chemistry of unsaturated fats and creates a fat that has a higher melting point, which is less prone to oxidation and hence lowers their rancidity, thus prolonging the shelf life of goods containing them (Figure 1).

Chemically, trans fats are made of the same carbons, hydrogens and oxygen molecules as non-trans fats, but they have a different shape. In trans fat molecules, the hydrogens on the double bonded carbon atoms (characteristic of all unsaturated fats) are in the trans configuration (hydrogens on opposite sides of the double bond) rather than the cis configuration (hydrogens on the same side as the double bond) configuration.

As a result, trans fats are less fluid and have a higher melting point than the corresponding cis fats.

The process of partial hydrogenation led to the development in the 1970s of margarines with a long shelf-life and a smooth spreadable texture.³ Trans fats are also found in shortenings, which are commonly used for deep frying in restaurants and in the fast food, snack food, fried food, and baked goods industries.

The partial hydrogenation of unsaturated fats was initially embraced by health professionals as the new fats substituted the atherogenic saturated fats already used in foods. However, it has since become apparent that trans fats are harmful, with an intake as low as 5 grams per day associated with a 25% increase in the incidence of cardiovascular disease over a 10-year history of exposure.⁴
Figure 1. Chemical structure of trans fatty acids (trans fats)

Not only do trans fats increase low density lipoprotein (LDL), as do saturated fats, but they have the added harmful effect of reducing high density lipoprotein (HDL). Saturated fats have a neutral effect on HDL. The average reduction in HDL that trans fats have over saturated fats is approximately 0.17 mmol/L, for a diet where they make up 10% of the daily energy intake.

Prospective dietary studies have not assessed the effect such a change might have on long-term cardiovascular outcomes. However, based upon data from the Framingham Heart Study, the risk for myocardial infarction increases by about 25% for every 0.13 mmol/L decrement in serum HDL-cholesterol below median values.

More recent data suggests trans fats also affect the expression of genes, promoting a pro-inflammatory state. Furthermore, a recent study has indicated that trans fats are
adipogenic, promoting greater weight gain when compared calorie for calorie with saturated fats.  

New Zealanders initially had a low consumption of synthetic trans fats, due to the low uptake of the earlier margarines in favour of butter as their preferred and traditional spread. However recent growth in the consumption of snack and fast foods in New Zealand is concerning.  

A survey of New Zealand diets in 1997 showed that greater than 42% of dietary fats came from pre-prepared and processed food, compared to less than 30% in 1977. The Environmental Science and Research Unit (ESR) undertook an analysis of the New Zealand food supply in 2006—it found that trans fat levels are generally less than 10% of total fat in items such as pies, margarines, biscuits, and cakes. However, in some imported baked goods, the quantity of undisclosed trans fats is alarmingly high, for example chocolate sandwich cookies (11%) and butter-flavoured popcorn (48% of total fat).  

This finding is concerning as although two ESR reports in 1995 and in 2006 have shown that the trans fats content in foods has been reducing over time, the consumption of processed foods that are often higher in trans fats has been increasing. In the margarine industry, self-regulation and competitive marketing pressures have reduced trans fats, in most spreads, to negligible levels.

It is difficult to define what an acceptable limit for trans fat content in food should be, especially since one of the main sources is from animal products in which the trans fats cannot be eliminated.

As these natural trans fats occur in about 10% of animal fats, any synthetic trans fat content less than this appears small. It has been suggested that synthetic trans fats and trans fats from natural sources (i.e. vaccenic acid) may not be comparable. This statement is as yet unsubstantiated and requires further human research.

The international move to regulate content and labelling of foods with respect to trans fats has been slow. A review of international policies shows a wide range of standards and methods of regulation. In New Zealand under the Australia New Zealand Food Standards Code the trans fat content must be declared on a food label if a nutrition claim is made about cholesterol or saturated, trans, polyunsaturated or monounsaturated fatty acids; or omega-3, omega-6 or omega-9 fatty acids. This code is not always adhered to however; voluntary labelling of trans fat content is also permitted.

Denmark became the first country, in March 2003, to introduce laws regulating the content of trans fats in food; the maximum allowable content of trans fats in fats and oils destined for human consumption in Denmark is 2%.

The European Union is currently reviewing trans fats in the food industry and Australia is drafting recommendations on trans fat intake. In New Zealand, the National Heart Foundation Pick the Tick programme identifies foods containing less than 2% trans fat content. However, other than the Pick the Tick programme, and voluntary disclosure by manufacturers, there is often no other way of knowing the trans fat content of a food product in New Zealand.  

The recent move in New York City to ban trans fats in food products, and have restaurants identify trans fat contents on menus, is an example of strict regulation.
Such a strong (possibly draconian) move in the United States (US) is probably justified because compared with other countries, and even other states in the US, the trans fat content of food in New York City is especially high. Such a strong (possibly draconian) move in the United States (US) is probably justified because compared with other countries, and even other states in the US, the trans fat content of food in New York City is especially high.18

A more universal method of managing trans fat consumption in the US has come in the form of food labelling. From 1 January 2006 mandatory labelling of trans fat content came into effect (Figure 2).

**Figure 2. Sample Nutritions Facts Panel, on a food label in the United States**

![Nutrition Facts Panel](https://www.cfsan.fda.gov/~dms/labtr.html)

On 11 July 2003, the US Food and Drug Administration (FDA) published a final rule requiring manufacturers to list trans fatty acids (i.e. trans fats), on the Nutrition Facts panel of conventional foods and some dietary supplements. This rule came into effect on 1 January 2006.

So what is happening in New Zealand? The Food Standards Australia New Zealand (FSANZ) has conducted a formal scientific review of trans fatty acids in the food
supply and reported back to the Australia and New Zealand Food Regulation Ministerial Council in May 2007.

The Review found that the contributions of trans fatty acids to energy intakes of Australians and New Zealanders was below the maximum of 1% proposed by the World Health Organization (WHO), and comparable to or lower than intake estimates from some countries overseas.

Ministers endorsed the findings of the Review that immediate regulatory intervention was not required and that non-regulatory measures to further reducing the levels of trans fatty acids in the Australian and New Zealand food supply would be the most appropriate action.  

Although the trans fat intakes are lower than that set by the WHO, when a comparison is drawn between New Zealand and Australia nearly twice as much of our trans fat consumption comes from manufactured sources (46% vs 24%). Conversely, more in the Australian diet comes from ruminant sources.

As a non-regulatory measure, New Zealand is working with the Australian Government on a Trans-Tasman Collaboration for trans fats. The primary aim of this Group is to work cooperatively to voluntarily reduce the amount of trans fats in the food supply without an associated increase in the amount of saturated fat. Progress may be reviewed by 2009.

The Group will promote wide implementation of current industry and public health initiatives for reducing the levels of trans fats and increasing consumer awareness and understanding. NZFSA is in the early stages of engaging with NZ industry on practical initiatives on how to reduce trans fats in the food supply. However imported goods, not associated with New Zealand industry, may be “the fly in the ointment.”

What can consumers do to avoid the inadvertent consumption of trans fats? Firstly, if available, consumers can look at contents labelling. Currently some food items such as margarines have voluntary disclosure of trans fats on contents labelling. However, in the US, values less than 500 mg are frequently reported as zero. In New Zealand, if labelling occurs then an absolute amount has to be declared as an average value per serving of food and per 100 g/ 100 ml.

If there is no contents labelling, then baked goods, particularly imported goods (e.g. cakes, biscuits, chocolates), should be avoided, as they may have higher levels of synthetic trans fats.

A general rule of thumb is to distrust foods that you have not baked yourself. Artificial creams or “synthetic butter”, as found in some popcorn brands, may have disproportionately high levels of synthetic trans fats and are particularly risky foods.

Health professionals in New Zealand have not (until now) entered into this debate, perhaps due to the reluctance to promote a switch to saturated fats. We should not be distracted from the public health goal of reducing the overall quantity of saturated fats consumed by New Zealanders. However there is a substantial body of evidence that cannot be ignored pointing to the harmful effects of trans fats. Although an argument exists that self-regulation by the food industry has reduced trans fat content over the last decade, this reduction has trailed behind the growing negative literature.
There are now alternatives to partially hydrogenated fats such as non-hydrogenated vegetable oils, with life-spans exceeding that of the frying shortenings. However even some of these newer oils need to be studied further as there is early evidence that the substitutes are no better than the original trans fats. Also more awareness of what trans fats are, the associated problems in eating them, and what they are found in, would be helpful.

