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This Issue in the Journal

Use of psychotropic medicines in residential care facilities for older people in Hawke’s Bay, New Zealand
Marilyn Tucker, Ian Hosford

International concern about a possible overuse or misuse of medicines used to treat mental disorders in resthome residents has existed for the past 30 to 40 years, but little is published about such use in New Zealand. This audit was designed to measure the extent of use in Hawke’s Bay resthomes and to compare it with a similar audit carried out there in 1990. Results showed a substantial increase in the use of antidepressants, and a sharp reduction in the “benzodiazepine” class of medicines (which includes Valium). The dose of one sleeping tablet that had been implicated in a significant event in the area has decreased but needs to reduce further. There was a small increase in use of antipsychotics to 23.7%. Educational activities, which focus on the audit’s results and appropriate use of these medicines, have started for all involved in the sector, and need to continue.

Rehabilitation after stroke: changes between 2002 and 2007 in services provided by district health boards in New Zealand
John Gommans, P Alan Barber, H Carl Hanger, Patricia Bennett

8000 people in New Zealand (NZ) suffer a stroke every year and half will die or remain dependent on others for daily living. International studies confirm that rehabilitation given in a specialised stroke unit can save lives and prevent disability but, despite this, our survey of all NZ hospitals shows that half of the population does not have access to a stroke rehabilitation service that meets the requirements recommended by NZ guidelines and the Ministry of Health. There is some good news though, as half of the population are now admitted to hospitals where they receive care in an area set aside for stroke rehabilitation compared with only 10% of the population in 2002 and there is now better use of guidelines for management of common problems after stroke and education for patients and families. Despite these improvements, there are still major discrepancies between different regions. A good starting point would be a consistent national approach to ensure that appropriate services are available to all New Zealanders with stroke.
Outpatient follow-up for patients with rheumatoid arthritis in relation to New Zealand Rheumatology Association guidelines at Dunedin Hospital
Georgina Chan, Fern Goh, Timothy Hodgson, Erica Hsu, Deborah Johnstone, Jasen Ly, Timothy Platt, Edrich Rodrigues, Wendy Tsai, Phil Hider, Andrew Gray, John Highton

Current treatment for rheumatoid arthritis involves medications (disease-modifying anti-rheumatic drugs) that require close medical supervision. In relation to hospital-based follow up, most is provided in the outpatients department by hospital specialists. An audit was undertaken to assess the adequacy of specialist follow-up at Dunedin Hospital Outpatients by measuring the time interval between follow up visits and comparing the intervals to those recommended by the New Zealand Rheumatology Association Guidelines. The results of the audit indicate that only 40% of patients were followed up within the recommended intervals. Two groups of patients—those newly started on treatment and those undergoing some change in management—were particularly less likely to receive follow-up within the guideline recommended interval, even though these patients are more at risk of medication-related problems. Marked discrepancies existed between the follow-up intervals recommended by the guidelines and those suggested by clinicians.

Best practice for assessment of patients with varicose veins
Emma Horrocks, Justin Roake, David Lewis

Varicose veins are a very common problem and are, internationally, a common cause for patient complaints against doctors. This paper suggests a standard for documenting the assessment of patients with varicose veins. Retrospective audit suggests that current or past practice can be improved.

Iron status and risk-profiling for deficiency in New Zealand blood donors
Krishna G Badami, Kate Taylor

Blood donation can lead to iron deficiency. In this study, around 14% of New Zealand blood donors were found to be iron deficient. Deficiency is particularly likely if the donor is young or female or has donated many times recently. Preventive methods, such as reducing the frequency of donation and iron supplements, may be required in such blood donors.

Chris Wilkins, Paul Sweetsur

In this paper we compared the findings from four national household surveys of drug use conducted in New Zealand in 1998, 2001, 2003, and 2006. We found a rise in the lifetime use and level of alcohol use, and this is consistent with the liberalisation of the alcohol environment (i.e. lower purchase age, sale from supermarkets).
Conversely we found a decline in the lifetime use of tobacco and this is consistent with stricter regulation and shifts in societal tolerance of smoking. The growing negative social connotations attached to smoking, as well the emergence of ‘new’ synthetic stimulants (e.g. ecstasy, BZP, and methamphetamine), may have impacted negatively on levels of cannabis use. There has been some entrenchment of amphetamine use since a reported levelling off of its prevalence in 2003.

The Bequest Programme at the University of Otago: cadavers donated for clinical anatomy teaching (Special Article)
Kathryn McClea

The Bequest Programme at the Otago Medical School has been run by the Department of Anatomy and Structural Biology for more than 60 years. Over 5000 undergraduate students study Anatomy during the academic year. This, coupled with an increase in the demand for cadaveric (human) material for research and the introduction of new postgraduate training schemes, highlights the value of the resource and the programme. This paper looks at the steps to making a bequest, the restrictions governing the acceptance of a body, and issues facing the bequest programme.
Psychotropic medications for elders in residential care

Matthew Croucher

Concern about how psychotropic medicines are being prescribed for elders living in residential care is bubbling away in the New Zealand community, in international political and regulatory arenas, and in the scientific literature. This is mainly driven by a keener appreciation of various serious adverse drug reactions that may accrue to elders treated with such medications; the limited efficacy of some of these agents for several common problems such as “sundowning”; rising costs associated with using expensive medicines; and a sense that ‘there must be a better way’.

There is a group of people I come into contact with regularly whose management is often very challenging, as it will be for many readers. Following a sundowning pattern, agitation and even frank aggression become more common as the afternoon wears on. Intrusive care-eliciting behaviour increases at exactly the time that the carers need to absent themselves to deliver the evening meal and engage in staff handover.

It is very tempting to prescribe a touch of medication to ameliorate this syndrome as it is genuinely distressing to all concerned. Demented elderly in resthome care? No: my own children (whom I hasten to add have never been exposed to haloperidol). Why do we sanction medication for the former but recoil from using drugs for the latter?

Whether or not there is a ‘better way’, the residential care sector in which this prescribing is occurring faces very significant challenges over the next 30 years. Indeed, the current general practice, nursing, and allied health professional workforce engaged in caring for elders who live in care facilities is already stretched—with many shortfalls and marked inequity around the country. The same is true in relevant secondary care settings. This inevitably means that skill levels are not optimal and that staff turnover is high.

The workforce is itself ageing, especially in primary care medicine and nursing, with no compensatory peak in recruitment into these areas of practice. Across all professional groups, there is (on average) less glamour, lower remuneration, and poorer career advancement opportunities associated with this sector compared with others.

At the same time, the well-known twin impact of the ageing baby-boomers and marked increases in the longevity of current cohorts of elders mean that the population of people in the country who might benefit from or require residential care is growing rapidly. This immediate and dramatic increase in the number of New Zealanders over 85 years old is still largely ignored by the media and, one suspects, health planners whose attention is somewhat nervously focussed on the baby-boomers.

We also know that elders in care have a high prevalence of the common psychiatric disorders such as depression, anxiety, psychosis, delirium, and dementia. Despite the
swing in emphasis in modern best-practice from medicalised and pharmacological management to more conservative psychosocial intervention plus medication as an adjunct, it is perhaps not surprising that a great deal of medicine is still prescribed given the context as I have described it. Indeed, it would not be surprising if there were a trend for prescribing to increase.

This issue’s study by Tucker and Hosford\(^1\) is an important contribution to thinking about the pharmacological aspects of the challenge of providing excellent residential care because there are no other published surveys of psychotropic utilisation in this setting in New Zealand.

A particular strength is that the survey has been repeated over a 15-year period. The main messages are a mixed bag of the potentially encouraging and the probably worrying. It may be a good thing that antidepressant prescribing has increased dramatically, although one worries about overcalling depression, a lack of more human, problem-focussed interventions for low mood, and the possibility that medications get started and never stopped.

It is good news that antipsychotic prescribing has remained stable and that doses are generally not large, but the mean doses of quetiapine and olanzapine in particular were still fairly high (which poor souls are getting much more than average?) and the marked shift from typicals to atypical antipsychotics cannot be supported by evidence in terms of efficacy, although the risk of extra-pyramidal side effects is generally lower.

The reduced regular usage of potent shorter-acting benzodiazepines is heartening, but on the other hand, do we really need to prescribe such a high proportion of long-acting agents instead? And what of psychotropic polypharmacy, its monitoring, and its reduction?

The main message from this paper that leaps out for me is that rates of psychotropic prescribing varied greatly between facilities offering more or less the same level of care. What can this mean from such a good regional sample other than that prescriber and environment factors are very potent influences upon prescribing patterns? Perhaps this means that educative and care-resource interventions can be selectively applied to reduce medication usage for outliers; perhaps it predicts a failure of applied logic to shift these variations in practice.

Of all these medicines, concern is highest for the antipsychotic drugs—necessary and demonstrably effective in the right setting at the right dose with the right support, but toxic in the wrong setting.

PHARMAC has recently commissioned the country’s old age psychiatrists to write guidelines for the prescription of these agents in residential care and a Primary Care group has been tasked with producing an educative and audit package. These endeavours must be applauded.

But they are not enough. The fundamental problem is not over-prescription of any particular class of drugs—it is an urgent need to improve our somewhat patchy and imperfect care for these most vulnerable citizens in the face of the great challenges that they present to carers, all at a time when the clinical need : clinical resources ratio is beginning to increase exponentially.
Disclaimer: The opinions expressed in this editorial are the author’s own and do not necessarily reflect the views of the any of the organisations with which he is associated, nor the NZMA.

Competing interests: No relevant financial interests. Convenor of FPOA(NZ) / PHARMAC Antipsychotic Prescribing Guidelines Project.

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Reference:

   http://www.nzma.org.nz/journal/121-1274/3063
Giant cell arteritis: a medical emergency

Helen V Danesh-Meyer

Giant cell arteritis (GCA) is “the prime medical emergency in ophthalmology”. This systemic inflammatory condition can produce sudden profound visual loss, not uncommonly leaving the patient with permanent blindness to a level of no light perception in both eyes. So how can clinicians influence the course of this potentially devastating disease?

There are three fundamental junctures that are crucial in the management of GCA. The first is diagnosis. The most common reason that GCA leads to blindness is failure of early diagnosis. The key to diagnosis is having a high index of suspicion in patients older than 55 years of age. The visual symptoms include transient visual blurring, diplopia, and acute visual loss in one or both eyes.

The transient visual loss of GCA may occur in one or both eyes and may last from minutes to 1–2 hours. Such symptoms are often a harbinger of impending severe permanent visual loss from ischaemic optic neuropathy or central retinal artery occlusion.

The most common cause of blindness from GCA is arteritic anterior ischaemic optic neuropathy that presents with sudden loss of vision and pallid disc oedema although haemorrhages may not be present on the optic disc, as in the case presented in this issue of the NZMJ.

Retinal artery occlusion may cause visual loss in GCA in approximately 10% of patients—the key retinal finding being lack of ophthalmoscopic evidence of embolic material.

New onset diplopia is also a well-recognised symptom of GCA and may be due to transient ischaemia of the extraocular muscles, the cranial nerves that innervate those muscles, or the brainstem ocular motility centres. The diplopia may be transient or permanent, and may take the form of isolated cranial nerve palsy, isolated extraocular muscle weakness, or an inter or supranuclear ocular motility pattern.

It is estimated that diplopia is the initial sign of GCA in approximately 10% of patients. Hence, any patient over the age of 55 years who presents with sudden visual loss and a swollen optic nerve, transient visual loss or diplopia should have GCA considered as an underlying cause.

When GCA is suspected, the clinician must specifically and directly question the patient regarding the presence of associated systemic symptoms as they may not spontaneously offer the information to their doctor.

It is the clinician’s responsibility to explore the review of systems for GCA. The presence of new onset of headache and scalp tenderness, particularly over the superficial temporal artery is suggestive of GCA. Likewise, jaw claudication (pain in the muscles of the jaw on chewing) is relatively specific for GCA.
Jaw claudication must be differentiated from other causes of temporomandibular joint discomfort that are not ischaemic in origin (such as loose dentures). However, more importantly the converse occurs: that is, jaw claudication is erroneously attributed to other causes. Symptoms or signs suggestive of polymyalgia rheumatica may be identified in approximately 50% of patients and may occur as the initial symptoms in patients who go on to develop GCA with visual loss.

Patients may also suffer from weight loss, loss of appetite, fever of unknown origin, and anaemia. However, the absence of the systemic clinical features of GCA does not preclude its diagnosis. In fact, 20% of GCA that results in visual loss is known as ‘occult’ GCA—that is, without any other clinical symptom other than the visual loss. Patients remain at high risk of blindness unless treatment is started expeditiously. Once the clinician suspects GCA, the patient should be started immediately on high-dose corticosteroid treatment while the investigative process is underway. Failure to commence treatment prior to histological confirmation is the second juncture where patients are placed at risk of blindness.

The investigation of GCA usually involves initial serological tests with ESR, CRP, and platelet level. The ESR and CRP are the most useful serological tests in suspected cases of GCA. Normal sedimentation rates, however, may be found in up to 17% of patients with GCA, so that a normal ESR does not exclude GCA. The CRP is probably superior to the ESR in establishing the diagnosis of GCA and the diagnostic accuracy improves when both are utilized together. Thrombocytosis also has been shown to be a reliable indicator of GCA with a likelihood ratio of nearly 6.0, thus indicating that GCA is six times more likely in the presence of thrombocytosis.

Temporal artery biopsy (TAB) is considered the reference standard for the diagnosis of GCA. It is prudent for the surgeon to obtain at least a 2-cm-long specimen of temporal artery and for the pathologist to do multiple level sections as there may be areas of normal artery (skip lesions) between two areas of inflammation in an abnormal temporal artery.

It should also be remembered that a certain degree of shrinkage occurs in the biopsy specimen, with the shrinkage being somewhat greater in involved arteries than in normal biopsies. Also, because the histopathological changes are not uniformly distributed, it may be necessary to perform a second TAB on the contralateral side to confirm the diagnosis as it has been shown that a unilateral biopsy misses up to 13% of cases of GCA.

Presently, the only treatment for GCA is systemic corticosteroid administration. The role of therapy is to prevent further visual loss and, less commonly, other sequelae caused by ischaemia (such as central nervous system, myocardial, or bowel infarction). It has been convincingly shown that once visual loss has occurred it can rarely be reversed.

On the other hand, further visual loss in the contralateral eye can be prevented with the expeditious use of high-dose corticosteroid therapy, although it is well recognised that visual loss in the contralateral eye may develop despite treatment. In such cases, it is presumed that the disease process is well-advanced and that the treatment was not able to circumvent the ischaemia that is already underway. However, inadequate
dosage or length of treatment places the patient at great risk for visual loss even after the initiation of treatment.

The third high-risk juncture for blindness is during the corticosteroid tapering process. Rapid tapering or cessation of treatment may result in a relapse with devastating sequelae. This is much more likely to occur in patients who have not had a TAB to confirm the diagnosis. The most common reason a biopsy is not performed is that at the time of initial presentation the diagnosis was deemed to be ‘clear cut’.

Once patients on high-dose corticosteroids start to develop the side-effect associated with such treatment (diabetes, mood disturbance, cushingoid features) the conviction of the original diagnosis often wanes or is doubted by another clinician and corticosteroid treatment is too rapidly tapered or stopped to prevent corticosteroid induced side-effects. Hence, the clinician may ‘second guess’ the original diagnosis in the absence of confirmatory histological diagnosis and taper the steroids hastily. It is therefore recommended that a histological confirmation of the clinical diagnosis should be obtained in all patients.

The challenges with GCA are many: its broad spectrum of signs or symptoms and risk of blindness; the lack of a single laboratory investigation that confirms the diagnosis; and the long treatment course with corticosteroids and the associated side-effects which the patient must endure. However with astute diagnosis and timely and appropriate intervention, the clinician can make a profound and lasting difference for the patient—between sudden irreversible bilateral blindness and the retention of useful sight.

Competing interests: None known.

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References:
Dare to struggle, dare to win (incrementally)

Ian Powell

The Association of Salaried Medical Specialists (ASMS) has, after a lengthy and bitter process commencing in May 2006, settled a new national collective agreement, known as the MECA (multi-employer collective agreement), covering senior doctors and dentists who are ASMS members and who are employed by district health boards (DHBs).\(^1\)

The dispute prior to the ballot on industrial action held in late 2007 has been previously discussed.\(^2\) In this environment it did not take long before the ASMS was compelled to consider whether to take strike action. However, this was difficult for two reasons. The first was lack of precedent. The only senior doctors’ strike had been in 2003 in the South Canterbury DHB over a local collective agreement prior to the first national MECA (2003–06) which was confined to electives and other non-acute services.\(^3\)

The second was the failure of the 1-week RMO strike in June 2006 and the negative, often public, reaction of many senior doctors to it despite the strike being provoked by an aggressive DHBs’ agenda. This strike has been aptly described as a ‘failed strike’ by a supporter of the right of health professionals to strike.\(^4\) The strike intruded too far into acute and emergency services, was too long, too many RMOs broke the strike (especially towards the end), and the strike weapon was unable to be used again during this dispute.

Many senior doctors were also angered by what was seen as a hard-line by the Resident Doctors’ Association (RDA) over life-preserving services plans. Consequently the ASMS faced an extraordinary challenge in order to achieve a mandate for industrial action should it be necessary.

**The Association of Salaried Medical Specialists’ strategic direction**

Consequently the ASMS opted for an approach of gradual escalation treating each enhanced action and decision as an event in its own right rather than simply a means to an end. The objective was not to paint either ourselves or the DHBs into a corner and to keep the talking going in between the actions and decisions. First, external mediation was initiated. Then, in November 2006, the ASMS Annual Conference authorised its negotiating team to proceed with national stopwork meetings should the impasse continue. Each of these actions attracted media interest but the decision to proceed with stopwork meetings was left for several months.

The national stopwork meetings in July–August 2007 were a considerable event. All the National Executive’s recommendations were adopted either unanimously or overwhelmingly including one authorising the ASMS to proceed to a membership ballot on limited industrial action.
The ASMS used the outcome of the stopwork meetings to explore further negotiating opportunities before proceeding to the industrial action ballot. However, although the DHBs’ bargaining position improved, it was insufficient to achieve resolution. Consequently the ballot was held in November-December after the decision to hold it was endorsed by the ASMS Annual Conference in early November.

The result represented a considerable shift in senior doctor attitudes towards strike action and would have been inconceivable in 2006. With a response rate of 75%, 88% voted for limited industrial action and only 12% against. Again, however, the ASMS did not proceed to the next step of industrial action. Instead it gave the DHBs (and Government) an opportunity to reflect on the significance of the ballot outcome.

On 21 February 2008, the ASMS National Executive was on the verge of giving formal notification of industrial action. However, in an unprecedented step, new Minister of Health David Cunliffe joined the meeting to ask the Executive to defer its decision on strike notification for a month so that he could try to facilitate a resolution. There is no doubt that had it not been for the ballot outcome, which itself built on earlier actions such as the national stopwork meetings, Mr Cunliffe would not have taken such a political risk.

The rest is, as they say, history. The National Executive accepted the Minister’s request, his facilitation proceeded; a provisional settlement between the ASMS and DHBs which was endorsed by a ballot of ASMS members in a result remarkably similar to the earlier strike ballot (88% voted to accept it; the only variation was 1% in the response rate); and both parties then ratified it.

It begs the question of why did the Minister make this offer of facilitation to the ASMS but not in the latest resident medical officers MECA dispute? First, the Minister was taking a considerable political risk in offering to facilitate. However, due to earlier working directly with the ASMS on developing a new policy document on enhancing clinical leadership known as ‘Time for Quality’, he found a comfort zone with us. Second, the facilitation offer was conditional on the ASMS delaying formal notification of strike action. This was accepted by the ASMS. The RDA was offered verbally facilitation assistance by the Minister during a meeting with the Pan Professional Medical Forum but the RDA proceeded straight to formally notifying DHBs of strike action.

The challenge of the arbitration option

The ASMS was forced to address the question of arbitration during the dispute on two separate occasions. Arbitration is no longer part of the industrial landscape (except for the police in separate legislation). Historically the ASMS had been an ‘arbitrationist’ orientated union. But there has been a discernable attitudinal shift.

The first occasion was, when immediately after the first of the 26 stopwork meetings held at North Shore Hospital, the DHBs called for the ASMS to agree to ‘final offer arbitration’, a system which is provided in the Police Act. The ASMS rejected this for several reasons including believing it was an attempt to derail the remaining stopwork meetings and because it is a ‘winner takes all’ system which favours the position closest to the status quo.
The second occurred immediately prior to the conducting of the industrial action ballot. The DHBs applied for formal facilitation by the Employment Relations Authority (a form of non-binding arbitration provided under a 2004 amendment to the Employment Relations Act). The ASMS managed to delay the ERA’s deliberation on the application until such time as it was overtaken by events. Our reasons included concern that it might create confusion among members in the midst of the strike ballot; it risked getting in the way of subsequent Ministerial facilitation; and (in the absence of suitable criteria focussed on the ‘rate for the job’ to advise the ERA) the DHBs (contested) claims over affordability might have undue influence.

The ASMS was mindful at all times during the dispute of the ethical considerations while accepting that any form of effective industrial action would impact on patients. Consequently we strove to marginalise as much as possible its potential impact and confine it to patient inconvenience at most through two main means. First, in contrast with the RDA, the ASMS would have excluded acutes and emergencies. Second, the ASMS resolved to give at least 8 weeks notice of industrial action to avoid cancellation of lists and clinics. Instead they would have simply not been scheduled on the strike days in the first place. This contrasts with the RDA’s approach of adhering to the minimum statutory obligation of 2 weeks which requires cancellations.

Where we have ended up

Although this has been a corrosive and exhausting journey, on balance the ASMS have ended up in a stronger position. This conclusion is based on the following factors:

- The new MECA provides useful fiscal and related enhancements of existing terms and conditions of employment. These include a 13.3% salary increase covering a 34-month period; a $10,000 lump sum ‘retention’ payment in lieu of a ‘lost’ 12 month period; two additional higher salary steps; and a doubling of CME expense reimbursement to $16,000 per annum.
- It provides for a further expansion of senior doctor influence in DHB decision-making, particularly around how services are organised and delivered.
- The ASMS’s membership in DHBs has increased noticeably since the commencement of negotiations by over 300 to over 3000 in a potentially divisive situation with national stopwork meetings and possible strike action where membership losses might have been anticipated. This increased membership further strengthens the ASMS’s representational and advocacy role.
- The ASMS has proven to DHBs and Government that it can organise successful well-attended national stopwork meetings in all 21 DHBs and also achieve an overwhelming ballot for industrial action in a secret ballot. This will be an invaluable asset in the future.

But of greatest significance, and critical to the settlement, was persuading the Minister of Health (and, through him, the DHBs) to accept an independent commission of enquiry. The commission is to report to the Minister, DHBs, and ASMS by 31 August 2009 with recommendations for a recruitment and retention strategy for senior doctors.
in DHBs and, in particular, recommended competitive terms and conditions of employment.

One of the factors the commission will be required to take account of is employment opportunities in Australia. The Minister of Health has commented that the commission ‘will ensure that senior doctors working in New Zealand will have pay and conditions commensurate with those working elsewhere.’7 To the best of our knowledge this is the first time that international relativity has been a factor to be considered by an industrial commission of enquiry.

This dispute has demonstrated that the ASMS has shifted from its historical arbitrationist’ preference and is prepared to adopt an industrial action strategy that includes adapting the old union slogan of ‘dare to struggle, dare to win’ to ‘dare to struggle, dare to win, incrementally.’

Competing interests: None known.

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References and footnotes:

5. The principles of ‘Time for Quality’ are incorporated into the new national MECA (Clause 57).
6. The meeting was held on 20 March 2008. The Pan Professional Medical Forum comprises the Council of Medical Colleges, ASMS, NZMA and RDA. The author was present while this offer was made. While the RDA had called for ‘intervention’, consistent with his involvement in the senior doctors’ negotiations, the Minister of Health deliberately used the word ‘facilitation’.
Use of psychotropic medicines in residential care facilities for older people in Hawke’s Bay, New Zealand

Marilyn Tucker, Ian Hosford

Abstract:

Aim To audit the use of various categories of psychotropic medicines in residential care facilities in Hawke’s Bay.

Method Data on psychotropic medicines use for all residents in participating residential care facilities were extracted from community pharmacy records and analysed. These data were compared to a similar study performed in 1990.

Results 54.7% of residents were prescribed one or more psychotropic medicines, a similar proportion to that recorded in 1990. The use of regular benzodiazepines reduced from 29.6% to 12.4% while the use of antidepressant medicines increased from 15.5% to 30.6%. Most residents on antipsychotic medicines are now on ‘atypical’ agents at relatively low doses, and overall use of antipsychotic medication has not changed significantly. The use of psychotropic medicines in Hawke’s Bay, New Zealand does not differ much from other countries where similar audits have been performed.

Conclusion The increase in use of antidepressants is likely to reflect better diagnosis and management of depression in nursing homes. The use of benzodiazepines and sedative medication is probably still excessive.

Internationally there is concern about the prescription of medicines to older people, particularly the frail elderly, many of whom reside in residential and hospital care. Polypharmacy, inappropriate prescribing, and use of psychotropic medicines have been shown to increase the risk of serious events such as falls, confusion, hospitalisation, fractures, delirium, and even death in this population.

In October 2005 a survey of the prescription of psychotropic medicines was done in 26 resthomes (including 5 dementia care units and 11 private hospitals) in Hawke’s Bay. The result of this survey was compared to a similar survey done in 1990 and used as part of a number of educational presentations to medical, nursing, and pharmacy practitioners in the region.

