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This Issue in the Journal

Knowledge and attitudes about influenza vaccination amongst general practitioners, practice nurses, and people aged 65 and over

C Brunton, R Weir, L Jennings; for the National Influenza and Pneumococcal Immunisation Attitudes Study (NIPIAS) Group

A national survey of GPs, practice nurses, and people aged 65 and over studies their knowledge and attitudes towards influenza immunisation. All three groups were generally very well-informed about influenza, its complications, and the effectiveness of influenza immunisation. However, some misinformation is still common in people aged 65 and over, and these beliefs discourage at least some older people from being immunised. This study suggests a need for more targeted information about the benefits of influenza immunisation for healthy older adults.

Dinner Bed and Breakfast for Older People: early experiences of a short-term service to manage acute hospital demand

C Hanger, J Griffith, S Lynn, G McGeoch, P Abernethy

Short-term rest home care may be a viable alternative to acute hospital care for some selected older people. This paper presents data for three successive audits of a new service where older people with an acute, self-limiting illness could be admitted to a rest home. Close collaboration between primary and secondary care enabled significant improvements to be made in this new service. However a persisting concern is the number of patients remaining in rest home care permanently. Alternatives such as short-term, enhanced home care would avoid this risk and need to be explored. The shift of care (from acute hospital to community) caused strain on specialist geriatric services, which was not planned or funded.

Shared care between geriatricians and orthopaedic surgeons as a model of care for older patients with hip fractures

J Thwaites, F Mann, N Gilchrist, C Frampton, A Rothwell, R Sainsbury

All older patients with orthopaedic injuries in Christchurch are now admitted under the shared care of both a geriatrician and an orthopaedic surgeon, who are responsible for their medical and orthopaedic problems respectively. An audit of the first 6 months of shared care, since this was introduced in December 2002, was undertaken. The benefits appear to be a low inpatient mortality and improved functional outcomes, with the majority returning to their usual place of domicile. Most patients are now discharged on treatment for osteoporosis. Length of stay has increased however.

Residential care workers and residents: the New Zealand story

L Kiata, N Kerse, R Dixon

Little is known about facilities providing long-term residential care in New Zealand. This survey, completed by over half of all facilities in New Zealand, shows that there is significant regional variation in both residents and staff living and working in long-term care. There are frequently ethnic differences between staff and residents. The available workforce is ageing, and staff turnover in facilities is high (up to 43%) every 2 years. For effective policy development and implementation, ongoing research is needed to follow population changes in long-term residential care facilities.

Quality of residential care for older people: does education for healthcare assistants make a difference?

B Smith, N Kerse, M Parsons

Older people in residential care are primarily cared for by healthcare assistants, of whom less than 25% have any formal professional training. This study assessed the quality of care of older people in a rest home in Auckland before and after a purpose written education programme for healthcare assistants. This study showed that healthcare assistant education could positively impact on the quality of care given to older people living in residential care.

An evaluation of two respite models for older people and their informal caregivers

A King, M Parsons

'Ageing in place' has numerous benefits, however informal caregivers experience significant stress. Respite care provides temporary provision of care for the older person living at home, allowing the informal caregiver rest from their caregiving responsibilities. This study evaluated two case-management models of respite relief care at Waitemata District Health Board. Both respite models were flexible which allowed increased control in decision-making for informal caregivers. Short-term placement in residential respite facilities for respite care may be linked to decreased functional ability of the older person. Furthermore, case managers need to form strong partnerships with caregivers to ensure that the needs of both the informal caregiver and older person are met.

New Zealand's psychiatry of old age services. Revisiting 'the view from the bottom of the cliff'—have we made any progress since 1998?

P Melding

New Zealand's ageing population is increasing and this will affect all health services, including mental health, within the next two decades. In 1998, The Mental Health Commission produced the *Blueprint for Mental Health Services*. This document set some benchmark levels of resources for older people's mental health services. In 2003, New Zealand Psychiatry of Old Age services were surveyed to see if there had been any progress towards achieving the recommended levels. The survey showed that there had been little progress towards achieving the *Blueprint* minimal levels of service, even in District Health Boards with established specialist services for Psychiatry of Old Age. There seems to be considerable work still to do to achieve minimum levels of acute beds and community team personnel for older people with mental health problems. Planning for the future needs to start by paying attention to current deficiencies.

Twelve-month experience of acute stroke thrombolysis in Christchurch, New Zealand: emergency department screening and acute stroke service treatment

J Fink

The 'clot-busting' drug tissue plasminogen activator (t-PA) is known to be beneficial for treatment of some patients with stroke within 3 hours of onset. However, use of this treatment is also associated with an increase in bleeding complications, some of which can be serious or fatal. This report of the first year of experience of this treatment at Christchurch Hospital indicates that it can be delivered in a safe and effective way in a New Zealand public hospital setting.

Guideline recommendations for management of patients admitted with acute stroke: implications of a local audit

J Gommans, D Sye, A MacDonald

Best-practice management of people with stroke (as recommended by the latest New Zealand stroke guideline) significantly improves the chances of a good recovery. Our audit confirms that current management of stroke patients admitted to Hawke's Bay Hospital already meets most guideline recommendations and fully implementing these should be feasible, even in a provincial hospital. It also identified some deficiencies in care that should be easily rectifiable—e.g. earlier use of aspirin, more accurate diagnosis of stroke, and better provision of advice about driving.



Cassandra calling?

Mark Weatherall

New Zealand's health system faces many challenges in the future: the relentless progress of science and technology, great expectations of the results of health interventions and the outcomes of health systems, and the aspirations of Maori. However the greatest challenge we all face is the changing demography of our nation.

Demographic changes arrive later in New Zealand than in other countries with a high standard of living. We currently have a relatively young population structure with only around 12% of the population aged over 65, around 500,000 people. In 2031, people aged over 65 will make up 23% of the population, around 1,000,000 people. In addition, even the group of older adults will themselves be older than they are currently.

In 2001, 50,000 adults were aged over 85, and this will be 150,000 in 2031. These changes in our population structure mean that diseases, impairments, and activity limitations that occur more commonly in older age will become more prevalent. Particular examples of common conditions that occur mainly in older adults are stroke (about 75% occur in adults aged over 65 years) and dementia—90% of these conditions occur in people aged over 65.

Unless there is an imminent change in the age-specific incidence of these conditions there will many more people suffering the consequences of these diseases in the near future. Utilisation of long-term residential care is almost exclusively confined to older adults. Although only a small proportion of adults aged over 65 years currently live in long-term residential care, rest homes, and private hospitals (around 6% of over 65s, or 30,000 people), the age-specific rates of utilisation rise dramatically with age. For instance, around one-third of people aged over 85 years live in residential care. And this will be the fastest-growing group of older adults during the next 25 years.

How should our health system be designed to provide the best care for older New Zealanders? Whatever the specific responses to this design challenge, a general principle is that adequate resources are allocated to provide effective interventions. Examples of healthcare system-based interventions are canvassed in this issue of the *Journal*.

Vaccination against influenza is widely acknowledged as preventing mortality, hospitalisation, and morbidity. It is reassuring, therefore, that the primary healthcare practitioners surveyed in the study by Brunton and colleagues¹ agree with this fact, and that around three-quarters of older people surveyed had (at some stage) received an influenza vaccine. Indeed, although there appeared to be some misconceptions about vaccination, the relatively simple expedient of providing free influenza vaccination for people aged over 65 seems to have been effective.

Organised stroke care also is well recognised as reducing mortality and improving function. It has been promoted by two guidelines published by the New Zealand Stroke Foundation, and a discussion of an audit against the standards promulgated by

the Stroke Foundation shows that it is feasible to provide a service that complies with best evidence.² It is very disappointing that such a straightforward intervention is not available in every District Health Board in New Zealand, and reflects very poorly on the lack of leadership displayed by the Ministry of Health.

Organised care for older adults with mental health problems, including dementia, also is an effective intervention. Shortcomings in resources in this important area of health for older adults were identified in 1998 but, as reported in the paper by Melding,³ little progress has been made to make an adequate service available for all older New Zealanders in 2005.

The majority of support for older people with activity limitations and participation restrictions is provided by informal caregivers; that is, support is provided for love, not money. Failure to care for the caregivers places an unfair burden on people who themselves may be older, or caring for a number of generations. The small survey by King and colleagues⁴ identifies a key expectation of support, it should be flexible, and meet the needs of both older people and their carers.

How should residential care services be structured and used? In particular, can any spare capacity in the residential care sector be used to substitute for care provided in the publicly funded secondary care sector? A series of audits of a service aiming to avoid hospital admissions for older adults (as part of the Elder Care Canterbury project) is presented in the paper by Hanger and colleagues.⁵ This makes for disturbing reading. The audit has clearly demonstrated that, whatever the intentions of the project, older adults were disadvantaged. Particularly in the early stages of the project, ageing in place was not promoted; older adults remained in residential care, died, or required (delayed) access to specialist health services.

Despite the difficulties of the proper design, trials of healthcare services should follow accepted scientific principles; including informed consent, randomisation, and blinded assessment of clinically meaningful outcomes. The widespread use of residential care to substitute for secondary healthcare services should be tempered also by the results of the small study by Smith and colleagues⁶ demonstrating that the current work force in the residential care (and the older people they care for) may benefit from enhanced training for their current work.

Proper healthcare system designs now will ensure our health system can manage the challenges of the future. The Ministry of Health, which is charged with oversight of New Zealand's health, must address these design issues now. Particular issues are the urgent need for District Health Boards to provide explicitly for organised stroke care and stroke units, and urgent provision of adequately resourced mental healthcare services for all older New Zealanders.

Furthermore, important design changes must be conducted in a robust fashion according to rational scientific principles using randomised controlled trials as the best standard. In 25 years, will it be a case of Cassandra called but no-one was at home?

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Tissue plasminogen activator approved for stroke

Alan Barber, John Gommans

In this issue of the *Journal*, the Christchurch Hospital Stroke Service shows that thrombolysis for acute ischaemic stroke, with recombinant tissue plasminogen activator (t-PA), can be given safely and in accordance with international treatment guidelines in New Zealand (NZ).¹ This is the first audit of stroke thrombolysis in NZ and its publication is timely as this treatment was recently approved by the Medicines Assessment Advisory Committee for this indication and subsequently published in the NZ Gazette.² Approval comes 9 years after the pivotal National Institute of Neurological Disorders–Stroke (NINDS) sponsored study confirmed the efficacy of t-PA.³

The evidence that t-PA is of benefit in ischaemic stroke is compelling. A meta-analysis of all randomised controlled trials has found that there are 110 fewer dead or dependent people for every 1000 treated with t-PA within 3 hours of symptom onset.⁴ Furthermore, the benefits of t-PA are still seen outside clinical trial settings. A meta-analysis of all 15 published open-label post-approval studies involving 2639 patients found an efficacy of t-PA similar to that seen in the NINDS trial.⁵

The New Zealand Guidelines for the Management of Stroke gives a Grade A recommendation that t-PA be given to eligible patients, but with the caveat that this should only be ‘in specialist centres by physicians with expertise in the assessment and management of people with acute stroke and where protocols for the use of thrombolysis are in place.’⁶ Despite this, few people with stroke are treated with thrombolysis in NZ.⁷ Indeed, to our knowledge, stroke thrombolysis is only offered as a standard treatment at Auckland and Christchurch Hospitals.

Why then has there been a failure to take up this treatment? There has been confusion about risks and benefits of this therapy as well as some controversy over the original NINDS study results with possible imbalances between the treatment and control groups and allegations of conflict of interest. However, with accumulating trial evidence confirming the results of the original NINDS trial, these concerns are no longer valid. Further barriers include a lack of physicians with experience in giving thrombolysis and the logistical difficulties of giving a potentially hazardous therapy with such a short therapeutic window.

A person needs to recognise they are having a stroke, get to hospital, have the diagnosis confirmed clinically, have brain imaging to exclude cerebral haemorrhage and start treatment—and all within 3 hours! This requires a degree of organisation and coordination of community and hospital services that is lacking in most District Health Boards. In 2001, only 5 of 41 hospitals admitting people with stroke acutely had identified lead stroke clinicians (or had organised stroke services), and only 15 hospitals had audited some aspect of their local stroke practice.⁷ The situation is improving with further stroke units opening in two large urban hospitals since this time and plans for stroke units in others—but there is still a long way to go.

So where do we go from here? Should all hospitals in NZ be offering thrombolysis for acute stroke? Stroke thrombolysis is potentially hazardous. Between 10–17% of patients treated with thrombolysis die, 5–10% have symptomatic intracerebral haemorrhage (ICH), and 25% have serious complications^{4,3,8}—although the overall benefit of therapy far outweighs these risks.