Consumers are presently bombarded with advice on healthy diets and it may be that information overload means a simple, easily identifiable programme like Pick the Tick is a more effective method of persuasion. However a problem with this campaign is that the omission of a tick does not identify foods that have particularly high levels of trans fats.

A further point to note is that the Pick the Tick scheme is voluntary and one that food producers have to pay for, so this cannot always be relied upon to steer consumers in their choices.

Commonsense must prevail and the recent backlash to the proposed restrictions on tuck shop (a small, food-selling outlet in schools) offerings shows that the New Zealand public does not want prescriptive diets. Such steps may be necessary, however, when, despite continued warnings and education in the face of a growing obesity epidemic, behaviour does not change.

Greater awareness by New Zealanders of the health hazards of certain foods like saturated and trans fats is the first step to taking control of the situation. Only then can consumers be given the option of voting with their feet, which cannot be achieved without satisfactory food labelling.

Competing interests: None.

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References:


Doctors exploited by the public


We publish in this number a letter, reprinted from the Christchurch “Press,” by Dr. Fenwick, which opens up a very big subject.

No one can have read the “British Medical Journal” for the last year without seeing that doctors are profoundly dissatisfied with things as they are. No doubt there are a few who have acquired a good position, are making a handsome income, and are perfectly satisfied, but of the Profession in England the bulk of the rank and file, after spending five or six years in going through an arduous course, after investing several thousand pounds in their training, find themselves hardly able to earn a living wage; too many are forced to work for fees which are really degrading, they have to hurry and scamp their work; they are dissatisfied with themselves, the high ideals they set before themselves have one by one to be allowed to fall into oblivion, and too often whiskey or the hypodermic syringe is resorted to to drown their troubles.

There are a number of causes contributing to the present unsatisfactory state of the Medical Profession in Great Britain, and to a lesser degree out here. We will mention a few of them:

Increased cost of living, the army of faith-healers, hypnotists, quacks, etc., who bleed the credulous sick and then hand them, too often impoverished and dying, over to the doctor; the growth of hospitals, and the tendency of those who could afford to pay to seek free hospital treatment; the growth of the Friendly Societies, which now embrace a large number of the well-to-do artisans; the improvidence of the British race; nothing is saved for a rainy day, so when sickness comes along the doctor has to attend for nothing; in these cases he does not even get gratitude, more often abuse; the grateful patients are the ones who always pay.

Lastly, perhaps the most important cause of all is the fact that doctors and scientific men in general, by their efforts, have succeeded in fighting many diseases and largely reducing the number of cases of preventable sickness, thereby cutting down their own incomes.

If the profession were over-manned, would soon right itself; men would seek other more remunerative work. But it is not so; the trouble is that doctors are exploited by the public; they work for nothing in the hospitals, so well-to-do people flock there to be treated for nothing; they are summoned from their beds or their meals to accidents, for which they are never paid; they attend the Benevolent Homes, and numbers of similar institutions, free; and they give ambulance lectures free.

The result of all this is that the time is ripe for some change; whether Dr. Fenwick’s suggestion is a good one or not we are not prepared to say, but we invite discussion on the subject.
Effects of severe passive hyperthermia on cardiorespiratory and cerebrovascular function. J-L Fan¹, R Lucas², L Wilson¹, K Thomas¹, J Cotter², P Ainslie¹. ¹Department of Physiology, Otago School of Medical Sciences; ²School of Physical Education, University of Otago, Dunedin.

Heat-induced hyperventilation causes hypocapnia (reduced arterial CO₂ pressure), which increases cerebral vascular tone and reduces cerebral blood flow (CBF). Hyperthermia also causes hypohydration, which can further elevate ventilation. However, no studies have examined the dose-response relation of hyperthermia and CBF, irrespective of hydration status. This study tested two hypotheses: 1. that a core temperature threshold exists above which hyperventilation occurs, resulting in hypocapnia and compromised CBF and cerebral oxygenation; and 2. hypohydration exacerbates hyperthermic-induced hyperventilation and related hypocapnia, further decreasing CBF.

Ten males, lying supine in a water-perfused suit, underwent normothermic and progressive hyperthermia trials, while euhydrated (EUH) and while hypohydrated by 1.5 - 2.0% body mass (HYPO; attained previous evening). Cerebral artery blood velocity (MCAv; transcranial Doppler ultrasound), cerebral oxygenation (Near-infrared spectroscopy), heart rate (HR; electrocardiography), mean arterial blood pressure (MAP; finometer) and partial pressure of end-tidal carbon dioxide (PETCO₂) were measured continuously at baseline and at 0.5°C increments in core (oesophageal) temperature to +2°C.

In HYPO, baseline MCAv and HR were elevated (P < 0.05 vs EUH). Compared with baseline (P < 0.05; pooled by hydration; repeated measures ANOVA), heating reduced PETCO₂ [-5 ± 1 mmHg at 1°C; -16 ± 4 mmHg at 2°C] and MCAv [-15 ± 3% (1°C); -32 ± 5% (2°C)], with hydration status having no effect on these variables (P > 0.05). MAP was reduced at +1°C, especially in EUH (-19 ± 10 mmHg EUH, -10 ± 8 mmHg HYPO, P < 0.05). Reductions in MCAv with rising core temperature were related to level of hypocapnia (r = 0.95 EUH, 0.97 HYPO, P < 0.05). Cerebral oxygenation was unchanged with heating (P > 0.05).

These results indicate that a core temperature threshold exists, above which hyperthermic-induced hypocapnia and hydration-dependent hypotension occurs. Despite reduced MCAv, cerebral oxygenation is maintained, presumably via greater O₂-extraction.
The influence of chair backrest inclination and lumbar support on resting head and neck posture in sitting. S Horton, G Johnson, M Skinner. School of Physiotherapy, University of Otago, Dunedin.

Forward head posture has been identified as a risk factor for neck pain with some evidence to show that simple ergonomic correction may reduce its incidence. The effect of using a lumbar roll on cervical spine posture has not been previously investigated experimentally, but rather assumed to have positive influence on the basis of clinical views. The purpose of this study was to investigate the possible influence of positional adjustments to the standard office chair and use of lumbar support with a McKenzie lumbar roll on the resting head and neck posture in the sagittal plane, as defined by the craniovertebral (CV) angle.

Thirty healthy male participants aged between 18-30 years were photographed whilst registered in the natural head resting position in four different sitting positions, with and without a McKenzie lumbar roll. The CV angles were measured using the NIH ImageJ software taken from digitized photographs of the eight postural registrations for each participant. Comparisons between all positions were analysed using a linear mixed model and adjusted for multiple comparisons. It was found that the most significant effect on the head and neck position with the lumbar roll in situ was in the backrest 110˚ position (difference = 2.32°, \( P < 0.001 \)). A more forward head and neck posture was correlated with higher body mass index (\( P < 0.005 \)).

Despite the clinical impression that use of a lumbar roll in sitting promotes a more retracted head position, this may not necessarily be the case, at least in young healthy males. Rather, the backrest position of the chair may be the more important factor influencing sagittal alignment of head and neck posture. These results highlight to the physiotherapist the need for consideration of the inherent chair adjustments before utilising ancillary lumbar support when providing postural advice.

Can the cystic fibrosis transmembrane conductance regulator (CFTR) function as a bicarbonate channel? P Mao, A Butt. Department of Physiology, Otago School of Medical Sciences, University of Otago, Dunedin.

Bicarbonate (HCO\(_3\)\(^-\)) secretion occurs throughout the human body. The cellular mechanism by which this secretion occurs is still contentious. One proposed model of secretion involves HCO\(_3\)\(^-\) entering the cell across the basolateral membrane via a NaHCO\(_3\) co-transporter and being secreted across the apical membrane via the cystic fibrosis transmembrane conductance regulator (CFTR), a recognised chloride channel. In this study CFTR from possum intestine which only secretes HCO\(_3\)\(^-\) has been utilised to investigate the possibility that CFTR can function as a HCO\(_3\)\(^-\) channel.