Method:

Management staff of residential care facilities and general practitioners providing medical services to those homes in the Hawke’s Bay region agreed to participate in this survey. The Central Ethics committee for “Projects involving only the retrospective review of patient/client notes or data” accepted an application.

Data for psychotropic medicines dispensed to all residents in the facilities were extracted from community pharmacy records and analysed. Regular medicines only were included in the results as the method adopted precluded knowledge of how frequently PRN medicines were administered. Identified ‘palliative care’ patients were excluded.
The categories of psychotropic medicines audited were; antipsychotics, antidepressants, sedatives, anxiolytics, and benzodiazepines. The sedative and anxiolytic categories comprise mostly of benzodiazepines but both these groups have other agents such as zopiclone and buspirone respectively. Short-acting benzodiazepines such as temazepam are categorised as ‘sedatives’ in the Pharmacy software and in the British National Formulary (BNF) and longer-acting benzodiazepines such as diazepam are categorised as ‘anxiolytics’.

Clonazepam is classified as an “anti-epileptic” but it is commonly used as an anxiolytic and in the treatment of Bipolar disorder. Because of the particular concern over the use of benzodiazepines in this population, this group was also calculated separately, regardless of the half-life of the individual agents. Anticonvulsants and lithium were excluded from the survey.

The proportion of residents in each facility regularly prescribed a psychotropic medicine was calculated, together with the proportion of residents in each home on each of the psychotropic categories listed above. Facilities with a range of levels of care were separated into dementia unit, hospital, or resthome. As there was only one dementia unit with a hospital level wing, this facility was analysed as a single unit. Facility managers provided information about resident numbers in each of their units at each level of care for the day of the study.

**Results:**

Twenty-six resthomes, dementia care units, and psychogeriatric hospitals participated in the audit. Data from 4 homes in the region could not be obtained. Data from 1053 residents were audited.

**Table 1. Proportion of Hawke’s Bay older people in residential care prescribed psychotropic medicines**

<table>
<thead>
<tr>
<th>Medicine</th>
<th>1990 (McIntosh P et al)</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychotropics</td>
<td>55.7%</td>
<td>54.7%</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>21.9%</td>
<td>23.7%</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>15.5%</td>
<td>30.6%</td>
</tr>
<tr>
<td>Sedatives</td>
<td></td>
<td>17.3%</td>
</tr>
<tr>
<td>Anxiolytics</td>
<td></td>
<td>6.5%</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>29.6%</td>
<td>12.4%</td>
</tr>
</tbody>
</table>

Note: The 1990 study did not separate out the sedative and anxiolytic classes.

In most classes of psychotropics there were variations in the level of prescribing both between individual facilities, and levels of care.

In addition to the wide variation within resthomes and hospitals, there was a much higher level of antipsychotic use in dementia units with an average of 59.5% (range 50–70%) of residents being on an antipsychotic medicine, compared to 17% (range 3.4–55.0%) and 29.5% (range 14.3–42.9%) of those in resthome care and hospital care respectively.
Figure 1. Percentage of residents in Hawke’s Bay nursing homes on one or more regular psychotropic medicines in October 2005

![Bar chart showing percentage of residents on psychotropic medicines]

Mean = 53.3% 95% CI = 47.3 – 59.3%

Figure 2. Percentage of residents in Hawke’s Bay resthome level of care on one or more regular antipsychotics in October 2005

![Bar chart showing percentage of residents on antipsychotics]

Mean = 17.0%; Range = 3.4% – 55%

In the 15 years between the two audits there were substantial shifts in the classes of medicines used within each therapeutic group, especially within the antidepressant
and antipsychotic groups (Table 1). These changes probably mirror the broader national change that has occurred during this period.

### Table 2. Difference in antidepressant use between 1990 and 2005

<table>
<thead>
<tr>
<th>Antidepressant class</th>
<th>1990</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricyclics</td>
<td>89.2%</td>
<td>41.2%</td>
</tr>
<tr>
<td>SSRIs</td>
<td>2.4%</td>
<td>52.5%</td>
</tr>
<tr>
<td>SNRIs</td>
<td>–</td>
<td>2.3%</td>
</tr>
<tr>
<td>MAOIs</td>
<td>1.2%</td>
<td>–</td>
</tr>
<tr>
<td>RIMAs</td>
<td>–</td>
<td>3.8%</td>
</tr>
<tr>
<td>Other cyclics</td>
<td>7.2%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

The most commonly prescribed tricyclic antidepressant in 2005 was amitriptyline (48.6%).

In 1990, only ‘typical’ antipsychotics were used. In 2005, the proportion of these agents had decreased to 23.8%, of which 5.2% was in the depot form.

### Figure 3. Percentage of antipsychotic medicines prescribed in October 2005

![Antipsychotic Medicines](image)

### Table 3. Doses of four most frequently prescribed antipsychotic medicines in October 2005

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dose range</th>
<th>Mean dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risperidone</td>
<td>0.25–8.0 mg</td>
<td>1.0 mg</td>
</tr>
<tr>
<td>Quetiapine</td>
<td>25–800 mg</td>
<td>115.8 mg</td>
</tr>
<tr>
<td>Olanzapine</td>
<td>2.5 mg–20 mg</td>
<td>12.75 mg</td>
</tr>
<tr>
<td>Haloperidol</td>
<td>0.25 mg–3.0 mg</td>
<td>1.38 mg</td>
</tr>
</tbody>
</table>

Thioridazine use had declined from 51.2% in 1990 to 0.8%.
The most commonly used benzodiazepine in 1990 was triazolam at 53.5% of the total. This had reduced to 21.6% in 2005. The maximum recommended dose of triazolam, unadjusted for age, is 250 mcg.

In 1990, 71% of those prescribed triazolam (or 12% of all residents) were taking either the maximum or more than the maximum recommended dose. In 2005 the comparative figures were 55.2% (or 1.5% of all residents) taking the maximum recommended dose with none prescribed over that maximum. The highest dose in 1990 was 750 mcg; and 25.3% were prescribed ≥500 mcg. The highest dose in 2005 was 250 mcg.

In 1990, 22.2% of benzodiazepines prescribed had a long half-life (>24 hours); this had increased to 35.1% in 2005. In 2005, diazepam (Valium), which has a half-life in older people of up to 90 hours, comprised 18.7% of benzodiazepine prescriptions with some prescriptions for two or three times a day dosing; 0.75% of residents were on more than one regular benzodiazepine.

**Discussion**

There are many reasons why residents of a nursing home may be prescribed a psychotropic medicine. It is likely that factors such as prescriber preference, resident preference, nursing-home staffing attitudes, the facility’s culture, the layout of the institution, and attitudes of the residents’ families could be as important in deciding to use these medicines as the resident’s actual medical condition.

These results suggest this as many of the resthomes would have similar patient mixes and similar rates of mental disorder but there are markedly varying rates of use of the various psychotropic medicines.

Unlike some of New Zealand’s bigger cities, the regional hospital in Hawke’s Bay does not have a psychogeriatric unit to assess and stabilise residents with the most challenging problems. This may account, in part, for what appears to be a high use of antipsychotics in dementia units.

Facility managers also reported that there were shortages of dementia care unit and psychogeriatric continuing care hospital beds in the area at the time and that some residents may therefore have been inappropriately placed.

In reviewing the literature, there do not seem to be any accepted ‘benchmarks’ for the rate of prescription of psychotropic medicines in nursing homes. However, concern about the level of psychotropic prescription in these settings dates back to the 1970s and has resulted in some countries introducing measures to reduce it. The United States, for example, took a legislative approach and introduced the Omnibus Budget Reconciliation Act in 1987 (OBRA).

Concern still exists about the risks of prescribing psychotropic medicines in residential care settings. Hawke’s Bay results can be compared to other countries where similar audits have been performed. Published audits in Canada (66.9%), Switzerland (78.1%), Australia (47.2%), Denmark (56%), and Norway (59%) indicate that a similar or greater proportion of patients in nursing homes are prescribed at least one psychotropic medicine compared to Hawke’s Bay, New Zealand (54%).
Audits in Canada (24%), USA (27.6%), Denmark (21%), and Norway (23%) indicate that a very similar proportion of residents are prescribed antipsychotic medicines as in Hawke’s Bay (24%). This would suggest that there are a proportion of residents for whom antipsychotic medicine is necessary and appropriate. Nonetheless there is a need for regular review of antipsychotics in this population.

If used for behavioural and psychiatric symptoms of dementia (BPSD), the need for such agents is not constant and some residents can have their dose down-titrated and stopped. Some study residents have subsequently had pharmacist-conducted medicine reviews through a follow-up pilot programme.

In New Zealand there are now older people with long-term major mental health disorders living in residential care. These residents also need medicine reviews. While the majority of antipsychotic doses found in this study were low, some were high. (For example, risperidone up to 8mg and quetiapine up to 800mg) and were in nearly all cases given in combination with other psychotropic and non-psychotropic medicines.

The most marked change in prescribing over the past 15 years in Hawke’s Bay has been the increase in antidepressant medicines. The proportion of residents being treated with antidepressants in Hawke’s Bay is now 30.6% and is similar to that in Canada (20.5%), Denmark (24%), and Norway (31%). It is recognised that there are high rates of depression in nursing homes, and this increase is probably a result of better recognition and treatment of depression.

As this was a quantitative study, the reasons for prescribing particular medicines were not investigated. The purposes for which tricyclic agents are now prescribed are likely to include neuropathic pain, migraine prevention, and possibly sedation—and the antidepressant figure may therefore be artificially elevated.

The choice of amitriptyline as the preferred tricyclic antidepressant is of concern as this is the most anticholinergic of the class and carries the highest risk of adverse effects including confusion, cognitive impairment, falls, postural hypotension and constipation.

Another, more positive trend, was that the use of nortriptyline had increased from 1.4% to 16.2%. Because of its lower adverse risk profile, it is the recommended first-line tricyclic antidepressant in New Zealand.

The use of benzodiazepines in Hawke’s Bay nursing homes over the past 15 years has substantially reduced. They are virtually the only type of anxiolytic now used, and make up less than 40% of sedatives. Zopiclone, a non-benzodiazepine that acts on the same receptors, is the single largest agent used for this purpose.

Given the recognised risks of all such medicines in the frail elderly, the authors would regard the current use of sedatives and benzodiazepines as probably still being excessive. One particular concern is that both clonazepam and diazepam were prescribed in combination with a short acting benzodiazepine or zopiclone on several occasions. However audits in Denmark (38%), Norway (22%), and Australia (15.4%) showed higher regular use of benzodiazepines.

A goal of educational sessions following this audit was to reduce the use of these medicines. Because of the difficulties entailed in even reducing doses in an elderly
person chronically dependent on benzodiazepines, this will be a longer-term goal with a major focus on changing prescribing behaviour in the community setting.

A significant medical event involving the benzodiazepine triazolam took place in Hawke’s Bay in 2001 and spawned headlines in the country’s daily media for several days after an enquiry reported its findings a year later.

A violent attack, conducted in an automaton-style trance, by a normally mild-mannered, gentle octogenarian was found (on advice from a medical pharmacologist) to have been caused by a four-fold overdose of triazolam (500 mcg). Similar problems had previously been found with large doses of the medicine in the US. Although this event occurred in the community setting, patterns of prescribing found in residential care are likely to reflect those elsewhere.

Triazolam doses have declined since then, but given that the population is predominantly over 80 years old, the number of people on 250 mcg is still excessive.

There are weaknesses in this audit. The quantitative nature of the study meant that it was not possible to know what conditions medicines were used for. Nor could those residents who had been suffering major mental health disorders for long periods before they entered the current residential facility be distinguished from those with dementia.

Four nursing homes in the region were not included which could have created a possible bias. The data for the audit performed in 1990 were collected manually meaning that the results are not directly comparable. Studies overseas have also used different methodology, again meaning that they cannot be directly compared to the Hawke’s Bay results.

In conclusion, the proportion of residents of nursing homes being prescribed psychotropic medicine is roughly similar to those overseas. The increase in use of antidepressant prescriptions in Hawke’s Bay is likely to reflect better diagnosis and management of depression in nursing homes. The use of benzodiazepines and sedative medicine is probably still excessive and should be a target of ongoing efforts to alter prescribing patterns in nursing homes. Treatment of BPSD or long-term mental illnesses with antipsychotic medicines requires ongoing review.

Competing interests: None known.

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1. Frazier SC. Health outcomes and polypharmacy in elderly individuals: an integrated literature review. J Gerontol Nurs. 2005 Sep;31(9):4–11.


Rehabilitation after stroke: changes between 2002 and 2007 in services provided by district health boards in New Zealand

John Gommans, P Alan Barber, H Carl Hanger, Patricia Bennett

Abstract

Aim To determine changes between 2002 and 2007 in stroke rehabilitation services provided by district health boards (DHBs) in New Zealand (NZ).

Method A questionnaire about organisation of stroke rehabilitation services and use of recommended guidelines was sent to hospitals in all 21 DHBs.

Results Seven DHBs serving 49% of the NZ population provided a designated inpatient area for stroke rehabilitation in 2007 compared with one DHB serving 10% of the population in 2002 (p<0.001). In six DHBs (37%), this designated area was within a general rehabilitation unit. Only one DHB (12%) had a dedicated stroke rehabilitation unit. DHBs with a designated stroke rehabilitation area (SRA) were more likely to have multidisciplinary teams that spent more than half of the time with stroke patients (94% population with SRA versus 22% without SRA; p<0.001), audit their services (90% vs 39%; p <0.001), and provide education sessions for patients/families (82% vs 55%; p 0.004). However, many DHBs did not have guidelines for the management of common aspects of stroke care.

Conclusion Stroke rehabilitation services have improved since 2002 but concerns exist about the variability and quality of services provided. A consistent national approach to implementation of guideline recommendations and audit of services is required.

Stroke is a major cause of death and the leading cause of long-term adult disability. Each year in New Zealand (NZ), over 5200 people will have their first-ever stroke and another 2000 will suffer a second or recurrent stroke of whom less than one-third will survive and return to full independence.1,2

In 2001 there were an estimated 37,000 survivors of stroke in NZ and this is expected to rise to over 45,000 by 2011 as a consequence of a falling stroke mortality rate and an ageing population.1 This increase in stroke survivors in the community will not only result in considerable personal and carer burden but will also result in an increasing cost to the nation. It is critical that proven, effective strategies to improve patient outcomes are applied.

For the majority of patients, treatment in an organised stroke service offers the best chance of regaining independence. An important aspect of this is early and coordinated rehabilitation within a comprehensive stroke unit, which unequivocally reduce both mortality and morbidity following stroke when compared with rehabilitation in general wards.3,4
Important components of an organised stroke service include: rehabilitation in a geographically identified stroke unit by a specialist multidisciplinary team (MDT) that has expertise in stroke and rehabilitation; educational programmes for staff, patients, and families; provision of written information; and agreed protocols for the assessment and management of problems commonly encountered after stroke.\textsuperscript{3–6}

In 2002 we surveyed stroke rehabilitation services in New Zealand and identified major deficiencies in stroke care.\textsuperscript{7} Since this time, stroke management guidelines from New Zealand (2003);\textsuperscript{2} England, Wales, and Northern Ireland (2004);\textsuperscript{8} and Australia (2005, 2007)\textsuperscript{9,10} have emphasised that all stroke patients should expect to be managed in a stroke unit by a team of health professionals with expertise in stroke and rehabilitation.

We have repeated the 2002 survey to determine if the provision of stroke rehabilitation services in NZ has improved in the last 5 years and whether these services comply with guideline recommendations.

\section*{Methods}

The 2002 survey was updated to take into account changes in New Zealand and international guidelines for an effective stroke rehabilitation service.\textsuperscript{2,3,8–10} Questions were asked about access to organised inpatient stroke rehabilitation, staffing mix and expertise, the use of guidelines for assessment and management of problems commonly encountered during stroke rehabilitation, audit of stroke rehabilitation, provision of education programmes, and availability of rehabilitation services after discharge from hospital.

An “expert” multidisciplinary therapy team (MDT) was defined as having at least three professionals interested in and expert in stroke care and rehabilitation, which is based on the Royal College of Physicians’ (RCP) guidelines for stroke, as used in the original survey.\textsuperscript{7}

The survey was sent to a physician known to have an interest in stroke or the medical director at each of 57 hospitals thought to admit patients with stroke in New Zealand. The survey was sent in June 2007 and repeat questionnaires were sent at 4 weeks followed by telephone contact at 8 weeks to ensure a 100% response rate. Responses were taken as reported and not verified, although any internal discrepant results were checked with respondents.

District health boards (DHBs) are responsible for the provision of inpatient stroke rehabilitation services for their populations and the 2002 survey identified that most patients with stroke received this in a DHB base hospital. Results are therefore reported by DHB rather than individual hospitals and the 2002 results have been recalculated to reflect this change to a DHB focus. DHBs varied considerably in the size of the population that they serve (from about 30,000 to 500,000), so all results are presented as both the numbers of DHBs and the percentage of the New Zealand population served by these DHBs.

Results between 2002 and 2007, and between those DHBs with and without designated stroke rehabilitation areas in 2007, were compared (using the Chi-squared test) on the population served, with a p value of <0.01 considered significant. The funding and provision of services dedicated solely to rehabilitation of younger people (aged less than 65 years) is different compared to older people and these services are not discussed in this paper. The organisation and provision of acute stroke services are reported separately.\textsuperscript{11}

\section*{Results}

Responses were received from all 57 hospitals surveyed. All 21 DHBs provided inpatient rehabilitation services for people with stroke. The eight largest DHBs (each over 180,000 people) between them provide services for 68\% of the NZ population; the eight medium-sized DHBs (80 to 180,000 people each) serve 26\% of the population; and the five smallest DHBs (each <80,000 people) serve 6\%.

The NZ stroke guidelines do not require the smallest DHBs to provide designated stroke rehabilitation areas (SRA) although current Ministry of Health service
specifications recommend that they should aggregate stroke patients within a general unit.\textsuperscript{12}

**Comparison of stroke rehabilitation services in 2002 and 2007**—Seven DHBs serving 49\% of the population provided a designated inpatient facility or area for rehabilitation of stroke patients in 2007 compared with only one DHB (10\% of population) in 2002 (p<0.001) (Table 1). In six DHBs (37\%) this designated area was within a general rehabilitation unit with only one DHB (12\%) having a dedicated stroke rehabilitation unit. Six of these seven (46\%) designated stroke rehabilitation services were led by a geriatrician and one (3\%) by a general physician with expertise in geriatric medicine.

Two of these seven (15\%) units were able to accommodate all stroke patients requiring inpatient rehabilitation, four (22\%) managed at least three quarters, and one unit (12\%) managed less than half of those requiring inpatient stroke rehabilitation.

Since 2002 there has been a move towards provision of stroke rehabilitation services that are more consistent with guidelines.

Most DHBs now have some protocols or guidelines for the assessment, prevention, and management of complications that are commonly seen following stroke. Compared with 2002, improvements were seen in the provision of guidelines for the prevention of venous thromboembolism, prevention and management of shoulder pain, assessment of mood, management of nutritional support, and bladder and bowel function. However, there was a reduction in the provision of guidelines for discharge planning and goal setting.

Almost all (92\%) of the population are now admitted to DHBs with MDTs expert in stroke care and rehabilitation. There has also been an increase in the number of DHBs that regularly audit their services.

Regular education sessions continue to be provided for staff in most DHBs, and there was an increase in the provision of education for patients and families. There was also an increase in the proportion of the population with access to an organised community rehabilitation and support service that facilitated early discharge. This occurred in tandem with a drop in the use of day hospitals for post discharge rehabilitation. There were also improvements over the past five years in the routine assessment of basic patient outcome measures such as discharge destination and independence with activities of daily living by the time of discharge.

There was no change in the population’s access to driving assessment services although this was only available free-of-charge in four DHBs.
Table 1. Comparison of stroke rehabilitation services between 2002 and 2007

<table>
<thead>
<tr>
<th>DHB responses to survey (N = 21)</th>
<th>2002 N (% population)</th>
<th>2007 N (% pop.)</th>
<th>P value (% pop.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location of stroke patient rehabilitation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dedicated stroke rehabilitation unit</td>
<td>1 (10)</td>
<td>1 (12)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>designated area within general ATR unit</td>
<td>0 (0)</td>
<td>6 (37)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>general ATR unit</td>
<td>18 (86)</td>
<td>14 (51)</td>
<td></td>
</tr>
<tr>
<td>general medical unit</td>
<td>2 (4)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td><strong>Multidisciplinary team</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>expert in stroke</td>
<td>16 (73)</td>
<td>17 (91)</td>
<td>0.001</td>
</tr>
<tr>
<td>spends ≥50% time treating stroke patients</td>
<td>9 (41)</td>
<td>8 (57)</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Guidelines (rehabilitation)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>swallowing assessment</td>
<td>20 (91)</td>
<td>15 (83)</td>
<td>0.09</td>
</tr>
<tr>
<td>discharge planning</td>
<td>18 (87)</td>
<td>12 (62)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>pressure areas</td>
<td>18 (81)</td>
<td>14 (81)</td>
<td>1.0</td>
</tr>
<tr>
<td>goal setting</td>
<td>14 (66)</td>
<td>11 (54)</td>
<td>0.08</td>
</tr>
<tr>
<td>bladder &amp; bowels</td>
<td>16 (60)</td>
<td>12 (74)</td>
<td>0.04</td>
</tr>
<tr>
<td>nutritional support</td>
<td>12 (50)</td>
<td>13 (69)</td>
<td>0.006</td>
</tr>
<tr>
<td>shoulder pain</td>
<td>8 (32)</td>
<td>11 (65)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>VTE prophylaxis</td>
<td>10 (31)</td>
<td>13 (74)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>mood assessment</td>
<td>6 (23)</td>
<td>8 (45)</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Audit and routine data collection</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>audit stroke service</td>
<td>3 (28)</td>
<td>10 (64)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>stroke register</td>
<td>5 (33)</td>
<td>4 (38)</td>
<td>0.46</td>
</tr>
<tr>
<td>discharge destination</td>
<td>12 (63)</td>
<td>13 (76)</td>
<td>0.05</td>
</tr>
<tr>
<td>activities of daily living at discharge</td>
<td>10 (48)</td>
<td>12 (75)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Post discharge rehabilitation services</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>early supported discharge service</td>
<td>6 (25)</td>
<td>7 (43)</td>
<td>0.007</td>
</tr>
<tr>
<td>outpatient rehabilitation</td>
<td>19 (86)</td>
<td>18 (92)</td>
<td>0.18</td>
</tr>
<tr>
<td>day hospital rehabilitation</td>
<td>14 (51)</td>
<td>7 (31)</td>
<td>0.004</td>
</tr>
<tr>
<td>home or community-based rehabilitation</td>
<td>14 (73)</td>
<td>18 (97)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Education sessions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>staff</td>
<td>17 (86)</td>
<td>18 (85)</td>
<td>0.84</td>
</tr>
<tr>
<td>patients and families</td>
<td>10 (42)</td>
<td>14 (68)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>written information for patient/family</td>
<td>20 (93)</td>
<td>18 (87)</td>
<td>0.16</td>
</tr>
<tr>
<td><strong>Other services</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>driving assessment</td>
<td>18 (86)</td>
<td>17 (79)</td>
<td>0.19</td>
</tr>
<tr>
<td>vocational retraining</td>
<td>9 (35)</td>
<td>7 (41)</td>
<td>0.38</td>
</tr>
</tbody>
</table>

DHB: District health board; ATR: Assessment treatment & rehabilitation; VTE: Venous thromboembolism.

Comparison of services in 2007 with and without designated areas for stroke rehabilitation—DHBs with designated areas for stroke rehabilitation were more likely to use a stroke register and perform regular audit of their services (Table 2). Audit tools included the RCP audit (4 DHBs, 30% population), self-generated audits (4 DHBs, 18%) and the National Stroke Foundation of Australia audit tool (1 DHB, 12%).

The degree of MDT stroke specialisation was higher in those DHBs that had a designated area for stroke rehabilitation, with six of seven MDTs served by a SRA spending the majority of their time caring for stroke patients compared with only two DHBs without a SRA. DHBs with designated stroke rehabilitation services were also more likely to provide regular education services for patients and families.
Table 2. Comparison between DHBs that do and do not provide a designated inpatient stroke rehabilitation area (SRA)

<table>
<thead>
<tr>
<th>DHB responses to survey (N = 21)</th>
<th>SRA N (% population)</th>
<th>No SRA N (% pop.)</th>
<th>P value (% pop.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHB number (% NZ population served)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 (49)</td>
<td>14 (51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multidisciplinary team</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>expert in stroke</td>
<td>6 (46)</td>
<td>11 (47)</td>
<td>0.74</td>
</tr>
<tr>
<td>spends ≥ 50% time treating stroke patients</td>
<td>6 (46)</td>
<td>2 (11)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Guidelines (rehabilitation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>swallowing assessment</td>
<td>4 (38)</td>
<td>11 (45)</td>
<td>0.16</td>
</tr>
<tr>
<td>discharge planning</td>
<td>3 (26)</td>
<td>9 (36)</td>
<td>0.07</td>
</tr>
<tr>
<td>pressure areas</td>
<td>4 (38)</td>
<td>10 (43)</td>
<td>0.39</td>
</tr>
<tr>
<td>goal setting</td>
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<td>8 (28)</td>
<td>0.85</td>
</tr>
<tr>
<td>bladder &amp; bowels</td>
<td>3 (26)</td>
<td>8 (36)</td>
<td>0.43</td>
</tr>
<tr>
<td>hydration and nutritional support</td>
<td>3 (26)</td>
<td>10 (43)</td>
<td>0.001</td>
</tr>
<tr>
<td>shoulder pain</td>
<td>4 (38)</td>
<td>7 (27)</td>
<td>0.01</td>
</tr>
<tr>
<td>VTE prophylaxis</td>
<td>4 (38)</td>
<td>9 (36)</td>
<td>0.43</td>
</tr>
<tr>
<td>mood assessment</td>
<td>2 (14)</td>
<td>6 (31)</td>
<td>0.01</td>
</tr>
<tr>
<td>Audit and routine data collection</td>
<td></td>
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<tr>
<td>audit stroke service</td>
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<td>4 (20)</td>
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</tr>
<tr>
<td>stroke register</td>
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<td>1 (4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>discharge destination</td>
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<td>9 (39)</td>
<td>0.91</td>
</tr>
<tr>
<td>activities of daily living at discharge</td>
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<td>8 (38)</td>
<td>0.91</td>
</tr>
<tr>
<td>Education sessions</td>
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<td></td>
</tr>
<tr>
<td>staff</td>
<td>6 (45)</td>
<td>12 (40)</td>
<td>0.06</td>
</tr>
<tr>
<td>patients and families</td>
<td>5 (40)</td>
<td>9 (28)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

DHB: District health board; SRA: [designated] Stroke rehabilitation area; VTE: Venous thromboembolism.