Thrombolysis should only be contemplated by physicians with expertise in the assessment and management of people with acute stroke. Even where such physicians exist, t-PA should not be given on an *ad hoc* basis. Substantial variations in early death are reported between hospitals depending on their experience with the use of t-PA. Hospitals treating five or fewer patients with t-PA per year have almost twice the mortality rate of hospitals treating 16 or more patients (13.5% versus 7.1%; OR 0.5; 95% CI: 0.3–0.8).⁸ This rate is still lower than the 17% mortality rate in the NINDS trial.³

In Christchurch and Auckland Hospitals, only 2–3% of all ischaemic stroke patients are treated with t-PA. Both admit approximately 500 stroke patients per year and have well organised stroke services. Smaller centres admitting fewer than 100–150 patients per year are likely to treat less than 5 patients per year and may be better concentrating their resources on improving other aspects of stroke care.

Ideally, as in Christchurch, there should be a Stroke Thrombolysis Team so that the experience with thrombolysis is concentrated within a hospital. Furthermore, there should be a high degree of communication with the ambulance service and emergency department, and no delays in obtaining brain imaging. Clear, accessible, written protocols for administration of t-PA based on the NINDS study and international guidelines must be available, and Fink has helpfully included the excellent Christchurch proforma.¹ This must include checklists for inclusion and exclusion criteria for treatment, drug information, clear nursing and medical guidelines, and further written protocols on the management of common problems seen in patients given thrombolysis such as elevated blood pressure or neurological deterioration. All of this must be in place prior to embarking on treatment. There must then be an obsessive adherence to these protocols as there is a clear relationship between the numbers of protocol violations and increased mortality.⁵ Ongoing audit of patients treated must also be performed.

Finally, it must be remembered that t-PA is not the answer to acute stroke care. Even in expert centres, only a small minority of stroke patients can be thrombolysed. Without the development of new agents with a more favourable safety profile, or methods by which the narrow 3-hour time window can be extended, this is unlikely to change. In the long run, there is likely to be more benefit from the identification (and training) of lead stroke physicians and the development of organised stroke services with stroke units, specialised multidisciplinary teams and protocols for diagnosis and management, as these will impact on the quality of care of all people admitted with stroke.⁶ However, for the increasing number of NZ hospitals where these are already in place, this audit shows that thrombolysis can be given safely and can lead to improved outcomes.

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Is PHARMAC's sole-supply tendering policy harming the health of New Zealanders?

Pippa MacKay

In the 10 September 1999 *NZ Medical Association Newsletter* I wrote an editorial entitled *When PHARMAC decides, who represents the patient?* Looking at contracting techniques used by PHARMAC to get the lowest prices for pharmaceuticals I drew the conclusions then that financial imperatives outweighed concern over patient safety, consultation with the medical profession was cynical, and bureaucratic requirements were smothering prescribers. Has anything improved?

In the intervening 5 years, PHARMAC's policies have hardened and its contracting attitude has become more combative and aggressive. It must be said that PHARMAC is fulfilling its statutory obligations in purchasing at the lowest price and it has a limited (most would say far too limited) budget to work with. The Government sets the agenda and budget for PHARMAC, so the sorry state of pharmaceuticals' availability, and indeed of the pharmaceutical industry and research in New Zealand, are a direct result of this Government policy.

Shortages of a number of pharmaceuticals have been in the news in recent months but none more spectacularly than the recent fiasco over flu vaccines. New Zealand's annual flu vaccination programme usually begins in March and runs through to the end of June, with up to three-quarters of a million people vaccinated. A month before the flu vaccine was expected in doctors' surgeries all over the country, it was announced that the vaccine was under-strength in one of the three component flu strains. (PHARMAC, who had taken over purchase of flu vaccines from the Ministry for the first time this year, had awarded the tender to one company, Sanofi-Pasteur of France, to supply all the vaccines.) Overnight, all of New Zealand's potential flu vaccine supplies were deemed unsuitable and PHARMAC was left scrambling trying to locate full-strength vaccines from other suppliers.

As has happened before with other shortages caused by PHARMAC's sole-supply tendering policy, the pharmaceutical industry rallied round to bail PHARMAC out. Ironically GlaxoSmithKline (GSK), the company who had successfully supplied New Zealand's flu vaccines for the last few years but failed to win the tender this year, has been able to supply 368,000 vaccines, thus salvaging the flu vaccine programme and saving both the Minister of Health and PHARMAC's faces.

Sole-supply tendering is one of PHARMAC's favourite ways of awarding contracts for off-patent pharmaceuticals. Specifically, interested companies put in a tender to supply the whole of the New Zealand market for a pharmaceutical, and PHARMAC awards the sole contract to one of them, generally the lowest priced.

The debacle over the flu vaccine is just the latest and undoubtedly the biggest and most far-reaching example of how sole-supply tendering can harm the health of New Zealanders. For small savings per dose, the health of hundreds of thousands of people

as well, as the very credibility of the national flu vaccine programme, have been put at risk.

The Press newspaper (Christchurch), in its editorial of 17 March 2005 headlined *Lessons for PHARMAC*,¹ observed:

‘...the public’s confidence in inoculation campaigns will be eroded by the lack of available cover. Many people will conclude that the administration of the campaigns cannot be trusted. This is serious because it comes at a time when the health authorities are rolling out the meningococcal vaccine and meeting a degree of parental opposition...’

The problem with the flu vaccine appears to be one of human error (that occurred at Sanofi-Pasteur’s manufacturing plant in France), and it has affected other countries besides New Zealand. But why did New Zealand have all its eggs in the one basket in this and so many other cases? Australia went for dual supply and had only 35% of its vaccines affected by the Sanofi-Pasteur problem. Merck Sharp & Dohme, the company who won the contract to supply the vaccines, and GSK both made it clear that a split tender was perfectly acceptable and indeed possibly desirable for them.

PHARMAC has correctly pointed out that the flu vaccines have been supplied by sole tender in the past successfully, but perhaps we have just been lucky that we have not had a problem in the past. A sole-tender contract means the company supplies all the vaccines that end up being required, whatever the number, and bears the financial risk. A split contract means that PHARMAC must order a set number of vaccines from each successful company whether or not they are ultimately used, so PHARMAC’s undoubted preference is for sole-supply regardless of the risks to the public.

The 2005 flu vaccination programme is going ahead albeit a month later than usual and with confusion surrounding the exact dates and availability of vaccines—and at considerable inconvenience to doctors and nurses administering the vaccines, and to New Zealanders seeking protection from the flu.

According to PHARMAC’s website (<http://www.pharmac.govt.nz/>), nearly a third of the 2600 chemicals listed on the Pharmaceutical Schedule are sourced through sole-supply tenders. If you speak to any pharmacist or doctor they will confirm that the numbers of frequently used pharmaceuticals that are unavailable has skyrocketed as sole supply has become more common. PHARMAC blames the Pharmaceutical Industry for this, saying that their contracts stipulate quality and continuity of supply. But what actually happens if the quality is not up to scratch or the supply fails? This has been an issue in many other compounds, not just the flu vaccine.

In late-2002, PHARMAC awarded a sole-supply contract for generic felodipine ousting the patented product Plendil. The Ministry of Health raised concerns about the bioequivalence and effectiveness of the generic felodipine so it was withdrawn. PHARMAC gave AstraZeneca 2 weeks’ notice to resupply the market with Plendil (for the 50,000 or so patients requiring it). By September 2003, Medsafe had reinstated consent for the 5 mg and 10 mg strengths of generic felodipine so PHARMAC informed AstraZeneca they were reinstating the original sole-supply contract immediately. The 2.5 mg dose has never been reinstated, so patented Plendil is still being supplied by AstraZeneca who would have preferred to have entirely withdrawn Plendil from the New Zealand market.

Pharmaceutical companies are not in the business of filling the gaps and propping up supply when generic companies' supplies fail and being expected to turn on and off product supply at one or two days' notice. Companies can be quite uncertain whether they have obtained a contract in the first place because of the lack of clearly defined response times from PHARMAC to contract submissions and tenders. A contract can be 'held in abeyance' for months (or even years), thus making forward planning almost impossible. Companies do not know whether to run stocks down or build them up.

New Zealand now has a very small manufacturing base, importing most products. Lead times to obtain products are around 4–5 months, constraining companies' abilities to react to any shortages.

The reduction in margins imposed by the tendering and contract processes mean that holding mountains of stock is not financially viable. This affects the whole supply chain including pharmaceutical companies, wholesalers, and pharmacies—thus making the 'pipeline' stocks much lower than they used to be. PHARMAC'S constant switching of products also worsens this problem.

Sole-supply tenders are often for 3 years, so products' supply can become tenuous toward the end of the contract period (as uncertainty mounts as to whether the contract will be re-awarded or go to an even cheaper generic supplier), thus cutting margins and possibly quality and reliability even more. Companies that fail to win a tender withdraw their products from New Zealand as there is no longer any market for them. In fact, entire companies have had to withdraw because their continued presence has become no longer viable in New Zealand.

Basic everyday pharmaceuticals (such as iron tablets, allopurinol for gout prevention, the only stat treatment for chlamydia, certain doses of progesterone, diltiazem 90 mg slow release to name just a very few) are all currently or recently out of stock nationwide. For many of these pharmaceuticals, there is no similar alternative.

Quality problems have caused difficulties too—with the generic brand of paracetamol (that won the sole-supply tender) being almost impossible to swallow because of its lack of film covering; cheap enalapril disintegrating into crumbs in unsuspecting patients' medicine cabinets; and having inferior slow-release morphine (giving higher peak blood levels, but shorter release times), thus leaving sick patients with side effects then premature pain.

Another major concern is that PHARMAC's sole-supply contracts are for therapeutic subgroups, forcing people to switch not just from a patented product to a generic product, but often to a completely different compound. Generic felodipine has not only replaced Plendil, but amlodipine also, for all but a few with Special Authority subsidies.

Professor Tim Maling, in his 2002 paper *Finding a better balance between pharmaceutical supply and demand – a medicinal issue*,² writes:

'...There is widespread concern and some evidence to suggest potentially significant health loss from some of PHARMAC's reference pricing and sole-supply arrangements. One example, the ACE inhibitor reference pricing initiative stands out...At the time, the therapeutic implications of this unique national initiative were unknown. An evaluation of the brand switch, commissioned by PHARMAC has recently been released. A disturbing finding

was that 30% of the patients did not sustain the initial switch and 11% of those patients with previously controlled blood pressure remained uncontrolled six months after the switch ...'

Professor Maling bemoans the lack of a National Medicines Policy too. Unfortunately the intervening 3 years have not remedied this lack in a country where we seem to have a national policy for almost everything else. Australia's National Medicines Policy would be a good model for us start with.

New Zealand is no different from any other country with a potentially bottomless demand for health dollars. PHARMAC and its policies have been remarkably successful at constraining the pharmaceutical expenditure of this country—but at what cost? Basic pharmaceuticals run out, are of poor quality, and cause constant and potentially harmful switching of brands for stabilised patients—as PHARMAC signs the next new cheapest deal. Indeed, our flu vaccination, and other vaccination programmes, by association, are in jeopardy from delay and public confusion and disaffection.

In a recent finding by the Health and Disability Commissioner, a pharmacist was found to be in breach of the code for dispensing the incorrect dose of atenolol and Accupril. However, in the pharmacist's defence, he stated that with frequent changes in suppliers for subsidised medications, plus unfamiliarity with different packs and medications, may have contributed to the error.

An editorial in the NZMJ by a group of respected physicians in Mar 2003 entitled *The sorry saga of the statins in New Zealand – pharmacopolitics versus patient care*³ had this to say of PHARMAC:

'Decisions made have flown in the face of evidence based medicine and conventional teaching of therapeutics...immediate savings in pharmaceutical spending are the primary concern, long term savings in the broader health sector, health outcomes...and good patient care matter less'

Two years since then, and 5 years since I wrote with concerns about PHARMAC, the situation is much worse, with that organisation being more aggressive and arrogant in its dealings—while choice, quality, and availability of necessary pharmaceuticals spirals us further into Second World health status.

A review of pharmaceutical management, and PHARMAC and its operations, is well overdue.

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Knowledge and attitudes about influenza vaccination amongst general practitioners, practice nurses, and people aged 65 and over

Cheryl Brunton, Rob Weir, Lance Jennings; for the National Influenza and Pneumococcal Immunisation Attitudes Study (NIPIAS) Group

Abstract

Aims To identify knowledge, attitudes, and beliefs influencing influenza-immunisation coverage in people aged 65 years and over in New Zealand

Methods A postal survey of general practitioners (GPs) and practice nurses (PNs) was carried out during 2001–2002 in four regions of New Zealand (Northland, Waikato, Bay of Plenty, and Christchurch) with low or high influenza-immunisation coverage, based on 2000 data. A telephone survey of people aged 65 and over was also carried out in each region. Both surveys assessed knowledge and attitudes about influenza and influenza vaccination, including barriers to vaccination and personal vaccination status.

Results GPs, PNs, and people aged 65 and over were generally well-informed about influenza, its complications, and the effectiveness of influenza immunisation. Some misinformation, however, is still prevalent in people 65 and over, and these beliefs discourage some older people from being immunised.