Fischer rat thyroid (FRT) cells previously transfected with possum CFTR (pCFTR) were cultured and used in whole-cell patch clamping. Cells were clamped between -100 and +100 mV in 20 mV steps and the current was recorded. Initially it was investigated whether pCFTR had the same functional properties as CFTR from other species. pCFTR was found to be similar to other species. A chloride current was stimulated following an increase in intracellular cAMP (\( I_{cl}^{80\text{mV}} \) before = 27 ± 8, mean ± SEM; \( I_{cl}^{80\text{mV}} \) after = 1558 ± 474; \( n = 5 \)). This current was time- and voltage-independent, and inhibited by CFTR inhibitor-172 (1 \( \mu \)M) (\( I_{cl}^{80\text{mV}} \) before = 587 ±
I\textsubscript{cl} \textasciitilde\textasciitilde \textasciitilde 80mV after = 29 \pm 4; n = 4). Subsequently it was shown that pCFTR is permeable to HCO\textsubscript{3}\textsuperscript{−} (P\textsubscript{Cl}:P\textsubscript{HCO3} \approx \textasciitilde0.25). However, HCO\textsubscript{3}\textsuperscript{−} also caused a time-dependent inhibition (I\textsubscript{cl}\textasciitilde\textasciitilde 80mV before = 403 \pm 148, I\textsubscript{HCO3}\textasciitilde\textasciitilde \textasciitilde 80mV after = 152 \pm 96; n = 4), an effect that was irreversible.

These results show that pCFTR has a significant but low HCO\textsubscript{3}\textsuperscript{−} permeability. This low permeability of pCFTR, combined with the fact that it is inhibited by HCO\textsubscript{3}\textsuperscript{−}, suggests that it may not have the properties to function as a HCO\textsubscript{3}\textsuperscript{−} channel in secretory epithelia. However, for this to be confirmed experiments on native tissue need to be conducted.

Effects of intracerebroventricular microinfusion of agmatine on spatial learning and memory. M Rushaidhi, P Liu. Department of Anatomy and Structural Biology, Otago School of Medical Sciences, University of Otago, Dunedin.

Agmatine, the metabolite of L-arginine, is a novel neurotransmitter. It binds to $\alpha$-adrenergic and imidazoline receptors, blocks N-methyl-D-aspartate receptors and regulates production of nitric oxide and the polyamine putrescine. Several previous studies have investigated the effects of agmatine administered systemically on learning and memory and the overall findings are controversial. The present study investigates the effects of intracerebroventricular microinfusion of agmatine on spatial learning and memory using the radial arm maze task.

Adult male Sprague-Dawley rats anaesthetised with halothane were implanted with a cannula into the lateral ventricle. Behavioural testing was begun 10 days post-surgery. Agmatine (10 $\mu$g in 5$\mu$l, n = 9) or saline (5$\mu$l, n = 9) was infused into the lateral ventricle over 2 min. The rats were tested 7 min after completion of the treatment. In the standard version of the task, the agmatine-treated group made significantly less errors over 5 days of training compared to the saline control group (agmatine: 8.8 \pm 1.0, saline: 15.7 \pm 2.8, mean \pm SEM, $P < 0.05$, unpaired $t$-test) with no significant difference between the two groups in the number of adjacent arm entries. By contrast, in the reference memory version of the task there was no significant difference between the agmatine and saline groups in the number of trials to reach the criterion or the number of errors made across the first 5 days of training.

The present study, for the first time, demonstrates the facilitating effect of agmatine on the spatial working memory, but not the reference memory, version of the radial arm maze task. These results suggest that agmatine may have an important role in modulating learning and memory in a task-dependent manner.

Investigation of the conformational change and interdomain interface of the DnaK molecular chaperone. F Short, S Wilbanks. Department of Biochemistry, Otago School of Medical Sciences, University of Otago, Dunedin.

The 70 kDa heat-shock proteins (Hsp70s) are ubiquitous molecular chaperones that function primarily to assist protein folding by binding to non-native protein states. They also have additional diverse roles such as uncoating of clathrin-coated pits in synaptic vesicle fusion. These functions depend on the ability to bind and release hydrophobic peptides in an ATP-dependent manner. DnaK is the Escherichia coli
Hsp70 homologue, and like all Hsp70 proteins DnaK consists of an ATPase domain and a peptide-binding domain. Two-way allosteric communication between domains is essential to Hsp70 function, and involves a global ATP-induced conformational change. The aim of this research was to derive a structural model for the conformational change and domain arrangement of DnaK in both ATP-bound and nucleotide-free states, using fluorescence resonance energy transfer (FRET) and small-angle X-ray scattering (SAXS).

SAXS analysis showed that DnaK undergoes a dramatic compaction on ATP binding, from a radius of gyration of 37 Å to 28 Å, and also demonstrated that the two domains of DnaK do not interact in the nucleotide-free form. FRET analysis showed that in ATP-bound DnaK the distances from residue 102 of the ATPase domain to residues 413, 449 and 517 of the peptide-binding domain were 29 ± 4 Å, 25 ± 5 Å and 21 ± 3 Å respectively, while in nucleotide-free DnaK residue 449 was 30 ± 4 Å from residue 102, and other residues were too distant to measure. Using results from both methods, a model was developed for the arrangement of the ATPase and peptide-binding domains in ATP-bound DnaK. These results, supported by information from previous studies, suggest a mechanism of interdomain communication where the two domains do not interact in the absence of ATP, and come together when ATP binds to mutually affect each other’s activity via a specific interface.

Rabbit haemorrhagic disease virus (RHDV) virus-like particles (VLPs) activate human dendritic cells when co-delivered with a ‘danger signal’. Z D’Costa, V Ward, S Young, M Baird. Department of Microbiology and Immunology, Otago School of Medical Sciences, University of Otago, Dunedin.

Virus-like particles (VLPs) are highly immunogenic inert shells formed when viral capsid proteins self-assemble into particulate structures. They can be used as carriers for vaccine antigens. The present study investigates the ability of rabbit haemorrhagic disease virus (RHDV) VLPs to activate human monocyte-derived dendritic cells (MoDC), which are necessary to initiate an immune response. Since RHDV does not infect humans, there is no destructive pre-existing immunity to these VLPs.

RHDV VLPs were prepared using a recombinant baculovirus expression system and their integrity was demonstrated by transmission electron microscopy. When human MoDC were pulsed with varying concentrations of native RHDV VLPs for 24 h, they did not up-regulate cell surface activation markers including major histocompatibility complex (MHC) class II, CD80 and CD83. However, addition of an adjuvant polyriboinosinic-polyribocytidylic acid (Poly(I:C)) to the VLPs induced MoDC to up-regulate the characteristic MoDC activation marker, CD83 (52 ± 6%, mean ± SEM, n = 8, P < 0.005; paired t-test compared with the negative untreated control cells 14 ± 5%, n = 8). MoDC from a range of genetically different donors activated by this combination were shown to produce significantly more interleukin (IL)-12, a cell-mediated immunity driving cytokine, intracellularly (69 ± 8%, n = 5, P < 0.01) compared to the MoDC treated with either Poly(I:C) (34 ± 9%, n = 5) or RHDV VLPs (27 ± 6%, n = 5) alone. Significant levels of IL-12 were also found in the supernatants of these activated MoDC (229 ± 45 ng/ml, n = 5) compared to negative controls (0 ng/ml).
Since IL-12 induction is essential for a vaccine to protect against intracellular infections and tumours, this work suggests that RHDV VLPs co-delivered with a ‘danger signal’ by way of Poly(I:C) adjuvant may provide effective vehicles to enhance human immunity to such antigens.
Cough and wheeze

Rauf Gorur, Erdogan Kunter, Turgut Isitmangil, Nurettin Yiyit, Hatice Kaya, Fatih Candas, Guner Sonmez

Problem

What is it, where is it, and how did it get there?