Discussion

The major finding of this study is that there have been significant improvements in the provision of stroke rehabilitation services by DHBs between 2002 and 2007. Half of the population are now served by DHBs with areas designated for inpatient stroke rehabilitation up from only 10% in 2002. All of the remaining DHBs provide stroke rehabilitation in general ATR units.

Other improvements are that more of the population is served by MDTs specialising in stroke and services that use guidelines and audit. There are also more education programmes for patients and families.

However, there remains considerable variation in the provision of stroke rehabilitation services across New Zealand. Many New Zealanders still do not have access to an organised stroke rehabilitation service despite unequivocal evidence that such care reduces the risk of death, dependency or need for institutionalised care when compared with conventional care. Only 18 people with stroke need to be treated in organised inpatient care to prevent one from dying or being dependent at 1 year.

The early survival benefits and improved functional outcomes are longstanding and sustained for at least 10 years. A change from service delivery within a general
ATR unit to a dedicated stroke rehabilitation unit confirmed that similar benefits can be achieved in NZ and also resulted in sustained reductions in length of stay.\textsuperscript{16,17}

There are also concerns about the quality services provided, even by those DHBs with designated areas for stroke rehabilitation. It is therefore of concern that three of these seven DHBs (serving 11\% of population) did not use guidelines and one (3\%) did not have an MDT with expertise in stroke or provide regular education sessions for staff. There was also a reduction in the reported use of guidelines for discharge planning and goal setting over the past 5 years. The use of guidelines and protocols for the management of common problems in patients with stroke are important markers of an effective, organised stroke service.\textsuperscript{3–6,8–10}

Despite improvements, variable use of audit and routine measures of patient outcomes, and the range of audit tools used indicate that many DHBs may fail to identify deficiencies in their own service delivery. This suggests that the Ministry of Health may not be able to rely on self reporting by DHBs as an acceptable marker of the quality of services provided. Similarly resources provided by DHBs may not be adequate to accommodate all patients requiring rehabilitation following their stroke and the presence of guidelines doesn’t necessarily ensure that they will be used to benefit patient care; failings that have also been identified in international audits of stroke services.\textsuperscript{18}

Changes in service delivery can be difficult to achieve which is something that this survey did not specifically address.\textsuperscript{16,19} Potential barriers to change include the perception of high initial stroke rehabilitation unit setup costs, but these are offset with improved long-term patient outcome.\textsuperscript{3} In reality, the set-up costs are modest, whereas the immediate and long-term benefits for both patients and DHBs are large.\textsuperscript{3,16}

There may also be a general resistance to change; some DHBs do not have clinical champions to push through change but this may be ameliorated by the sharing of protocols and guidelines as well as other peer support.\textsuperscript{20}

Finally, the Ministry of Health stroke service specifications are not mandatory.\textsuperscript{12} The reasons for the apparent change from day hospitals to community-based rehabilitation and support teams for provision of post discharge rehabilitation services are not clear. The NZ guidelines did not recommend one form of service delivery over another as there was very little good-quality evidence to support decision-making in this area.\textsuperscript{2}

Our survey has a number of weaknesses. Questionnaires offer a simple means of rapidly surveying clinical practice but the most appropriate clinician may not be targeted and responses may not reflect actual practice.\textsuperscript{18,21} We did not attempt to verify the validity of responses but all participants were reassured that the survey was confidential and that no respondent or hospital would be identified. Attempts were made to contact specialists known to have an interest in stroke rehabilitation at each hospital, but this was not always possible and many questionnaires were simply addressed to the “medical director”. However the 100\% response rate provides some confidence that the survey reflects the current state of stroke rehabilitation services across all of New Zealand.

This paper focussed on services delivered by rehabilitation services within DHB base hospitals and therefore ignores services provided by a number of community hospitals.
that serve a very small proportion of the NZ population. However, these are unlikely ever to be capable of providing specialised stroke services and, if used, any guidelines were considered likely to be based on those from the relevant base hospitals. Similarly we have not reported on those limited services dedicated solely to rehabilitation of younger people.

In summary, there have been significant improvements in the implementation of recommended specialist services for stroke rehabilitation in NZ over the last 5 years. However there remains considerable variation in the type and quality of services provided by the 21 DHBs. The evidence supporting the effectiveness of organised inpatient stroke rehabilitation services, especially stroke rehabilitation units, is overwhelming. Ensuring that this service is available to all New Zealanders must continue to be a high priority. DHBs and the Ministry of Health need a consistent, national approach to both the mandatory implementation and audit of stroke services as this has already been successful in countries with similar health systems.18,19

Disclosure: Three authors currently act as honorary regional medical advisors for the Stroke Foundation of New Zealand (JG Central, PAB Northern, HCH Southern) and were also members of the Ministry of Health’s Stroke Advisory Committee 2002–4.

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Acknowledgements: This study was supported by the Hawke’s Bay Hospital Research Unit (JG) and the Julius Brendel Trust (PB). The authors also thank Drs John Fink (Stroke Neurologist, Christchurch Hospital, Christchurch) and Harry McNaughton (Rehabilitation Specialist, Medical Research Institute of NZ, Wellington) for their assistance with the survey questions.

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References:

Outpatient follow-up for patients with rheumatoid arthritis in relation to New Zealand Rheumatology Association guidelines at Dunedin Hospital

Georgina Chan, Fern Goh, Timothy Hodgson, Erica Hsu, Deborah Johnstone, Jasen Ly, Timothy Platt, Edrich Rodrigues, Wendy Tsai, Phil Hider, Andrew Gray, John Highton

Abstract

Aim

Current treatment for rheumatoid arthritis (RA) involves the use of various disease-modifying anti-rheumatic drugs (DMARDs) and biologic response agents which require ongoing medical supervision. An audit was undertaken to assess the adequacy of outpatient specialist follow-up for supervision of treatment in patients with RA in the Otago region.

Methods

The Rheumatology Service database was used to assess time between follow-up for the penultimate and last visit to rheumatology outpatient clinic for all patients who made at least two visits between 1 October 2001 and 30 September 2006. Other recorded data included demographic information and clinician expectations for the timing of the next outpatient visit. Comparisons were made between actual follow-up intervals, those indicated by specialists and the follow-up intervals recommended by the New Zealand Rheumatology Association Guidelines. Patients were characterised according to four groups specified in the guidelines: Group A: patients newly started on DMARDs; Group B: patients with some change in disease management; Group C: patient stable on potent medications; Group D: patients stable on less severe medication.

Results

According to the guidelines only 40% of patients were followed up within the recommended intervals. Groups A and B (76.9% and 70.6% respectively) had a significantly greater proportion of patients with follow-up at variance to guideline recommendations compared to groups C and D (50% and 45.3% respectively) (p<0.001). There were marked discrepancies between the guideline recommended follow-up intervals and those suggested by the clinicians. Compared with guideline recommendations clinicians advised less frequent follow-up for groups A and B but more frequent for patients in Groups C and D. However, an assessment of the quality of life scores amongst the patients suggested that follow-up was still appropriately targeted to those patients with lower quality of life.

Conclusion

Discrepancies in follow-up were most marked in the patient groups potentially most at risk of medication-related problems in whom guidelines suggested more intensive monitoring. Additional strategies to promote guideline-based follow-up arrangements may be indicated. Further work should examine the relationships between guideline recommended, physician intended and actual follow-up among rheumatology patients in other regions in order to assess whether modifications should occur to clinician behaviour or guideline content.
Current treatment of rheumatoid arthritis (RA) involves the use of disease-modifying anti-rheumatic drugs (DMARDs) and biologic response agents (BRAs) therapies which both have considerable potential to reduce or prevent joint damage and improve patient wellbeing.\(^1,2\) However, the potentially toxic effects of both therapies mean that rigorous follow-up is essential. As DMARDs and BRAs control rather than cure, follow-up is also necessary to assess disease activity in order to adjust management strategies and prevent unnecessary morbidity and expensive inpatient care.\(^1\)

The demands of providing adequate follow-up for patients with RA is an international issue.\(^3\) Closely linked is the need for a satisfactory specialist workforce to either provide or supervise the follow-up. A regional comparison in New Zealand during 2003 indicated that huge disparities in the availability of rheumatologists ensured that many regions were unlikely to be associated with adequate specialist follow-up.\(^4\)

The Rheumatology Service at Dunedin Public Hospital provides diagnosis and management services to patients with rheumatic disorders from the Otago and Southland regions of New Zealand. The service uses a multidisciplinary team approach to patient care and is primarily outpatient based.\(^5\)

Based on census data about the size of the regional population and using a 1% estimate for the prevalence of RA in the region, it can be estimated that approximately 2000 people with RA reside in the Otago area.\(^6,7\) In 2006 there was 1.5 full-time equivalent (FTE) consultants working in public service in the region—this was about 1.0 FTE below the optimal number estimated to be needed to serve the population in the region, although this represents a better level of provision than in most other areas of New Zealand.\(^5\)

In common with other countries guidelines have been developed in New Zealand to assist rheumatologists with their management of patients with RA.\(^1\) The New Zealand Rheumatology Association (NZRA) guidelines provide explicit recommendations about follow-up frequency in relation to disease status.\(^8\)

An audit was conducted to investigate the adequacy of outpatient specialist follow-up for patients with RA in Otago with reference to the NZRA guidelines. In addition, the study also assessed the potential impact that specialist follow-up, whether within or outside of the guideline recommended interval, may have on patients’ quality of life.

**Methods**

**Patient selection**—Study participants were all patients with a clinical diagnosis of RA on the Dunedin Rheumatology Service database. The service provides publicly funded care to RA patients in the Otago region as well as some from the nearby Southland area. Study participants were restricted to patients who had been seen at least once in the rheumatology outpatient department in the five years from 1 October 2001 to 30 September 2006 and were known to be alive at the end of this period.

The database generated a list of 524 patients with a diagnosis of RA in the region. Out of these, 24 patients were deceased, 2 patients were duplicates, and 2 patients’ files were not found. The remaining 496 patients were included in the study.

**Information recorded**—Information was obtained from hospital electronic patient records and paper-based clinical notes kept in the Rheumatology Service. Recorded data included patient’s sex, date of birth, and dates of last and penultimate outpatient appointment in which they were seen by a rheumatologist.
Nurse clinics, injection clinics, and clinics cancelled by the department were excluded. If a patient did not attend a clinic they were classified as “did not attend” (DNA). However, if they received a new scheduled appointment within 30 days of not attending, that appointment was recorded instead of the DNA appointment. The clinical letter for the patients’ penultimate appointment was used to extract data about the specialists’ indications for future follow-up.

**Categorisation of patients according to NZRA guidelines**—A comparison was made between actual follow-up intervals and the follow-up intervals recommended by the NZRA guidelines. Patients were characterised as belonging to one of four groups (A–D) that corresponded to the categories of follow-up advised in the NZRA guidelines.

- **Group A** included patients who were seen after DMARD introduction, recommended follow-up within 3 months;
- **Group B** were patients with moderate to severe inflammatory disease activity who required a change in DMARD therapy and/or additional treatment with corticosteroids (2–3 months);
- **Group C** were patients who were stable on potent medications (6–9 months) and **Group D** were patients who were stable on less severe medications such as non-steroidal anti-inflammatories, sulphasalazine, hydrochloroquine, or no medications (12 months). Patients who did not attend were classified as Group E.

Calculation of follow-up interval in relation to whether it was within or outside the time period recommended by the guidelines.

For groups A to D the actual period from the penultimate to last clinic was calculated and coded as to whether or not it agreed with NZRA guidelines. Individuals in Group E did not attend their second last scheduled appointment and therefore their follow-up adequacy cannot be determined.

**Questionnaire**—To assess any impact that outpatient follow-up longer than that recommended by the guidelines may have on quality of life we used with permission the RAQoL questionnaire. The questionnaire was sent to all patients identified by the audit after ethics committee approval was obtained.

Questionnaires were coded in relation to disease status identified by the NZRA recommendations (A,B,C,D) and whether or not they were followed up within or outside the recommended interval. Patients who did not attend their second to last appointment were coded ‘Q’. The code was inserted on the corner of the questionnaire. The questionnaire was sent out with a cover letter and a pre-paid reply envelope. Patients were requested to post back their responses within 10 days.

Audit information was exported into SPSS for analysis. A Rasch analysis was performed using BIGSTEPS 2.82 for the RAQoL scores. Factor analysis using polychoric correlations demonstrated that a one factor solution was plausible using the scree plot approach. The initial analysis included all 30 questions; however one question displayed high misfit statistics, outside the range 0.7–1.3, and it was excluded from further analyses.

The 30-item RAQoL instrument was estimated to have a minimally important difference of 2.0, which correlated to an effect size of 0.32 when modelled using the Rasch analysis.

For comparisons between groups, analyses were performed using SAS 9.1.2 and Stata 9.2 software. A general linear model was used to test for differences in outcome (RAQoL) between groups while controlling for potential confounders. Fractional polynomials were used to test for non-linearity in the association between the outcome and two continuous predictors (age and duration of RA).

**Results**

The study population had a mean age of 60 years with the ages ranging from 16 to 93 years (Table 1). The mean age, proportion of females and duration of disease was similar between all groups, except for males in group E who were relatively younger than their counterparts.

Table 1 also displays the results of actual follow-up in groups A, B, C, and D. Group E was eliminated from the analysis. Groups A and B (76.9% and 70.6% respectively) had a greater proportion of patients with follow-up that was outside the guidelines compared to groups C and D (50% and 45.3% respectively) that was statistically significant (p<0.001).
Table 1. Demographic characteristics and audit results

<table>
<thead>
<tr>
<th>Groups</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Chi-squared P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (%)</td>
<td>26 (5%)</td>
<td>177 (36%)</td>
<td>170 (34%)</td>
<td>75 (15%)</td>
<td>46 (9%)</td>
<td></td>
</tr>
<tr>
<td>Females n (% of group)</td>
<td>19 (73%)</td>
<td>134 (76%)</td>
<td>122 (72%)</td>
<td>46 (61%)</td>
<td>30 (65%)</td>
<td></td>
</tr>
<tr>
<td>Female mean age (years)</td>
<td>60.3</td>
<td>60.6</td>
<td>63.5</td>
<td>60.0</td>
<td>59.7</td>
<td></td>
</tr>
<tr>
<td>Female disease duration (years)</td>
<td>7.8</td>
<td>8.9</td>
<td>10.3</td>
<td>8.0</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>Male n (%)</td>
<td>7 (27%)</td>
<td>43 (24%)</td>
<td>48 (28%)</td>
<td>29 (39%)</td>
<td>16 (35%)</td>
<td></td>
</tr>
<tr>
<td>Male mean age (years)</td>
<td>63.1</td>
<td>62.5</td>
<td>64.9</td>
<td>65.1</td>
<td>54.6</td>
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<tr>
<td>Male disease duration (years)</td>
<td>8.0</td>
<td>9.1</td>
<td>9.0</td>
<td>5.3</td>
<td>6.6</td>
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<tr>
<td>Guideline recommended follow-up (months)</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>12</td>
<td></td>
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<tr>
<td>Follow-up within guidelines %</td>
<td>23.1</td>
<td>29.4</td>
<td>50</td>
<td>54.7</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Follow-up delay outside of guidelines %</td>
<td>76.9</td>
<td>70.6</td>
<td>50</td>
<td>45.3</td>
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</table>

<table>
<thead>
<tr>
<th>Amount of delay</th>
<th>0 to 3 months</th>
<th>3 to 6 months</th>
<th>6 to 9 months</th>
<th>9 to 12 months</th>
<th>More than 12 months</th>
<th>Delay, as proportion of time interval recommended in follow-up guidelines and percentage of patients delayed</th>
<th>0 to 25%</th>
<th>25 to 50%</th>
<th>50 to 75%</th>
<th>75 to 100%</th>
<th>&gt;100%</th>
<th>Chi-squared P value</th>
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<tbody>
<tr>
<td>Follow-up (%)</td>
<td>53.8</td>
<td>34.5</td>
<td>9.4</td>
<td>8.0</td>
<td>6.7</td>
<td>7.7</td>
<td>13</td>
<td>8.2</td>
<td>8</td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Delay (%)</td>
<td>4.7</td>
<td>6.5</td>
<td>11.5</td>
<td>12.4</td>
<td>14.7</td>
<td>11.5</td>
<td>3.4</td>
<td>7.1</td>
<td>14.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay (%)</td>
<td>7.8</td>
<td>6.5</td>
<td>11.5</td>
<td>12.4</td>
<td>14.7</td>
<td>11.5</td>
<td>3.4</td>
<td>7.1</td>
<td>14.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay (%)</td>
<td>23.1</td>
<td>36.2</td>
<td>20</td>
<td>8</td>
<td></td>
<td>7.7</td>
<td>13</td>
<td>8.2</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There was a discrepancy between the suggested follow-up intervals and those recommended by the clinician in their outpatient letters (Figure 1). In groups A and B, the mean for the clinician intended guidelines is 4.0 months (compared to 3), for group C 6.4 months (compared to 9) and for group D 6.7 months (compared to 12).

Responses to the RAQoL questionnaire were obtained from 66% of patients in the database. Respondents had similar demographic and disease characteristics to those in the audit database. There was no statistically significant difference between disease status groups in terms of the quality of life scores (p=0.327) (Table 2). There was also no evidence of any interaction between the disease status groups and follow-up groups (p=0.829). However, there was strong evidence of a difference for RAQoL between patients with follow-up within the recommended interval versus those followed up longer than recommended (within W/outside O) (p=0.004).

After adjusting for potential confounders, the difference between mean Rasch scores for patients who were followed up within guidelines and those who were not was 0.90 (95%CI 0.29–1.50) which was statistically significant (p=0.004) and exceeded the clinically significant effect size of 0.32.
Table 2. Demographics of respondents compared to audit population

<table>
<thead>
<tr>
<th>Variables</th>
<th>Audit</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>496</td>
<td>329</td>
</tr>
<tr>
<td>Age (mean)</td>
<td>61.9</td>
<td>62.50</td>
</tr>
<tr>
<td>Females %</td>
<td>71%</td>
<td>72.6%</td>
</tr>
<tr>
<td>Group A</td>
<td>5%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Group B</td>
<td>36%</td>
<td>37.2%</td>
</tr>
<tr>
<td>Group C</td>
<td>34%</td>
<td>36.9%</td>
</tr>
<tr>
<td>Group D</td>
<td>15%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Group E</td>
<td>9%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Subgroup Y</td>
<td>41%</td>
<td>46.2%</td>
</tr>
<tr>
<td>Subgroup N</td>
<td>59%</td>
<td>53.8%</td>
</tr>
</tbody>
</table>

Table 3. Effect of predictors on Rasch-adjusted RAQoL scores

<table>
<thead>
<tr>
<th>Predictors</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease status groups (A,B,C, and D)</td>
<td>0.327</td>
</tr>
<tr>
<td>Follow-up within or outside guideline interval (within W or outside O)</td>
<td>0.004</td>
</tr>
<tr>
<td>Interaction (A,B,C,D and Y,N)</td>
<td>0.829</td>
</tr>
<tr>
<td>Sex/Gender</td>
<td>0.031</td>
</tr>
<tr>
<td>Age*</td>
<td>0.084</td>
</tr>
<tr>
<td>Duration of RA*</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Among other predictors for quality-of-life disease duration (p=0.0004) had a statistically significant effect on quality-of-life scores. Although age did not have a statistically significant effect on scores (p=0.084), there was a tendency for an association between the two factors. Each additional year of age and year of disease duration were associated with an increase in score of 0.013 (95% CI: 0.002–0.028) and 0.034 (0.016–0.053) respectively.

Figure 1. Comparison of clinician intended follow-up with actual follow-up
Sex had a statistically significant effect on quality of life (p=0.031), the difference between the adjusted mean scores between females and males was 0.52 (95%CI 0.05–1.00). No evidence was found for the effect of other interactions among predictors on quality of life scores, including any interaction between age and sex and duration and sex individually or together.

Discussion

The study presents information about the adequacy of follow-up for RA patients when assessed against guidelines that explicitly define recommended follow-up intervals for patients undergoing treatment with disease-modifying medications. The results of our audit suggest that the follow-up of patients with RA in the Otago region does not meet Guideline recommendations across all groups (A, B, C and D).

According to the guidelines our audit shows that only 40% of patients were followed up within the recommended intervals. Discrepancies in follow-up were most marked in groups A and B (76.9% and 70.6% followed up outside of the recommended interval) which is of particular concern as patients categorized as A (introduction of new DMARD) and B (patients with moderate to severe inflammatory disease activity who required a change in DMARD therapy and/or additional treatment with corticosteroids) were potentially at greater risk of medication-related problems and needed more intensive monitoring.

An important contributor to the discrepancy between actual follow-up intervals and those recommended by NZRA guidelines appears to be the follow-up arrangements made by clinicians. On average clinicians arranged follow-up for patients in groups A and B for longer intervals than those recommended by the guidelines while the arrangements were usually shorter than recommended for patients in groups C and D. Possible explanations for this include clinicians either not being aware of or not agreeing with the NZRA guidelines.

To improve the adequacy of follow-up for patients according to guideline recommendations it appears necessary to change the way rheumatologists schedule follow-up. And to meet the guidelines clinicians would need to schedule follow-up with patients categorised as groups C and D over longer intervals than current arrangements (more towards the NZRA guidelines) which would then allow those patients in groups A and B to be seen earlier.

A higher Rasch score was correlated with a worse RA related quality of life. After adjusting for age, sex, and disease duration, scores were significantly different between those who were followed up within the recommended interval and those who were followed up outside of the interval recommended by the guidelines.

These results imply that those who had follow-up within the recommended time interval had a poorer quality of life than those who did not. RAQoL has previously been shown to correlate well with patient-reported disease severity in a number of countries. Hence if patients who were followed up within the recommended interval also had more severe disease then it implies that the Rheumatology Service clinicians were appropriately identifying those patients with worse disease and prioritising their follow-up accordingly. This may suggest that clinicians are
identifying patient characteristics not specified in the guidelines that may warrant modification of guideline recommendations in particular patients, especially those newly instituted on therapy.

Future initiatives to improve service provision to patients with RA in the Otago region include education and support to clinicians to encourage them to schedule follow-up more in accordance with the guidelines, consideration of enhancing the nurse clinician role to assume more involvement in follow-up or the provision of training to enable some GPs with a special interest in rheumatology to take over more follow-up.

As disparities in service provision may be a national problem, similar studies need to be conducted in other centres in order to assess the adequacy of follow up for RA in other regions. This information is particularly important in the development of national responses to ensuring the adequacy of follow-up such as by increasing the size of the rheumatology specialist workforce.

Finally there is an ongoing need to keep guidelines up to date and if the results from similar studies in other regions also indicated consistent disparities between practice and guideline recommendations then it would be important to ensure that the guidelines remained based on the best available evidence. Furthermore if disparities between clinician intended follow-up and guideline recommended care remained evident elsewhere in combination with evidence of physicians prioritising follow-up to match patients’ quality of life then additional work is needed to elucidate the patient factors that clinicians are responding to and then ensuring that they feature in any subsequent modifications to the guidelines.

Future research could examine a group of patients seen within or outside the recommended guideline interval and assess whether clinician judgement indicated that any delay was appropriate. Key aspects of the patient characteristics associated with appropriate follow-up intervals could be elucidated. This information could then be used to refine the guidelines to ensure that they helped deliver the best care for patients.

Competing interests: None known.

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**References:**


Best practice for assessment of patients with varicose veins

Emma Horrocks, Justin Roake, David Lewis

Abstract

Background Varicose veins are a significant health problem which attract much medicolegal attention. Recent publications have suggested “best practice” regarding assessment of patients with varicose veins. A retrospective audit was performed comparing clinical practice in a New Zealand teaching hospital with suggested standards.

Methods Clinic letters from 80 patients awaiting varicose vein surgery were reviewed. Data were collated regarding presenting problem, relevant medical history, clinical findings on examination, further investigations, and outcome.

Results Presenting complaint was noted for 99% of patients but actual symptoms were only recorded for 41%. The degree of disability caused by varicose veins was documented for 33% and patient concerns in 4%. Half of the patients presented with leg ulcers but ankle-brachial indices (ABPIs) were only recorded in 26% of clinic letters. Duplex scanning was recommended prior to surgery for 69% of patients and hand held Doppler assessment of venous disease was recorded in 61% cases. Clinic letters did not specify the nature and extent of disease in 6% of cases, and although every patient was recommended for surgery, the exact procedure was specified in only 24%. Details of surgical risks and complications were only present in 20% of letters, and only 21% of patients received a printed information sheet.