Conclusions Influenza vaccination coverage among high-risk groups in New Zealand is suboptimal. Overseas studies have shown that patient attitudes and beliefs influence influenza vaccination uptake, and our findings support this. While levels of awareness about influenza and the role of vaccination in its control are high, this study suggests a need for information specifically targeted towards younger age groups about the benefits of vaccination in healthy older adults.

Influenza remains a disease of public health importance in New Zealand. The national general practice-based sentinel surveillance programme estimated that an annual average of 2.7% of the population attended their general practitioner because of an influenza-like illness between 1990 and 1999.¹ Additionally, during the same time period, there were 278 hospital admissions and 34 fatalities per year directly attributed to influenza. This is also likely to be a significant underestimate since influenza modelling carried out by the Ministry of Health for 1980–1992 suggested that for each death attributed to influenza, a further 7.7 were also attributable to influenza but not diagnosed as such.²

Older people are more likely to experience severe consequences of influenza. They have higher hospitalisation rates (33.7 per 100,000 in those persons aged ≥ 65 years compared with 7.5 per 100,000 in the overall population) and higher mortality rates (10.5 per 100,000 in the 65 and over group compared with 0.9 per 100,000 in the overall population).¹ This higher risk of complications from influenza is the rationale for recommending influenza vaccination in the 65 and over age group, as influenza

vaccination is effective in preventing morbidity and mortality from influenza in older people.³

In New Zealand, influenza vaccination became available free of charge to people aged 65 years and over in 1997. Since then, vaccination coverage has increased in this age group - from 39% in 1997 to 59% in 2000.¹ However, there is still wide variation by region (see Table 1) and the Ministry of Health's national coverage target (75% in those aged 65 and over) has not yet been met.

Table 1. Influenza vaccination coverage in people aged 65 years and over during 2000.

Region	Influenza vaccination coverage (%)
Canterbury/West Coast	75
Waikato	71
Wanganui/Manawatu	68
Otago/Southland	63
Nelson/Marlborough	62
Hawera/Tairāwhiti	58
Wellington	58
Taranaki	55
Bay of Plenty	51
Auckland	49
Northland	46
Total	59

Studies in several countries have shown that patient attitudes and beliefs influence influenza vaccine uptake. Many older people believe that the vaccine is unnecessary, because they are not at risk if they are generally healthy.⁴⁻⁶ However, elderly people without existing comorbidity⁷ also benefit from vaccination. Concern about side effects following vaccination is frequently given as a reason for not being vaccinated^{4,5,8,9}, however, minor reactions are uncommon and serious side effects are rare.¹⁰ Some patients also think influenza can be acquired from vaccination,¹¹ although this is not the case. Patient beliefs that vaccination does not prevent serious disease or reduce their risk of developing complications from influenza are also associated with lower vaccine uptake.^{5,8,9}

Other patient-related reasons for lower vaccine uptake include difficulties with access to a doctor,⁹ fewer visits to the doctor,⁵ and a reduction in other preventive health activities¹². The influence of demographic factors is less clear. An Australian study found that the 'older old' were less likely to receive influenza vaccination,¹³ although a US study noted that older subjects were more likely to be vaccinated.⁵ Existing illness is also associated with higher levels of vaccine uptake^{7,14}.

Identifying factors associated with influenza vaccine uptake is important to enable public health campaigns to tailor their advice to eligible patients more effectively. For example, a recommendation from a patient's doctor has been shown to have a major influence on the patient's decision to be vaccinated,^{4,5,8,9} even when they did not initially want vaccination.¹¹ A nurse's recommendation is also a positive predictor of

vaccine uptake.^{4,15} Performance of other preventive activities by doctors is also associated with higher levels of vaccination.¹²

Strategies to increase influenza vaccination uptake can be categorised as client oriented (such as mail reminders and phone reminders), provider oriented (such as chart reminders), and system oriented (such as standing orders). All categories of strategy have been shown to increase vaccine uptake, although system-oriented strategies seem to be most effective.¹⁶ However, the proportion of healthcare providers in New Zealand who believe in and have implemented such strategies is unclear.

This study aimed to identify the knowledge, attitudes, and beliefs that influence influenza immunisation coverage in people aged 65 years and over in New Zealand. In particular, we sought to determine the factors that influence general practitioners and practice nurses to recommend immunisation, and that influence immunisation uptake by people aged 65 and over.

Methods

Study regions

General practitioners, practice nurses, and people aged 65 and over from four regions throughout New Zealand were included in our study which was carried out between November 2001 and February 2002. The study regions were selected on the basis of year-2000 influenza immunisation coverage, and two high (Waikato and Christchurch) and two low (Northland and Bay of Plenty) coverage regions were included. The regional selection also took into account the need to have a reasonably representative mix of urban/rural, Maori and non-Maori, and North/South Island population distributions.

Selection and contact of study participants

General practitioners and practice nurses—Within each region, a postal survey of a random sample of 150 general practitioners (except in Northland where all general practitioners were included as there are fewer than 150) and up to 150 practice nurses was undertaken. Covering letters; study information; a self-complete questionnaire; and a stamped, addressed, return envelope were mailed to general practitioners. They were asked to pass on an enclosed letter of invitation, study information, questionnaire, and return envelope to the practice nurse who would usually administer influenza immunisations to their patients.

If two general practitioners within a practice nominated the same nurse, they were then asked to pass on the second questionnaire to another nurse from that practice. The assistance of Independent Practitioner Associations (IPAs) within each region was also sought to help inform general practices about the study. Two weeks after the initial mail-out, a further mail-out of a study package was made to each practice if one or both of the general practitioner or practice nurse questionnaires had not yet been returned.

People aged 65 and over—A stratified sample of 1000 people aged 65 and over in each of the four regions was randomly drawn from the corresponding electoral rolls (both general and Maori rolls). To approximate the distributions found in data from the most recent census, the regional samples were stratified according to age group (65–69, 70–74, 75–79, 80–84, and 85 and over), gender, and ethnicity. The sampled individuals' name and address details were cross-checked with the Telecom Internet White Pages to identify contact telephone numbers. Those persons without a telephone number (n=339) were not approached to take part in the study. A letter containing information about the study, and an invitation to take part, was sent to the randomly selected people who had a telephone (2 weeks before any telephone contact was made with them).

In that letter, potential participants were advised that they could decline further contact by the study team (either by returning a reply-paid response to that effect, telephoning a designated phone number in the study region, or declining to take part when telephoned). They were also given information about the study's exclusion criteria (recently bereaved, too unwell to be interviewed, and cognitive or hearing

impairment that would prevent being interviewed by telephone). Those persons who had not previously declined further contact were telephoned by a study interviewer within the next 2 weeks, and interviewed if they gave consent.

Study questionnaires

The study questionnaires were based on those used by John Litt in his Australian study of the knowledge and attitudes of general practitioners and their patients about influenza immunisation.¹³ A New Zealand version of both questionnaires was pilot tested with small groups of general practitioners and people aged 65 and over before use in the main study. The general practitioner and practice nurse questionnaires were virtually identical, and required respondents to indicate agreement/disagreement with a series of statements about influenza and influenza immunisation using a Likert scale. The provider questionnaires also asked about the respondent's own vaccination status, and asked them to rank a list of possible strategies to improve vaccination coverage. The questionnaire for the people aged 65 and over also contained the same basic knowledge and attitude items and asked about vaccination status. Instead of a section about strategies to increase coverage, this questionnaire contained a final section about potential barriers to access to influenza vaccination.

Data entry

Three databases (one for each group of participants) were created for study data entry using EpiInfo version 6.04.¹⁷ An experienced data entry operator entered all the questionnaire data and the study databases were cross-checked and cleaned by another member of the study team.

Data analysis

Data analysis was carried out using STATA version 7.¹⁸ Simple frequencies were calculated for questionnaire response categories for each group of respondents. The responses of the three groups were compared for similar items. Chi-squared testing was used for comparisons of categorical data provided the expected values in all cells was at least five (Fisher's exact test was used if this criterion was not met). Regional breakdowns of data from all three respondent groups were also carried out. Analysis by vaccination status was also conducted in the 65 and over group.

Ethical approval for the study was granted by the Canterbury, Bay of Plenty, Waikato, and Northland Ethics Committees.

Results

Response rates

Providers—319 (58%) of the 552 invited general practitioners completed a questionnaire. The response rate among practice nurses is less straightforward as an unknown number of index general practitioners either did not have a practice nurse or shared the services of a practice nurse within a group practice. Without taking these factors into account, the response rate among practice nurses was 271 out of 549 (49%).

People aged 65 and over—1558 (39%) of the 4000 people aged 65 and over (selected from the electoral roll) completed a study interview. Of the remainder, 1659 declined to participate, 413 met the study's exclusion criteria (hearing impairment 165, cognitive impairment 77, currently too ill to be interviewed 171), 339 had no telephone, and 5 had moved and were not contactable. Although this non-response rate is comparatively high, the age and sex distributions of the respondent sample did not differ significantly from aggregate census data for the study regions. The overall proportion of Maori respondents (4%) was slightly lower than would have been expected from regional census data (7%).

Provider knowledge about influenza and influenza vaccination

Almost all (>99%) of the general practitioners and practice nurses agreed that *influenza can be serious in older people and healthy people can get influenza*. Moreover, 97% of general practitioner and practice nurse respondents believed the influenza injection would reduce the risk of patients becoming seriously ill from influenza and its complications.

However, while 92% of general practitioners disagreed with the statement *people can get influenza from the influenza injection*, 4% were unsure and 4% agreed with the statement. Levels of disagreement were slightly lower among practice nurses (89%), although 8% were unsure and 3% agreed. A higher proportion of Northland general practitioners agreed with this statement (12%) than in each of the other three regions (Bay of Plenty 1%, Waikato 5%, and Christchurch 3% [p=0.02]).

Northland had the lowest influenza vaccination coverage in people aged 65 and over in 2000. The comparative regional figures were slightly different for practice nurses (Northland 15%, Bay of Plenty 15%, Waikato 13%, Christchurch 3% [p=0.05]).

Among both general practitioners and practice nurses, Christchurch had both the highest vaccination coverage in 2000 and the lowest levels of agreement with the statement.

Only 88% of general practitioners disagreed with the statement *healthy older people do not need the influenza injection as they rarely get sick* (7% were unsure and 5% agreed). This contrasts with practice nurses—93% disagreed with the statement, 3% were unsure, and 4% agreed. There were no statistically significant regional differences in answers to this question.

Influenza vaccination coverage among providers

The majority of providers had been immunised against influenza at some time; however, a lower proportion of both general practitioners (68%) and practice nurses (64%) had been immunised in 2001 compared to 2000 (see Figure 1)—although this difference was not statistically significant.

Respondents who had been vaccinated in 2001 were asked to rank three factors (from a range of six options) as the main reasons for their decision to have an influenza injection in 2001. Concern about getting influenza and reducing the chance of being off work were the highest ranked for both provider groups, however, there were some differences in rankings of other reasons between the groups (see Table 2). The main reasons given by providers for not being vaccinated were that they rarely get sick or didn't get around to it (see Table 2).

Figure 1. Proportion of general practitioners (GPs) and practice nurses (PNs) who had been vaccinated against influenza

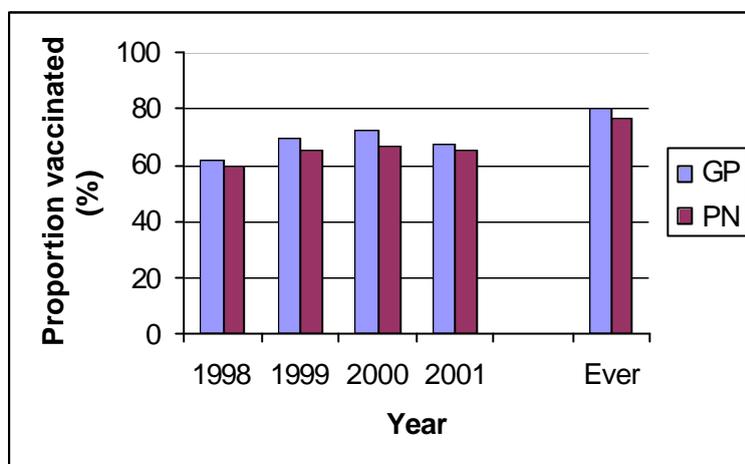


Table 2. Proportion of general practitioners (GPs) and practice nurses (PNs) ranking stipulated reasons for choosing to be/or not to be vaccinated against influenza in 2001

Vaccinated in 2001	Reasons for choosing 'to be' or 'not to be' vaccinated	Proportion ranking the reason (%)		P value (GP vs PN)
		GPs	PNs	
Yes	Concerned about getting influenza	47	58	NS
	Reduce chance of being off work	43	30	NS
	Believe the influenza vaccination may prevent serious disease	29	20	0.02
	Concerned about spreading the disease to my patients if I got influenza	27	45	<0.0001
No	Rarely get sick	45	33	NS
	Didn't get around to it	34	12	0.02

Strategies to improve or maintain vaccination coverage

Respondents were asked to rank (*essential=1, would help a lot=2, would help a little=3, no help at all=4, or make things worse=5*) strategies that would improve or maintain their patient vaccination coverage. The questionnaire listed 18 possible strategies, and provided space for respondents to add others. Fifty percent of general practitioners ranked *increasing the subsidy for influenza vaccination* as essential. *Better use of a recall system* was ranked second most important (with 30% of general practitioners considering this strategy essential).