Figure 1
Answer

A 20-year-old man was admitted with mild cough and wheezing for 1 month. He had been treated for upper respiratory tract infection and bronchitis in a local hospital. The patient was in mild respiratory distress and unable to answer questions clearly, but a friend gave a history that nail clippers may have been aspirated during an epileptic seizure.

A chest X-ray showed the presence of *nail clippers in the left main bronchus* (Figure 1).

Fiberoptic bronchoscopy was performed under general anaesthesia through a single lumen (9.5 mm) endotracheal tube. The foreign body was captured by alligator forceps and removed from the left main bronchus with a fiberoptic bronchoscope and endotracheal tube (Figure 2).

Discussion

Most of the cases with foreign body aspiration involve children between 1 and 3 years of age. In addition, different objects are more frequently aspirated in different parts of the World.
This condition is uncommon in adults, and adult patients frequently have an underlying condition such as submental retardation, or alcohol or sedative abuse. Most adult patients with a foreign body in the bronchial tree have a strong history suggesting aspiration.

Occult foreign body aspiration usually lacks specific symptoms. It may present with coughing or sense of choking initially, followed by a long latent period. Severe symptoms, including relapsing pneumonia, purulent expectoration, and haemoptysis, occur late.

Bronchial foreign bodies are mostly in the right main bronchus in adults, due to the position of the carina, but some studies have reported that the left main bronchus was the most common location of the foreign bodies (or equal to the right), with no clear explanation for these occurrences.

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An unusual chest X-ray mass!
Shoaib Faruqi, Ibrahim K Djoukhadar, Muthu Thirumaran, Simon Williams

A 76-year-old male who was a current smoker had a chest X-ray performed for symptoms suggestive of a lower respiratory tract infection (Figure 1). He did not have any haemoptysis or weight loss.

*Figure 1. Chest X-ray showing a lesion in the right middle zone*

The X-ray was appropriately reported as showing a large soft tissue mass in the right middle zone 10 centimetres in diameter with a smooth superior and lateral outline and ill-defined medial and inferior margins, projecting over the upper pole of the right hilum. A computed tomography scan and chest referral was subsequently suggested.

The radiological finding had a rather benign explanation. On inspection, over the anterior chest wall there was a large sub-cutaneous swelling consistent with that of a lipoma (Figure 2). This had been present for more than 20 years. It corresponded to the shadow on the chest X-ray. A lateral film confirmed that there was no
parenchymal lung lesion and it was the lipoma which was the cause for the radiological shadow.

**Figure 2. Lipoma on the right anterior chest wall**

This case emphasises the importance of interpreting radiological findings in the appropriate clinical context. It also demonstrates the importance of a lateral film in delineating the anatomical position of a chest lesion.

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Freedom of speech in the United States

The office of the surgeon general in the US dates from 1898. Nowadays the holder has little power and no budget but is considered “the nation’s doctor,” charged with giving truthful scientific information to the public.

Richard Carmona, the last surgeon general, told the House of Representatives Committee on Oversight and Government Reform that he had been instructed to mention President Bush three times on each page of his speeches.

And he had been forbidden by the Bush administration to speak on topics such as stem cell research, emergency contraception, sex education, health of prisoners, mental health, secondhand smoking, and global health issues.

BMJ 2007;335:114.

Pneumonia—CAP, HAP, and now HCAP?

Pneumonias have traditionally been classified as community or hospital acquired (CAP or HAP respectively) and this classification is used to guide diagnosis and treatment decisions.

This paper from Barcelona makes the case for health-care associated pneumonia (HCAP)—i.e. pneumonia in those living in community hospitals or rest homes. They analysed their data and found that HCAP subjects were older, sicker, and had more comorbidities that the CAP subjects—no surprises there!

Aspiration pneumonia and more virulent bacteria were also seen more in the HCAP subjects. They conclude that these patients require a targeted approach when selecting empirical antibiotic therapy.


Reducing macrovascular and microvascular outcomes in patients with type 2 diabetes mellitus.

Hypertension aggravates the risk of vascular events in those with diabetes. The ADVANCE trial, which involves 215 centres in 20 countries, has randomised 11,140 such patients to a fixed combination of perindopril and indapamide or placebo, irrespective of initial blood pressure levels or the use of other blood pressure lowering drugs.

At 4.3 years of follow-up, those taking perindopril and indapamide had lower blood pressure (5.6 mm systolic, 2.2 mm diastolic) than those on placebo, and a 9% reduction in relative risk of major macrovascular or microvascular events (placebo 16.8%; intervention 15.5%; absolute risk reduction 1.3%). The overall relative risk of death was reduced by 14% in the treatment group.
Very good. An editorial commentator points out that the majority of the placebo arm patients were also taking an ACE inhibitor and diuretic. He commends the trial results but concludes his commentary by saying that lowering the blood pressure is what counts, not the way by which it is lowered.


Neglected diseases

*Nature*, in 8 papers, considers this topic with contributions from physicians, scientists, the WHO, and drug companies. We are talking about diseases, affecting millions in “third world” countries—tuberculosis, sleeping sickness (African trypanosomiasis), Chagas’ disease, leishmaniasis, etc.

In the introductory paper, Declan Butler sums up the problem as follows—academia has traditionally restricted its role to basic research. Subsequent development is then left to the pharmaceutical industry. But when it comes to neglected diseases—those that disproportionately affect poor and marginalized populations—the drugs and vaccines have low returns, so commercial firms cannot fork out for the expensive development. As a result, there is a ‘translational gap’ in which promising research leads sit on the shelf, and potential drugs and vaccines go undeveloped.

All is not gloom and gloom—a variety of cooperative ventures involving the WHO, governments, philanthropic institutes, and the drug companies are explored in these papers.


Treatment of agitation in Alzheimer’s disease—is donepezil the answer?

The authors of this paper remind us that Alzheimer’s disease causes a progressive decline in cognitive and functional ability and distress on the part of both patients and their caregivers.

More specifically, agitation and related syndromes that includes anxiety, irritability, and motor restlessness, leading to behaviours such as pacing, wandering, shouting, and aggression is very common and is seen in approximately half of such patients living in residential care.

Hence a 12-week randomised trial comparing donepezil (a cholinesterase inhibitor) with placebo in 272 patients who lived in residential care or with a carer in the community.

Alas, donepezil was no more effective than placebo.

Trends in hospital bed utilisation in New Zealand

Professor Malcolm\(^1\) has drawn attention again to the important concept that performance of providers in the New Zealand Health Service is not necessarily equal. If those who perform poorly can learn from those who perform well, overall performance will improve.

Figure 5 of Malcolm’s paper shows, based on Ministry of Health data, a 43% variation in standardised discharge ratios among the NZ District Health Boards. Although deficiencies in the standardisation process for age, gender and casemix on the one hand (and differing socioeconomic factors on the other) may have contributed to the apparent variation, the probability remains that some Health Boards use their resources more efficiently than others.

Measurement of performance needs to be applied more selectively throughout the Health Service. How effectively is breast cancer diagnosed and treated in different parts of New Zealand? How effectively are antibiotics used in different general practices? Performance in delivery of treatment is most easily measured for common diseases which have a relatively stereotyped clinical course.

For instance, in acute myocardial infarction, Ellis et al\(^2\) have shown that provincial hospitals perform less effectively than metropolitan hospitals in carrying out cardiac investigations. And I have suggested that a similar audit should be carried out of the pre-hospital phase of acute infarction.\(^3\)

In most cases, data are already recorded routinely so that comparisons could be made and acted upon, and advances in information technology will make this progressively easier to do. In the past, comparison of doctors’ performances would have been unthinkable, but the world has changed. In the UK, performance of individual cardiac surgeons has been compared,\(^4\) performance of individual hospitals in delivery of thrombolytic treatment is routinely assessed\(^5\)—and the best performing hospitals (according to a number of criteria) have been freed from direct government control, in order to allow greater freedom and flexibility.\(^6\)

There are many opportunities in our unified health system with integration of primary, secondary, and tertiary care for performance to be measured, with the prospect of general improvements in efficiency and effectiveness of care for our patients.