Conclusions The quality of the data recorded in the clinic letters of fell below suggested standards for assessment of patients with varicose veins. Improving the documentation of patient assessment will allow better communication between providers of healthcare and make clinical errors less likely.

In Western society, 25–40% of adults have varicose veins and, although the prevalence is higher in men, a larger number of women present for treatment.¹–³

Varicose veins can affect people of any age.³ Risk factors in the male population include increasing height, lower educational level, and a positive family history; for women they include increasing height, obesity, and a positive family history.³ Use of hormone replacement therapy (HRT) and a seated occupation seem to decrease this risk in women.¹

Varicose veins cause considerable morbidity, consume approximately 2% of national healthcare resources, and make up a significant proportion of the vascular surgical workload in many countries.¹,⁴,⁵ Varicose vein surgery also attracts much medicolegal attention, with action against vascular specialists following this type of surgery being the most common claim settled in the UK by the Medical Defence Union from 1990 to 2000 within the specialties General and Vascular Surgery.⁶
Varicose vein surgery is not currently recommended for asymptomatic patients because it is not without risk of complications and the long-term benefits of surgery have not yet been satisfactorily demonstrated by clinical studies.7,8,10

It is important that a standard of ‘best practice’ for the assessment of varicose veins in the outpatient setting is agreed by vascular specialists. Equally, the documentation of this assessment is important, especially in centres where waiting lists are pooled, and the operating surgeon may not have seen the patient personally in the outpatient clinic or before the day of surgery.

Currently, no agreed ‘best practice’ for the assessment of varicose veins exists. Indeed, individual surgeons, in their own way, variably assess and document consultations with patients suffering from varicose veins.

A protocol was designed locally for a ‘best practice’ consultation of patients with varicose veins in the outpatient setting. This protocol outlines the information which the current literature suggests is essential to be gathered and recorded about each patient to ensure they receive the best possible care.3,5,9–11 This includes accurate, patient-focused history taking, a full clinical assessment, detailed explanation to the patient about their condition and the treatment options, and agreement on the correct course of managing the condition.3,5,9–11

The rationale behind the protocol is as follows.

**Presenting complaint**—Within the ‘presenting complaint’, it is important to determine the reason for consultation, including cosmesis, symptoms, or complications of chronic venous insufficiency.

Many people with varicose veins are never harmed by them and some people may present for cosmetic reasons alone where reassurance about a benign prognosis can lead to the decision that surgery is not appropriate.3,5

It is the complications of varicose veins and chronic venous insufficiency that dictate consideration for treatment.3 Along with this it is necessary to gauge the degree of disability that the varicose veins might be causing or what concerns about the varicose veins the patient has. It has been well documented that ‘recognising and addressing patients’ true concerns and fears about their varicose veins can avoid unnecessary treatment12—and likewise by identifying those who are the most severely affected by symptoms they have the most to gain from treatment.7

**History relevant to the management of varicose veins and past medical history**—The ‘vascular history’ should include an assessment of vascular risk factors (including smoking, diabetes, hypertension, hypercholesterolaemia, other atherosclerotic disease), symptoms of arterial disease (including claudication), and enquiry about hormone therapy amongst female patients. These will help when deciding the probable cause of lower limb symptoms/ulceration and give an indication of the general health and comorbidities of a patient.

Systemic hormone therapy may increase the risk of deep vein thrombosis if surgery is undertaken. Documentation of past medical history should include any contraindications (whether relative or absolute) to varicose vein surgery, such as extensive deep venous incompetence, previous deep vein thrombosis, and some indication of general health or comorbidities as a guide to anaesthetic risk.
Clinical examination—Examination should include inspection for venotensive skin changes, assessment of extent of the varicose veins (long and/or short saphenous disease, presence of perforators, number of varicosities), Doppler assessment, and duplex assessment where indicated. Arterial pulses and/or ankle brachial pressure indices should also be noted.

Other tests, such as Trendelenberg or ‘tap’ testing may also be performed although the Trendelenberg, ‘cough’, and ‘tap’ tests have been abandoned by many surgeons as ‘unreliable and obsolete’.3,9,12

Hand-held Doppler examination provides a simple, non-invasive technique for assessing varicose veins which improves the accuracy of clinical examination in the outpatient setting. Indeed, members of the Vascular Society of Great Britain and Ireland advise that it be used as an initial assessment tool,4 although it is documented to be inaccurate in approximately 1 in 10 limbs examined.10 It is accepted that colour duplex scanning is the gold standard in varicose vein surgery planning and that it improves outcome, but unfortunately duplex scanning remains operator-dependent and is available only at a relatively high cost.3,4,10

Although some clinicians feel that duplex ultrasound scanning is essential before varicose vein surgery in order that the best outcome is obtained, the main indications for duplex scanning have been described3 as:

- Reflux in the popliteal fossa
- Recurrent varicose veins
- Complex or unusual varicose veins
- History of deep vein thrombosis

Outcome—The final ‘outcome’ section should include a discussion as to whether surgical intervention is indicated, and if so, what operation is to be performed. Surgical risks should be specified and explained, and an information sheet provided for the patient. The patient should also be given a choice as to whether to proceed with surgery based on the information provided, and an opportunity to ask questions, re-consult at a later date, or change their mind.

The aim of this study was to retrospectively assess how closely vascular surgeons at Christchurch Hospital have adhered to what may now be considered ‘best practice’ by auditing clinic letters regarding assessment of patients with varicose veins.

Methods

A cohort of patients on the waiting list for varicose vein surgery, between May 2000 and May 2006, at Christchurch Hospital were identified from the patient management system (PMS). The clinic letter from each patient’s outpatient assessment was assessed by a medically trained, independent assessor (EH) according to the ‘best practice’ protocol. The ‘best practice’ protocol consists of five main areas; presenting complaint, history relevant to the management of varicose veins, relevant past medical history, clinical examination, and outcome as discussed in the introduction.

Data were collected according to the information provided in the clinic letter on each of the following areas and collated onto an excel spreadsheet for analysis. No statistical tests were used for this retrospective observational study.
Results

A cohort of 80 patients was identified for this study, 55 male and 25 female. The median age of the patients was 57 years (female 59 years, and male 56 years) with a range of 28–81 years. Fifteen patients were assessed by an advanced surgical trainee, the remainder were assessed by a consultant.

**Presenting complaint**—The presenting complaint (i.e. main complaint of the patient in their own words) was identified and specified in 79 cases (99%). Of those 79 patients, 49% of patients presented because of ulcers, and 46% due to varicose veins. The remaining 2 patients presented with venous insufficiency.

Symptoms or lack of symptoms were only documented in the clinic letters of 33 patients (41%). One patient experienced no symptoms, while in 4 cases the clinic letter stated that the patient was experiencing ‘symptoms’ but it did not define what these symptoms were.

In the remaining 28 patients, the symptoms experienced were mainly pain (12), itch (6), and ache (10). None of the patients complained about the cosmetic appearance of their veins. Thrombophlebitis was mentioned in 12 clinic letters, with 1 patient suffering from a single episode, and 5 patients suffering from recurrent or severe episodes. The number of episodes of thrombophlebitis suffered was not documented in 6 clinic letters.

Cellulitis was mentioned in 15 letters, with 2 patient suffering a single episode and 6 patients suffering recurrent episodes. The number of episodes of cellulitis suffered was not documented in 5 clinic letters. The presence or absence of venous ulceration was mentioned in 73 cases (91%). Of those patients 15% had no current or past history of venous ulceration, 7% had healed ulcers, 34% had current ulcers but had not tried compression therapy, 7% had ulcers that were improving with compression, 10% had ulcers resistant to compression, and 26% had recurrent ulcers.

Patient concerns about their condition were mentioned in only three consultation letters (4%). Bleeding was the main concern. The degree of disability suffered by patients was mentioned in only 24 cases (33%) and of these patients 8 (38%) were able to carry out usual activities without compression, 5 (21%) were able to carry out usual activities if they wore compression hosiery, and 10 (42%) had their activities restricted by the symptoms.

**History relevant to the management of varicose veins and past medical history**—History of smoking was documented in 11 letters. There were 5 current smokers, 2 ex smokers, and 4 non-smokers. The patient’s ability to walk was mentioned in 20 (25%) cases and in all of these the patients walking was unaffected. A reference to hormone replacement therapy was only made in 2 cases.

Contraindications to surgery were mentioned in 68 (85%) cases, with 55 having no contraindications. Contraindications in the remaining patients included extensive deep venous incompetence, history of deep vein thrombosis, obesity, poor capacity for healing (e.g. systemic steroid therapy, immunosupression, smoking, diabetes), arterial insufficiency or a mixed aetiology ulcer. An indication of the patient’s general health was mentioned in 50 cases (63%), with most people being otherwise fit and well (60%). ASA Score was not mentioned in any clinic letters.
Clinical examination—Disease extent (long saphenous, short saphenous, or both) was mentioned in 75 patients (94%) and of those, most patients had long saphenous vein incompetence (56%). With regards to further examination, venotensive skin changes were mentioned in 58 cases (73%) and arterial pulses were documented in only 39 cases (49%). Examination of the varicose veins with a hand-held Doppler was performed in 49 cases (61%), ABPIs were documented in 21 cases (26%), and duplex scanning was mentioned in 45 cases (56%).

Outcome—When considering outcome of the consultations, surgical intervention was recommended in all cases, and the operation was specified in 19 cases (24%). Surgical risks were mentioned in 16 (20%) cases, and actually specified in only 7 (9%) cases. A College information sheet was given to 17 (21%) patients, and patient choice was mentioned in 27 (34%) cases i.e. whether the patient requested or agreed to the proposed management plan.

Discussion

Auditing clinic letters from the vascular surgical department at Christchurch Hospital using a ‘best practice’ protocol designed within the department and based on current literature has shown some interesting results. Some aspects of the consultations held were recorded very reliably and accurately, while other equally important information was neglected or omitted from documentation.

The presenting problem was generally reported reliably. Presenting complaint was mentioned on all but one occasion, with leg ulceration being the commonest reason for consultation. Symptoms experienced by patients were poorly reported with only 41% of letters mentioning symptoms. This seems unusual since surgery should be considered as a treatment option only for patients with symptomatic veins or complications of varicose veins, and evidence from a recent UK based randomised controlled trial has shown that varicose vein surgery is both clinically and cost-effective for such patients.\(^3,6\)

Surgery is not routinely indicated for asymptomatic varicose veins because this type of surgery is not without risk of complications, and the long-term benefits of surgery remain controversial.\(^7,8,10\) - This low level of documentation of symptoms may be explained by the fact that the majority of patients in this study had leg ulceration and in this situation a presumption of being symptomatic could have been made.

Complications of varicose veins were generally quite well reported and it seems that ulceration is by far the commonest problem in patients waiting for varicose vein surgery in Christchurch. Presence, absence, or history of ulceration was mentioned in 91% of cases with only 15% of those patients not having suffered an ulcer. The concerns of the patients and degree of disability resulting from the varicose veins were almost uniformly ignored, or at least not reported in clinic letters.

Although it states in the literature that a significant proportion of patients seek medical attention because they are primarily concerned with cosmetic appearance, it actually seems that most of these patients have fears, worries, or concerns about harm that the varicose veins may cause in the future; for example, deep vein thrombosis, trauma, bleeding, and ulcers.\(^5,7\)
It has been reported that many patients with asymptomatic varicose veins decide against treatment if reassured about the likelihood of a benign prognosis, especially if an offer of reconsultation in the future is offered should symptoms or complications develop. It seems that recognising and addressing patients’ true concerns and fears about their varicose veins can avoid unnecessary treatment.

The importance of ascertaining the reasons for presentation, and asking specifically about cosmetic appearance, symptoms, medical complications, and concerns cannot be overestimated. With this information at hand, unnecessary and inappropriate operations can be avoided. The literature suggests that while vascular specialists routinely ask about the presenting complaint, it is interesting to note that most do not recognise, elicit, or document that their patient has specific concerns. This was true in the current study.

History relevant to the management of varicose veins was very poorly reported. Smoking was only mentioned in 11% of patients. Vascular risk factors should have been very well reported not only because of the prevalence of leg ulceration in the current cohort, but also as a tool for assessing co-morbidity and operative risk.

Smoking was, however, the only risk factor for which an assessment was made, so this may indicate bias within the auditing tool. Debate occasionally centres on the fact that patients who are likely to develop arterial disease should have their superficial veins preserved as possible conduits for future bypasses. For the majority of our patients such concerns are misplaced because the saphenous systems are so abnormal that they are not suitable as bypass grafts.

Past medical history with regards to contraindications or relative contraindications to surgery or the patients’ general health were generally well documented. Contraindications were mentioned in 85% of cases, and of those 69% were in fact mentioning that no contraindications existed. In the last area assessed (outcome), documentation was very poor. Although all patients were recommended for surgery and indeed put on the waiting list for surgery, only 24% of clinic letters specified the precise operation to be performed. Surgical risks were only mentioned in 20% of cases and were only specified in 9% of letters.

Reasons for these findings could be that although reviewing clinic letters is a convenient way of assessing what occurred during a consultation, it may not be the most accurate. Although clinic letters should contain information about all the issues discussed at consultation there is no way of being sure that this is the case. Some argue that time during busy clinics should be spent seeing patients rather than dictating lengthy clinic letters covering all of the above mentioned points. Recording of relevant negatives in a patient assessment, however, is necessary—for example the presence or absence of symptoms and medical complications of varicose veins, and the presence or absence of contraindications to surgery.

A balance must be struck between time-constraints and including enough information to provide a safe and efficient service to patients. With voice recognition software and the use of “macros” dictation and typing time can be effectively reduced. The medicolegal implications of not recording an accurate record of a consultation are obvious.
From this information it is clear that surgeons do not seem to discuss all of the areas that we have highlighted as important within each varicose vein consultation. One of the weaknesses of this audit is that it is impossible to say whether these areas are totally neglected or just poorly documented. Although auditing clinic letters is not the most reliable way of obtaining information about a consultation, it is the only means of written documentation that is easily available after the event, and it is also the only information available to other surgeons or clinicians, so it does seem a reasonable method of assessing the consultation.

A limitation of this study is the fact that the data were collated retrospectively. It would have added an interesting dimension had it been possible to correlate the data collected with written notes and video footage or documented observation from the clinical consultation to see how accurate a representation the clinic letters are.

In summary, although some important information was recorded well during vascular consultations, the overall standard of documentation regarding patient concerns and symptoms and about the outcome of the consultation was poor.

With education about the ‘best practice protocol’ it is hoped that consultations will become more standardised between surgeons and documentation will improve to benefit the outcome and care for each patient.

**Competing interests:** None known.

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**References**

Iron status and risk-profiling for deficiency in New Zealand blood donors

Krishna G Badami, Kate Taylor

Abstract

Aim To assess the iron status of New Zealand blood donors using the serum ferritin (ferritin) assay and the impact of gender, age, and donation history on iron status.

Methods Ferritin levels were measured in 5006 subjects attending two New Zealand Blood Service (NZBS) blood donor sites between October and December 2006. The influence of three major determinants of iron status (gender, age, and blood donation history) in the previous 12 months was assessed.

Results Ferritin levels tended to be lower in younger people, females, and those with more intensive blood donation history. Levels lower than 12 mcg/L were found in 14.1% of subjects overall, 19.9% of females, 19.0% of those aged under 20 years, and 25.1% of those who had donated 3–4 whole blood units during the previous 12 months had ferritin levels lower than 12 mcg/L. Risks were additive and total risk correlated inversely with ferritin levels.

Conclusions Iron deficiency is a significant problem in New Zealand blood donors. Prevention or treatment, as appropriate, would help both donors and the long-term supply of blood. A stratified approach to testing, prevention and treatment taking into account risk factors, ferritin and Hb levels is likely to be the most effective strategy.

Iron deficiency is a major health problem throughout the world including New Zealand. Indeed, some evidence shows that deficiency, even if insufficient to cause anaemia, may affect physical and mental performance and health. An individual’s iron status is a balance between intake, absorption, and loss.

Blood donation is a well-recognised risk factor for iron deficiency. Iron deficiency is probably the most significant impact of blood donation on donors. Current, ‘one size fits all’ protocols may be insufficient to prevent iron deficiency in some blood donors.

Published information on the iron status of New Zealand blood donors is limited. A study from the United States suggested that up to 8 and 23% of male and female donors respectively may be iron deficient.

We report results from a two-site observational study on New Zealand blood donors which aimed to determine:

• The iron status of current donors using the serum ferritin (hereafter termed ‘ferritin’) assay;
• How iron status correlates with three important determinants—gender, age, and blood donation history; and
• Groups at particular risk of becoming iron deficient.
Methods
The study was undertaken between October and December 2006 at the Christchurch and Waikato New Zealand Blood Service (NZBS) sites after approval by the multi-region ethics committee, Wellington. Intending blood donors attending static and mobile venues were given an information leaflet and asked if they wished to participate. Inclusion in the study required:

- Signed informed consent;
- Satisfactory pre-donation health assessment (with the sole exception of a ‘low’ Hb—i.e. one that is less than acceptable for donation: <130 g/L and 120 g/L in males and females respectively);
- Satisfactory post-donation blood test results (among others, antibody to and nucleic acid testing for HIV 1 and 2, HBsAg, antibody to and nucleic acid testing for HCV and the TPHA serological test for syphilis and, in first-time donors, antibody to HTLV I and II, in O negative donors and a proportion of other donors, antibody to CMV);
- No adverse post-donation information.

Note: Blood donors routinely undergo health assessment which includes a questionnaire, an interview, pre-donation haemoglobin measurement and post-donation blood tests.

Ferritin was measured using a validated enzyme immunoassay (Abbot Axsym®). For the purposes of this study the iron status of subjects, based on the ferritin level was classified as:

- ‘High’ (males >300 mcg/L; females >250 mcg/L);
- ‘Normal’ (males >20–300 mcg/L; females >20–250 mcg/L),
- ‘Borderline’ (males and females 12–20 mcg/L) or
- ‘Low’ (males and females <12 mcg/L).

Subjects with normal results were not informed but were given the opportunity to discuss their results by telephone. Those with abnormal results were informed and advised to see their own doctors.

Demographic data and blood test results were taken from computer records and collated electronically. Data were analysed using the Epi Info 2000 statistics package.

Results
Of the 5046 participants approached, 5006 (99.2%) participants were recruited: 3001 from Waikato and 2005 from Christchurch. Figure 1 shows the study flow chart.

Characteristics of study subjects are shown in Table 1. They were comparable with those for New Zealand blood donors as a whole and subjects at the two sites were essentially comparable with each other.

Correlations between the three main variables (age, gender, and donation history) for the 5006 subjects are shown in Figures 2–4. Ferritin levels and the iron status of subjects are shown in Tables 2 and 3.

While the majority of subjects with a ‘low’ Hb (as previously defined) had a low ferritin, a substantial minority of those with acceptable Hb also had a low ferritin (Table 3); 99.0% of all subjects had an Hb that was acceptable for blood donation (Table 3) as did 1694/1730 (97.9%) of subjects with a low or borderline iron status.

Gender, age, and prior donation history influence the risk of becoming iron deficient (Tables 2 and 3). Risk categorisation by cumulative risk scores based on these variables is shown in Table 4 and the correlation between risk category and ferritin level is shown in Table 5. Though this model has not been validated and is incomplete (not having taken in to account other determinants of iron status), it has biological basis and our results suggest that there is a good correlation.
In the scheme described above, cumulative risk scores 5 and 4 (together 6.1% of all subjects) might represent ‘high risk’, 3 and 2 (55.0%) ‘intermediate risk’, and 1 and 0 (38.7%) ‘low risk’ for iron deficiency.

Figure 1. Study flow chart

<table>
<thead>
<tr>
<th>Potential subjects approached</th>
<th>Walkato</th>
<th>Christchurch</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consent obtained</td>
<td>3025</td>
<td>2021</td>
<td>5046</td>
</tr>
<tr>
<td>Passed initial assessment</td>
<td>3024</td>
<td>2020</td>
<td>5044</td>
</tr>
<tr>
<td>Passed DA testing</td>
<td>3004</td>
<td>2011</td>
<td>5015</td>
</tr>
<tr>
<td>Adverse post-donation information obtained</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Subjects recruited</td>
<td>3001</td>
<td>2005</td>
<td>5006</td>
</tr>
</tbody>
</table>

Note: Includes 48 ineligible to donate on account of ‘low’ Hb but eligible for the study; DA testing=donor accreditation testing (post-donation blood tests). Hb=haemoglobin.
### Table 1. Characteristics of subjects in the study compared to New Zealand blood donors in 2006. All values are shown as n (%)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Study subjects</th>
<th>All NZBS donors 2006</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>5006</td>
<td>94288</td>
</tr>
<tr>
<td>Donation Venue</td>
<td>static</td>
<td>2817 (56.2)</td>
</tr>
<tr>
<td></td>
<td>mobile</td>
<td>2189 (43.7)</td>
</tr>
<tr>
<td>Gender</td>
<td>males</td>
<td>2395 (47.8)</td>
</tr>
<tr>
<td></td>
<td>females</td>
<td>2611 (52.1)</td>
</tr>
<tr>
<td>Age group</td>
<td>&lt;20</td>
<td>415 (8.2)</td>
</tr>
<tr>
<td></td>
<td>21–50</td>
<td>2867 (57.2)</td>
</tr>
<tr>
<td></td>
<td>&gt;51</td>
<td>1724 (34.4)</td>
</tr>
<tr>
<td>Blood donation history in previous 12 months</td>
<td>3–4 whole blood (WB)</td>
<td>927 (18.5)</td>
</tr>
<tr>
<td></td>
<td>1–2 WB / &gt;15 pheresis (ph)</td>
<td>2758 (55.0)</td>
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<tr>
<td></td>
<td>1–14 ph</td>
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<td></td>
<td>Nil</td>
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<tr>
<td>Blood group</td>
<td>O negative</td>
<td>583 (11.6)</td>
</tr>
<tr>
<td></td>
<td>other</td>
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### Table 2. Serum ferritin levels (mcg/L) and subject characteristics

<table>
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<td></td>
<td>Christchurch (2005, 40.0)</td>
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<td></td>
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<td>51.0 (50.9)</td>
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<td></td>
<td>&lt;14 ph / nil (1321, 26.3)</td>
<td>70.2 (64.9)</td>
<td>49.9</td>
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<td>Blood group</td>
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<td>41.3 (45.1)</td>
<td>27.5</td>
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<tr>
<td></td>
<td>other (4423, 88.3)</td>
<td>48.3 (49.1)</td>
<td>33.7</td>
</tr>
<tr>
<td>Hb (n, %)</td>
<td>'low' (49, 0.9)</td>
<td>17.8 (24.2)</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>adequate (4957, 99.0)</td>
<td>47.7 (48.6)</td>
<td>33.2</td>
</tr>
<tr>
<td>Overall (n=5006)</td>
<td>47.5 (48.7)</td>
<td>33.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Iron status and subject characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Iron status (% in each category)</th>
<th>high</th>
<th>normal</th>
<th>borderline</th>
<th>low</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waikato (3001, 59.9)</td>
<td>0.6</td>
<td>68.7</td>
<td>17.5</td>
<td>13.0</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Christchurch (2005, 40.0)</td>
<td>0.3</td>
<td>59.1</td>
<td>24.6</td>
<td>15.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gender (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males (2395, 47.8)</td>
<td>0.8</td>
<td>71.0</td>
<td>20.2</td>
<td>7.8</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>females (2611, 52.1)</td>
<td>0.2</td>
<td>59.2</td>
<td>20.5</td>
<td>19.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20 (415, 8.2)</td>
<td>0.2</td>
<td>54.4</td>
<td>26.2</td>
<td>19.0</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>21–50 (2867, 57.2)</td>
<td>0.5</td>
<td>63.3</td>
<td>20.4</td>
<td>15.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;51 (1724, 34.4)</td>
<td>0.6</td>
<td>69.9</td>
<td>18.9</td>
<td>10.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Donation history (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3–4 WB (927, 18.5)</td>
<td>0</td>
<td>40.2</td>
<td>34.6</td>
<td>25.1</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1–2 WB / &gt;15 ph (2758, 55.0)</td>
<td>0.4</td>
<td>65.2</td>
<td>20.1</td>
<td>14.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;14 ph/nil (1321, 26.3)</td>
<td>1.3</td>
<td>81.0</td>
<td>11.2</td>
<td>6.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Blood group (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O negative (583, 11.6)</td>
<td>0.3</td>
<td>57.8</td>
<td>25.0</td>
<td>16.8</td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>other (4423, 88.3)</td>
<td>0.6</td>
<td>65.8</td>
<td>19.8</td>
<td>13.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hb (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘low’ (49, 0.9)</td>
<td>0</td>
<td>24.4</td>
<td>12.2</td>
<td>61.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>adequate (4957, 99.0)</td>
<td>0.5</td>
<td>65.2</td>
<td>20.4</td>
<td>13.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overall (n=5006)</strong></td>
<td></td>
<td>0.5</td>
<td>64.9</td>
<td>20.4</td>
<td>14.1</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2. Proportions (%) of males and females in the 3 age groups

![Figure 2](image2.png)

Figure 3. Gender and prior donation history

![Figure 3](image3.png)
Table 4. Cumulative risk (risk categories) based on gender, age, and prior donation history

<table>
<thead>
<tr>
<th>Variables</th>
<th>Prior donation history</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3–4 WB (2 points)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>&lt;20 y (2 points)</td>
</tr>
<tr>
<td></td>
<td>21–50 y (1 point)</td>
</tr>
<tr>
<td></td>
<td>&gt;51 y (0 points)</td>
</tr>
<tr>
<td>Male</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>&lt;20 y (1 point)</td>
</tr>
<tr>
<td></td>
<td>&gt;21 y (0 points)</td>
</tr>
</tbody>
</table>

Table 5. Ferritin levels (mcg/L) according to cumulative risk (risk category) for iron deficiency)—all subjects combined

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cumulative risk (risk category)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Number (% in each risk category)</td>
<td>19 (0.37)</td>
</tr>
<tr>
<td>Mean ferritin</td>
<td>11.4*</td>
</tr>
<tr>
<td>SD</td>
<td>7.2</td>
</tr>
<tr>
<td>Median ferritin</td>
<td>8.0</td>
</tr>
</tbody>
</table>

*P value <0.0001 comparing the mean ferritin for categories 3 and 5.