By contrast, practice nurses ranked *increasing the subsidy for influenza vaccination* a close second in importance (with 42% considering this essential). *Increased emphasis on wider community education about recommended vaccination* was ranked as essential by 43% of practice nurses (this strategy was ranked as third-most important by GPs, with 27% considering it essential).

People 65 and over - knowledge about influenza and influenza vaccination

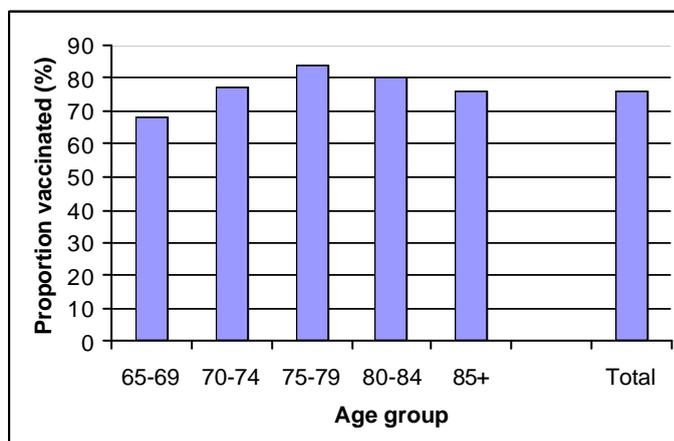
The vast majority (93%) of respondents from the sample of people aged 65 and over agreed that *influenza can be a serious disease in older people* and 78% agreed that *an influenza injection will reduce your risk of becoming seriously ill from influenza and from the complications of influenza*. While not as high as the proportions of providers agreeing with similar statements (99% and 97% respectively), these are still high rates of agreement with correct information about influenza. However, only just over half (52%) of the respondents aged 65 and over agreed that *healthy older people are at just as much risk of getting influenza as older people with chronic illness*.

Just under a third (30%) of respondents agreed that *people can get influenza from the influenza injection*. There was some regional variation in response to this question, and agreement was less frequent in higher coverage areas (24 and 25% in Waikato and Canterbury vs 37 and 32% in Northland and Bay of Plenty). Thirty percent of participants agreed that *people can get sick from the influenza injection* compared to only 4% of GPs and 3% of practice nurses. Twenty-two percent of respondents agreed that *I don't need an influenza injection as I rarely get sick*. Regional responses to this question showed no consistent association with regional coverage levels.

Influenza vaccination coverage among sample aged 65 and over

Overall, 76% of respondents reported having had an influenza vaccination in 2001. Self-reported vaccination status varied with age, and was highest in the 75–79 age group (see Figure 2).

Figure 2. Self-reported influenza immunisation status by age



Among those respondents who were immunised against influenza in 2001, the three commonest reasons for having had the injection were: *believe influenza vaccine prevents me from getting influenza* (68%), *concerned about getting influenza or its complications* (61%), *believe influenza injection prevents serious disease* (49%). There were no significant regional differences, except that a higher proportion of respondents in high coverage regions chose to be vaccinated because of a belief that influenza vaccine prevents influenza (72% vs 64%, $p=0.005$).

Among respondents who were not immunised in 2001, the three commonest reasons for choosing not to be vaccinated were: *didn't need it as I rarely get sick* (67%), *I was unlikely to get influenza this year* (39%), and *concerned about side effects or having a bad reaction* (35%). There were no significant regional differences in reasons for not being vaccinated in 2001.

Role of provider recommendation

Sixty-seven percent of the respondents recalled receiving a recommendation from their GP or practice nurse to have the influenza vaccination in 2001. Eighty-three percent of these respondents were vaccinated, in contrast to 63% of those who did not receive such a recommendation ($p < 0.001$).

Knowledge and immunisation status in people aged 65 and over

While high proportions of both vaccinated and unvaccinated respondents agreed that influenza can be a serious disease in older people, there were some differences in the knowledge and beliefs of those who had chosen not to be vaccinated against influenza in 2002 (see Table 3).

Table 3 Knowledge about influenza and influenza vaccination and self-reported vaccination status—people aged 65 and over

Statements about influenza and influenza vaccination	% of respondents agreeing with statement		P value
	Vaccinated	Not vaccinated	
<i>Influenza can be a serious disease in older people</i>	94	92	NS
<i>An influenza injection will reduce your risk of becoming seriously ill from influenza and from the complications of influenza</i>	91	45	<0.001
<i>Healthy older people are at just as much risk of getting influenza as older people with chronic illness</i>	54	43	<0.001
<i>People can get influenza from the influenza injection</i>	21	54	<0.001
<i>People can get sick from the influenza injection</i>	22	52	<0.001
<i>I don't need an influenza injection as I rarely get sick</i>	5	64	<0.001

Timing and preferred venue for influenza vaccination

Most respondents had been vaccinated against influenza during either a special visit to their practice nurse for immunisation (49%) or during a routine visit to their GP for another reason (27%). The remainder had been vaccinated during a special visit to their GP for immunisation (9%), a routine visit to practice nurse for another reason (9%), a visit to a special immunisation clinic (3%), or a visit organised by their GP or practice nurse. The vast majority of respondents (95%) preferred to have their vaccination at their GP's surgery or medical centre, and most (94%) said they had experienced no difficulty in getting access to their provider for vaccination.

Discussion

This study has found that general practitioners, practice nurses, and people aged 65 and over are generally very well-informed about the importance of influenza and its complications as well as the effectiveness of influenza immunisation. As other studies^{4-6,11} have found, some misinformation still exists among people aged 65 and over, such as the belief that people can get influenza from the influenza injection and that healthy older people do not need to be vaccinated against influenza.

This study provides evidence that these beliefs discourage at least some older people from being immunised. The respondents aged 65 and over strongly preferred general practice as the venue for influenza vaccination, and only a very small proportion had experienced difficulty in gaining access to vaccination. While general practitioners and practice nurses differed somewhat in the relative importance they ascribed to particular strategies to improve vaccine coverage, there was a high level of support overall for increasing the vaccination subsidy, providing wider public education about influenza vaccination, and improving the use of recall systems. The latter two strategies are already part of current influenza immunisation campaigns.

There were limitations to this study. The response rate was low, particularly in the 65 and over sample. This may have meant that those who did respond tended to be more supportive of influenza vaccination and more likely to be vaccinated. Indeed, vaccination coverage in the study sample was higher than that estimated from vaccine claims data in 2000 (see Table 1), although the accuracy of claims data is uncertain. However, vaccination coverage in the current study was similar to that estimated amongst a cohort of Canterbury rest home residents.¹⁹

It is also likely that this study overestimated knowledge about influenza vaccination in this target group. The study sample was selected from two high-coverage regions and two low-coverage regions (based on influenza vaccine claims data from year 2000). It is unclear how representative knowledge and attitudes of GPs, practice nurses, and people aged 65 and over in these regions are of those in New Zealand as a whole. Information bias is also likely to exist, particularly in the 65 and over age group component of the study. Influenza vaccination status was based on self-reported data, and all data in this component were collected by telephone interview. As a result, the study may have overestimated positive attitudes towards vaccination if respondents tended to give the interviewers 'desirable' responses.

While the levels of awareness about influenza and the role of vaccination in its control are very encouraging, this study suggests some potential issues that could be addressed to further increase vaccination coverage towards the Ministry of Health's targets. The younger age groups of people in the 65 and over sample had lower self-reported vaccination status. For instance, just under half of the 65 and over sample were either unsure or disagreed that healthy older people are at risk of influenza or its complications. Thus information strategies (providing evidence about the benefits of vaccination in healthy older adults) may be needed that are specifically targeted to this age group.²⁰

Provider recommendation was also associated with increased influenza vaccination coverage in people aged 65 years and over. As far as providers themselves are concerned, although the study general practitioners and practice nurses reported far higher rates of personal uptake of influenza vaccination than previously found in

studies involving NZ hospital personnel,²¹ their levels of protection could still be improved.

This study supports the contention that GPs and practice nurses, as well as people aged 65 and over, all have important roles in the uptake of influenza vaccination in the 65 and over age group. Therefore, to achieve further increases in influenza vaccination coverage in New Zealand, the National Influenza Immunisation Strategy Group should continue to target both providers and groups recommended annual influenza vaccination.

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Dinner Bed and Breakfast for Older People: early experiences of a short-term service to manage acute hospital demand

Carl Hanger, Jacqueline Griffith, Sarah Lynn, Graham McGeoch, Paul Abernethy

Abstract

Aims The paper describes a service (Dinner Bed and Breakfast [DBB]) to provide short-term rest home care to acutely unwell elderly people as an alternative to acute hospital admission. This was part of a larger project to manage acute general hospital demand. Service changes were introduced after an initial audit cycle and key outcomes monitored.

Method Retrospective audit of patient data for three audit periods.

Results The interim outcomes (at conclusion of DBB funding) in the initial audit were 46% of patients able to return home, 32% remained in the rest home, and 22% were admitted to hospital. The proportion of patients returning home from DBB increased to 68% over the study period. At final outcome (at end of index illness), the return home rate increased from 73% to 85% and the number requiring permanent rest home care decreased from 22% to 14%.

Conclusions Short-term rest home care may be a viable alternative to acute hospital care, but the service needs to include appropriate patient selection, multidisciplinary care, and ongoing monitoring of patient outcomes. One of the risks of this service is patients staying on in rest home care. Short-term enhanced home care may be preferable to rest home care to avoid this risk. The shift of care (from acute hospital to community) caused strain on specialist geriatric services, which was not planned or funded.

In 2002, the New Zealand Government announced its *Health of Older People Strategy (HOPS)*.¹ This document raises important issues in providing healthcare in New Zealand as the population ages. It stresses the need for using evidence-based service delivery—emphasising comprehensive geriatric assessment and the importance of integration across all sectors. Some of the current systems of care are better tailored to meet the needs of a younger population and do not always provide the best care for an older person.² Therefore, more appropriate models of care for older people, with a range of alternatives, are needed.

The HOPS explores some of these options including intermediate care, supported early discharge,³ and hospital-avoidance schemes.⁴⁻⁷ It is important that these options are researched and appropriate in the New Zealand context. This paper describes our experience of setting up of a hospital-avoidance service and how the service was modified based on successive audits.

The *Dinner Bed and Breakfast* (DBB) service is one of a raft of services (collectively called Community Care [CC]) implemented in Christchurch to manage acute demand. In 2000, the Health Funding Authority (subsequently Canterbury District Health

Board [CDHB]) provided funding to Pegasus Health (PH), an Independent Practitioners Association, with the aim of reducing the growing demand for acute services at Christchurch Hospital. The hypothesis was that appropriately resourced teams of general practitioners (GPs) and practice nurses could impact on general medical adult admissions to the acute hospital.

Several initiatives were set up as a result of this funding including an acute observation unit, access to additional acute diagnostic services, funded follow-up, augmented short-term home care, and the DBB service—which is the focus of this study.

The DBB project was initiated (and led) by primary care, and is intended for use when home care cannot be adequately supported. There was surplus rest home capacity in Christchurch, which provided the opportunity for this service to be bought at a marginal price. DBB provides short-term rest home care (accommodation, meals, and support for personal care) for a patient with an acute illness. GP visits (at all times), nurse visits, and some diagnostics (including ECG, blood tests, troponin T, radiology, and oximetry) are available at no cost to patients. It relies primarily on convalescence for patient recovery, rather than active rehabilitation.

Additional rehabilitation resources are only available by referral, and not as an integral part of the service. The service was intended for patients who were usually independent, expected to recover over 3 to 5 days, and would otherwise have required admission to hospital as they were unable to meet their own care needs at home. The rest homes participating in the service had to have a minimum of a registered nurse on duty during working hours and a nurse on call after hours.

It became clear to the project team during the first months of operation that *Dinner Bed and Breakfast* was neither targeting the right patients nor effectively returning them to their own home. This led to a collaborative approach to undertake an initial audit, modification of the service, and subsequent monitoring. This report, therefore, aims to outline the DBB project, and to present outcome data (patient domicile, length of stay [LOS] in DBB and other health sectors during the index illness) from an initial audit and also subsequent years.

Changes made to the service as a result of the collaborative audits will be presented, so that similar projects elsewhere may benefit from our experiences.

Methods

Data collection—The initial audit data were collected on consecutive patients admitted under the DBB service between April 2000 and October 2001. Two subsequent 6-month periods were audited in 2002 (January–June) and 2003 (January–June) and compared. Some younger patients (under 65 years) were admitted to DBB but these were all excluded from further analysis.