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References:


A good catch

It was refreshing to read *Passing the buck: clinical handovers at a New Zealand tertiary hospital* [http://www.nzma.org.nz/journal/120-1264/2778/](http://www.nzma.org.nz/journal/120-1264/2778/) (by McCann, McHardy, and Child) which compared and contrasted junior doctors’ and nurses’ views about the need for handover between shifts, and their assessments of the quality of the process and the likelihood that avoidable adverse events were occurring in the absence of adequate processes.

As Dan Carter might have said, “When I pass the ball, three things can happen and two of them are bad.”

Complex systems involve many gaps—discontinuities of care—between people, teams, stages, processes, institutions, etc. As the Institute of Medicine pointed out,1 the loosely coupled (but intricate) networks of individuals, teams, procedures, regulations, communications, equipment, and devices (that function within such diverse and diffuse management, accountability, and information structures) make the term health system a misnomer.

“Thousands of handovers are occurring every day, in hospitals, doctors’ rooms, laboratories, etc. Every one is like a complex electrical circuit: push the wrong button, leave a switch open, drop a live wire, or spill a little coffee on the machinery, and a vital record, even a life can go up in smoke.”2 The most comprehensive guidance for these unremitting handover requirements comes from the US Department of Defense.3

Since acknowledgement of the need for effective handover has been inconsistent and change has been slow, contributions from the group that will provide the leaders of the future might stimulate the development of safer systems. McCann et al responsibly recognise that, “as junior doctors’ hours of work decrease,” the communication and coordination of patient information becomes of crucial importance, as the best known substitute for the stability of care, traditionally provided by carer continuity.”

The study also reminds us that it was Elihu Schimmel and fellow residents who were the first (from a prospective study in a Yale teaching hospital) to report the hazards of hospitalisation. They discovered that 20% of the patients at risk suffered from what is now called an adverse event—death, disability, or prolonged hospital stay as a result of their treatment, not their disease.

Because staff in training frequently move between departments and hospitals, stable safe handover systems should be established by the medical leaders and departmental managers working with them, and new team members should be orientated to the process. Shift handovers should be multidisciplinary where possible, supervised by a leader, and communication between outgoing and incoming staff, to exchange task-relevant information, is inadequate when dependant on bits of paper. The relevance of the asterisk beside a patient’s name only became obvious when the cardiac arrest call came, because without read back it was overlooked that the asterisk was intended to draw attention to a rising serum potassium level.
“Moving paper from one place to another is always a dicey matter. It can get misrouted, lost, trapped between two other bits of paper, slip behind the desk and become invisible, be placed in the wrong file and—ultimately—it can contain the wrong information, or even if it is the right information it can be misinterpreted or ignored.”

That Nursing is better aware of the necessity and has developed better handover processes, is probably attributable to longer experience of shift working.

“Every handover takes place over potentially hazardous gaps and some of these are wide enough to drive an ambulance through” but in practice overt failure can often be avoided by identification and bridging done at the sharp end.

Since developing handover processes and assessing their effectiveness provides outstanding learning opportunities, McCann et al are to be commended for the potential of their little study to contribute to training and service.

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References:
General practice rotations for house officers: factors to consider


The subject of general practice rotations for House Officers is indeed worthy of consideration and debate, and (as outlined in the paper) there are several potential benefits for the medical profession, general practices, and patients. The paper describes "two major factors" emerging as potential barriers for general practice rotations: consultation space and financial cost to the practice.

However, I would like to point out some others which were not mentioned:

- I hope that future studies on the feasibility of such rotations also actually ask the House Officers themselves how they feel about such rotations. This is particularly important if they are to be made compulsory as the study notes the Medical Council is considering. It is seductive to bemoan the all-too-quick specialisation and the lack of width of experience of our current medical graduates (in addition to the constant challenges of recruiting enough GPs), however the counter argument is the ever-increasing length of medical training—how long do we need to train before we are finally free to choose our own career pathways?

- With registered medical officer (RMO) shortages already existing within our hospitals, particularly in post graduate year 1 (PGY1) and PGY2 years, how are these proposed rotations to be filled?

- Costs of accommodation, travel, and/or relocation for RMOs who undertake such runs (either voluntarily or by compulsion) would need to be considered, and were not discussed in this paper.

Whilst the proposal for PGY1 and PGY2 House Officers to undertake GP rotations do have merit, I hope that the impact on all parties will be properly considered and done in consultation with RMOs.

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Response to the letter by Bolland et al on defining vitamin D deficiency

Bolland et al state that there is no clinical trial evidence that increasing vitamin D levels impacts favourably on non-skeletal outcomes.1 This is not true. In our paper,2 we referenced Lappe et al which showed that improving calcium and vitamin D status substantially reduces all-cancer risk in postmenopausal women.3 This was a rigorously conducted 4-year population-based, double-blind, randomised placebo-controlled clinical trial in which mean serum 25-hydroxyvitamin D was raised from 72 to 96 nmol/L.

More recently, a meta-analysis4 of 18 independent randomised controlled trials, including 57,311 participants, showed a relative risk for all-cause mortality of 0.93 (95% CI 0.87–0.99). Daily doses of vitamin D supplements varied from 300 to 2000 IU. The trial size-adjusted mean daily vitamin D dose was 528 IU.

In 9 trials, there was a 1.4- to 5.2-fold difference in serum 25-hydroxyvitamin D between the intervention and control groups. There was neither indication for heterogeneity nor indication for publication biases. Moreover, the summary relative risk did not change according to the addition of calcium supplements in the intervention.

Three other randomised controlled clinical trials give some pointers to the reasons for the reduced mortality. A single dose of vitamin D significantly enhanced tuberculosis contacts’ antimycobacterial immunity in vitro.5 Trials of vitamin D for the prevention of infections6 and falls,7 while failing to show statistically significant effects; did, consistent with hypotheses, observe fewer infections (by 20%) and fewer fallers (by 18%) in the vitamin D-treated groups.

Regarding expert consensus on the optimal serum 25-hydroxyvitamin D concentration, the median of the values favoured by each member of the panel of six experts8 referred to by Bolland et al was 75 nmol/L. This is the same value we used.2 It is emerging that vitamin D has a greater role than maintenance of skeletal integrity9 and that the clinical community needs to broaden its field of view away from the sharp skeletal focus of Bolland et al. Supportive evidence-based medicine is already present in the literature.3–7

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References:


A simple gene test for lactose intolerance/adult hypolactasia

The predominant sugar in the milk of lactating mammals is lactose (milk sugar). Lactose cannot cross the enterocyte plasma membrane and must be hydrolysed to its component monosaccharides glucose and galactose by the enzyme lactase, which is present on the luminal surface of the duodenal mucosa. All mammals exhibit a maturational decline in lactase activity after weaning, but in certain groups of humans lactase activity continues into adulthood (lactase persistence).¹

Lactose tolerance, a direct result of lactase persistence, is found predominantly in Caucasian populations of northern European origin.² Most of the New Zealand population, for example, can consume milk and other dairy products with no apparent ill-effects. They may well be surprised to learn that much of the world’s human population cannot drink appreciable quantities of dairy milk as adults without developing distressing symptoms of lactose intolerance.

Lactase nonpersistence is the ancestral condition, and it was only with the advent of pastoral farming and dairying some 10,000 years ago that a positive selective pressure for lactose tolerance emerged. Recent studies by NS Ettanah and coworkers³ established the existence of a single nucleotide polymorphism (SNP) some 14 kilobases upstream of the lactase gene on chromosome 2q21. This locus exhibits a C>T substitution at position -13,910 which highly correlates with the existence of lactose tolerance/non-tolerance.

Individuals who are C/C homozygous at this locus are lactose intolerant, while those with the genotypes C/T or T/T are tolerant. The identification of this polymorphism has allowed for the development of a simple genetic test for lactose tolerance/non-tolerance.

The extent of lactose intolerance (adult hypolactasia) within the New Zealand population has not been formally determined, but overseas data⁴,⁵ and preliminary work in this laboratory suggest that it is significantly underestimated. The recent and continuing influx of Southeast Asian peoples into this country will also result in an increased number of New Zealanders who exhibit lactose intolerance.

The identification of a simple genetic test for adult hypolactasia is a significant advance on previous methods of diagnosis. These extant methods are both time- and labour intensive, and require specialist facilities. The lactose hydrogen breath test (LHBT) is carried out in a clinical setting, and lacks both formal standardisation and sensitivity. It also requires travel to a tertiary referral centre.