Discussion

This is the first systematic assessment of iron status in a broad range of New Zealand blood donors. Our results show that iron deficiency is a significant problem in this group (Tables 2 and 3). Overall 14.1% and 20.4% of subjects had low or borderline iron status respectively. Current standards (see later), protect donors poorly in this regard. The vast majority (97.9%) of subjects with a low or borderline iron status had an Hb that was adequate for donation.
The proportion of iron-deficient subjects in this study is similar to those in previous reports on blood donors\textsuperscript{1,2,4–6} but higher than those in New Zealand population-based reports (with some exceptions).\textsuperscript{7–10} Direct comparisons are difficult because of inconsistencies in the use of terms such as ‘donor’ and ‘non-donor’ and in the ferritin levels defining iron deficiency.

As expected, females, subjects aged under 20 years (y) and those with more intense prior donation history had lower ferritin levels and significantly worse iron status (Tables 2, 3). While the relationship between gender and prior donation history is not clear-cut (Figure 3), it is unlikely that prior donation history alone is sufficient to explain the worse iron status of female subjects.

Factors not evaluated in the present study such as diet and menstruation are likely to be more important. The relatively poor iron status of <20 y subjects is possibly due to the combined effect of increased iron requirements during growth and inadequate intake. Indeed, several studies have confirmed the relatively poor iron intakes and iron status in adolescents—especially, girls.\textsuperscript{11–13}

Intensity of blood donation during the previous 12 months was inversely and significantly related to ferritin (Tables 2, 3). Those with the highest levels of prior donations, constituting 73.5% of all subjects (Table 1) accounted for 687/751 (91.4%) of those with low ferritin.

Red RBC (and hence iron) loss depends on the number and type of donation. NZBS standards permit up to 4 whole blood donations or (at that time) up to 15 L of plasma in a 12-month period with at least 90 days between successive whole blood and 14 days between successive phereses donations subject to satisfactory pre-donation health assessment as described under methods.

Loss of packed RBC is 175–330 ml with a whole blood donation and, in our set-up, 10–15 ml with a pheresis donation. Additional losses of blood occur—for routine blood tests in all donors and, for instance, the initial blood draw into the diversion pouch (to reduce bacterial contamination) in plateletpheresis donors.

The relationship between ABO/RhD group, ferritin levels, and donation frequency has not previously been commented on. In this study, O negative subjects had significantly lower ferritin levels (Tables 2 and 3) perhaps because they donate blood more intensively than those of other groups. 54.2% and 26.5% of O-negative subjects donated 3–4 WB units and 1–2 WB / >15 ph units respectively during the previous 12 months compared to 48.5% and 15.4% respectively for those of other groups.

Waikato subjects had significantly higher ferritin levels than Christchurch subjects, lower proportions of those with low and borderline ferritin, and higher proportions of those with normal and high ferritin (Tables 2 and 3). The reasons are not clear. Christchurch had slightly more O negative donors and subjects donating more intensively in the previous 12 months compared to Waikato. Waikato though, had a slightly higher proportion of females and <20 y subjects than Christchurch (results not shown) and possibly also a higher proportion of Māori subjects.

In the last National Nutrition Survey (NNS 97),\textsuperscript{7} Māori (especially women) appeared to have a worse iron status than that of their ‘European and Other’ counterparts. Factors not considered in the current study (such as ethnicity, dietary iron intake and
absorption, body-mass index, menstruation, oral contraceptive vs intrauterine device use, and causes of ‘falsely’ elevated ferritin) may explain the difference between the two sites.

Individuals with latent iron deficiency (low ferritin but ‘normal’ Hb and red cell indices) may show increase in both Hb and indices as iron status improves. Furthermore, latent iron deficiency may be associated with a variety of significant, though sometimes subtle, health problems such as fatigue, low physical endurance, impaired cognition, and the restless leg syndrome.

A small minority of subjects with borderline or normal ferritin (6/1022 and 12/3249 respectively) but none with raised ferritin also had ‘low’ Hb but they were not further investigated by us. Explanations include:

- Hb that was normal for the individual concerned but less than acceptable for donation;
- Technical causes affecting either the Hb or ferritin assays;
- Iron deficiency anaemia masquerading as normo-ferremic anaemia because of associated anaemia of chronic disease, acute phase reaction or other causes; and
- Anaemia due to causes other than iron deficiency.

While the majority of subjects with a ‘low’ Hb had a low ferritin, a substantial minority of those with acceptable Hb also had a low ferritin (Table 3) thus confirming again that anaemia develops late in iron deficiency. It is sobering to note that 13.6% and 20.4% of the 4957 subjects who actually donated blood had low or borderline iron status respectively on the day they donated blood (Table 3).

Only 1% of all subjects (and 4.3% of those with a low ferritin) had a ‘low’ Hb. Normally we would detect a higher proportion of intending blood donors with a low Hb. The low numbers of ‘Hb failures’ in this study may have resulted from the low enrollment of subjects with low Hb. Nevertheless, our results suggest that the magnitude of the problem of iron deficiency amongst New Zealand blood donors is perhaps no less than stated.

In this connection it is interesting to consider ferritins routinely checked in 1077 intending blood donors with a low Hb at the Christchurch centre between July 2001 and February 2007 (not part of the current study). This ranged from 1–464 mcg/L, the mean was 14.9 mcg/L and the median 6.0 mcg/L. Of these, 2 (0.18%), 148 (13.7%), 138 (13.7%), and 789 (78.3%), would have been classified as iron status high, normal, borderline and low respectively according to the criteria used in this study.

Risks for iron deficiency are additive and a combination of factors determines overall risk (Table 5). In this study, gender, age, and prior donation history were evaluated. As expected, male donors, in general, are able to maintain iron levels better than females. For example, the mean serum ferritin in males aged >21 y donating 3–4 WB units during the previous 12 months was comparable (results not shown), not to that of females >51 y with a similar donation history, but to >51 y female subjects with a past history of 1–2 WB or pheresis equivalents.
Interestingly 27/5006 (0.5%) subjects had higher than normal ferritin including 13/2758 (0.4%) of those who had donated 1–2 whole blood units or >15 phereses units, 6/2611 (0.2%) of females and 1/415 (0.2%) of those <20 y [Table 3].

In blood donors, raised or high-normal ferritin for reasons other than genetic haemochromatosis (HC) are possible but unlikely. Indeed, some subjects may have been patients with known HC (but accepted as blood donors) and some who were previously undiagnosed have since had HC formally confirmed. While the serum ferritin assay is not a good test for early HC, in blood donors it is likely to uncover at least some cases of HC—an example of ‘value addition’ to the donation process (from the perspective of the donor) that has recently been mooted. 20

Conclusions and Recommendations

A significant proportion of New Zealand blood donors have poor iron status. As expected, female gender, lower age, and more intensive blood donation history predict poor iron status. Current protocols protect blood donors poorly from iron deficiency.

Iron deficiency affects donor health, donor retention, and blood supply. The latter possibility been discussed in a previous publication. 21 Amongst New Zealand blood donors, Hb failure is the prime single reason for deferral accounting for 20% of all deferrals in 2006–2007 (internal NZBS data). Most of these are likely to be due to iron deficiency.

This study has not considered all the risk factors for iron deficiency and a further study is planned to consider factors such as diet, menstruation, ethnicity, and BMI. However, even on the basis of the information currently available, individually tailored protocols can be created that are better able to preserve donor iron status.

Changes to donation protocols, if stratified by risk should not prove too difficult to implement because only a minority of subjects (6.1%) in our study were in a putative ‘high risk’ group requiring particular attention while 55.0% and 38.7% respectively were in ‘intermediate’ and ‘low’ risk categories (Table 5).

Reducing donation frequency alone, in order to improve donor iron status, may lead to unacceptable reduction in supply—at least in the short-term. A stratified protocol taking into account risk, (but also Hb and ferritin) and incorporating testing for deficiency, prophylaxis or, treatment with iron supplements as appropriate and follow-up is the one most likely to reconcile the conflicting demands of blood supply and donor well-being.

Competing interests: None known.

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• Dr Sue Levin (Medical Officer, NZBS Christchurch)
• Dr Anita Bell (Public Health Physician, Waikato District Health Board)
• Maree Clarkin (Collections Support Officer, NZBS Waikato)
• Olive Utiera (National Manager, Donor Services, NZBS)
• Rosie Hawes (Manufacturing Support Officer, NZBS Christchurch)
• Glenys Whitelaw (Executive Assistant, Donor Administration, NZBS Christchurch)

Correspondence: Dr Krishna G Badami, Transfusion Medicine Specialist, New Zealand Blood Service, 87 Riccarton Rd., Christchurch, New Zealand. Email: krishna.badami@nzblood.co.nz

References:


Chris Wilkins, Paul Sweetsur

Abstract

Aim To track trends in drug use in the New Zealand population over the past 8 years.

Method National household surveys of drug use were conducted in New Zealand in 1998, 2001, 2003, and 2006 using the same Computer Assisted Telephone Interview (CATI) methodology. The age ranges of the random digit dial (RDD) samples from each survey wave were truncated to those aged 15–45 years old. The respective sample sizes for each of the survey waves were: 5475 in 1998; 5504 in 2001, 3042 in 2003, and 1902 in 2006. Statistical comparisons were made between the 2006 survey wave and the three other survey waves for 13 different drug types.

Results A higher proportion of the sample had tried alcohol in their lifetimes in 2006 compared to 2003 (89.5% vs 83.7%, p<0.0001) and compared to 2001 (89.5% vs 86.4%, p=0.0038). A lower proportion had tried tobacco in 2006 compared to 2001 (57.6% vs 63.9%, p<0.0001) and compared to 1998 (57.6% vs 64.4%, p<0.0001). A lower proportion had used cannabis in the past 12 months in 2006 compared to 2001 (17.9% vs 20.3%, p=0.0448). A lower proportion had used amphetamine in the past year in 2006 than in 2001 (3.4% vs 5.0%, p=0.0085). A higher proportion of the sample had used ecstasy (MDMA) in the past year in 2006 compared to 1998 (3.9% vs 1.5%, p<0.0001). There was an increase in the level of alcohol use by last year drinkers in 2006 compared to 1998 with an increase in the proportion of drinkers saying they were using ‘more’ alcohol and a decrease in those saying they were using ‘less’ alcohol. There was an increase in the level of amphetamine use by current amphetamine users in 2006 compared to 2003 with less users saying they had ‘stopped’ using the drug (12% vs 42%, p=0.0386).

Conclusions The rise in the lifetime use and level of use of alcohol is consistent with the liberalisation of the alcohol environment in New Zealand. Conversely, the decline in the lifetime use of tobacco reflects stricter regulation and shifts in societal tolerance of smoking. The growing negative social connotations attached to smoking, as well the emergence of new synthetic stimulants, may have impacted negatively on levels of cannabis use. There has been some entrenchment of amphetamine use since a reported levelling off of its prevalence in 2003.

Drug use imposes a range of health and social costs on New Zealand including death, illness, mental health problems, injuries from accidents, domestic violence, family and relationship breakdown, and child neglect. Monitoring population trends in drug use is important in developing responses to emerging drug problems, and also for evaluating the effectiveness of existing responses.
There have been several changes in drug use and drug policy in New Zealand over the past 10 years or so. There has been a liberalisation of the alcohol environment since 1989, which culminated in the lowering of the alcohol purchase age to 18 years old in 1999. The Government has implemented a range of initiatives to reduce the use and social impacts of tobacco use—including increased taxation of tobacco products; mass media campaigns encouraging users to seek help to stop use; and the imposition of smoke free areas in workplaces, restaurants, and bars.

The Government’s response to the emergence of methamphetamine has included the reclassification of methamphetamine to the highest Class A category of the Misuse of Drugs Act 1975, additional resources and powers given to Police and Customs involved in drug enforcement, the negotiation of a Memorandum of Understanding with the New Zealand Chemical Industry Council to monitor the sale of chemical precursors that can be used to clandestinely manufacture methamphetamine, and the development at a local level of protocols with pharmacies to notify police of suspicious purchases of medicines containing pseudoephedrine.

Trends in the use and regulation of high-profile substances should be viewed in the wider context of trends for other drug types in New Zealand. While national data on drug use in New Zealand has been collected fairly regularly over the past 8 years using the same survey methodology, extensions to the original survey design have made comparisons over the entire period of national surveying somewhat difficult. The age ranges of the samples surveyed have been extended in recent waves and some new drug types have been included.

The national surveys of drug use have regularly collected data concerning changes in the level of use of each drug type, but the nature of the data collected has made it difficult to assess overall changes in the level of use of substances between survey waves.

The aim of this paper is therefore to compare the national population prevalence, and change in levels of use, of 13 drug types—including alcohol, tobacco, cannabis, amphetamines, and ecstasy (MDMA)—among the general New Zealand population aged 15–45 years old over the past 8 years.

Method

National household surveying of drug use was conducted in New Zealand in 1998, 2001, 2003, and 2006. The 1998 National Drug Survey (NDS) interviewed a national sample of 15–45 year olds using a Computer Assisted Telephone Interview (CATI) survey methodology. The 2001 NDS retained the same questionnaire and CATI methodology as the 1998 NDS and extended the age range of the sample to 13–45 year olds. The 2003 Health Behaviours–Drug Use (2003 HBS-Drug Use) retained the core sections of the questionnaire and same CATI survey methodology as the two previous NDS. The age range of the 2003 HBS-Drug Use sample was extended further to include 13–65 year olds. The 2006 data was collected as part of the 2006 national survey of benzylpiperazine (BZP) party pill use. The party pill survey used the same CATI methodology as the previous NDS and the 2003 HBS-Drug Use. The drug prevalence section used in the NDS and the 2003 HBS-Drug Use was included in the BZP party pill questionnaire and was asked of all those aged 13–45 years who were contacted for the survey whether or not they used BZP party pills. All four waves of random digit dialling (RDD) sampling employed the same CATI sampling methodology. Telephone numbers were selected using a stratified random digit dialling method so that each household, of a particular stratum nationwide, had an equal chance of being called. The country
was divided into several strata based on telephone exchanges to represent the different socioeconomic characteristics of the population. A proportionate sample from each stratum was then taken. Within each household, one person was randomly selected for an interview.

Each telephone number was tried at least 10 times on different dates and times of the day in an effort to reach those seldom at home. Respondents were informed that the study was being conducted on behalf of the Ministry of Health and that everything they said would be confidential.

In each survey wave, participants were asked the same questions concerning whether they had ever used a drug type for recreational purposes, and whether they had used that drug type in the past 12 months. Questions concerning the use of nitrous oxide were added to the list of drug types asked about in the 2003 survey wave and were included in all subsequent survey waves. In 2006, BZP party pills were included as a drug type asked about.

The drug types were described to the respondents by the interviewer in the same way in each survey wave. The questions about amphetamine referred to the broad class of amphetamines, which the interviewer described as ‘amphetamines, uppers, speed, methamphetamine’. There was a separate category for ‘ice’ which was described by the interviewer as ‘crystal methamphetamine’.

All of those respondents who reported using a drug type in the past 12 months were asked whether they were using ‘more’, ‘less’, ‘the same’ or had ‘stopped’ using the drug type compared to a year ago. Those who had used tobacco had not been asked this question in previous surveys.

The age range of the survey samples for the 2001 NDS, 2003 HBS-Drug Use and 2006 national household survey of party pill use were truncated to those aged 15–45 years old to allow valid comparisons back to the 1998 NDS. The general population RDD samples of those aged 15–45 years old from each survey wave were then compared. The respective sample sizes for each survey wave were: 5475 in 1998; 5504 in 2001, 3042 in 2003, and 1902 in 2006. The response rates for the survey waves were 79% in 1998, 80% in 2001, 68% in 2003, and 69% in 2006.*

(*The response rates quoted are for the original age ranges of the surveys. It was not possible to recalculate the response rates for the different surveys for the truncated age range as we cannot distinguish the non-response by age.)

The sample data were weighted by eligible household size to adjust for the selection of only one person from each household. Comparisons of drug measures were made between the 2006 survey and the three other survey waves conducted in 2003, 2001, and 1998. Significance testing controlled for multiple tests with an overall alpha level of 0.05. Mean prevalence and 95% confidence intervals for prevalence variables were calculated using logistic regression. To ensure reliable statistical comparisons we restricted our analysis to the drug types which included 10 or more respondents in the 2006 survey wave.

To provide an overall quantitative measure of the change in level of use we calculated the mean score for each drug type by enumerating the scale provided. These values were defined as follows:

<table>
<thead>
<tr>
<th>Change in level of use scores</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stepped</td>
<td>Less</td>
<td>Same</td>
<td>More</td>
</tr>
</tbody>
</table>

One-way ANOVAs were used to test for differences in the mean score for a question between the 2006 survey and the other survey waves. One-way ANOVAs assume the samples tested form a normal distribution. With scale-type questions such an assumption can never be met as the scores are based on discrete data. However, frequency tables show the distribution of data as being mound shaped, providing an approximation of a normal probability distribution. All analysis was completed in the SAS statistical environment and controlled for the effects of weighting and stratification.

Results

Lifetime use of different drug types—Alcohol tobacco and cannabis remained the most commonly tried drug types in all four survey waves (Table 1). In 2006, BZP party pills emerged as the fourth most widely tried drug type.

<table>
<thead>
<tr>
<th>Drug type</th>
<th>1998 (%)</th>
<th>2001 (%)</th>
<th>2003 (%)</th>
<th>2006 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>87.6</td>
<td>86.4</td>
<td>83.7</td>
<td>89.5</td>
</tr>
<tr>
<td>Tobacco</td>
<td>64.4</td>
<td>63.9</td>
<td>59.6</td>
<td>57.6</td>
</tr>
<tr>
<td>Cannabis</td>
<td>50.4</td>
<td>52.1</td>
<td>53.8</td>
<td>44.1</td>
</tr>
<tr>
<td>BZP party pills</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>21.4</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>7.6</td>
<td>11.0</td>
<td>9.0</td>
<td>9.3</td>
</tr>
<tr>
<td>LSD</td>
<td>8.9</td>
<td>9.7</td>
<td>8.1</td>
<td>8.5</td>
</tr>
<tr>
<td>Ecstasy (MDMA)</td>
<td>3.1</td>
<td>5.4</td>
<td>5.5</td>
<td>8.0</td>
</tr>
<tr>
<td>Hallucinogenic mushrooms</td>
<td>7.6</td>
<td>9.0</td>
<td>7.8</td>
<td>7.9</td>
</tr>
<tr>
<td>Kava</td>
<td>8.2</td>
<td>9.7</td>
<td>5.9</td>
<td>7.6</td>
</tr>
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<td>Crystal methamphetamine</td>
<td>0.2</td>
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<td>1.8</td>
<td>1.8</td>
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</table>

n/a: not applicable (question was not asked in survey wave); BZP: benzylpiperazine; LSD: lysergic acid diethylamide; MDMA: methylenedioxymethamphetamine.

A higher proportion of the sample had tried alcohol in their lifetimes in 2006 compared to 2003 (89.5% vs 83.7%, p<0.0001) and compared to 2001 (89.5% vs 86.4%, p=0.0038). A higher proportion of the sample had tried alcohol in 2006 compared to 1998 (89.5% vs 87.6%) and this difference was close to being statistically significant (p=0.0683).

A lower proportion of the sample had tried tobacco in 2006 compared to 2001 (57.6% vs 63.9%, p<0.0001) and compared to 1998 (57.6% vs 64.4%, p<0.0001). A lower proportion of the sample had tried cannabis in 2006 compared to 2003 (44.1% vs 53.8%, p<0.0001) and compared to 2001 (44.1% vs 52.1%, p<0.0001) and compared to 1998 (44.1% vs 50.4%, p<0.0001). These differences in lifetime cannabis use were due to a particularly low level of lifetime cannabis use reported in the 2006 survey.

A higher proportion of the sample had tried amphetamine in 2006 than in 1998 (9.3% vs 7.6%, p=0.0315). A higher proportion of the sample had tried crystal methamphetamine in 2006 compared to 1998 (1.8% vs 0.2%, p<0.0001). A higher proportion of the sample had tried kava in 2006 compared to 2003 (7.6% vs 5.9%, p=0.0303). A higher proportion of the sample had tried nitrous oxide in 2006 than in 2003 (7.6% vs 4.3%, p<0.0001). A higher proportion of the sample had tried cocaine in 2006 compared to 2003 (4.5% vs 3.1%, p=0.0225) and compared to 2001 (4.5% vs 3.3%, p=0.0289).

Use of different drug types in the past year—Alcohol, followed by tobacco and cannabis, were the drug types most commonly reported used in the past year in all the survey waves (Table 2). In 2006, 16.1% of the survey sample reported using BZP party pills in the past year and this approached the level of cannabis use in that survey wave. The next drug types most commonly used in the past 12 months in 2006 were ecstasy (MDMA), amphetamines, and nitrous oxide.

<table>
<thead>
<tr>
<th>Drug type</th>
<th>1998 (%)</th>
<th>2001 (%)</th>
<th>2003 (%)</th>
<th>2006 (%)</th>
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<td>0.4</td>
<td>0.6</td>
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<tr>
<td>Crystal methamphetamine</td>
<td>0.1</td>
<td>0.9</td>
<td>0.9</td>
<td>0.8</td>
</tr>
</tbody>
</table>

n/a: not applicable (question was not asked in survey wave); BZP: benzylpiperazine; LSD: lysergic acid diethylamide; MDMA: methylenedioxymethamphetamine.

- A higher proportion of the sample had drunk alcohol in the past year in 2006 compared to 2003 (85.1% vs 82.2%, p=0.0233). This result was due to a low level of last year alcohol use reported in the 2003 survey. There was no difference in the last year use of alcohol in 2006 compared to 2001 (85.1% vs 85.3%, p=0.8724) and compared to 1998 (85.1% vs 86.3%, p=0.2684).
- A higher proportion of the sample had smoked tobacco in the past 12 months in 2006 compared to 2003 (35.8% vs 31.1%, p=0.0025). Again, this result was due to a low level of last year tobacco use reported in the 2003 survey. There was no difference in the last year use of tobacco in 2006 compared to 2001 (35.8% vs 34.5%, p=0.3653) and compared to 1998 (35.8% vs 35.8%, p=0.9806).
- A lower proportion of the sample had used cannabis in the past 12 months in 2006 compared to 2001 (17.9% vs 20.3%, p=0.0448). A lower proportion of the sample had used amphetamine in the past year in 2006 compared to 2001 (3.4% vs 5.0%, p=0.0085).
- A lower proportion of the sample had used LSD in the past year in 2006 compared to 2001 (1.8% vs 3.2%, p=0.0071) and compared to 1998 (1.8% vs 3.9%, p=0.0002).
- A higher proportion of the sample had used ecstasy (MDMA) in the past year in 2006 compared to 1998 (3.9% vs 1.5%, p=0.0001).
- A higher proportion of the sample had used cocaine in the past 12 months in 2006 compared to 2003 (1.1% vs 0.5%, p=0.0147).

**Change in level of use of different drug types**—There was a relative increase in the level of alcohol drinking in 2006 compared to 2003 (2.8 vs 2.7, p<0.0001) and compared to 2001 (2.8 vs 2.3, p<0.0001) and compared to 1998 (2.8 vs 2.3, p<0.0001) (Table 3).
<table>
<thead>
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<td>48</td>
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<td>16</td>
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<td>44</td>
<td>25</td>
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<td>1.9</td>
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<td>21</td>
<td>19</td>
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<td>32</td>
<td>12</td>
<td>5</td>
<td>1.7</td>
</tr>
</tbody>
</table>

- The increase in drinking was initially due to a lower proportion of last year alcohol users saying they had ‘stopped’ using alcohol in 2003 compared to 2001 (3% vs 11%), and a higher proportion saying they were using ‘more’ alcohol in 2003 compared to 2001 (14% vs 2%). After 2003, a lower proportion of last year alcohol users reported using ‘less’ alcohol in 2006 compared to 2003 (26% vs 39%) and a higher proportion of last year users reported using the ‘same’ level of alcohol (54% vs 45%).

- There was a relative increase in the level of amphetamine use in 2006 compared to 2003 (2.4 vs 2.0, p=0.0386). This was due to a lower proportion of last year amphetamine users saying they had ‘stopped’ using amphetamine in 2006 compared to 2003 (12% vs 42%). There was also a relative increase in the level of use of crystal methamphetamine in 2006 compared to 2003 (2.5 vs 1.7, p=0.0214). This was due to a lower proportion of last year users saying
they had ‘stopped’ using crystal methamphetamine in 2006 compared to 2003 (24% vs 64%) and a higher proportion of last year users saying they were using ‘more’ crystal methamphetamine (30% vs 11%).

- There was a relative increase in the level of hallucinogenic mushroom (psilocybin) use in 2006 compared to 2003 (2.6 vs 1.7, p=0.0004). This was largely caused by a lower proportion of last year users of hallucinogenic mushrooms saying they had ‘stopped’ using hallucinogenic mushrooms in 2006 compared to 2003 (7% vs 65%).