The information provided by Pegasus Health was then cross-referenced with that available on The Princess Margaret hospital (TPMH) and Christchurch Hospital (CH) computerised patient management systems. Some patient notes were then reviewed by hand, where clarification of admission details or outcomes was required. In selected cases, rest homes were also telephoned to confirm discharge dates and destinations.

Ninety percent of general practices in Christchurch city are members of Pegasus Health, an independent practitioners association (IPA) of doctors and practice nurses. Christchurch has a population of 316,000,⁸ which is serviced by one acute hospital. Specialist geriatric care is provided by Older Persons Health at TPMH. Patients from surrounding rural and small towns in the hospital catchment area did not have access to the DBB service. Our computer systems provide data on all

patients in Christchurch accessing public hospital care, as well as publicly subsidised community and institutional care.

The following data were collected:

- *Demographic details.*
- *LOS in all sectors following index admission*—including time in DBB service, in rest home under other funding (such as respite care/carer support provided through Ministry of Health Disability Support Services [DSS] funding), in acute hospitals, and in rehabilitation hospitals.
- *Primary diagnosis*—Diagnostic information is limited to the data provided to PH by the admitting GP. The service was designed with minimal paperwork required from the GP, hence diagnostic information was brief.
- *Older Persons Health (OPH) input*—including referrals, community visits, and admissions.
- *Interim and final domicile outcomes for each patient*—Interim domicile is defined as the location of the patient at the end of the DBB funded period. Possible outcomes were rest home, hospital admission (includes direct admission to TPMH under a geriatrician), or home.
Final domicile is defined as the location of the patient at the end of their index illness. Possible outcomes were rest home, home or deceased. No attempt was made to ascertain the stability of the final location beyond this.

(No measures of function or quality of life were collected.)

Following the first audit, it was jointly agreed to improve patient selection and tighten admission procedures. Several changes were made, including:

- Prospective telephone screening of all admissions by a support coordinator with the GP (previously GPs could admit directly), including the following questions
If this person had a healthy carer at home, would you be able to look after them there?
Is this person likely to go home within three days? (ie. active discharge planning encouraged).
(If either response was negative, the GP was strongly encouraged to consider alternative options of care, such as acute hospital admission.)
- GPs were given written, updated information about the service, including potential benefits and pitfalls for older patients.
- Rest home contracts were tightened with greater emphasis on registered nursing input.
- Patients with diagnoses such as acute stroke, delirium and falls were encouraged to be referred on to hospital because acute interventions were likely to be required.⁹⁻¹⁰
- Greater emphasis on early assessment by either their usual GP or a Community Care nurse from PH with assessment within 24 hours.
- GPs were also encouraged to seek help earlier from secondary care (acute services or OPH), preferably by telephone discussion with a specialist physician.

Subsequent audit cycles observed changes following the service modifications.

Statistics—Continuous variables were compared by Students t-tests variables. Chi-squared test was used for comparing the number of people returning home (both interim and final) for each audit period. Significance was preset at $p < 0.05$. All analyses were performed using SPSS software (version 11.5).

Results

Demographic details are shown in Table 1. There were no significant differences in the age and gender of the three audit periods. The majority of patients were 65 years or older (94%, 96%, and 91% in 2000–1, 2002, and 2003 audits respectively). The small numbers of younger patients were excluded from further analysis.

Table 1. Demographic and admission data of older patients admitted to the Dinner Bed and Breakfast (DBB) service

Year	2000–1	2002	2003
Number of months audited	19	6	6
Mean age (years)	82	82	81
% Female	74	78	68
Admissions (aged over 65 years)	189	137	79
Number of patients*	174	135	79
Monday–Friday admissions (%)	80	79	92
Friday admissions (%)	25	27	24
Admissions per month	10	23	13

*11 patients were admitted twice, and 2 patients were admitted three times during 2000/1; 2 patients were admitted twice during 2002. (For the purposes of analysis, each admission is considered separately.)

Table 2. Primary diagnosis on admission during the three audit periods (2000–1, 2002, and 2003)

Primary diagnosis	2000–1	2002	2003
Not coping	8%	14%	18%
Infection*	11%	17%	13%
Falls	5%	14%	9%
Back pain	6%	7%	9%
Pain (not back)†	6%	9%	9%
Chronic Obstructive Pulmonary Disease (COPD)	5%	5%	1%
Confusion/dementia	5%	4%	2%
Vomiting or diarrhoea	4%	7%	9%
Stroke/Transient Ischaemic Attack (TIA)	3%	3%	2%
Other/not specified‡	14%	6%	6%
Miscellaneous§	33%	14%	22%

*Wound, chest, cellulitis, urinary tract infection; †Abdo', chest, joints, shingles; ‡Information on diagnosis was not routinely collected in the initial period of DBB. §Includes asthma, heart failure, incontinence, depression, convalescence, motor vehicle accident, osteoporosis, Parkinson's, diabetes, vertigo, urinary retention.

Interim outcomes are shown in Figure 1. In the 2000–1 audit, less than half (46%) of those persons admitted returned home at the conclusion of DBB funding. However there was a significant increase in the return home rate in both 2002 and 2003 ($p < 0.001$, chi-squared=20.4). Over half (52%) of the patients in 2000–1 period stayed longer than the anticipated 3 days in care and 88 (47%) more than 5 days. Table 3 shows length of stay (LOS) in the different institutions during this index admission for the three audit periods.

Use of DSS respite care funding for these older patients with acute illness has been strongly discouraged from the outset, yet 61% of those patients who needed additional time in the rest home were funded under DSS respite care (Table 3). Others paid for their own additional care or DBB funding was extended. Respite care was still used to extend the stay of 12 (15%) patients in 2003. Some patients who had their time in the DBB extended were subsequently admitted to hospital before returning to the community.

Figure 1. Interim domicile outcomes (p<0.001, chi-squared=20.4)

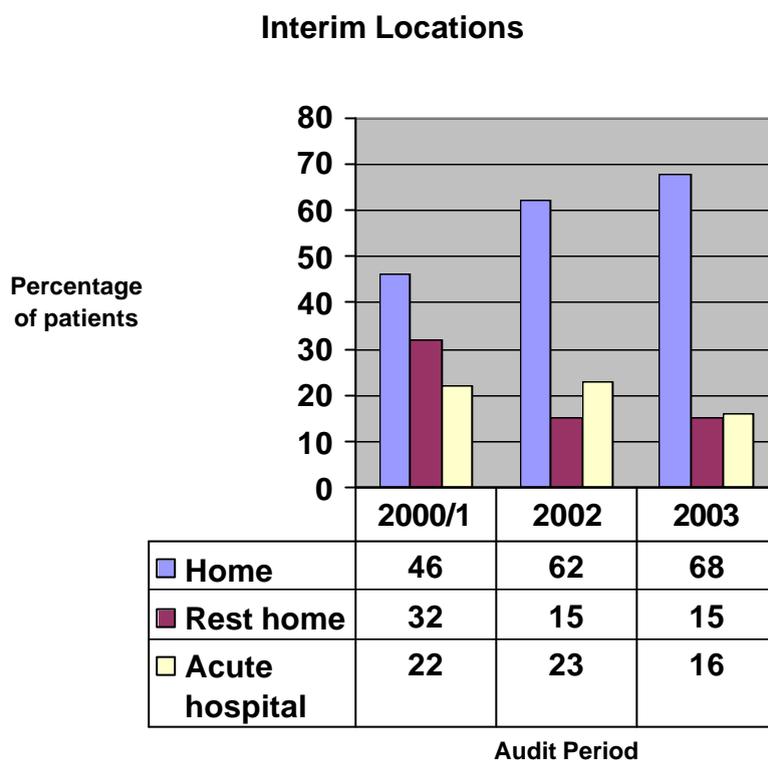


Figure 2 shows the final location of patients after their index admission. During the first audit period (2001–2), 73% of patients admitted to the service eventually returned home, whereas 22% remained as long-term residents in the rest home. Subsequent audits show there has been a significant improvement in these figures (p=0.048, chi-squared=9.6). However, in 2003, 14% stayed (as long-term residents) in rest home care at the end of their index illness.

During the 2000–1 audit period, patients with diagnoses of back pain, delirium, falls, or stroke were admitted to DBB. They did not meet the admission criteria (require more intensive medical attention or unlikely to resolve in 3 days) and as a result of the first audit, procedures were changed as above. Despite this, the diagnoses recorded remained similar across the three periods (Table 2).

In the 2000-1 audit period, 50% of the patients admitted to DBB were referred to OPH for additional assistance (Table 4). Some were admitted to the acute hospital directly, so 78 (41%) were actually seen by OPH teams. This number seen by OPH teams declined to 36% in 2002 and 24% in 2003 (chi-squared=7.2, p=0.03). OPH input included ‘needs assessment’ for additional support services, requests for additional funding (usually for DSS respite care), urgent rehabilitation admission, medical review in the community, and domiciliary allied health visits.

Table 3. Mean length of stay (LOS) in days (range in parentheses) in the different health sectors following admission to the Dinner Bed and Breakfast (DBB) service for a self-limiting illness

Variable		2000/1 N=189		2002 N=137		2003 N=79	
		N	Mean	N	Mean	N	Mean
Rest Home Care	Dinner Bed Breakfast (DBB) funded	189	3 (1–9)	137	2.8 (0–7)	79	2.7 (0–5)
	Private funded*	10	7 (2–18)	9	10 (1–46)	3	2.7 (1–4)
	DSS funded	44	13 (2–28)	15	13 (1–34)	12	10 (1–26)
	Total Rest Home LOS†	189	6 (0–31)	137	5 (0–49)	79	4 (0–29)
Hospital	Christchurch Hospital	21	12 (1–28)	12	13 (5–23)	10	11 (4–30)
	Princess Margaret Hospital‡	41	26 (6–103)	22	24 (7–66)	9	23 (10–37)
	Emergency Department §		**	25	0.3 (0–1)	10	0.7 (0–1)
Total	Total days in care during index admission††	189	13(1–110)	137	10 (1–84)	79	8.5(1–47)

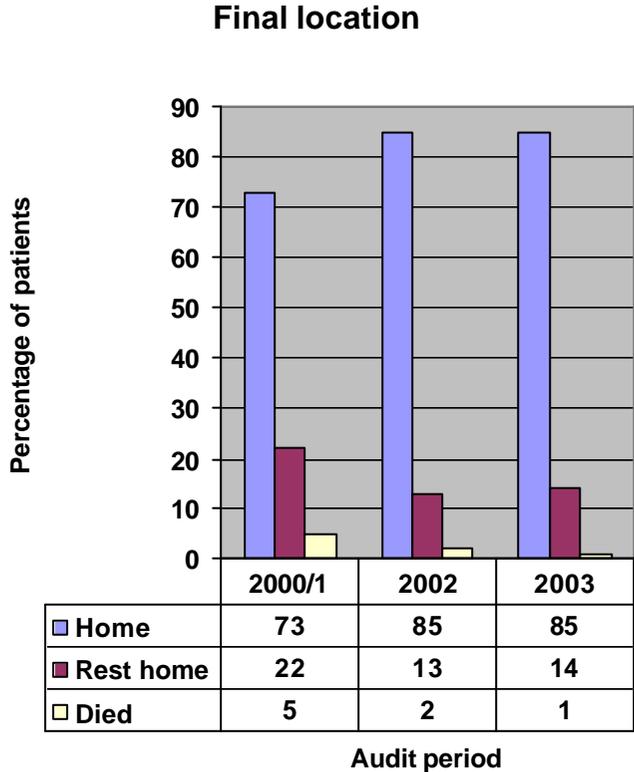
*Private funding of Rest home care may have been underestimated as a further 18 patients had additional time in the rest home (funding source unknown but they did not access DSS funding); †Includes DBB and any other additional stay in rest home; ‡May include some transferred from Christchurch Hospital; §Not collected for this period; **Not collected for this period; ††All days spent in any institutional care from date of admission to DBB until discharge; DSS=Disability Support Services.

Table 4. Older Persons' Health Service initial involvement during the three audit periods (2000–1, 2002, and 2003)

Intervention*	2000-1 Audit N=78 (41% of 189)	2002 Audit N=50 (36 % of 137)	2003 Audit N=19 (24% of 79)
Medical or Multidisciplinary team visit	29 (37%)	15 (30%)	4 (21%)
Psychiatry of Old Age community team visit	2 (3%)	6 (12%)	3 (16%)
Community Gerontology Nurse visit †	30 (38%)	7 (14%)	2 (11%)
Service Coordinator visit †	2 (3%)	–	–
Needs Assessor/Service Coordinator †	–	9 (18%)	6 (32%)
Social Worker visit	2 (3%)	–	–
Direct admission to OPH ward	11 (14%)	13 (26%)	4 (21%)
Direct admission to Acute Hospital advised	2 (3%)	–	–
Percentage of referrals to OPH made less than 24 hours after DBB admission	56%	62%	79%
Percentage of referrals to OPH made later than 48 hours after DBB admission	28%	34%	14%

*No data was available for community therapist involvement; †In 2000-1, Community gerontology nurse completed "Needs assessments (NA)" for additional supports, in addition to their clinical review. Following this NA, the Service Coordinator then organised the services. In 2002 and 2003 periods, the NA role had been transferred to Needs Assessor/Service Coordinator (NASC) team attached to the OPH community team.