The gold standard for genetic disaccharide deficiencies is an in vitro assay of enzymic activity in biopsy samples, with obligatory endoscopic sampling, a necessarily invasive procedure. The lactose tolerance test is analogous to a glucose tolerance test, with an oral loading of lactose in a fasting subject, followed by sampling of blood over a 2-hour period. A doubling of blood glucose over this time indicates that the subject is lactose tolerant. Commonly, a diagnosis of lactose intolerance has been a diagnosis by exclusion, based on an empiric trail of dietary avoidance.
Non-tolerant subjects have a highly variable tolerance to lactose. One study of 30 people self-identified as severely lactose-intolerant found that 9 of these individuals were able to absorb lactose. The other 21, who had lactose intolerance confirmed by LHBT, could ingest 240 mL of dairy milk daily over a one-week period without significant symptoms. It is clear that other factors (e.g. length of the large bowel) affect the individual patient’s ability to tolerate a lactose load.

The genetic test for adult hypolactasia requires only 5 mL of blood. Thus there is no need for the patient to travel further than a GP’s surgery. This test is roughly half the cost of a LHBT. The assay involves a robust PCR, followed by restriction endonuclease digestion. Fragments of the DNA amplicon are separated by agarose gel electrophoresis, and the genotype is established unequivocally from the digestion pattern (Figure 1).

**Figure 1. Agarose gel electrophoresis (100V) of amplicon fragments**

C/C: 210 and 90 bp (lanes 1 and 5)
C/T: 210, 148 and 90 bp (lanes 4 and 6)
T/T: 148 and 90 bp (lanes 2 and 3)
Gel: 3% Agarose MS; L(add): φX174 RF DNA/ Hae III fragments

An appropriate use of genetic testing would be to exclude adult-onset hypolactasia as a cause of non-specific intolerance symptoms which may derive from a multiplicity of causes. Detection of the -13,910 C/C genotype would not constitute proof that a patient’s symptoms resulted from hypolactasia, but detection of the C/T or T/T genotypes would essentially rule out primary lactase deficiency as a cause of patient symptomatology.
In summary, the recent identification of DNA polymorphisms associated with lactase nonpersistence or persistence permits analysis of the genetic predisposition for lactose maldigestion by standard molecular biological techniques.

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References:
The case for echocardiography in non-ST elevation myocardial infarction in New Zealand

International guidelines recommend echocardiography in the management of patients admitted with non-ST elevation myocardial infarction, but in New Zealand echocardiography is not included in the national non-ST elevation acute coronary syndrome guidelines and only 22% of patients undergo this investigation.1-3

Furthermore, utilisation of echocardiography is highly variable around New Zealand.4 We examined the diagnostic yield of echocardiography in 77 consecutive inpatients with non-ST elevation myocardial infarction (NSTEMI) treated with coronary artery angioplasty at Christchurch Hospital. Mean age was 64±1 years; 72% of patients were male. Mean ejection fraction (EF) was 58±1%.

Eleven patients (14%) had an EF of less than 45%. Regional wall motion abnormalities were identified in 60%. In 89% of these cases the culprit artery was correctly predicted by the echocardiogram. As expected peak troponin T was significantly higher in cases where the culprit artery was accurately identified but there was a large overlap with the range in which the culprit was not identified. Peak troponin T level was not able to predict the diagnostic yield of echocardiography, and did not predict ejection fraction.

This data demonstrates in a New Zealand setting a high utility for echocardiography in NSTEMI patients who are candidates for intervention. In some instances the degree of troponin elevation has been used to prioritise for echocardiography. This approach is not supported by our data, where troponin T elevation was not related to the likelihood or extent of echocardiographically identified LV dysfunction.

Echocardiography is a limited resource and it is therefore important to make decisions on allocation on the basis of the best possible information. Unfortunately there is little data available from which to directly compare the clinical utility of various indications for echocardiography. Our data demonstrates the high yield of echocardiography in NSTEMI, a condition for which only 22% of New Zealand patients get a scan. It should be seen as strengthening the case for improved access to echocardiography for all patients in New Zealand.

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Janet Frame and autism? Response from a Frame scholar

As a Frame scholar, I read the viewpoint article (12 October 2007 issue of the NZMJ; http://www.nzma.org.nz/journal/120-1263/2747) by Sarah Abrahamson on Janet Frame with astounded interest. It struck me as bizarre from the very first line. Surely Janet Frame is one of New Zealand’s most well-known authors and Abrahamson has got her tense wrong? But that is not the most serious mistake she makes.

She states in the next line that Frame’s “formal psychiatric diagnosis, however, has not been clear”. On the contrary, her formal diagnosis, given in New Zealand, was not only horrifyingly clear, but dangerously incorrect, and was revoked by a group of psychiatrists at the Maudsley Hospital in London, 12 years later.1,2 It seems that Antipodeans are determined to repeat that original mistake, because Abrahamson, regretting that “no alternative diagnosis has been widely canvassed”, now wants to impose “strong autistic features” on Frame, using a (mis)reading of Frame’s Autobiography as her only evidence. It’s like accusing Agatha Christie of murder!

I’d like to know whether, in Australia and New Zealand, it is an accepted part of the medical profession to make a diagnosis without examining the person concerned. Here in Europe, that is out of the question. And anybody who has the slightest idea of how literature functions knows that one can’t confuse a text with the person who wrote it.

Moreover, Abrahamson’s ‘analysis’ of the Autobiography is blatantly unconvincing. She uses a literal reading of the title of the first volume To the Is-land as proof of hyperlexia, revealing thereby that she is not acquainted with figurative language and failed to pick up the play on multiple meanings that Frame so obviously exploits.

Instead of accepting Frame’s account of her poor family background as leading to the young Janet’s social struggle at school, she discovers autism. Could an autistic child of 10 become Dux, as Frame did, at the Oamaru North School?3 According to her article, Abrahamson even considers that a person who has a strong interest in poetry, or a talent in mathematics, has the symptoms of autism. Her definition is so wide, it could include almost anyone.

What is the use of publishing an article like this? And what is the use of trying to diagnose a dead author? Is it a bid for fame at Frame’s expense that drives Abrahamson to risk showing her ignorance in public? It doesn’t add anything to our knowledge of Frame and is in extremely bad taste.

Her biographer, Michael King, points out that, because of an inaccurate medical diagnosis, Frame herself struggled against these types of allegations all her life.4 Isn’t it time to leave her in peace?

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Disclosure: One-third of my doctorate was on Janet Frame, and I published a book *Surfaces of Strangeness: Janet Frame and the Rhetoric of Madness* on her work in 2003. More than half of the latter deals with Frame's Autobiography. Additionally, I have taught her work repeatedly at the University of Geneva.

References:

3. Frame, ibid, p69; King, ibid, p35.
4. King, ibid, p388.
Response to the letter by ASH on smoking and taxation

I thank Ben Youdan for his letter (http://www.nzma.org.nz/journal/120-1264/2786) responding to my prior editorial (http://www.nzma.org.nz/journal/120-1263/2756) in which I cited the McLeod Tax Review’s finding that smokers contribute more through cigarette taxes paid than they cost the public purse via the health costs of their smoking.

Youdan counters that tobacco taxes generate $1 billion per year while the cost of treating smoking-related diseases runs to about $200 million, which seems to support my argument. He then cites the O’Dea report on tobacco taxation which apparently tallies many other costs.

I wish I could check that report. When I first heard of its existence, I emailed Mark Peck of the Smokefree Coalition for a copy. The response I received 5 September was that the final report would soon be online but that some fixes were needed following peer review: I was promised a copy but have yet to receive one. Before writing my editorial, I again looked for the report as it seemed likely to be relevant—it still wasn’t available.

After Ben Youdan’s reply to my editorial, I emailed him asking for a copy of it. His reply of 30 October noted that it was perhaps “a bit of a liberty to cite it without being able to share the calculations” and that I would not be given a copy of the report until he’d been able to secure the permission of other organisations involved in its production. I’m still waiting for a copy. A recent working paper of mine proves that honest scholarly discourse requires that cited sources be openly available,¹ but please don’t ask me for a copy.