Discussion

The statistical power of our survey waves to detect changes in drug use can be summarised as follows. If the last year use of amphetamine increased by 2% in 2006 compared to 2003 (e.g. from 4.0% to 6.0%) then, based on the sample sizes available, we would have an 89% chance of detecting the increase. Alternatively, if amphetamine use fell by 2% we would have a 98% chance of detecting the decrease.

Alcohol, tobacco, and cannabis remained the most widely used drug types in New Zealand over the entire 8-year period of national surveying. We found mixed evidence of rising levels of alcohol use. The lifetime use of alcohol appeared to be tracking upwards while the last year prevalence of alcohol use was largely stable through the four waves of surveying. A higher proportion of alcohol drinkers reported drinking ‘more’ alcohol and a lower proportion reported drinking ‘less’ or to have ‘stopped’ drinking in 2006 compared to the earlier survey waves.

Census statistics show the total volume of alcohol available for consumption in New Zealand has increased almost every year since 1998, reaching its highest recorded level in 2006 since the series was begun in 1986. Increasing lifetime use of alcohol is likely to reflect a range of environmental factors including more liberal public attitudes to alcohol use, the lowering of the drinking age, the expansion of places where alcohol can be purchased and consumed, the liberalisation of alcohol advertising, and the introduction of ready-to-drink (RTD) alcohol products marketed at young people.

Huckle et al found evidence of increased alcohol-related social disorder and driving offences among young people in New Zealand from 1990 to 2003 following the liberalisation of alcohol policy during the 1990s.

We found a consistent decline in the lifetime use of tobacco in each of the four waves of surveying. The decline in lifetime levels of tobacco use appears to reflect societal shifts in tolerance to smoking, increases in tobacco prices through taxation, and the impact of stricter regulation of smoking in semi-public areas such as workplaces, public transport, restaurants, and bars.

The rapid emergence of BZP party pills, as measured in the 2006 wave of surveying, introduced a fourth most widely used drug type in New Zealand. The extent of BZP party pill use in New Zealand at this time was to our knowledge unique in the world. Prior to 2006, BZP had been prohibited in several countries including the United States, Sweden, Denmark, Belgium, Greece, and most states in Australia.
levels of BZP use were occurring in some other European countries during this time, including the United Kingdom.\textsuperscript{15}

The use of BZP party pills in New Zealand has been linked with a number of hospital Emergency Department presentations which ranged from minor problems involving anxiety, headaches, and insomnia, to more serious incidents such as collapse, seizures, and renal failure.\textsuperscript{12,16,17}

A national household survey of BZP party pill use in New Zealand conducted in 2006 found most last year users of BZP pills reported fairly minor physical problems from BZP use, such as ‘insomnia’ (50\% of last year users), ‘poor appetite’ (41\%), ‘nausea’ (22\%), and ‘headaches’ (22). However, some users reported potentially more serious physical problems such as ‘heart palpitations’ (15\%), ‘vomiting’ (12\%), ‘chest pains’ (4\%), ‘passing out’ (0.8\%), and ‘seizures’ (0.3\%).\textsuperscript{18}

Eighty-six percent of the BZP users combined their use of BZP with other drug types, including alcohol (91\%), tobacco (40\%), cannabis (22\%), and 5-HTP (5-hydroxytryptophan) ‘recovery’ pills (9\%) and ecstasy (MDMA) (5\%).

In November 2006, the Government signalled its intention to follow the recommendation of the Expert Advisory Committee on Drugs (EACD) to schedule BZP party pills as a Class C controlled drug under the \textit{Misuse of Drugs Act 1975} (i.e. the same category as cannabis).\textsuperscript{19} The New Zealand Parliament passed the bill to schedule BZP as a Class C drug in March 2008. In the same month, the Council of the European Union announced that BZP would be subject to ‘control measures and criminal provisions’ across all European Union Member States.\textsuperscript{25}

We found a general trend toward greater use of amphetamine type stimulant (ATS) drug types—such as amphetamine, crystal methamphetamine, and ecstasy (MDMA)—in New Zealand since 1998. The use of amphetamine appears to have peaked in 2001 and levelled off after that following the introduction of greater legal penalties, increased law enforcement, and greater public awareness of the health risks of methamphetamine use.\textsuperscript{5,20}

Ecstasy (MDMA) has sustained a more consistent increase in use over this time with more of the sample having used ecstasy (MDMA) in the past 12 months in 2006 compared to 1998. The situation with ecstasy in New Zealand is somewhat confused, however, by the presence of a large legal market for BZP. Drug dealers sometimes sell BZP as ecstasy to earn higher black market prices, and chemical analysis of alleged ecstasy pills has uncovered a range of substances, including BZP. Another stimulant, cocaine, was also found to have higher levels of last year use in 2006 compared to 2003.

We found a surprising decline in both the lifetime and last year use of cannabis in 2006 compared to the previous survey waves. It is difficult to know at this early stage whether the 2006 result will translate into a sustained trend toward lower levels of cannabis use in New Zealand. The emergence of several ‘new’ synthetic stimulant drugs over the past 5 years—such as methamphetamine, ecstasy, and BZP pills—may have impacted negatively on levels of cannabis use.
Stimulants are currently more consistent with underlying cultural trends among young people which value productivity and success in both the social and professional spheres.\textsuperscript{21}

Cannabis, on the other hand, is often associated with the counter culture of the 1960s and 1970s, and a desire to opt out of mainstream ambitions.\textsuperscript{22} Recent research in Australia has found that young people now place negative social and health connotations on cannabis use, and associate cannabis smoking with the health risks of tobacco smoking.\textsuperscript{23}

There was an increase in the level of use of both amphetamine and crystal methamphetamine by last year users of these drug types in 2006 compared to 2003. These findings suggest that there has been some entrenchment in amphetamine use in recent years since the reported levelling out of its prevalence of use in 2003.\textsuperscript{20} Heavy dependent users are less responsive to stiffer legal penalties and evidence of health harms from use. New Zealand has relied on voluntary agreements with chemical suppliers and pharmacies to control precursor chemicals used to manufacture methamphetamine. Evidence from overseas indicates that stricter more formal controls of precursor chemicals can have an impact on levels of methamphetamine use and harm.\textsuperscript{26}

The entrenchment of amphetamine use can be viewed as part of the natural lifespan of this drug trend where occasional and experimental users cease use due to growing awareness of health harms and increasing legal pressures, and leave a residual user population of heavy and dependent users.\textsuperscript{24} (pp 287–90).

Paradoxically, this type of entrenchment can lead to growing social costs related to the use of a drug type even when its prevalence of use is in decline\textsuperscript{24} (pp 287–90).

**Competing interests:** None known.

**Author information:** Dr Chris Wilkins, Senior Researcher; Paul Sweetsur, Statistician; Centre for Social and Health Outcomes Research and Evaluation (SHORE), Massey University, Auckland

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The legal party pill survey was funded from the 2005/6 round of the National Drug Policy Discretionary Fund (NDPDF). The NDPDF is jointly managed by the Inter-Agency Committee of Drugs (IACD) and the Ministerial Committee on Drug Policy (MCDP). The national household comparison analysis presented in this paper was funded from the 2006/7 NDPDF.

In addition, we acknowledge all the researchers and interviewers who worked on the different survey waves and all those members of the New Zealand public who participated in the surveys.
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http://www.emcdda.europa.eu

The Bequest Programme at the University of Otago: cadavers donated for clinical anatomy teaching

Kathryn McClea

Abstract

This paper aims to inform the reader about the procedures of, and the need to run, a bequest programme for the teaching of clinical anatomy. It provides an overview of how the programme operates, and why the Department of Anatomy and Structural Biology at the University of Otago (Dunedin, New Zealand) requires cadavers (bodies). It also looks at the acceptance and restrictions of bequests, and the altruistic nature of those who bequeath themselves to the Department.

Body bequests have been accepted by the Department of Anatomy and Structural Biology at the University of Otago (Dunedin, New Zealand) for over 60 years. The first official bequest was documented in 1943. Prior to this year, bodies for medical study were obtained from mental hospitals around the country, when no next-of-kin came forward to claim a body. At that time, documentation of the deceased’s name or cause of death was deemed not to be important and not recorded.

Currently, all aspects of the bequest programme are monitored by an Inspector of Anatomy (a senior member of the New Zealand Police) and governed by the Human Tissues Act 1964 (currently under review).

What does the Department use cadavers for?

In an era where many medical schools in the Northern Hemisphere are choosing to teach anatomy by means of computer images and models, the Department runs an active and very successful bequest programme. The Department teaches anatomy to over 5000 students per annum, in subjects ranging from biological anthropology and bio/medical laboratory science, to dentistry, medicine, physical education, physiotherapy, and science. All Anatomy undergraduate students, at some stage in their studies, attend practical laboratories involving the use of human material.

The Department receives, on average, 40 cadavers a year, and 90% of these will be used in the teaching of gross and functional anatomy. Students learn the various systems of the body through full body dissection, or by studying features in closer detail using prosections (dissections where tissue is removed to show selected anatomical features) and plastinated material (a vacuum process where acetone and silicone are injected into the specimen to preserve the tissue).

While they can never wholly replace the value of actual dissection, prosections and plastinations have revolutionised the way anatomy is taught. Students are now able to pick up an arm, foot, hand, or leg, and study vessels and structures in minute detail (see Figures 1 and 2). All prosections and plastinations are created in the Department by specialist staff. These processes also mean that, in certain circumstances, the
Department retains human material for an indefinite period of time (as allowed under the Human Tissue Act 1964).

**Figure 1. Plastinated hand showing deep arteries, veins, tendons, and nerves**

A small number of staff and postgraduate students use cadaveric material in research projects. This accounts for about 10% of the cadavers used in any given year. Current projects include the study of interstitial cells of Cajal in the gallbladder, investigating the gross morphology of the vastus lateralis and gluteal muscles, and the relationship between the venous plexus of the cavernous sinus and the internal carotid artery. Staff do not perform post-mortems and are not able to provide a report on the cause of death.
Who bequeaths their body?

At this University, bequests are accepted from the Otago, Canterbury, and Nelson/Marlborough regions only, as illustrated below (Figure 3).

**Figure 3. Bequest acceptance area (in grey)**

The Department receives about 200 enquiries a year from people requesting information on how they can bequeath their body, and approximately 75% of these go on to complete and return the form, confirming their bequest. Most people wish to bequeath their body because they have benefited from medical procedures in the past and now wish to give something back and be of value to medical science (Jones and Fennell 1991). Others simply do not wish to be placed in the ground “to rot”.

Donors are usually aged in their 60s or 70s when they first contact the Department, and while most are in good health, some have only a few weeks or months to live and want to finalise arrangements while they are still able. There is an even split between males and females, with the majority of bequests coming from the Christchurch region.

The Department urges all donors to talk to their families about their wish to bequeath their body as, under the current terms of the Human Tissue Act, if a close family member objects to the bequest at the time of death, the Department is unable to accept the body.
How to register a bequest

The Department requires all donors to complete a bequest form confirming that it is their wish to bequeath their body. The Department will not accept a bequest where this form has not been completed, or where there has been no contact prior to the time of death.

The procedure is as follows:

- After contact has been made, and if the recipient lives in the accepted area, the Department will send an information pamphlet and Bequest Form B.
- The potential donor is advised to read the pamphlet and talk to their family. If they wish to continue with the bequest, they complete and return Bequest Form B.
- Upon receipt of Form B, the Department will send Bequest Form C (an information sheet about the procedure at the time of death) and two copies of Bequest Form H.735 (both original copies to be completed by the doctor who attends the death).
- The bequest is now registered.

The Department undertakes to pay the costs of transporting the body from the place of death to the embalming centre in Dunedin, Christchurch, or Nelson; the embalming of the body; the transfer of the cadaver to the Department’s premises in Dunedin; and the disposal of the cadaver when the course of study has been completed.

The Department has received over 2700 cadavers since 1876, and currently has over 1800 donors who have registered their body and are still alive. A donor may withdraw their bequest at any time.

Acceptance at the time of death

Sometimes the circumstances of a person’s death are such that it may not be possible to accept their body. It has also become necessary to place a number of restrictions on the acceptance of bodies at the time of death. For these reasons, it is important that the Department is contacted at the time of death to ascertain if the bequest can be accepted. Donors are informed of these restrictions at the time of making their bequest, and advised that their estates should make alternative arrangements should the circumstances of their death preclude the Department being able to accept their body.

The Department is not able to accept a body if a donor has:

- Contracted a contagious disease or infection.
- Displayed rapid onset of dementia, within 6 months of death.
- Undergone major surgery within a month of death.
- A body weight greater than 90 kg.
- Undergone a post-mortem examination.
- Died while outside the defined acceptance area.
• Lived in the United Kingdom, France or the Republic of Ireland between 1980 and 1996 for a cumulative period of 6 months or more.
• Given their organs for transplantation.

Due to the generous support of the bequest programme there will be occasions when the Department is not able to accept a bequest because we have reached capacity.

Once a donor’s death has been confirmed and their body accepted, the body (now termed a cadaver) is removed for embalming—preferably within 24 hours of death. The Department contracts the services of funeral directors in Christchurch and Nelson who embalm to the Department’s specifications. The cadaver is then transported to Dunedin. Dunedin donors are embalmed either by staff in the Department, or by a local funeral director.

The Department has elected not to begin dissection until a period of 6 months has elapsed from the time of embalming. This is to enable adequate fixation to take place.

**Disposal of the remains**

Strict rules govern the dissection of human tissue, and protocols ensure that material dissected from one particular cadaver is kept separate from material removed from other cadavers. Each body part removed from a cadaver is tagged and coded. Information pertaining to the description and location of these parts is entered onto a database, thereby enabling the Department to trace the location of all human material at any given time.

At the end of the teaching year, all remains not to be retained are placed in cardboard coffins, cremated, and the ashes scattered on a rose garden at the Anderson Bay Cemetery in Dunedin. The garden and a nearby bench commemorate those who have bequeathed their bodies to the Department. A similar garden bench at the Nurses’ Chapel at Christchurch Hospital is also dedicated to the memory of the donors.

In cases where the ashes have been requested to be returned to the next-of-kin, the Department puts in place a study plan to ensure that the cadaver is used within a 20–24 month period. This ensures that the family will not have to wait more than 2 years to receive the ashes. The Department recognises that an important part of the grieving process is having a body to mourn over and a grave to visit. Donor families do not have these and for these reasons, the Department will always honour a request to return ashes. The ashes are returned to a nominated next-of-kin at the end of the teaching year.

**Thanksgiving Service**

In 2004, the Department held its first Thanksgiving Service. The service, commemorating those who have died and bequeathed their bodies, was very well received with about 200 friends and family of donors, and staff and students of the Medical School, attending. These services now alternate between Dunedin and Christchurch.

Guests are invited to bring a framed photograph of their loved one; this is placed at the front of the room, providing a focus for the occasion (see Figure 4). The Department’s undergraduate and postgraduate students are encouraged to take part in
the service, either acting as ushers, reading poems, assisting in candle lighting, providing musical accompaniment, or presenting their own personally written reflections on the bequest programme.

Figure 4. The 2007 Thanksgiving Service was held in Dunedin

These services also provide an opportunity to acknowledge and thank the families for the sacrifice made by their loved one in the bequest, and also by themselves in living in the shadow of the bequest.

Issues facing the bequest programme

Providing adequate and suitable space to store the number of cadavers the Department receives and retains is a constant problem. The ability to retain cadavers long-term means they are not dissected and cremated as rapidly as they were a few years ago. For instance, in 2006, a noticeable increase in the number of cadavers received meant that by the middle of that year the Department had reached its storage capacity, and a moratorium was placed on accepting cadavers for the remainder of that year. The Department recognises that this was distressing for some families. To better manage this issue, in May of this year the Department introduced a quota system whereby once we reach capacity we will decline all bodies for the remainder of that calendar year. Acceptance of bodies will resume on 1 January the following year. Funeral Directors will be informed each time the quota is reached. All donors registered with the Department have been informed of this new restriction. They do not need to re-register their bequest each year.

Requests for the return of ashes are increasing. This raises two issues. To ensure that next-of-kin do not wait an indefinite number of years for the return of the ashes, the Department’s policy is to return them within a 2-year period. However this means the cadaver is not able to be utilised to its full potential—i.e. used in a long-term research study or made into plastinated/prosected material and retained within the Department. Often a request is not made until the body has already been received and a study plan set in place, thus resulting in some projects being shortened to enable the remains to be returned. This can hamper ongoing research projects and the Department’s ability...
to provide prosections and plastinations for long-term teaching. This is something which the Department has chosen to live with, however donors and their families are asked to be aware of these effects when requesting the return of ashes.

Second, the Department pays all costs relating to the disposal of a cadaver. In cases where the ashes have been requested to be returned, cadavers are cremated individually to ensure the ashes returned are those of the loved one. In 2006, the Department returned 11 boxes of ashes; and in 2007, 16 boxes were returned. While it understands that receiving the ashes of a loved one is an important step in the grieving process, the increasing cost to the Department is an issue which may need to be addressed in the future.

Summary

Bequeathing one’s body is not for everyone. It is usually only once people have experienced life, and are nearing the end of that life that they come to appreciate the medical advances and procedures which they may have benefited from. Those who bequeath themselves have a strong desire and commitment to help others.

The Department of Anatomy and Structural Biology is reliant on the actions of these people to enable it to continue teaching anatomy to the next generation of health professionals and science majors.

The success of the Bequest Programme is entirely due to the altruistic actions of those who make the ultimate donation to the advancement of medical and science teaching. The value of such benevolent acts will not be forgotten by those involved in the Programme.

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Reference:
Debunking the myths to provide 21st Century management of gout

Doone Winnard, Tony Kake, Peter Gow, Caran Barratt-Boyes, Victoria Harris, Devi-Ann Hall, Henare Mason, Tony Merriman, Nicola Dalbeth; for The Maaori Gout Action Group in Counties Manukau District Health Board

Abstract

Epidemiologic and recent qualitative research suggests that the impact of undertreated gout is far more significant than many health professionals realise. The magnitude of this impact for Maaori and Pacific men of working age has been identified as a particular concern by the recently formed Maaori Gout Action Group in Counties Manukau District Health Board (South Auckland, New Zealand). The Group has identified that to achieve modern management of gout, those with gout need to be supported by primary care practitioners who are aware of the need for early intervention with allopurinol, as well as whaanau/families and communities who understand the impact and causes of gout and the lifestyle changes that are needed alongside long-term allopurinol. The Group wishes to support further research into the impact and causes of gout, particularly for Maaori, and to develop strategic alliances to ensure that the treatment and prevention of gout is advocated by those working with conditions such as diabetes and cardiovascular disease where gout is a frequent comorbidity.

The ‘Gout Capital of the World’ was a description recently given to Counties Manukau by a Rheumatology Fellow from the UK undertaking qualitative research into why gout appeared to be such a problem in South Auckland, New Zealand.

The stories unearthed by this qualitative research—of working age men severely incapacitated by a condition well-recognised (but not talked about) in their families, and a condition that should be readily treatable—have spurred the formation of a Maaori* Gout Action Group in Counties Manukau DHB. (*Double vowels [e.g. aa] are used rather than macrons [e.g. ā] where appropriate in Te Reo words in this article in keeping with the Tainui convention, as Manawhenua of the Counties Manukau district.)

Myths about gout

The Group has identified five unhelpful myths that they believe may be undermining best practice by both the medical community and patients and their whaanau/families, and perpetuating under-treatment of gout:

(1) Gout is a relatively uncommon and minor condition compared to other priority issues that need attention

Evidence suggests that in Maaori and Pacific men a diagnosis of gout is actually more common than that of diabetes. Indeed, data from one primary health organisation (PHO) in South Auckland gives a prevalence of diagnosed gout of 9.3% in Maaori
men and 14.9% in Pacific men, compared to 7.3% and 9.7% respectively for diabetes (Personal communication, Dr Richard Hulme, Total Healthcare Otara, 2007).

Previous studies in the Rotorua/Lakes district have documented a prevalence of gout of 14% in Māori men. It is likely that these figures significantly underestimate the true burden of disease of gout, as anecdotal evidence suggests that whānau members not infrequently share acute pain relieving medications for gout, so they may not present to medical care to have a formal diagnosis of gout made.

Importantly, gout is also frequently linked to other priority conditions. Among Counties Manukau clinic patients with gout, 89% patients have the metabolic syndrome and 59% are at high risk of cardiovascular events in the next 5 years (based on Framingham risk assessment).

Cardiovascular disease risk factor targets are frequently not achieved in this population; for example:

- Target body mass index achieved in only 5% of high-risk patients.
- Target blood pressure achieved in 34% of high-risk patients.
- Target HbA1c achieved in 39% of diabetic patients.

Recent data from diabetes clinics in South Auckland also demonstrate that 22.3% of patients with Type 2 diabetes have gout. Gouty arthritis may hinder attempts at exercise and weight loss, and treatments for acute gout can have adverse effects on control of glycaemic control and complications of disease.

A recent study of hand function in patients with gout from rheumatology clinics in Counties Manukau and Auckland has demonstrated that chronic and poorly controlled gout can have a significant impact on hand function in patients with gout, especially tophaceous joint disease. In addition, young men aged 18–30 years are increasingly being diagnosed with gout and giving up sport and physical activity, which exacerbates their other health risks.

Thus, engaging early with those with gout has the potential to improve screening and management of cardiovascular disease and diabetes.

(2) Gout doesn’t consume secondary care resources

The burden of disease for gout is primarily an issue in the community and primary care; however, in Counties Manukau, secondary care admissions (which should be preventable) are still important. For instance, in the past 4 years a primary diagnosis of gout has accounted for an average of 130 admissions in Counties Manukau each year in the 15–64 year (working age) age group (45 of these people being Māori).

An additional 155 admissions per year on average (50 Māori) recorded gout as a secondary diagnosis. There have been a further 60–75 admissions with gout as a primary diagnosis in the 65+ age group, where non-Māori/non-Pacific populations represent a higher proportion of those afflicted.

As shown in Figure 1, the rate for admission with gout as a primary diagnosis in Counties Manukau has doubled for Māori of working age in the past 6 years, and is similarly high for Pacific peoples.
Some of these admissions are due to surgery for tophaceous gout. A review of all patients who had undergone surgery related to gouty tophi at Middlemore Hospital from July 1995–2001 found 45 such patients. This was the largest cohort described in any study reported in the Medline or Cochrane databases since 1960, which was attributed to the high prevalence of gout in Counties Manukau. The study found a relatively high surgical complication rate, in part attributable to the large burden of medical comorbidities. The majority of the patients had raised serum uric acid levels and less than one-third were on allopurinol.

(3) People who have gout bring it on themselves by drinking too much and eating the wrong foods

While it is acknowledged that attention to diet is an important aspect of gout management, many patients with gout do not ‘overindulge’ in seafood and beer every weekend. In fact, evidence suggests that Maaori and other Polynesian peoples do not excrete urate as effectively as Paakehaa (Europeans), thus predisposing them to developing gout. This understanding can help whaanau and communities consider dietary issues related to cultural norms about hospitality, ‘feasting’ and portion size without blaming and shaming those suffering from gout.

(4) Gout is a ‘normal’ part of life, and you just put up with it

In many Maaori (and Pacific) whaanau, gout is so common that its onset is almost a rite of passage. However whaanau tend not to talk about gout, and certainly not about the fact that it is readily treatable and that disability can be prevented. Whakamaa, or shame, is common because of the perception that the cause of gout is alcohol and
overeating. This has led to a tolerance of pain and disability, and low expectations of treatment, with significant impact on quality of life.

Work disability due to gout is frequent; for instance, in a study of Counties Manukau clinic patients almost two-thirds of patients are men of working age, and 56% have had work absences due to gout in the preceding 6 months (Personal communication, Dr Nicola Dalbeth, Rheumatologist, June 2007). Recent international research has indicated that gout leads to an average of 4.6 additional health-related absence days per annum, and causes reduced work productivity.\(^\text{12}\)

The young age of gout diagnosis in South Auckland means work related disability is a very significant issue—recent data from the South Auckland PHO cited previously has shown that 40% of those diagnosed with gout are aged less than 45 years, and 80% are aged 25–64 years (Personal communication, Dr Richard Hulme, Total Healthcare Otara, 2007).

(5) Medications for gout should be taken for acute attacks only

The Maaori Gout Action Group has identified that equipping whaanau with the understanding that there are medications that can relieve the acute pain of gout, but more importantly that allopurinol combined with lifestyle changes can prevent recurrent attacks and long term disability has the potential to improve the quality of life of many whaanau members.

Patients and their whaanau need support to understand that preventive treatment with allopurinol is not just something for end-stage disease; that in fact optimal treatment means starting allopurinol early, well before onset of tophi\(^\text{13}\) and sometimes requires repeated blood tests to ensure that adequate doses are being taken to achieve target serum uric acid levels.

Evidence suggests that Maaori and Pacific patients are less likely to achieve target serum uric acid levels on allopurinol,\(^\text{14}\) emphasising the importance of close monitoring and dose titration of allopurinol in these groups.