Figure 2: Final domicile outcomes (chi-squared=9.6, p=0.048)



Discussion

The DBB Service is one of several initiatives set up by Pegasus Health in 2000 to manage demand on acute hospital services by providing additional services for general practice teams to care for unwell people in the community. This study did not attempt to demonstrate any reduction in demand, but rather looked at patient outcomes (domicile) and also resource use in the disability sector.

The results from the first audit are of considerable concern to clinicians and management. Patients were selected on the basis of having an acute self-limiting illness and expected to resolve within 3–5 days, yet only 46% were able to return home after the DBB funding finished, and nearly one-third remained in institutional care.

Half of the patients stayed longer than the anticipated 3–5 days to recover from their index illness. This may have been due to difficulty selecting out only patients with low-level illness. Alternatively, GPs were not using the service for patients with an acute illness, but for patients requiring admission to the subacute hospital or assessment for long term placement. Just under half of the patients required additional input from OPH (both clinical visits and for respite care funding), thus suggesting the demand for care (and associated costs) had shifted from acute health to the disability sector as well as primary care.

Following the first audit, it was jointly agreed to improve patient selection and tighten admission procedures. Subsequent audits showed an improvement in the numbers of patients returning home (both as the interim and final outcome), and these changes have been sustained.

DSS respite funding is available for emergency carer relief, rather than recovery from an acute illness. Patients who did not recover in 3–5 days required extra funding and DSS funding was sometimes needed as a stop gap measure. Table 4 shows a reduction in this respite care use and fewer urgent calls to OPH.

‘Completing the audit cycle’ (i.e. feeding back the results of the first audit, altering the service, and further evaluation before repeating the process), with involvement from both primary and secondary care sectors, has been critical in achieving these improvements. Established links between primary care and OPH from previous Elder Care Canterbury projects¹¹ enabled this close collaboration, which is essential, as this service involves several parts of the health sector.

A particular strength of the DBB service is that the patient’s own GP may remain involved throughout the illness, thus allowing their extensive knowledge of the patient and their support networks to be fully utilised.⁷

Other potential strengths include:

- GPs can arrange this care easily with a minimum of paperwork,
- It provides an alternative care option for patients who have a lower level of illness and are struggling at home alone, yet not ill enough to warrant acute hospital admission,
- Lower costs by avoidance of acute hospital care,

- Rest home care may be more acceptable and geographically suitable to patients than hospital care,
- The rest home environment may be more homely and thus enabling than the acute hospital, and
- Some of the nosocomial risks associated with hospital may be avoided.¹²

Central support coordination was necessary to ensure that assessment and discharge planning started at the time of referral.

Illness in older people is often more complex and atypical in presentation^{13,14} than in a younger age group. The underlying medical problems need prompt investigation and treatment.^{13,15} Reversible disability is often found, enabling the person to remain independent.²² Timely access to appropriate diagnostic tests, and where necessary specialist input, is essential. Without these, the level of diagnostic information is degraded¹⁶ and poorer care can result. It is vital that any alternative care system, such as this, has appropriate strategies to enable timely access to such diagnostic tests and specialist reviews. GPs had access to some diagnostic tests in the community as part of CC but many tests were still not available to GPs (through the public system).

Historically, in New Zealand, access to these tests has been by admission to hospital. However, to reduce acute demand and enable 'ageing in place', this view needs to be challenged, with the provision of a greater range of services and tests available in the community.¹

The OPH community team was asked to be involved with 50% of patients in the first audit. Responding to these acutely ill patients in the community in a timely manner is critical, however there were delays both at the level of GPs making referrals and OPH responding to requests. As a result of this work, consideration is being given to ways that general practice and OPH could improve services—these include acute specialist geriatric or physician opinion in the community, access to additional funded GP visits, home nursing, and allied health services.

Options to improve access to specialist input in the community¹⁷ include a Rapid Response Team (RRT), in addition to the existing community visit service^{18,19}—but the effectiveness of these schemes is still unclear.²⁰ To avoid the delays experienced in our study, RRT would need to be developed concurrently and involve both primary and secondary care. Moreover, to manage greater numbers of older people in the community during episodes of acute illness (and associated dependency), a paradigm shift in healthcare delivery is required.^{1,2,7} Furthermore, there needs to be a greater emphasis on rapid mobilisation of specialist, diagnostic, and support services in the community and a much greater flexibility in funding streams.

The artificial separation of funding (between acute, rehabilitation, and support services) during this study was limiting. Funding that would have been used for acute hospital care was not available to enable geriatric services to respond more acutely in the community. Comprehensive geriatric assessment (CGA) and treatment is effective either in the hospital or community setting and remains the gold standard of care for older people.^{18,21} Therefore any system of care must build in and facilitate CGA. Failure to recognise this may result in a paradoxical increase in the final level of dependency.^{22,23}

Older people who become ill may lose abilities rapidly, through the effects of illness itself and through deconditioning.²⁴ Deconditioning and nosocomial illness may occur in rest home care, just as much as in hospital.^{25,26} This needs to be actively managed and often requires a multidisciplinary, functional approach to regain their previous level of abilities.²⁷

Augmented home care either by hospital at home or supported early discharge (SED) schemes both have a reasonable evidence base to support their introduction.^{20,28–30} They meet most of the criteria necessary for managing acutely ill elderly patients as outlined by Elder² and have the major benefit of keeping the older person functional within their own familiar surrounds (“ageing in place”). They have all the advantages of continuity of care by their GP, familiarity of their own home and avoid the dependency and nosocomial pitfalls of institutional care.

SED has considerable merit enabling prompt access to the investigative and specialist resources of the hospital sector, but minimising the disabling aspects of the hospital (a ‘get them in and out quick’ approach). The CC projects set up, including DBB, did have provision for augmented home supports, but not to the level required for these schemes.

In retrospect, augmented home care is a more desirable option than DBB for managing ill older people in the community. However, it is logistically more difficult, with outstanding issues including not being able to mobilise supports quickly enough, the shortage of home care workers, funding silos, and family concern about leaving the person at home still to be resolved. Thus much greater emphasis on this augmented home care is required to further reduce acute demand.

A persisting concern is the potential for ‘capture’ by rest homes.³¹ Despite marked improvements in this area, 14% of patients (who were previously independent) remained as permanent RH residents in 2003—they usually remained in the same rest home they had entered under DBB. Some of these people will have disabilities that (with specialist input) might have been modified to enable a return to independent living.²² Others may have been borderline at home beforehand, so their illness was the ‘final straw’ tipping them into dependency.

A perverse financial incentive exists for rest homes to encourage dependence thus retaining patients and income. Similarly, families may feel relieved by the sense of security and discourage return to independent living. Staffing levels in rest homes often preclude an active rehabilitative approach, which is necessary to avoid deconditioning. Whatever the reasons, the number of people entering rest home care in this manner needs careful monitoring to ensure independence is maximised.

This study did not aim to gauge whether demand for acute care changed, nor whether overall costs to the health sector were reduced. Indeed, these issues cannot be assumed,³² and require a separate study. However the first audit highlights the importance at looking at all health sector (not just acute care) use.

Whilst only 21/189 (11%) episodes required acute hospital care, a significant number spent time in the subacute hospital, or needed community visits by clinical teams or stayed additional time in the rest home (41 (22%), 63 (33%) and 44 (23%) respectively). The impact on other services, such as OPH, was not initially appreciated and highlights the importance of monitoring the “flow on” effects of

change. It is vital that projects such as this have a collaborative, multi-sectoral approach to identify issues such as cost/resource shifting³³ as well as blocks to service innovation.

Whilst this study has the problems of any retrospective study, these problems are partly offset by performing sequential audits and by demonstrating that changes were sustained. Furthermore, this study highlights potential pitfalls for others embarking on similar projects. We acknowledge the lack of quality of life or functional measures, which are important outcomes for these patients. Randomised control trials are lacking in this setting and are challenging to conduct.²⁰ Without such trials, it will remain uncertain whether intermediate care schemes represent inadequate or delayed healthcare, or an appropriate alternative to hospital care.^{6,34}

In summary, we have presented our experience with the introduction, and subsequent modification, of a service to provide an alternative to acute hospital care. DBB may be a useful addition to services for older people when acutely unwell. Whilst there were some major initial concerns, many of these have been allayed through a collaborative approach and constructive use of audit. Areas of concern remain, but joint monitoring continues, thus serving to highlight the importance of integration in health systems in the management of older people.¹

The authors view DBB as an interim solution while continuing to develop the ideal of enhanced care at home for appropriately selected, acutely unwell older people.

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Shared care between geriatricians and orthopaedic surgeons as a model of care for older patients with hip fractures

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Abstract

Aims To evaluate the effect of shared care between geriatricians and orthopaedic surgeons as a model of care for older patients with hip fractures.

Methods All patients over the age of 65 years are under the shared care of an orthopaedic surgeon and geriatrician (the Ortho-Medicine Service) when they are admitted to the Orthopaedic Service, Christchurch Hospital, New Zealand. This retrospective case records audit includes all patients over the age of 65 years with hip fracture admitted to this service over a 6-month period from December 2002 to June 2003.

Results There were 150 patients. The median age was 83 years (range 66–99 years). Median total length of stay was 23 days. Median time delay until theatre was 43.5 hours. Inpatient mortality was 0.7%. Of 97 patients admitted from home, 86(88.6%) returned home, 6 (6.2%) went to rest home care, and 5 (5.2 %) went to hospital level care. Of 43 patients admitted from rest home care, 40 (93%) returned to rest home care, and 3 (7.0 %) were discharged to hospital level care.

Three patients admitted from rest home dementia care and six patients admitted from hospital level care were discharged back to their pre-morbid place of domicile. At discharge, 86.8% of patients were on Vitamin D supplementation and over 80% were on calcium. Only 10.6% were discharged on bisphosphonates.

Conclusions Shared care between geriatricians and orthopaedic surgeons for older people with hip fractures is associated with a low in-patient mortality, with the majority returning to their pre-morbid place of domicile. Length of stay has increased. Most patients are discharged on treatment for osteoporosis.

After the age of 60 years, 56% of women and 29% of men will suffer from an osteoporotic fracture.¹ Those fractures involving the hip in older people can threaten their continued independence, recovery, or even their life. Hip fracture significantly increases morbidity and mortality, and increases the likelihood of subsequent hospitalisation.² The risk of long-term institutional stay is also increased.³ The 12-month mortality for patients with a mean age of 79 years following hip fracture is over 25%.⁴ For patients who survive 6 months, only 60% recover their pre-fracture walking ability, and only 50% recover their pre-fracture ability to perform physical activities of daily living.⁵ Many people do not return to their pre-fracture lifestyle.⁶

Active rehabilitation in this group of patients has been shown to reduce hospital length of stay, and to improve physical independence and accommodation status after discharge.⁷

To address the needs of these patients in Christchurch, closer cooperation between orthopaedic surgeons and geriatricians was first established in 1983 when an ortho-geriatric rehabilitation ward was opened. Improved outcomes in medical care and length of stay were subsequently seen.⁸ In the mid 1990s, further cooperation with twice weekly geriatrician visits enabled improved functional outcomes for patients with orthopaedic injuries, reduced length of stay, and significant cost savings in the intervention ward.⁹

Elder Care Canterbury (ECC)—a project to plan, integrate, and improve future health services for older people—was started in 1998 through a joint venture between the main providers of care for the elderly in the Canterbury region, including the geriatricians and psycho-geriatricians from Older Persons Health, Canterbury Health Limited, Health Link South Limited, and general practitioners from the Pegasus Health Group.

One of ECC's working groups, 'Broken Hip', identified the need for a closer partnership or team approach between the medical staff providing care to elderly patients with orthopaedic injuries.¹⁰ This partnership in care was seen as being critical to improving the care provided to older people with orthopaedic injuries. It proposed the establishment of medical teams integrating the expertise of geriatricians and orthopaedic surgeons and the interdisciplinary team to support such a service.

This recommendation was subsequently implemented in Christchurch with the introduction of shared inpatient care (for all older people who were admitted with hip fractures or musculoskeletal injuries) between geriatricians and orthopaedic surgeons—the 'Ortho-Medicine Service'. This has also led to the development of a Fractured Neck of Femur Pathway (a joint project between the Canterbury District Health Board and the Accident Compensation Corporation [ACC]) looking at all aspects of care in this group of patients to improve outcomes.

All patients over the age of 65 years with orthopaedic injuries are now admitted acutely under the care of both an orthopaedic surgeon and a geriatrician who are responsible for the orthopaedic and medical problems respectively. In addition to the house officers and orthopaedic registrars, there is a medical registrar on rotation from Older Persons Health. Ward rounds by either the physician or medical registrar occur daily in a normal working week. Central to the new service is the physician's 'ownership' of the patient's medical care in conjunction with the orthopaedic consultant. Close supervision and instruction of the resident medical officers and close liaison with the anaesthetists and the wider multidisciplinary team are critical elements of the new service.