Youdan uses the ASH-commissioned report to add in other costs of smoking: cigarette breaks and lost productivity, among others. When I teach my students about cost benefit analysis, I warn them about a few tricks that motivated people can and do use, either ignorantly or deceitfully, to make it seem as though a policy proposal passes cost benefit analysis.

Here, the factor not accounted for is that employers pay less to less productive employees: we have reasonable evidence that smokers earn less than non-smokers.² These are costs borne by the smoker and not imposed on other people. As such, they do not confer an externality and do not cause inefficiency as economists define the terms. We consequently cannot honestly tally them as external social costs of smoking.

Economists often criticise policies that are harmful to economic growth, but only where such policies induce inefficiency. If individuals choose leisure over work and economic growth suffers as consequence, there’s no inefficiency involved. Economists don’t complain when people take vacations. Similarly, people choose tobacco: if they’re then less productive, earn less, and GDP is lower, there’s no inefficiency and no particular cause for concern.
If we start adding in costs that individuals themselves bear as part of an overall cost-benefit analysis, rather than just considering costs to the public purse, we’d then need to include the benefits of smoking as experienced by smokers: counting only the costs necessarily biases any such analysis.

I’d like to invite Ben Youdan to attend my second year paper in which I cover these issues, or at least to send me a copy of his report so that I can confirm that his results aren’t driven by these sorts of practices.

Youdan also suggests higher taxes as a mechanism for reducing tobacco consumption. If tobacco addiction “totally undermines [smokers’] freedom to choose”, increases in cigarette taxes are not likely to prove effective. Empirical work does suggest that smoking is price sensitive, but that also does undermine the hypothesis of smoker helplessness.

I’m delighted that Edwards et al also have responded to my sally. I’m especially delighted that, where their prior letter suggested that increased taxes were demanded by rational analysis, and insinuated that failure to adopt these policies pointed to the workings of special interest groups, they now seem happy to admit a more paternalistic motivation: “health goals are worth achieving in themselves”. I’m glad that we’ve been able to put to one side the argument that taxes on cigarettes or alcohol are meant to address inefficiencies, because there’s no inefficiency there to be addressed.

I completely agree with Edwards et al that economists often focus too closely on a narrow conception of efficiency. But, economists typically move to the use of a social welfare function to define notions of the public good; such functions will typically include much broader outcomes than GDP. The nice thing about a social welfare function is that it forces the economist to be explicit about his weightings of the various good things. If a policy improves environmental quality somewhat but reduces economic output somewhat, we cannot determine whether it is desirable without these kinds of explicit weightings.

Where Edwards et al note concerns for personal autonomy, it clearly enters into their social welfare function with much lower weight than do concerns that individuals be protected against the consequences of their choices. They note the “clever, aspirational marketing” used by the tobacco industry, among others. I find this rather odd: I can’t remember the last time I saw a television ad for tobacco or a tobacco billboard, but I see government-funded anti-tobacco advertisements all the time. It is perhaps as consequence of these kinds of ads that most people **overestimate** the risk of smoking.

Edwards et al also cite studies that many smokers claim to regret having started smoking. We’ve just discovered a new reason for government intervention into people’s personal lives: regret prevention. I’ll bet that large proportions of surveyed people will regret having dated at least one former partner. Surely there’s something government can do to prevent those horrible regrets. Perhaps a tax on dating known cads, or some regulations requiring that folks only date people that have been vetted for them by some government agency.

Surely such measures would do as much to increase personal freedom as Edwards’ suggested freedom-enhancing taxes protecting young people from starting smoking.
I’d suggest we name the agency charged with such things the Ministry of Freedom, or Minifree, as it’s a rather Orwellian notion of freedom that asserts that freedom is augmented by the discouraging or removal of choices one might regret.

Finally, Edwards reasserts his support for an independent policy-making agency to protect us from bad choices. Where I’d suggested that people don’t really agree about the goals that such an agency would be charged with achieving, they dismissed such argument as the standard recourse of those whose interest is “profit not health.” I didn’t know that my interest here was profit; my wife would perhaps wish it were. If my interest were in profit, I wouldn’t have written the editorial in the first place as it appears that the more lucrative route in New Zealand is anti-tobacco report writing.

As discussed above, it seems that one need never actually even produce the report! Again, my academic salary is completely invariant to any position I might advocate with respect to alcohol or tobacco. I rather suspect that Edwards et al, or Youdan, cannot say the same.

The notion that politics is dominated by shadowy special interest groups is pretty prevalent in the field in which I wrote my dissertation: public choice. But, the more modern literature has moved somewhat beyond that to view interest groups as operating on the margins where the public has only weak preferences, with voter preferences, for better or for worse, elsewhere driving policy. The modern literature worries a lot about whether people, when voting, make reasonable decisions. Because any individual voter is exceedingly unlikely to change the outcome of an election, the voter can then afford to indulge expressive preferences for things he would not prefer if he knew he were to be decisive.

At the supermarket, by contrast, the shopper gets with certainty whatever he puts in his basket. The modern literature suggests that individual choices at the ballot box are systematically worse than their choices in other contexts. We ought to then leave more choices to individuals in markets, where they’re better equipped to make good choices, rather than having their choices in politics, where rational irrationality prevails, constrain their market choices. Even if those choices are ones of which either Youdan, or Edwards et al, would not approve.

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References:
Professional Misconduct – Inadequate Care (05/15D)

Charge

The Director of Proceedings charged that Dr Hariett Rosalind Elles Martin was guilty of professional misconduct. The charge was divided into three parts.

Part 1 of the charge contained allegations about the quality of Dr Martin’s care and treatment of her patient, (Ms D) during the period from September 2001 through to December 2002. Ms D suffered from longstanding constipation. The charge alleged that Dr Martin failed to undertake an adequate examination and that she failed to refer her patient for a colonoscopy or barium enema in order to exclude bowel cancer.

Part 2 of the charge alleged that Dr Martin made inappropriate additions to Ms D’s records and that her notes were deficient.

Part 3 of the charge alleged that Dr Martin misled the Health & Disability Commissioner (HDC) in her response to inquiries made by him.

Legal principles – Standard of Proof

Counsel for Dr Martin submitted that the Tribunal should find that the Director of Proceedings was required to prove the allegations in the charge on the basis of proof beyond reasonable doubt. The Tribunal did not accept this submission and considered that New Zealand authorities currently require the Tribunal to assess the culpability of a health practitioner on the basis of the civil standard of proof, bearing in mind that serious allegations require a high level of proof.

Background

Ms D suffered from constipation during the course of 2001 and she often used laxatives for relief. During 2002 her constipation problems got worse and she often had episodes of extreme pain and discomfort in her lower abdomen. Ms D had been a patient of Dr Martin’s since 1999. She was seen by Dr Martin on 6 occasions between 6 September 2001 and 11 October 2002 and spoke to her on the telephone in December 2002. Dr Martin considered Ms D was suffering from irritable bowel syndrome.

Ms D saw Dr Potter, who worked part time at the same practice as Dr Martin, on 27 June 2002. Dr Martin was not available at the time and Ms D went to the practice seeking a prescription for a Fleet enema to treat her constipation. Dr Potter took a history from Ms D and she considered that Ms D needed to be carefully monitored. Dr Potter was concerned that a definitive diagnosis had not been established and that serious conditions had not been excluded. Dr Potter made full notes of the consultation and spoke to Dr Martin about the consultation when Dr Martin arrived at work the same day. Dr Potter expected that after the discussions with Dr Martin any further follow up would be undertaken by Dr Martin.

Ms D’s daughter gave evidence about the next consultation Ms D had with Dr Martin on 19 July 2002. She said Dr Martin told Ms D not to be concerned with a suggestion
made by Dr Potter that Ms D should get another opinion or have a cancer check. Dr Martin gave evidence that she did not fail to review Ms D in light of the recommendations made by Dr Potter. Dr Martin said she discussed Dr Potter’s recommendation with Ms D and that she strongly advised Ms D to seek further investigations.