Moving to 21\(^{st}\) Century management of gout

The European League Against Rheumatism (EULAR) has recently released guidelines for the diagnosis and management of gout.\(^\text{15}\) A study of primary care management of gout in the UK reported recently in the Annals of Rheumatic Disease demonstrates that primary care management of gout in the UK is poor when compared against these EULAR best practice guidelines.\(^\text{16}\) Evidence from previous practice audits in South Auckland suggest that primary care in New Zealand may also not fare well if compared to best practice.\(^\text{17}\)

However to achieve 21\(^{st}\) Century best practice, like other patients with chronic conditions, those with gout will also need to be supported by whaanau and communities who understand what gout is about, the lifestyle changes that are needed and the importance of adherence to long-term allopurinol. To this end, the Maaori Gout Action Group in Counties Manukau has embarked on an action plan to ‘Out Gout’.
This plan has five interweaving strands:

1. Community Education/Clinics to support improved primary care management of gout
   a. continuing medical education (CME) and eventually electronic resources to support best practice in primary care.
   b. offering access to community clinics (rheumatologist, specialist nurse, and Arthritis New Zealand educator working alongside the primary care team).
   c. working with Arthritis New Zealand to support a Maaori educator to specifically work alongside Maaori whaanau.
   d. incorporation of gout into the ongoing development of self-management resources and programmes.
   e. a medical school summer studentship benchmarking project within primary care.

2. Patient resource development
   a. update of current gout resources (e.g. flip charts and pamphlets) with support from PHARMAC.
   b. development of a community DVD resource about the causes and symptoms, prevention and treatment of gout.

3. A campaign to destigmatisate gout as a tolerated disease
   a. using local media opportunities and hui (meetings) to promote the message that gout is a treatable and preventable condition that does not need to interfere with daily living.
   b. exploring options to extend this campaign more widely than the Counties Manukau district.

4. Further research into the impact and causes of gout, particularly for Maaori
   a. extension of the qualitative and quantitative research on the impact of gout in Maaori.
   b. supporting cellular and genetic research on the causes of severe gout.

5. Strategic alliances to ensure that the treatment and prevention of gout is advocated by those working with conditions related to gout such as diabetes and cardiovascular disease
   a. working with local clinicians involved in diabetes and cardiovascular care to promote the recognition of gout as an important comorbidity.
   b. collaboration with national organisations such as Diabetes New Zealand and the National Heart Foundation to promote the recognition of gout as an important comorbidity.
Conclusion

Gout is a readily treatable condition but it is currently having a much greater impact on the lives of Māori and Pacific men in Counties Manukau than it should. Best practice in primary care needs to be complemented by a mobilised community of patients and their whānau who understand what it takes to ‘out gout’.

Useful resources to assist in improving gout management include a recent BPAC summary of best practice (http://www.bpac.org.nz/magazine/2007/september/gout.asp?page=1) and the PHARMAC patient education resource for gout (this booklet is currently being revised and the updated version will replace the previous edition at the following link: http://www.pharmac.govt.nz/information_campaigns.asp).

Competing interests: None known.

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Toxic epidermal necrolysis after paroxetine treatment

Rashid Ahmed, Carl Eagleton

Abstract

Toxic epidermal necrolysis (TEN) is a rare complication of paroxetine treatment and can be life-threatening. We report a case of paroxetine-induced TEN in an 80-year-old Māori female. She was started on paroxetine 10 mg once daily 6 days prior to hospital admission. The patient then developed extensive vesiculobullous skin eruptions. She was treated with intravenous fluid, corticosteroid, and local dressings and concurrently her paroxetine was stopped. A series of laboratory investigations were carried out and a final diagnosis of TEN was made from skin biopsy. The patient was discharged home after 2 weeks of treatment. Her skin lesions improved gradually.

Serotonin reuptake inhibitors paroxetine, fluoxetine, and fluvoxamine are second-generation antidepressant drugs. They are indicated mainly in depression in which their efficacy is comparable with that of tricyclic antidepressants.

Toxic epidermal necrolysis (TEN) is characterised by a prodrome of fever and malaise. Temperatures are frequently higher than those seen with Steven-Johnson syndrome (SJS), and often exceed 39°C. The skin lesions are widely distributed erythematous macules and patches, although about 50% of cases begin with diffuse erythema. In the early stages, skin pain may be prominent and out of proportion to clinical findings. Later, full-thickness epidermal necrosis leads to sloughing over more than 30% of the body surface area. The ultimate appearance of the skin has been likened to that of extensive thermal injury. Mucous membranes are involved in nearly all cases.

We report herein the first patient in New Zealand to our knowledge to develop severe TEN after starting paroxetine.

Case report

An 80-year-old Māori woman was started on paroxetine by her general practitioner for depression 6 days before her hospital admission. She went to see her family physician 3 days after starting paroxetine, because of itchy erythematous skin lesion in both knees. She was started on amoxicillin/clavulanate and loratidine for skin lesions. Her skin lesions got worse with extensive itchy painful blisters in both upper and lower limbs, neck, and anterior chest wall. This was associated with fever, malaise, and decreased oral intake. She was then admitted in hospital. Of note, she took amoxicillin/clavulanate and loratidine in the past without any problems.

She had a previous history of skin blisters 8 years ago which was treated with corticosteroid by a dermatologist; no cause was found. Her other medications included cilazapril, simvastatin, metoprolol CR, and thyroxine.
On admission, her temperature was 38°C, and there was extensive blisters in the anterior and posterior surfaces of both upper and lower limbs, neck, and anterior chest wall involving 40% of her body surface area (Figure 1).

**Figure 1. Erythematous bullous lesions in lower limbs**

No oral, ocular, and genital erosions were present.

Blood tests showed WCC 19.3×10⁹/L, N- 17.4×10⁹/L, creatinine 82 µmol/L, urea 7.3 mmol/L, and glucose 6.7 mmol/L.

Histological examination of the skin biopsy showed vesiculobullous reaction pattern with some areas showing full thickness epidermal necrosis consistent with a diagnosis of TEN (Figure 2).

**Figure 2. High power view showing subepidermal split with "cell poor" bullous (i.e. no real inflammatory cells in the split—really just red cells). Here the epidermis shows full thickness necrosis**
Investigations for viral and mycoplasma infection excluded infection-induced TEN. Paroxetine was stopped on admission. She was rehydrated with intravenous fluid. Prednisone 40 mg od was started as advised by a dermatologist. Regular dressings were performed for the skin lesions, which improved gradually (Figure 3).

**Figure 3. Skin lesions in lower limb after treatment of 2 weeks**

The patient was discharged from hospital after 2 weeks.

**Discussion**

SJS and TEN are severe, idiosyncratic reactions (usually in response to medications) characterised by fever and mucocutaneous lesions that culminate in epidermal death.
and sloughing. SJS and TEN are distinguished chiefly by severity and percentage of body surface involved.\textsuperscript{3}

Paroxetine is a serotonin reuptake inhibitor mainly used as antidepressant drug. Cutaneous adverse reactions are not common. These reactions include skin rash (3–4\%), urticaria (<1\%), pruritus (<1\%), erythema multiforme (rare), and toxic epidermal necrolysis (very rare).\textsuperscript{4}

Paroxetine has been available for prescription since 1993. According to Reactions Database from 1993–July 2007 only one case of TEN has been reported from France after paroxetine treatment for depression.\textsuperscript{5}

According to the New Zealand Drug Reaction Database (MedSafe) the reported cases of paroxetine-induced skin reactions are skin rash in many cases, urticaria in four cases, and erythema multiforme in three cases. There have been no case reports of SJS or TEN. Thus, to our knowledge, this is the first case of TEN observed after paroxetine treatment in New Zealand.

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**References:**

An atypical presentation of giant cell arteritis

Anmar M A Rahman

Chalky white optic disc oedema is suggestive of arteritic anterior ischaemic optic neuropathy (AAION). Hyperaemic or segmental swelling of the optic disc can lead to a low clinical suspicion of giant cell arteritis (GCA) resulting in diagnostic delay.

I describe case of AAION with segmental optic disc oedema in a male with multiple atherosclerotic risk factors and absence of classic symptoms and signs of giant cell arteritis (GCA).

Case report

An 81-year-old Caucasian male presented with bilateral simultaneous visual loss. Vision returned to normal after 1 hour in the left eye, but blurring of vision persisted in the right eye.

His past medical history included hypertension, hyperlipidaemia, recurrent transient ischaemic attacks (TIAs), and bilateral carotid artery stenosis.

On examination there were no temporal artery abnormalities. Ophthalmic examination revealed a corrected visual acuity of 6/36 on the right, there was a right relative afferent pupillary defect and the right optic disc displayed the appearance shown in Figure 1a.

Figure 1a. Right optic nerve showing segmental swelling involving the superior temporal 2 clock hours, nerve fibre layer haemorrhage at 10 o'clock and an area of nerve fibre layer infarction at 9 o'clock; 2b. Right optic nerve 1 month after the onset of AAION showing superotemporal neuroretinal rim notching, and the resolution of the acute changes
Investigations showed an erythrocyte sedimentation rate (ESR) of 83 mm/hr, a C-reactive protein (CRP) of 46 mg/dl, and a normal cell blood count (CBC). A clinical diagnosis of GCA was made.

The patient was prescribed intravenous methylprednisolone 1 gram/day for 3 days followed by oral prednisone 60 mg/day, and a temporal artery biopsy confirmed the diagnosis of GCA.

One month after onset, his visual acuity remains at hand movements in the right eye; the right optic nerve is shown in Figure 1b. The left eye was not involved during the course of the illness. He remains on a tapering dose of oral prednisone.

Discussion

The history of advanced atherosclerotic disease, the relatively preserved visual acuity, the sectoral optic disc swelling involving only the superior temporal portion of the optic disc, and the normal complete blood count are misleading features in this case that are more commonly associated with non-arteritic anterior ischaemic optic neuropathy.  

In a series of 69 patients with AAION Hayreh et al described optic swelling in AAION to be characteristically chalky white in appearance in 68.7% of patients. In an earlier study he reported the appearance of sectoral AAION in 11 eyes, which he has described as asymmetrical oedema of the optic disc being greatest in the involved part of the optic disc. This is in contrast to the appearance of the optic disc in this patient who demonstrated an entirely normal appearance of the uninvolved part.

In a population of 648 consecutive temporal artery biopsies performed at Dunedin Hospital between 1993–2007 there were 112 patients with biopsy proven GCA. A total of 11 eyes presented with AAION. Only the described case demonstrated segmental optic disc oedema.

The course of GCA is influenced by the concomitant presence of advanced atherosclerosis as the presence of risk factors of atherosclerosis at the time of diagnosis of GCA increases the risk of developing severe ischaemic complications OR 1.79 (95%CI: 1.03–3.11; p=0.04).

Elevated inflammatory markers were an important determining factor in the decision to undertake a temporal artery biopsy in this patient. ESR and CRP are the most sensitive of the haematologic tests in the diagnosis of AAION. This case illustrates that a temporal artery biopsy should be performed to exclude giant cell arteritis in patients with advanced atherosclerosis presenting with clinically unexplained elevated inflammatory markers and optic nerve swelling of any type.

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Visual impairment in an elderly man

Biju Jose, Sharmistha Roy Chowdhury, George I Varughese, David M Barton

Clinical

A 78-year-old Caucasian man was referred by the ophthalmologist with a history of gradual visual deterioration over 2 years, particularly affecting the left eye and getting worse over the preceding months.

A coronal MRI scan of the brain through the pituitary fossa is shown (Figure 1).

Figure 1. MRI scan of the brain

Questions

1. Where is the lesion and what is the most likely diagnosis?
2. What nerve does this lesion usually affect?
3. What would have been the likely visual disturbance?
4. What is the single blood test which is crucial in deciding further management?
Answers

1. Pituitary macroadenoma.

2. Optic chiasm (in this case the chiasm has been displaced upwards along with elevation of the adjacent frontal lobe).


4. Serum prolactin. If it is a prolactin-secreting tumour, the initial management is usually medical with dopamine agonists like bromocriptine or cabergoline, rather than surgery or radiotherapy.

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Abdominal distension
Ersin Ozturk, Guner Sonmez

Clinical
A 26-year-old woman presented with progressively increasing abdominal distension over 10 months. Physical examination revealed a painless mass occupying the whole abdomen.
Abdominal ultrasound revealed a cystic mass extending into all quadrants of the abdomen. An abdominal MR (T2-weighted) was performed (Figure 1).

Figure 1. T2-weighted abdominal MR image

What are the two abdominal masses shown in Figure 1 (long arrow and short arrows)?
Answer

The abdominal MRI demonstrates a cystic mass of 36cm×22cm×13cm occupying the entire abdominal cavity, extending to both paracolic spaces and displacing the abdominal organs to the posterior (long arrow). A horseshoe kidney (short arrows) was also present in the patient.

The cyst was surgically removed. Histopathologic examination revealed a giant mesenteric cyst arising from the mesentery of the terminal ileum. Although a number of anomalies have been described coexisting with a horseshoe kidney, there is no case of mesenteric cyst with a horseshoe kidney in the literature. Mesenteric cysts are rare abdominal masses with an incidence of 1:100,000 in the adult population. They can produce symptoms when they reach a large size. Most common symptoms are abdominal pain, distention, nausea, and vomiting (when cysts are large).

Complications have been reported such as infection, rupture, haemorrhage, and torsion of the cyst. Treatment options include percutaneous aspiration of cyst contents or surgical resection.

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A case of caesarean section


The patient was a dwarf 4ft. 5½in. in height, and 39 years of age. She has been married five years. In 1904 she became pregnant, but aborted in the second month. In the following she again became pregnant, and consulted me between the second and third month. After examining her I informed her that a living child, even at the seventh month, was an impossibility, and she then asked me to terminate the pregnancy, which after consultation I did.

In 1906 she was once more pregnant, and decided to allow matters to go on, and to undergo caesarian section at term. She continued well for some months, when the urine became loaded with Albumen, and dropsy supervened. Labour came on at 5½ months, and a dead foetus was delivered with great difficulty.

In 1907 she was pregnant again, and being in better health and the urine being free from albumen, it was decided to allow pregnancy to proceed, the patient leading a most careful life. At the 37th. week patient entered the private hospital in Geraldine. On April 4th. a soft bougie was passed at 9 p.m., and left in the uterus. Sharp pains set in next morning, and labour began.

At 10 a.m. the patient was chloroformed by Dr. Paterson, and the usual incision was made. There was considerable matting of the tissues, but no difficulty was found in opening the abdomen. The uterus was opened by a six-inch incision, and the head presented. The child was delivered head first, the broad ligaments being grasped by the assistant. Considerable difficulty was experienced in removing the placenta, owing to its strong adhesion to the uterine wall, but it was eventually cleanly peeled off. The Fallopian tubes were divided between two ligatures, and the uterine wound closed by two layers of silk. The abdominal cavity was cleansed with saline solution, and a deep injection of Ernutin was given into the buttock. The abdominal incision was closed in the usual way in layers. A second injection of Ernutin was then given.

The child cried freely, and evidently did not suffer from being delivered head first, every care being taken to prevent any blood or fluid entering the mouth. The patient suffered from severe after pains for three days, but with the exception of a slight rise in temperature on the first night and on the third day (when the breasts filled), the convalescence was uninterrupted. The internal conjugate was measured at the time of operation, and was 2¼ inches.

The child weighed 6½ pounds. During convalescence there was no haemorrhage from the vagina, and only on two or three days any vaginal discharge. The urine became slightly offensive, but improved after three 10-grain doses of Urotropine. There was an occasional trace of albumen.

The breasts filled on the third day, and the mother has suckled the child successfully since that date.
Inhibitory action of taurine at GABA<sub>A</sub> and glycine receptors in the main olfactory bulb of the brain. K Igelstrom, P Heyward. Department of Physiology, Otago School of Medical Sciences, University of Otago, Dunedin.

Taurine is present in the brain at concentrations comparable to those of the major neurotransmitters GABA and glutamate, and can act at GABA or glycine receptors in several areas. Taurine is particularly abundant in the main olfactory bulb (MOB), but its role in this area is largely unknown. This study investigated the action of taurine on mitral cells (MC), the principal output neurons of the MOB.

Male Swiss outbred mice were decapitated and the MOB removed. Extracellular recordings were obtained from MC in horizontal MOB slices (350 µm) maintained in vitro at 30°C. Taurine was bath-applied for 15 min, with or without receptor antagonists. The action potential frequency in the last 5 min of this period was compared with a 5 min recording made prior to drug application (paired t-test). Results are reported as a percentage change ± SEM.

Taurine inhibited MC spontaneous firing at 0.5 and 1 mM (-8.55 ± 2.39%, n = 6, P < 0.01; and -36.7 ± 8.19%, n = 10, P < 0.001, respectively). Inhibition by 1 mM taurine was unaffected by glycine receptor (GlyR) antagonist strychnine (1 µM; -21.9 ± 4.04%, n = 11, P < 0.001), and GABA<sub>A</sub> receptor (GABA<sub>A</sub>R) antagonists bicuculline (50 µM; -19.4 ± 6.05%, n = 8, P < 0.05) and gabazine (10 µM; -20.0 ± 6.94%, n = 8, P < 0.01). However, the non-specific chloride channel blocker picrotoxin (0.1 mM) abolished taurinergic inhibition (-0.98 ± 7.27%, n = 7, P > 0.05), as did simultaneous application of GlyR and GABA<sub>A</sub>R antagonists (bicuculline + strychnine, -0.52 ± 7.49, n = 4, P > 0.05; gabazine + strychnine, -4.65 ± 5.18%, n = 6, P > 0.05).

These results suggest that taurine inhibits MC via chloride channels with unusual pharmacology. Further research is needed to understand the contribution of the GABA<sub>A</sub>R and GlyR.

Destabilised adhesion and c-Src activation characterise inherited lobular breast carcinoma from E-cadherin (CDH1) mutation carriers. HJ Kwon<sup>1</sup>, D Zou<sup>1</sup>, V Blair<sup>2</sup>, B Humar<sup>1</sup>. <sup>1</sup>Department of Biochemistry, Otago School of Medical Sciences, University of Otago, Dunedin; <sup>2</sup>Department of Surgery, University of Auckland, Auckland.

E-cadherin (CDH1) germline mutations predispose to both hereditary diffuse gastric cancer (HDGC) and hereditary lobular breast cancer (HLBC). Early HDGC stages develop following down-regulation of the cell-cell adhesion molecule E-cadherin, whilst progression to submucosal tissue involves an epithelial-mesenchymal transition that is paralleled by activation of the sarcoma cellular oncogene kinase (c-Src) and its downstream target protein, signal transducer and activator of transcription 3 (Stat3).
Similar events have been reported for sporadic diffuse gastric cancer and lobular breast cancer, however HLBC has not been studied at a molecular level. In this study, two cases of HLBC were pathobiologically characterised with the following aims; to demonstrate similarities between the development of sporadic and hereditary LBC, and to provide a first rationale for the use of c-Src and Stat3 inhibitors as potential chemotherapeutic agents in HLBC.

Paraffin-embedded tissue from mastectomies of two patients carrying a CDH1 germline 1008G>T mutation was examined using immunohistochemistry and immunofluorescence. Reduced expression of E-cadherin was observed from earliest stages onwards (atypical hyperplasia and in situ carcinoma) and was accompanied by down-regulation of other proteins (β-catenin, p120, Lin-7) that participate with E-cadherin in the adherens junction complex. Markers of normal mammary cells (CK5, CK18) demonstrated that HLBC differentiates along the luminal epithelial lineage. Progression to invasive carcinoma correlated with increased activites of c-Src and Stat3, with invasive cells showing a mesenchymal-like phenotype as evidenced by vimentin staining.

This study provides the first pathobiological description of HLBC. Our results suggest HLBC develops similar to its sporadic counterpart with regards to the initiating event (down-regulation of adhesion), its differentiation path and further progression to invasive disease. Our observation that c-Src and Stat3 activities both correlate with invasiveness of HLBC encourages the evaluation of corresponding inhibitors for the treatment of this disease.

An evidence-based approach to human dermatomes. M Lee, R McPhee, M Stringer. Department of Anatomy and Structural Biology, Otago School of Medical Sciences, University of Otago, Dunedin.

A dermatome is the area of skin sensation supplied by one spinal nerve. It is a fundamental concept in human anatomy and of major importance in clinical diagnosis. Despite this, there are major discrepancies in current dermatome maps in standard anatomy and clinical texts. The aim of this study was to undertake a detailed systematic literature review of the evidence for the distribution of human dermatomes.

A thorough search of several electronic databases was conducted, together with a hand search of papers. Two independent observers analysed each paper to improve objectivity. Emphasis was placed on the technique of ascertainment, dermatome location and extent, number of subjects studied, and methodologic limitations of each study. Studies were graded into one of three categories using a scheme adapted from evidence-based clinical medicine: good (accurate methodology, further research unlikely to change the result, reasonable consistency in data, appropriate numbers of cases); intermediate (further research likely to change the result, deficiencies in methodology or sample size); or poor (very uncertain contribution).

Currently, the best available evidence is derived from mapping cutaneous sensory disturbances in humans by three methods of investigation: sectioning of adjacent dorsal nerve roots; Herpes zoster skin eruptions with histological confirmation of nerve root involvement; and recording of mixed spinal nerve sensory action potentials after electrical skin stimulation. Based on these findings, a novel evidence-based
A dermatome map was constructed by a professional medical illustrator. This represents the most consistent tactile dermatomal areas associated with each spinal dorsal nerve root found in most individuals. The map not only highlights the orderly arrangement and areas of consistency of dermatomes, but also emphasizes overlap and variability.

In conclusion, this review demonstrates i) that current dermatome maps are inaccurate and based on flawed studies and ii) the validity of an evidence-based approach to an anatomical concept.

Pyoverdine production by *Pseudomonas aeruginosa* isolates from patients with cystic fibrosis. M McNeil, I Lamont. Department of Biochemistry, Otago School of Medical Sciences, University of Otago, Dunedin.

The bacterial pathogen, *Pseudomonas aeruginosa*, is the major cause of chronic lung infections in cystic fibrosis patients. Iron is important for the survival of *P. aeruginosa*, but within hosts the levels of free iron are low. To overcome this *P. aeruginosa* produces an iron-chelating compound known as pyoverdine. Sputum samples from cystic fibrosis patients have high levels of pyoverdine, whilst pyoverdine deficient mutants have a reduced ability to cause infection in animal models of disease, emphasising the role of pyoverdine in infection. This study aimed to determine the amount of pyoverdine produced by clinical isolates of *P. aeruginosa* from cystic fibrosis patients and the molecular basis for variation between isolates.

Screens on agar plates were used to detect pyoverdine production, as when pyoverdine is produced *P. aeruginosa* emits a yellow-green fluorescence. The amount of pyoverdine produced by each isolate was quantified using a fluorescence assay. The expression of a key pyoverdine synthesis gene (*pvdE*) was then analysed in reporter assays.

Eighteen percent of clinical isolates (3/17) were pyoverdine deficient. There was also considerable variation in the amount of pyoverdine produced by the remaining isolates (62 – 1173 µmol) and all produced less than a well characterised laboratory strain (2061 µmol). Reporter assays identified that pyoverdine-deficient strains did not express PvdE. Pyoverdine-deficient strains were able to utilise pyoverdine when it was present in the environment, despite not being able to produce it.

The results from this study illustrate that there is considerable variation in the amount of pyoverdine produced by clinical isolates, with some isolates being pyoverdine deficient. Despite this, all clinical isolates utilise pyoverdine as a means of acquiring iron, making pyoverdine an important factor in the successful establishment of infections. These results support research investigating the use of pyoverdine as a potential drug target for *P. aeruginosa* infection.
The expression of toll-like receptor 2 and toll-like receptor 4 in oral squamous cell carcinoma and irritative hyperplastic lesions. L Ng, A Rich, G Seymour. Department of Oral Diagnostic and Surgical Sciences, School of Dentistry, University of Otago, Dunedin.

The toll-like receptors (TLRs) are transmembrane proteins expressed by chronic inflammatory cells (CIC) and endothelial cells (EC) during inflammation. TLRs induce reactive oxygen and nitrogen intermediates, initiate signal transduction cascades and activate apoptotic pathways. This study investigated TLR2 and TLR4 expression by CIC and EC in oral squamous cell carcinoma (OSCC) and irritative hyperplasia (IH) to determine the possibility of using TLRs as a marker of potential malignancy.

Thirty-two archival OSCC and 15 IH were stained via immunohistochemistry (primary antibodies TLR2: sc-21759 and TLR4: sc-8694, Santa Cruz Biotechnology, California, USA) and counterstained with haematoxylin and eosin. A minimum of 1000 cells in total (mixture of CIC and EC) per sample was systematically assessed with light microscopy and the proportion of positively stained cells to negatively stained cells determined. TLR expression was recorded as positive when there was crisp dark brown cellular staining.

TLR4 showed no positive staining. TLR2 expression in OSCC (mean = 14.1%, SD = 10.2%, n = 32) compared to IH (mean = 3.8%, SD = 7.5%, n = 15) was significantly higher (95% CI = 5.1 – 15.5). Standardisation for site between OSCC and IH confirmed the difference in TLR2 expression (alveolar ridge 95% CI = 3.0 – 20.0, lip 95% CI = 8.2 – 18.0, mucosa 95% CI = 2.4 – 15.0). Standardisation of variables showed OSCC from lip (n = 10) and tongue (n = 11) have significantly higher TLR2 expression (lip $P < 0.02$, tongue $P < 0.01$). CI and $P$ value calculation were based on the central limit theorem and standardised normal curve.

In conclusion, TLR2 expression is significantly higher in OSCC compared to IH. This supports the possibility of TLR being used as a marker of potential malignancy with potential therapeutic implications.

Evaluating gentamicin and ototoxicity in neonates to optimise development of a new dosing regimen. K Owens¹, C Sherwin², D Reith², N Medlicott¹. ¹School of Pharmacy and ²Department of Paediatrics and Child Health, Dunedin School of Medicine, University of Otago, Dunedin.

Gentamicin is a broad-spectrum aminoglycoside antibiotic that is often used in hospitals to treat neonates with suspected or confirmed sepsis. Neonates require relatively higher doses of gentamicin compared to adults due to their increased volume of distribution in proportion to their body size and decreased renal clearance. This increases the risk of ototoxicity, which can lead to permanent hearing impairment. The general incidence of hearing impairment in neonates is reportedly 4-5%.