In conjunction with the multidisciplinary team, joint decision-making occurs when the patient is ready to be transferred to an off-site orthopaedic or geriatric ward where the patient usually remains under the same specialist teams ensuring continuity of care. The results of this partnership in care are described in this paper.

Methods

This was a retrospective case records audit. All patients (over the age of 65 years with a fractured neck of femur) admitted to the orthopaedic service between 1 December 2002 and 31 May 2003 (6 months) were included in the audit. Computerised hospital records from the orthopaedic department database allowed initial identification of all patients over the age of 65 years admitted to the orthopaedic service

during this time period. All notes were then reviewed manually and those patients with hip fractures were identified.

A dedicated database was then developed for the record of patient information using Microsoft Access software. Information from hospital notes was recorded in the database—including patient demographics, place of domicile, type of fracture, time to operation, operative procedure, length of stay in the acute and rehabilitation wards, total length of stay, mortality, discharge destination, investigations for osteoporosis, and treatment of osteoporosis.

Place of domicile and level of care at discharge was identified from the clinical notes and was then verified by telephone contact. The results for the first 6 months of the ortho-medicine service are as follows.

Results

Patient characteristics—150 patients over the age of 65 years were admitted with hip fractures during the 6-month period. Patients with trochanteric fractures (treated conservatively) were excluded from the audit (n=3). The patients' median age was 83 years (range 66–99 years). There were 115 females (76.7%) and 35 males (23.3%).

Place of domicile pre-admission—Prior to admission, 98 (65.3 %) patients were living in their own home, 43 (28.7%) in a rest home, 6 (4%) in hospital level care, and 3 (2 %) in rest home dementia care.

Time to theatre—The median time delay until theatre was 43.5 hours (range 4–360 hours).

Operative procedure—59.2% of the patients underwent compression or cannulated hip screws; 25.7 % underwent a hemiarthroplasty; 10.5% had a total hip joint replacement; and 4.6% underwent other operations.

Length of stay (LOS)—The median length of stay in the acute orthopaedic wards was 8 days, whereas the median total length of stay until discharge from the acute and rehabilitation wards was 23 days (range 3–206 days). One patient was in hospital for 206 days due to *Staphylococcus aureus* infection of a hip joint following a compression hip screw requiring further surgical intervention and prolonged antibiotics—and complicated by severe depression and poor nutrition.

Table 1. Demographic and length of stay data

Demographics	
Age (median)	83 years (range: 66–99 years)
Females	115
Males	35
Length of stay (LOS) in days	
Acute LOS (median)	8
Total LOS (median)	23

Place of domicile: at discharge—Ninety-eight patients were admitted from home. One male patient died. Of the remaining 97, 86 patients (88.6%) returned home, 6 (6.2%) went to rest home care, and 5 (5.2%) went to hospital level care.

Of 43 patients admitted from rest home care, 40 (93%) returned to rest home care and 3 (7%) were discharged to hospital level care. All three patients admitted from rest

home dementia care were discharged back to rest home dementia care, and all six patients admitted from hospital level care were discharged back to hospital level care.

Table 2. Place of domicile pre-admission and at discharge

Pre-admission place of domicile		Discharge destination	
	Number		Number (%)
Home	97	Home	86 (88.6)
		Rest Home	6 (6.2)
		Hospital	5 (5.2)
Rest home	43	Rest home	40 (93)
		Hospital care	3 (7)
Dementia Care	3	Dementia Care	3
Hospital Care	6	Hospital Care	6
Deaths	1		
Total	150		

In-hospital mortality—In-hospital mortality was 0.7% with one patient dying of metastatic cancer of unknown primary. Hip surgery was performed for palliative reasons.

Investigations for osteoporosis—Investigations for osteoporosis were undertaken in 90.1% of patients—and included screening tests for serum calcium, phosphate, vitamin D, and full blood count.

Bone density scan was performed or requisition made for outpatient bone density scan in 48% of patients.

Osteoporosis treatment at time of discharge—At discharge, 82% were commenced or already on calcium and 83.5% were on vitamin D in the form of calciferol or multivite tablets containing vitamin D as per the osteoporosis treatment protocol in Christchurch. Those patients (3.3%) already on the vitamin D analogue calcitriol had this continued.

Some patients were treated with bisphosphonates, including 6.6% on alendronate, 3.3% on etidronate, and 0.7% on intravenous pamidronate.

Discussion

In this study, shared care between geriatricians and orthopaedic surgeons for older people with hip fractures was associated with a low in-patient mortality, with the majority of patients returning to their pre-morbid place of domicile.

In-patient mortality was only 0.7%. This compares with an in-patient mortality of 8.2% in the intervention ward in Christchurch previously in the study by Elliot et al in 1996.⁹

In a Waikato study by Weatherall¹¹ looking at patients over 60 years old with hip fractures where liaison occurred between orthopaedic and elderly services, postoperative mortality was 3%. Other studies report overall inpatient mortality rates (for patients over 65 with hip fracture) of more than 6%.^{12,13} The low inpatient mortality in our study is thought to reflect earlier identification and management of

medical problems preoperatively combined with improved peri- and postoperative medical care of patients. As these months did not include winter, a possible seasonal variation may have therefore been missed. Thus, an audit of future outcomes will be necessary to determine overall mortality trends.

Most patients returned to their usual place of domicile with 88.6 % of those admitted from home returning to their homes, and 93% returning to their rest homes rather than going into a higher level of care. This compares with 11% of patients in the intervention group being discharged to a higher level of care in the study by Elliot et al.⁹

In Weatherall's study,¹¹ 79% of those admitted from home and 67% of those from rest home returned to their pre-morbid place of domicile respectively. In a study of patients over 65 years with hip fracture, Van Balen et al found only 47% were discharged to the same type of residence they had before fracture, but this percentage had increased to 57% at 4 months post discharge.¹⁴ Further follow-up of our patients is planned to determine the level of independence and place of domicile at 6 and 12 months' post-discharge.

In New Zealand, which has rest home costs of up to NZ\$35,000 per annum and long-term hospital care of up to NZ\$55,000 per annum, reducing the number of patients going to a higher level of care has significant cost-savings implications.

Balancing length of stay with optimising function and opportunity to return home can be difficult. The median total length of stay of 23 days was longer than the mean length of stay of 20.7 days in the study by Elliot et al⁹ and 19.9 days in Weatherall's study.¹¹ In contrast, in a randomised controlled intervention study in Finland where intensive geriatric rehabilitation of hip fractures in patients older than 65 years was undertaken, the median length of stay was 34 days in the intervention group and 42 days in the control group.¹⁵

The increased length of stay in this study is mainly due to an increased stay in the rehabilitation rather than the acute wards. It should be noted that the total length of stay included time spent in country hospitals by some rural patients following their discharge from rehabilitation in Christchurch but prior to their discharge home. This is not usually included in other studies and does have cost implications. The low inpatient mortality may have further contributed to the increased length of stay.

Median time delay to theatre was 43 hours, which is longer than the recommended 24 hours for surgery.¹⁶ This was due to a combination of restricted operating theatre capacity and medical stabilisation of unwell patients. These delays, however, were not reflected in an increase in perioperative mortality—possibly due to the increased medical involvement and stabilisation of patients.

Treatment of osteoporosis decreases the risk of fracture. Chapuy et al found that daily supplementation with cholecalciferol and calcium substantially decreased the risk of hip fractures in elderly women living in rest homes.^{17,18} Hip fracture risk can also be significantly reduced with treatment with bisphosphonates such as Alendronate¹⁹ and Risedronate.²⁰ However data for this cohort of patients for the efficacy of bisphosphonates reducing subsequent fractures is lacking.

In this study, 86.8% of patients were on Vitamin D supplementation for treatment of osteoporosis at time of discharge from hospital and over 80% were on calcium.

Only 6.6% of patients in our study were discharged on Alendronate. In New Zealand the funded prescription of Alendronate is restricted to those with a bone density T-score of -3.0 or below and a fragility fracture. Difficulty accessing bone density scans in our hospitals has resulted in a disproportionately low number of patients being commenced on Alendronate. In Australia, this medicine is funded for people with fragility fractures without requiring a bone density scan.

Several studies have shown under-treatment for secondary prevention of hip fracture in older patients. For example, in a study of patients in Christchurch (12 months following a hip fracture), in 1998–99 only 12% were on calcium; 9% on bisphosphonates, hormone replacement, or calcitriol; and 79% were on no treatment.⁴ It is possible that a higher percentage were discharged initially on some form of osteoporosis treatment but subsequently discontinued.

In a study of veterans following hip fracture, 47% were treated with Vitamin D and 35% with calcium but only 4.5% were treated with Alendronate.²¹ Other studies looking at secondary prevention following hip fractures have shown that despite improvement in trends, fewer than 30% of patients are receiving either calcium or other osteoporotic treatments at time of discharge following hip fracture.^{22,23}

To date, many studies and trials have had different aims, interventions, and outcomes for patients with hip fractures.²⁴ As a retrospective audit, this study has limitations when comparing outcomes with other studies. Formal standardised tools to assess the level of functioning of our patients were not used and therefore unable to be compared with other studies. Using the return to pre-morbid place of domicile as an indicator of functioning is an insensitive but practical marker with which to assess level of functioning. An accurate assessment of mobility was not performed.

With the establishment of a Hip Fracture Pathway and database some of these issues will be addressed with information being collated prospectively. This will provide a consistent approach in the methods, collation of data, and allow similar methods of analysis. This audit tool will also be used to monitor long-term outcomes for patients with hip fractures; manage osteoporosis; and identify trends in demographics in the region. It will also assist in the identification of problems occurring such as insufficient operating theatre capacity and delays in discharge. This will provide important information to assist in service provision and development to ensure the appropriate use of resources. Further review and development of the Hip Fracture Pathway in conjunction with the Accident Compensation Corporation (ACC) will address these issues.

In summary, this study provides current data showing the outcome of shared care for older patients with hip fractures in an Ortho–Medicine Service. The benefits appear to be a low in-hospital mortality and improved functional outcomes, with the majority of patients returning to their pre-morbid place of domicile.

Management of secondary prevention to reduce further hip fractures has been instituted in the majority of patients. Delay to operating theatre may be too long and reasons for delay need to be further studied together with the low mortality. Improved outcomes have been at the expense of a slightly increased length of stay in the rehabilitation phase.

The establishment of a dedicated database will facilitate future audit of shared care in the Ortho-Medicine Service and assist with the provision of care to improve outcomes for older people with hip fractures. A single-site hip-fracture service has been proposed in Christchurch, and may help to further address some of the above issues.

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Residential care workers and residents: the New Zealand story

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Abstract

Aims To describe the nature and size of long-term residential care homes in New Zealand; funding of facilities; and the ethnic and gender composition of residents and residential care workers nationwide.

Methods A postal, fax, and email survey of all long-term residential care homes in New Zealand.

Results Completed surveys were received from an eligible 845 facilities (response rate: 55%). The majority of these (54%) facilities housed less than 30 residents. Of the 438 (94%) facilities completing the questions about residents' ethnicity, 432 (99%) housed residents from New Zealand European (Pakeha) descent, 156 (33%) housed at least 1 Maori resident, 71 (15%) at least 1 Pacific (Islands) resident, and 61 (13%) housed at least 1 Asian resident. Facilities employed a range of ethnically diverse staff, with 66% reporting Maori staff. Less than half of all facilities employed Pacific staff (43%) and Asian staff (33%). Registered nursing staff were mainly between 46 and 60 years (47%), and healthcare assistant staff were mostly between 25 and 45 years old (52%). Wide regional variation in the ethnic make up of staff was reported. About half of all staff were reported to have moved within the previous 2 years.

Conclusions The age and turnover of the residential care workforce suggests the industry continues to be under threat from staffing shortages. While few ethnic minority residents live in long-term care facilities, staff come from diverse backgrounds, especially in certain regions.

The ageing of the population, with a projected six-fold increase in those persons over age 85 in the next decades,¹ will ensure that health and care of older people remains an important issue for New Zealand health planners. Currently, 28% of people over age 85 years live in long-term residential care. Even with an emphasis on community care and 'ageing in place'² such an increase in the absolute numbers of frail older people will ensure that residential care will be needed, and will probably increase in the decades to come.

Although Maori and Pacific (Islands) older peoples are under-represented in long-term care^{3,4} the demographic projections show the potential for considerable increase in the proportion over age 75 years in the next half century,⁴ and it is likely that there will be increased need for culturally appropriate residential care to assist aging minority groups.

Debate about whether ethnic matching in caregiving enhances quality may be academic if ethnically appropriate caregivers are not available in the workforce. Differing models of residential care are being developed to better meet the needs of

ethnically diverse older people, however little is known about the available workforce to support such developments.