Ms D telephoned on 2 December 2002 seeking prescriptions for further laxatives. During the conversation Ms D explained she had been to an accident and medical clinic the previous day and that a rectal examination had been performed which revealed her bowel was empty, even though she had been constipated for two to three weeks. Ms D said she wanted to try a colonic wash. Dr Martin said she had tried to arrange for Ms D to come and see her and she recommended further investigations, but Ms D declined. Dr Martin did not make any contemporaneous note to suggest she encouraged Ms D to undergo further examination and investigation. Instead, on 17 January 2003 she added to her notes – “advised to come in for investigations if no success at colonic clinic.”

Ms D went to Australia on 27 December 2002. She returned to New Zealand on 4 January 2003 in considerable distress and pain. Ms D’s fiancée took her straight to the hospital. Ms D was told she had seriously advanced cancer and a very poor chance of long term survival.

Ms D became a patient of Dr Hursthouse on 17 January 2003 after she had been diagnosed with cancer. When Dr Hursthouse received Ms D’s notes from Dr Martin, they contained some entries which had been highlighted.

Sadly, Ms D died from bowel cancer on 21 February 2003. She was 43 years old.

Dr Martin acknowledged that she made additional entries in Ms D’s notes of the consultations on 24 May 2002, 11 October 2002 and 21 December 2002 after she had received a request to send the notes to Dr Hursthouse on 17 January 2003. Dr Martin highlighted those entries but did not record the date. Dr Martin was adamant the additional entries were accurate comments about what had happened in those consultations.

Dr Martin acknowledged that she misled the HDC in her initial report about the additions to the entries in Ms D’s notes.

**Findings**

The Tribunal found Dr Martin guilty of professional misconduct.

**Part 1 of the charge**

The Tribunal made no adverse findings in relation to the consultations of 6 September 2001, 22 February 2002, and 11 March 2002. However, by the 11 March 2002 consultation, the Tribunal considered Dr Martin should have began to seriously question her diagnosis of irritable bowel syndrome.

The Tribunal found that Dr Martin was guilty of professional misconduct in relation to her consultation with Ms D on 19 July 2002. The Tribunal accepted the evidence of Ms D’s daughter, and considered it highly likely that Dr Martin down played Dr Potter’s concerns and recommendations which were not consistent with Dr Martin’s view that Ms D probably had irritable bowel syndrome.
The Tribunal considered Dr Martin should have been very concerned that her diagnosis of irritable bowel syndrome may not have been correct. The Tribunal stressed that Dr Martin was not criticised for failing to diagnose bowel cancer. She was criticised for not taking the steps reasonably expected of a general practitioner in her circumstances.

The Tribunal found Dr Martin guilty of professional misconduct in relation to the 11 October 2002 appointment. She should have encouraged Ms D to have a colonoscopy or barium enema to exclude bowel cancer. The Tribunal did not accept Dr Martin’s evidence that she did encourage Ms D to have further investigations. The Tribunal considered that if there had been a “stand off” with Ms D refusing to comply with Dr Martin’s recommendations then she would have made this clear in her notes. Instead three months later, when Dr Martin knew about Ms D’s prognosis, she added to her notes “not keen on further investigations.”

The Tribunal found Dr Martin guilty of professional misconduct in relation to the telephone conversation she had with Ms D on 2 December 2002. The Tribunal believed Dr Martin’s additional notes were probably a close reflection of what really happened. The Tribunal was satisfied the advice which Dr Martin gave on 2 December 2002 fell well short of what could be reasonably expected of a general practitioner in her circumstances.

**Part 2 of the charge**

The Tribunal believed Dr Martin’s notes were inadequate and fell below the standards reasonably expected of a general practitioner in her position. However, the Tribunal did not believe that her notes were so bad that a disciplinary finding was merited.

With the possible exception of the additional entry for 11 October 2002, the Tribunal believed the extra entries made by Dr Martin on 17 January 2003 were probably reasonably accurate. However, the Tribunal believed, it was totally inappropriate for Dr Martin to make those additional entries without clearly recording that they were made retrospectively. The Tribunal considered no-one reading the notes would appreciate that the entries were made on 17 January 2003.

The Tribunal was satisfied Dr Martin’s conduct in this regard constituted negligence and justified a disciplinary sanction.

**Part 3 of the charge**

Dr Martin misled the Commissioner when, in a letter to him dated 11 December 2003, she said that highlighting the notes were the only additions to her original notes. In her evidence, Dr Martin admitted she had misled the Commissioner about the additions to the entries of 24 May, 11 October and 2 December 2002.

The Tribunal was very concerned by this aspect of the case. The Tribunal believed misleading the Commissioner was Dr Martin’s most culpable misconduct. The Tribunal was in no doubt her actions were likely to bring discredit to the medical profession.
Penalty

The Tribunal ordered the following penalties:

1. Dr Martin was censured;
2. Dr Martin was fined $5,000 in relation to the Tribunal’s findings against her regarding part 1 and part 2 of the charge;
3. Dr Martin was fined $10,000 in relation to the Tribunal’s findings against her regarding part 3 of the charge;
4. Dr Martin was ordered to pay costs of $20,000 ($10,000 to the Director of Proceedings and $10,000 to the Tribunal.)

The Executive Officer was directed to publish a summary of the Tribunal’s finding in the *New Zealand Medical Journal*.

The full decisions relating to the case can be found on the Tribunal web site at [www.hpdt.org.nz](http://www.hpdt.org.nz)

Reference No: Med05/15D.
The AIDS Pandemic: The collision of epidemiology with political correctness


This book has been written to try to debunk some of the mythology surrounding HIV/AIDS.

The book begins with an unusually lengthy section on the author’s background. It then goes on to detail the probable origin of HIV with a primer on the basic biology of HIV/AIDS for the reader with less medical background.

The next sections, and the bulk of the book, guide the reader through the past, present, and probable future epidemiology of HIV/AIDS. This is done in a very systematic and clear way that is understandable for readers with only a rudimentary understanding of epidemiology. It includes insights as to why the rates of HIV vary so markedly between different populations and lays the ground for some estimates for future numbers within various populations.

At each step of the way James Chin compares and contrasts these epidemiologically based conclusions with the myths and misinformation that have been perpetuated since HIV was first described. He also tries to detail the sources of these myths and proposes reasons why various organisations may have found it useful to promote these for their own purposes. These range from organisations aiming to exaggerate the potential size of the HIV/AIDS burden in order to increase funding for their organisations, research, and treatments through to governments not wanting to be ‘blamed’ for the global spread of HIV. This is followed through to the myths that still persist today including the denial of HIV as the cause of AIDS by some African leaders.

Overall, the book provides a fascinating background for anyone with an interest in the HIV/AIDS situation globally and its future trajectory. It includes enough background detail for readers with little background scientific or medical knowledge. Having obviously been frustrated after a long career having to deal with the various ‘myths’ surrounding HIV, Chin carefully dissects them with science and a not small amount of passion.

The New Zealand reader may feel a little removed from the politics in the story but it makes a fascinating read nevertheless.

Matthew Amodeo
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Leadership and Teambuilding in Primary Care


This is an excellent book which everyone can learn from. Although titled “in Primary Care” the book covers the whole spectrum of leadership and has application to all team functioning and leadership whether in the health sector or not.

One of the authors (Clare Mullins) is a physiotherapist, and Graham Constable is a professional business developer and manager who has a background as a commissioned officer in the Royal Air Force. The book does have a primary care focus and examples of strategies are drawn from this discipline.

It provides information in a clear straightforward way—the difference between leadership and management, analysis of an individual’s style of leadership, the leadership model—and provides information on alternative styles and techniques. It outlines leading by compulsion”—when to be bossy, when to “lead by persuasion”, by example, and so on. Included is an excellent section on situations that need extra-strength leadership. This includes handling difficult behaviour by staff, and difficult behaviour by patients towards staff—both difficult and usually stressful situations.

This book would be of benefit to anyone who aspires to lead a team, or to anyone who has been thrust into that position whether they be a medical practitioner, a receptionist, or a practice manager. It would also be of great value to members of leaderless teams—to facilitate their rising to the surface to every team member’s benefit.

This is a good book—I will read it again.

James J Reid
Head of Department
Department of General Practice
University of Otago, Dunedin