A retrospective chart review was performed for 122 neonates treated with gentamicin in the Neonatal Intensive Care Unit (NICU) at Dunedin Hospital from September 2003 to November 2007. A clinical audit was undertaken to review hearing tests done
within 3-6 months of discharge on neonates who had received gentamicin treatment, which included prospective audiology data collected from NICU. Results were analysed by logistic regression using STATA® (version 9), with a measured outcome of hearing impairment. A one-compartment PK model was developed using NONMEM (version 5) to estimate the posthoc values of area under the curve (AUC) and maximum therapeutic concentration (C_{max}).

It was found that the incidence of hearing impairment in the study population was 7.4%. The statistically significant independent variables associated with hearing impairment included total duration of treatment with all aminoglycosides (gentamicin and amikacin) (days) \((P = 0.045)\), gentamicin C_{max} (mg/L) \((P = 0.009)\), and gentamicin AUC (mg/L·h) \((P = 0.005)\). A logistic regression model was conducted, resulting in total duration of treatment with all aminoglycosides (days) as the most significant covariate \((p\text{-value of} \ 0.005, R^2 \text{ of} \ 0.305)\).

The most significant variable associated with hearing impairment was total duration of aminoglycosides (days). This is the combination of total duration of gentamicin treatment (days) and total duration of amikacin treatment (days). These results will contribute to the development of a new dosing regimen for gentamicin in neonates.

Recombinant sAPPα causes specific changes in gene expression in neuroblastoma cells and rat hippocampal cell slices. J Renshaw¹, M Ryan², J Williams², W Tate¹. ¹Department of Biochemistry, ²Department of Anatomy and Structural Biology, Otago School of Medical Sciences, University of Otago, Dunedin.

Alzheimer’s Disease (AD) is a neurodegenerative disorder, marked by an increase in the soluble aggregate of amyloid beta (Aβ), produced from internal cleavage of amyloid precursor protein (APP) by β- and γ-secretase. APP can be cleaved alternately by α-secretase producing secretory amyloid precursor protein alpha (sAPPα). The endogenous levels of sAPPα and Aβ are kept in equilibrium by opposing activities of α- and β-secretases. We propose that loss of sAPPα in diseased states contributes as much to cognitive decline as the accumulation of Aβ.

sAPPα is both neurotrophic and neuroprotective, but the biochemical mechanisms are unknown. This group has shown that sAPPα enhances specific gene expression in hippocampal cell slices, and stimulates in vivo long-term potentiation (LTP), the mammalian model for memory. The present study investigated gene expression in hippocampal cell slices and differentiated SH-SY5Y neuroblastoma cells with short or extended exposure to varying concentrations of sAPPα.

RNA was first extracted from the treated cells, cDNA synthesised, and real-time quantitative polymerase chain reaction (rt-qPCR) used to analyse expression. The neuroprotective genes (insulin-like growth factor 2 (IGF2) and insulin growth factor binding protein 2 (IGFBP2)), and the immediately early genes associated with LTP (junB, zif268 and BDNF) were investigated. Expression of IGFBP2 and IGF2 in neuroblastoma cells was enhanced by 3-and 4-fold respectively after 30 min exposure to 0.25 nM sAPPα, but with 24 h exposure IGF2 expression was depressed (0.4-fold) but IGFBP2 was further enhanced (5-fold). Enhancement of expression for IGFBP2
(2.5-fold), junB (5-fold) and zif268 (2.5-fold) was also seen in rat hippocampal cell slices at 1 nM sAPPα.

These results show that sAPPα increases gene expression in genes associated with LTP and neuroprotection. This is consistent with the hypothesis that loss of sAPPα may contribute to the neurodegeneration seen in AD.

Excitation by GABA in the mouse olfactory bulb is not mediated by a bicarbonate efflux. M Tantirigama, P Heyward. Department of Physiology, Otago School of Medical Sciences, University of Otago, Dunedin.

Gamma-aminobutyric acid (GABA) activates chloride current in neurons, and is the main inhibitory neurotransmitter in the brain. However, recent observations suggest that GABA can depolarise and excite neurons. This could result from regenerative bicarbonate (HCO₃⁻) efflux through chloride channels following strong GABA receptor stimulation. The current study aimed to test this hypothesis in vitro in the mouse olfactory bulb.

Transverse mouse olfactory bulb slices (350 µm) from 20-30-day-old mice were obtained. Single-cell extracellular recordings were made from the mitral cell layer and the frequency of spontaneous action potential (sAP) firing was recorded. In the first experiment, sAP firing at different concentrations of bath-applied GABA (10 µM – 1 mM) was tested. Sixteen of 20 cells (80%) were inhibited at concentrations up to 250 µM GABA with four cells displaying no change. At concentrations greater than 400 µM, however, 23 of 25 cells (92%) were excited. In many cells, however, this excitation was transient. Some cells displayed rhythmic epileptiform activity across the period of incubation with GABA, while others showed no subsequent firing after an excitatory response. In the second experiment, effect of GABA at 100 µM (inhibitory) or 500 µM (excitatory) was tested in the presence of acetazolamide (ACTZ), a carbonic anhydrase blocker which disturbs regenerative bicarbonate efflux. Incubation with ACTZ produced no obvious change in epileptiform activity seen at 500 µM (n = 8) or inhibition seen at 100 µM GABA (n = 5).

In summary, the current study shows GABAergic excitation of mitral cells, similar to that reported elsewhere in the brain. This effect of GABA was not abolished by the blockade of HCO₃⁻ efflux, suggesting that at least some GABA synapses on mitral cells may have a depolarising, chloride-mediated, excitatory role in olfactory processing.

Validation of the electronic nose. Do inhaled salbutamol, exercise, coffee and food affect analysis of exhaled breath? M Tolmay, D Cowan, R Taylor. Department of Medical and Surgical Sciences, University of Otago, Dunedin.

The electronic nose uses electronic sensors to distinguish odours and analyse exhaled breath. The role of the nose in the diagnosis of asthma is currently being investigated by the Department’s Respiratory Research Unit. This study explored the effects of exercise, inhaled salbutamol, and oral intake of coffee and food, on the “smellprint” obtained from the electronic nose to develop guidelines for sampling in clinical studies.
Food intake was a standardised bowl of Sanitarium muesli. Exercise involved cycling for 10 min on an exercise bicycle at 60-80% of maximum heart rate (220-age). Exhaled breath was sampled for 10 sec before and after exposure. The smellprints were then analysed using statistical measures such as the Mahalanobis distance, cross validation value and canonical plots.

Salbutamol, exercise and food intake did not significantly alter the smellprint. However, following caffeine intake, there is a trend towards discrimination of smellprints. This would suggest that prior to breath analysis using the electronic nose, caffeine should be withheld. Further work has demonstrated that sampling time is critical. Samples taken with a 10 sec sampling time differed from those taken over 30 or 60 sec. Thus a sampling time of at least 30 sec and preferably 60 sec is necessary to maximise the possibility of discrimination of different groups by their smellprints.

During the main study of the effects of salbutamol, caffeine, food and exercise on the smellprint, a sampling time of 10 sec was used. No significant differences were seen. With longer sampling time, differences might have become apparent and this will be explored in the future.

In conclusion, we recommend that caffeine be withheld prior to breath analysis by the nose and breath be sampled for 60 sec. These changes have been incorporated into the protocol for the use of the electronic nose in our asthma studies.

Increased cell proliferation in the cochlear nucleus following bilateral cochlear lesions. C Zhang, Y Zheng¹, P Smith¹, M Zhang², C Darlington¹. ¹Department of Pharmacology and Toxicology, and ²Department of Anatomy and Structural Biology, Otago School of Medical Sciences, University of Otago, Dunedin.

Chronic tinnitus is a common condition that significantly reduces quality of life for sufferers. However, few treatments are available, mainly due to a lack of understanding of its mechanisms. Since injury-induced neurogenesis plays an important role in a number of physiological and pathological conditions, we propose that cochlear damage, a common cause for tinnitus, may induce neurogenesis in the cochlear nucleus and that the newborn cells may display different behaviour from the existing neurons. Therefore, the aims of this study were to investigate the time course of cell proliferation in the cochlear nucleus following bilateral cochlear lesions (BCLs) and to identify the phenotypes of the newborn cells.

Thirteen male Wistar rats (n = 3 or 4 per group) were divided into 4 groups: sham surgery without cochlear lesions, BCLs at 24 h, 48 h, and 72 h after surgery. Bromodeoxyuridine (BrdU) was injected at different time points and the animals were killed at 24 h after the injection. Sections (40 µm) were collected throughout the cochlear nucleus using a random systematic sampling method. Immunohistochemistry using anti-BrdU was used to label dividing cells and an optical disector method was used for quantitative analysis.

The number of BrdU⁺ve profiles was found to be significantly increased at 48 h post-surgery (29.9 ± 7.2, mean ± SEM, P < 0.01, t-test) compared to the sham group (0.8 ± 0.2). Double-immunolabelling revealed that the BrdU⁺ve cells often coexpressed Ki-67, a marker for proliferating cells. However, none of the BrdU⁺ve cells expressed...
markers for neuronal stem cells (nestin), immature neurons (doublecortin), or astrocytes (glial fibrillary acidic protein).

Our results provide the first evidence on cochlear lesion-induced cell proliferation and suggest that these proliferating cells may remain at a multipotential status. Such interesting findings may help to develop a target-specific tinnitus treatment in the future.
A teenage epidemic in the United States of America

In March, the US Centers for Disease Control and Prevention announced that more than one in four teenage girls in the US has a sexually transmitted disease. But there is even worse news.

The *Lancet* quotes data from the 2003–04 National Health and Nutrition Examination Survey in the US which has recently been presented at the 2008 National STD Prevention Conference. It was reported that around 3.2 million American girls aged 14–19 years have an STD, with the most common disease being HPV (affecting 18%), followed by chlamydia, which accounts for 4% of infections. And downstream from HPV is cervical cancer.

Let’s hope our comparable figures are better. Anyway, roll on HPV immunisation.


Interruption of warfarin therapy and the risk of thromboembolism

Health care professionals face a dilemma when a warfarin sodium-treated patient needs to undergo an elective procedure or minor surgery—the risks of haemorrhage versus the risks of thromboembolism. There are 3 tactics—continue or cease warfarin, or cease warfarin and use short-term heparin.

In this prospective study, a total of 1293 episodes of warfarin therapy interruption in 1024 individuals were included. Bridging heparin was used in 8.3% of patients. Length of warfarin withdrawal was 5 days or less in most cases.

And the outcome—only 7 patients (0.7%) experienced post-procedure thromboembolism. 23 patients (2.3%) had significant bleeding. Interestingly, 14 of these 23 had heparin bridging treatment. It would seem that warfarin withdrawal without heparin is the way to go.


Stem cell harvests for rainy days

Rainy day harvests describe the phenomenon of the collection of haemopoietic stem cells from a patient early in the course of the disease for potential rather than planned use in autologous transplantation later on.

Several randomised and non-randomised studies have confirmed that such treatment is mainstream as part of first-line therapy for relapsed lymphomas and some solid tumours such as germ-cell cancers.

It is known that such cells, properly cryopreserved, can be used without problem up to and possibly beyond 20 years of cryopreservation. Therein lies the rub. In some parts of the world there is an expansile growth of private collection and storage of umbilical
cord-derived haematopoietic stem cells for potential autologous use. It is clear that despite extensive advertising and activity worldwide, there is as yet, no evidence whatsoever for any clinical utility for cells collected in this way. The ethics and practical problems created by this phenomenon are explored in this paper and editorial.


**Simvastatin with or without ezetimibe in familial hypercholesterolaemia**

Ezetimibe, a cholesterol-absorption inhibitor, reduces levels of low-density lipoprotein (LDL) cholesterol when added to statin treatment. However, the effect of ezetimibe on the progression of atherosclerosis remains unknown. Hence this trial—a 2-year randomised trial comparing 80 mg of simvastatin and 10 mg of ezetimibe daily with simvastatin and placebo.

And the results—in patients with familial hypercholesterolaemia, combined therapy with ezetimibe and simvastatin did not result in a significant difference in changes in intima-media thickness, as compared with simvastatin alone, despite decreases in levels of LDL cholesterol and C-reactive protein. Not very encouraging.

An editorial comments that it seems prudent to encourage patients whose LDL cholesterol levels remain elevated despite treatment with an optimal dose of a statin to redouble their efforts at dietary control and regular exercise. Niacin, fibrates, and resins should be considered when diet, exercise, and a statin have failed to achieve the target, with ezetimibe reserved for patients who cannot tolerate these agents.

Yes, but the final clause is somewhat bewildering.


**Effect of glucosamine sulphate on hip osteoarthritis**

Not another meta analysis. No, a prospective randomised trial comparing 2 years of treatment with 1500 mg of oral glucosamine sulphate or placebo once daily in a cohort of 222 patients with hip osteoarthritis who were recruited by their general practitioner. Patients were eligible if they met the American College of Rheumatology clinical criteria for hip osteoarthritis.

After 2 years of treatment, no clinically significant effect on pain, function, or joint space narrowing was found.

A definitive answer to a controversial topic? Maybe—an accompanying editorial suggests the study may not have used the best glucosamine and that the study was underpowered. And maybe the study should have enrolled more severely affected patients for a longer period. Take your pick.

Majority of smokers and non-smokers in favour of smokefree parks in New Zealand

Some local government authorities in New Zealand have started to introduce ‘educational’ smokefree park policies, including those in South Taranaki, Ashburton, Tararua, Gisborne, New Plymouth, Rotorua, and Upper Hutt. The policies depend on signage and media coverage, rather than bylaws, to encourage compliance. Upper Hutt introduced a policy in May 2006. Little is know about the public attitudes to and compliance with such policies.

We carried out a multifaceted evaluation aiming to assess attitudes towards, and compliance with, Upper Hutt’s smokefree parks policy in 2007.

Data collection occurred in the three largest parks in Upper Hutt with one or more children’s playgrounds. We carried out a face-to-face survey and observational study among park users in two of the parks, on 4 days in September 2007. This included data collection during a family-orientated event. We collected and counted cigarette butts from areas in three parks, a week after they had been cleared of all visible butts. These areas were concentrated close to paths, benches, playgrounds, and litter bins. We also carried out a visual analysis of signage in all three parks. The detailed methods and results are described in the project report, with the main findings summarised here. Ethics approval was provided through the University of Otago’s ethics review process.

The main finding was that 83% of adult park users thought that having a “smokefree parks policy” was a good idea (n=488/587). However, only 63% of respondents knew about the policy. Most smokers (73%) also agreed with the policy (n=109/149). Seventeen percent of smokers who knew about the policy and 32% of smokers who did not know about the policy reported that they smoked in the parks.

Of those who thought the policy was a good idea, the most common reasons given were enhancing positive role modelling (28%), reducing secondhand smoke exposure (28%), and because parks are children’s environments (27%). The main reasons people gave for opposing the policy were: “smoking outdoors is acceptable” (50%), “smokers should have the right to autonomy” (26%), and “the policy won’t work or cannot be enforced” (12%). Furthermore, the respondents who agreed with the policy most often thought the Upper Hutt City Council had implemented the policy because: “parks are for children”, “it reduces negative role modelling”, and “it reduces litter”. The respondents who disagreed with the policy most frequently stated that the Council implemented it for “political reasons”.

Observational data of smoking behaviour indicated that smoking was rare among adults, with 8 out of 488 adults observed smoking over the data collection period. No smoking among children was observed (0/1013). However, systematic collection of cigarette remnants indicated that smoking in the parks was still occurring—with 210, 87, and 12 new cigarette butts found in the study areas after 1 week in the three parks. The parks all displayed at least one “Smokefree Parks” sign. However, these were
only visible from a few locations in each park, and were often not in the field of view when looking towards the playground.

The results of this study were generally positive, particularly with regards to public support for a smokefree parks policy. The findings are consistent with the few available studies in other countries and within New Zealand that indicate majority public support for smokefree parks. In New Zealand, a District Health Board survey of 200 park users in Opotiki (following the introduction of a smokefree parks policy) found that 69% supported smokefree outdoor council areas, despite 31% of interviewees being smokers. A Health Sponsorship Council (HSC) survey of subjects across New Zealand found that 51% of interviewees said it was “not at all” acceptable to smoke at outdoor sports fields and courts, and 69% agreed with the statement “smoking should be banned in all outdoor places that children are likely to go”. In the HSC survey, 76% also said it was not acceptable to smoke at outdoor childrens’ playgrounds. In Minnesota in the USA there was 70% support for a smokefree parks policy. There was also majority public support for smokefree beaches in California, and for a number of other smokefree outdoor settings (including child play yards, outside of building entrances, and outdoor restaurant dining patios).

The attitudinal and observational surveys in our study were limited by only involving users of two parks, and not interviewing non-users of parks. Non-response was not recorded systematically, but was reported by interviewers to be very low (<5%). However, some park users were not included in the survey—e.g. joggers were not approached. The results may also have been subject to social desirability bias, since the interviewers were identified to respondents as being “medical students”.

In summary, we found strong support for smokefree parks among park users. However, only 62% of respondents knew that the parks were covered with a smokefree policy, signage appeared to be inadequate, and the butt study suggested an appreciable degree of non-compliance. This suggests that more promotion through better signage, media campaigns, and public education is required. Recommendations for further research in this area are provided in the report. However, while further research on smokefree parks is warranted in New Zealand, there is probably enough public health justification for the introduction of such policies already, especially in settings frequented by children. Furthermore, the available research findings suggest that legislators can be confident of majority public support for smokefree parks.

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Competing interests: Wilson, Edwards, and Thomson have previously worked for NGOs and the Ministry of Health on tobacco control issues.

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John Philip Andrew

20 July 1930–2 February 2008

It is difficult to write an obituary of John Andrew without appearing to exaggerate. But the facts speak for themselves. Country general practice involves skills and responsibilities rarely glimpsed by urban practitioners, and measured alongside his country colleagues, he was one of the finest.

In 1961 he joined Dr David Cross in Warkworth, and together, over their practising lifetimes, they provided primary care of the very highest standard.

Their skills were wide-ranging. Once, John was called to a farmer who had suffered horrific injuries after being run over by a tractor. His face was crushed, he had sustained bilateral fractures of his mandible, and his airway was becoming obstructed.

In the paddock, John cut down on the larynx and inserted an airway, and then rode with the ambulance to Auckland Hospital to be met by Laurie Smith, a long-term friend of both John and I, who later told me the story.

Like many rural practitioners, John was an excellent GP obstetrician in an environment where specialist backup in a crisis was far away. John was prominent in the College of General Practitioners. He and David Cross were among the first to organise registrar training programs. For 2 years John was Chairman of the Board of Governors of the College.

He was physically talented. He excelled at many sports, but golf was his best. As a schoolboy at Wanganui Collegiate, he travelled to play in the Auckland Schoolboys’ Championship, winning in consecutive years. Among those he defeated were several who later became prominent professionals. These few details of his life tell only part of his story. For John Andrew possessed a special mind and a special character. He enjoyed listening to the views of others, particularly those whose opinions differed from his.

On some issues he had very strong opinions, but never were those opinions tainted by prejudice. He had a great sense of humour and was fun to be with. His strength of character was on full display in his final years, when he so wonderfully coped with near total deafness, back pain requiring two spinal procedures, a progressive paralysis from motor neurone disease which ultimately forced him to accept a wheelchair, and if that wasn’t enough, the thyroid carcinoma which took his life.

He is survived by his beloved Moira, and their four talented children. This obituary was contributed by Dr Michael Cooper of Auckland.
Vettivetpillai Tharmapalan

*General Practitioner; 1937–2008*

Dr Tharmapalan passed away in his home in Epsom, Auckland, on 17 April.

Dr Tharmapalan, the son of a Postmaster, was born at Pt Pedro, Sri Lanka, and educated at the Royal College, Colombo.

He excelled in sport, representing his school in rugby and boxing, and later qualified in medicine at the University of Colombo.

He migrated to New Zealand in 1973, working first as a house surgeon at Gisborne Hospital.

In 1975 he moved to Auckland, where he set up practice in the suburb of Sandringham. There he remained till his death.

The funeral took place on 19 April 2008. Dr Thermapalan is survived by a nephew.
Geoffrey Martin Wallace

7 July 1961–24 October 2007

Dr Geoffrey Wallace was tragically drowned in a boating accident on 24 October 2007. He was just 46 years old.

Geoff was born in Morrinsville on New Zealand’s North Island. His primary and secondary schooling was in Tauranga. Geoff attended Tauranga Boys’ College from 1974–1978, excelling academically, and was a school prefect. He played rugby for Rangataua club in his junior grades. As the only European in the club, he stood out from Māori team mates with his fair skin, blond hair and much lighter physique. His rugby “war” stories included a broken femur that left an impressive scar. Geoff was interested in the sea from an early age. He kept yachts, dinghies and kayaks on the jetty at the foot of the family property.

He learnt to sail in a P-Class and developed large boat-handling skills on the family’s motor-sailers. He joined the Naval Reserves while at university and completed several maritime qualifications. His favourite recreational activity was windsurfing. He could often be seen out on his windsurfer in rough conditions when less confident souls limited themselves to the role of observer. He was always fit and healthy, supported by an interest in good nutrition and exercise.

Geoff graduated from the University of Auckland School of Medicine in 1985, and this was followed by specialist training in ophthalmology in Wellington. He graduated as a Fellow of The Royal Australian College of Ophthalmologists (now RANZCO) in 1996, the year after he married Kathy.

After a brief spell in Bunbury, Geoff moved to Whangarei in 1997. He worked at Whangarei Area Hospital and in private practice. In 2005 Geoff and I built a day stay surgical centre in Whangarei. The centre was Geoff’s brainchild and was planned in great detail in keeping with Geoff’s character. He was a meticulous surgeon who took great care with each and every procedure. He was always careful to limit himself to those procedures he felt competent to perform.

Geoff and Kathy were fortunate to have three beautiful children, Scott (aged nine), Kristin (seven) and Julia (three). His family was the love of his life and a great source of pride. Geoff periodically took time off work just to be at home with his family, and regularly took Friday afternoons off for that same reason.

Geoff’s funeral took place in his home town, Parua Bay, on Saturday 17 November. A slide show gave us all an insight into the different aspects of his life. The themes that came through most clearly were love of his family, love of the sea and love of his profession. Geoff died much too soon and will be greatly missed by us all.

Dr Brian Kent-Smith (FRANZCO), a colleague and friend of Dr Wallace, wrote this obituary which is reprinted from Ophthalmologists Exchange 2008;36(1):35.
Ronald Ernest Tingey

5 January 1924–10 June 2007

Dr Ron Tingey who died at the age of 83 years, practised in Tauranga, New Zealand for most of his working career.

He had planned a career as an engineer, but met an ophthalmologist Dr Brewster and this changed his career path. Dr Tingey entered Otago Medical School 1943, boarding at Knox College and attended university alongside Ratu Mara, who later became Prime Minister of Fiji.

He completed his sixth year at Auckland Hospital in 1948. He then returned to New Plymouth Hospital for his house surgeon years, and it was here that he met his wife, Pam, and they married in February 1952. In his third year of hospital service he applied for the Ophthalmic Registrar / Junior lecturer post at Dunedin Hospital and the University of Otago, where he worked under Dr Roland Wilson and Dr Gair MacDonald.

For the fourth year of hospital service he applied for the position of Ear, Nose, and Throat Registrar under Mr Alan Wardale.

Dr Tingey departed for England early 1953 and commenced a Diploma of Ophthalmology course at London University, with a good part of the time spent at Moorfields Eye Hospital. After gaining the qualification, he moved to Portsmouth, Ireland, where his intention was to sit the Diploma in Ophthalmic Medicine and Surgery. For the duration of his time there he was able to improve the working surgical conditions and, at the end of 1953, gained the primary and secondary examinations. He was the only one of 20 candidates who passed both parts at once.

Dr Tingey returned to Wellington in early 1955, and then moved to Tauranga where he set up practice as an ophthalmic and ear, nose and throat surgeon, continuing until his retirement in 1989. In 1970 he passed the Australian College of Surgeons exam in Ophthalmology.

During his working life he had to overcome some major illnesses that had major impact on his work. Dr Tingey developed double vision, second to measles encephalitis. He found it very difficult to operate during this period. The diplopia was rectified by an operation late 1961.

Early 1961 he developed “serum” hepatitis from vaccination injections for poliomyelitis. During his recovery he took time out to travel overseas for six months to review ophthalmic techniques worldwide.
Auckland ophthalmology colleagues came down to look after his practice while he was away. He travelled through Canada and the USA, spending time in Philadelphia with Dr. Harold Scheie a leading glaucoma specialist. He then went on to Moorfields Eye Hospital, London before returning to New Zealand.

Dr Tingey was keen on the outdoors, golf, fishing, and tramping. He had a passion for the sharemarket, and was actively trading up to the time of his death. He was a charter member of the Tauranga Lions Club, and helped to plant a large number of trees at McLarens Falls Park. He was a member of the Tauranga Gliding Club, achieving a gold height award for a rise of over 12,000 feet.

His real love for ballroom dancing began again when he joined the Tauranga Sequence Dance Club in 1986 becoming an active member and teaching dancing. He was president of the club from 1998 to 2004, and elected a life member 2004.

Dr Tingey’s values and leadership in life and medicine were an inspiration to his family. Ron is survived by Pam, three sons, and a daughter.

This obituary was written by Graeme Tingey (Dr Graeme Tingey is a son of Dr Ronald Tingey). It originally appeared in New Zealand Optics and is reprinted from Ophthalmologists Exchange 2008;36(1):33–4.
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