Quality of long-term care has been questioned in the United Kingdom (UK);⁵ and another study in the United States (US) suggests poorer quality in privately funded facilities compared with not for profit facilities.⁶ Over the last three decades, there has been a general shifting of funding of residential care from publicly-run facilities to publicly subsidised, privately-run facilities. The effects of these large policy shifts have not been studied. Previous work established profiles of residents in care,⁷ but staffing arrangements have not been described.

Currently the main source of information about working and living in residential care has come from ethnographic studies, based mainly in the US.⁸⁻¹² A first step in finding out who it is that lives and works in long-term residential care in New Zealand is to survey long-term care facilities New Zealand-wide.

This paper reports the results of a study aiming to establish the characteristics of staff and residents, particularly looking at regional variations in ethnicity and workforce stability.

Methods

Clinical directors and managers of long-term care facilities were asked to complete a survey about the characteristics of their workforce and residents. One survey per home was sent with a letter of explanation.

Questionnaire development—Key informant interviews with managers of long-term care facilities in Auckland informed ways of asking about ethnic and age make up of residents and staff. A two-page survey questionnaire was designed and pilot-tested in long-term care facilities in the greater Auckland area with group discussions and feedback to researchers. The resulting nine-question survey entitled *Who Cares for Older People?* was used in the survey.

The questionnaire enquired about the following:

- Type of residence (privately owned, religious and welfare, publicly funded, charity trust, or combination of these sources).
- Numbers of residential care beds, private hospital beds, rest homes beds, respite beds, secure unit beds at the residence.
- Numbers and ethnicity of residents living at the residence.
- Age-range of the residents.
- Numbers, ethnicity, and job designation of facilities' employees.
- Age-range and formal qualifications of facilities' employees.
- English as a second language among facilities' employees.
- Numbers and ethnicity of employees working part and full-time at the residence.
- Length of time employees had worked at residence.

Sample—A national list of the residential care facilities providing long-term care (including rest homes and private hospitals) was compiled from the Ministry of Health's listings of licensed 'hospitals and old people's homes' in New Zealand and a commercial list used for marketing purposes (Personal Communication with Meg Butler, 2002). Assurances from the sources of both lists indicated that they were updated regularly. Private hospitals care for very frail, high-needs older people requiring daily nursing care. Rest homes cater for the frail mobile aged with dependencies in one or two aspects of daily living. These long-term care facilities are hereafter referred to as 'facilities' in this paper. The final list comprised 919 facilities.

Data collection—Questionnaires were sent and returned between March and May 2002 to 919 facilities on the list. 679 surveys (74%) were posted out, and 240 (26%) were emailed. Two follow-up telephone calls were made, and mail-out reminder letters were sent to facilities that had not responded

within 2 weeks. Respondents either mailed or faxed their completed surveys back to the research centre.

Data analysis—Descriptive statistics of age, gender, ethnicity, and stability of the workforce were generated using SPSS (v. 10.0) software. Cross tabulations were used to investigate the degree of ethnic ‘match’ between workers and residents in facilities where Maori, Pacific, and Asian older people lived.

Approval for this study was obtained from the University of Auckland Human Subjects Ethics Committee.

Results

The data from 845 of 919 facilities were eligible to be included in the study. Of the remainder, 27 were not long-term care facilities (they were private surgical hospitals), and 47 were no longer in business.

468 facilities (55%) chose to respond to the survey. The majority (78%) of these responses were returned by postal mail, 14% were faxed, 7% emailed, and 1% were completed by telephone survey.

Of the 468 facilities (for which completed surveys were received), the majority (65%) were privately owned. The remaining facilities were run using a variety of funding sources: religious and welfare organisations (18%), public funding through health funding agencies (4%), or a mixture of funding sources (7%). Three percent of facilities were run by a charitable trust.

Tables 1 and 2 show regional and population density breakdown of facilities and the regional variation in response rates. A quarter (26%) of all facilities were located in the greater Auckland area. There were 33% of all facilities in mainly rural areas (with populations less than 25,000), with the remainder being located in small and large towns and cities of greater than 400,000 people.

Table 1. Total respondents and response rate of New Zealand long-term care facilities by population (n=845)

Size of population where facility was located	Number of facilities sent surveys N (% of total)		Number of returned surveys N (% of regions)	
<25,000	283	(33)	170	(60)
25,000 to 250,000	222	(26)	112	(50)
250,000 to 400,000	149	(18)	75	(50)
>400,000	191	(23)	111	(58)
Total	845	(100)	468	(55)

Size of facility

Facilities size ranged from 3 beds to 222 beds (mean=37, standard deviation [SD]=32). Fifty-four percent of facilities had fewer than 30 residents and only 10% had more than 70 beds.

Private Hospital beds

158 (34%) facilities accounted for a total of 3,899 private hospital beds (mean=25, SD=16). The majority of these facilities (63%) had 25 or fewer private hospital beds,

while 25% reported 14 or fewer private hospital beds. Eight facilities had only 1 private hospital bed, and 1 large residence had 89 private hospital beds.

Table 2. Number of surveys sent and returned by regional location of residence

Number of facilities			Number of returned surveys	
Region	N	(% of total)	N	(% of regions)
Northland	45	(5)	26	(58)
Auckland	209	(25)	120	(57)
Waikato	63	(7)	31	(49)
Hawke's Bay	185	(22)	100	(54)
Wellington	85	(10)	50	(59)
Marlborough	26	(3)	15	(58)
West Coast	7	(1)	6	(85)
Canterbury	145	(17)	75	(51)
Otago	80	(10)	45	(56)
Total	845	(100)	468	(55)

Rest Home beds

Rest homes ranged in size from 1 to 150 beds—accounting in total for 11,243 rest home beds (mean=29, SD=18). Fifty percent of rest homes had 25 or fewer beds, and 90% of all respondents reported that their facility had fewer than 50 rest home beds. The largest complexes (10%) had between 50 and 150 rest home beds.

Respite beds

171 facilities had respite beds that were used for short stays. Over half (59%) of these facilities had beds specifically designated for respite care, while 41% of facilities used regular beds (as and when available). Over half (52%) of those facilities with regular beds had 1 bed held only for short stay residents, while 30% of residential care management reported that they had 2 beds ready. The remaining facilities (18%) had between 3 and 8 beds available for respite care.

Secure Unit beds

A small number (n=65; 14%) of facilities had dementia care units where 1,270 secure unit beds were located. Approximately half (49%) of the 65 facilities had 16 or fewer secure unit beds, and the other half (49%) had between 16 and 100 secure unit beds. Only 5% (n=3) of the facilities offered more than 50 secure beds.

Residents

Ninety-three percent (n=437) of respondents offered information about the ethnic make-up of their residents. Information was provided on 16,092 residents, most (95%) of whom were of European and/or New Zealand European (Pakeha) descent. Minority ethnic groups were indeed in the minority, with 392 Maori (2%) and Pacific accounting for less than 1% (n=81) of the total number of residents. Asian (including Indian) residents accounted for less than 1% (n=55) of residents. Other non-European residents (including African and Middle Eastern people) comprised the remaining 1% (n=145).

Table 3. Ethnic diversity of residents in long-term care facilities by region in New Zealand

Facilities by region			Ethnic composition of facilities housing one or more...									
			Maori residents		New Zealand European (Pakeha) residents		Pacific Islands residents		Asian (including Indian) residents		Other non-European residents	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Northland	24	(5)	12	(50)	24	(100)	3	(11)	1	(-)	0	(-)
Auckland	117	(26)	38	(32)	115	(98)	41	(34)	37	(31)	19	(16)
Waikato	30	(7)	19	(63)	30	(100)	3	(1)	3	(1)	0	(-)
Hawke's Bay	92	(21)	47	(51)	92	(100)	5	(5)	5	(5)	4	(4)
Wellington	47	(11)	16	(34)	46	(98)	15	(3)	9	(18)	2	(-)
Marlborough	14	(3)	4	(29)	14	(100)	0	(-)	1	(1)	0	(-)
West Coast	6	(1)	0	(-)	6	(100)	0	(-)	0	(-)	0	(-)
Canterbury	68	(16)	10	(15)	66	(97)	1	(-)	4	(1)	6	(1)
Otago	39	(10)	10	(26)	38	(97)	3	(1)	1	(-)	2	(-)
Total*	437	(100)	156	(36)	431	(98)	71	(15)	61	(13)	33	(7)

*Totals do not reconcile with the values above them due to missing values.

Table 3 shows how many facilities in each region housed ethnically diverse residents. Thirty six percent of facilities (n=156) housed Maori residents. Half of these (51%) had only 1 Maori resident (mean 2.3), with a maximum of 10 Maori residents being housed. Fifteen percent (n=71) of facilities had at least 1 (but no more than 10) Pacific Islands resident (mean 1.3).

Similarly, 61 (13%) facilities housed Asian (including Indian) residents. Seven percent of facilities housed other non-European residents (n=33). Over 50% of facilities in Northland, Waikato, and Hawke's Bay reported having Maori residents, while one-third of Auckland facilities had Pacific residents. However, overall there was considerable regional variation in the ethnic distribution of facilities with non-Pakeha residents.

Age range of residents

Although the study focused on residential care for the elderly, 31 (7%) of the facilities reported that they also catered for younger residents, with 114 residents being aged 45 years of age and under. The majority of these facilities (75%) had no more than four of these younger residents. Seventy percent of managers (n=329) reported catering for residents aged between 45 and 75 years (total residents 2,146) while the majority of residents were over 75 years of age (n=4656). Almost all facilities had residents over 75 years of age (92%).

Staff

Qualifications/Training—Managers reported that a total of 1,990 registered and enrolled nurses worked in their facilities. The age range of employees in specific roles in residential care varied. The majority of registered and enrolled nurses were between 46 and 60 years of age (47%). Forty-four percent were aged between 25 and 45 years, while only 2% were less than 25 years of age. An important minority of registered and enrolled nurses were over 60 years of age (8%).

Healthcare assistants—A total of 8,184 healthcare assistants worked in the facilities surveyed. The healthcare assistants' age-range differed from registered and enrolled nurses, with the majority (52%) being between 25 and 45 years of age; 36% being between 46 and 60 years of age, and 2% being 60 years and older. Nine percent were less than 25 years of age.

Other employees—12% of maintenance, kitchen, cleaning, laundry, and administration staff were aged 25 years and under. One-third (38%) of these staff were aged between 25 and 45 years. The majority of staff doing these jobs were aged between 46 and 60 years of age (42%), and 8% were 60 years of age and older.

Ethnic composition of staff

Enrolled and registered nurses—Of those facilities who provided information about ethnic composition of staff, 15% (n=70) had Maori enrolled and registered nurses on their staff. Nine percent of facilities employed Pacific nurses and 13% employed Asian (including Indian) nurses respectively.

Healthcare assistants—63% (n=295) of facilities employed Maori healthcare assistants. Even fewer facilities (n=198; 42%) employed Pacific healthcare assistants, and less than one-third (29%) employed Asian (including Indian) healthcare assistants.

Other employees—Non-clinical roles including administrators, maintenance workers, gardeners, cooks, cleaners, and activities performers (such as piano players) were also predominantly New Zealand European (Pakeha) employees. Thirty-five percent of facilities employed Maori, 16% percent of facilities employed Pacific people, and 15% employed Asians (including Indian) in these roles.

Table 4 shows how many facilities in each region employed ethnically diverse staff.

Table 4. Ethnic diversity of staff in long-term care facilities by region in New Zealand

Facilities by region			Ethnic composition of facilities staffed by one or more...									
			Maori employees		New Zealand European (Pakeha) employees		Pacific Islands employees		Asian (including Indian) employees		Other non-European employees	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Northland	24	(5)	20	(83)	24	(100)	5	(21)	7	(29)	3	(12)
Auckland	117	(27)	84	(72)	116	(99)	97	(83)	76	(65)	39	(33)
Waikato	30	(7)	29	(97)	30	(100)	12	(40)	13	(43)	5	(17)
Hawke's Bay	93	(21)	77	(84)	93	(100)	29	(32)	15	(16)	7	(75)
Wellington	47	(11)	36	(76)	47	(100)	25	(53)	20	(42)	8	(17)
Marlborough	14	(3)	9	(64)	14	(100)	4	(44)	1	(7)	0	(-)
West Coast	6	(1)	3	(50)	6	(100)	2	(33)	1	(16)	0	(-)
Canterbury	69	(16)	30	(44)	69	(100)	20	(29)	14	(20)	10	(30)
Otago	41	(9)	21	(54)	41	(100)	9	(22)	8	(19)	3	(73)
Total*	441	(100)	309	(70)	440	(100)	203	(46)	155	(35)	75	(17)

*Totals do not reconcile with the values above them due to missing values.

Language

Management was also asked about employees who spoke English as a second language. One-quarter (25%) of the respondents stated that they had employees who were speakers of Maori as a first language at the residence. Seventy-five percent of these respondents said that they had one or two Maori first-language speakers at their facility. Another 35% of respondents had employees who spoke a Pacific language (not specified), and nearly half (49%) of these facilities had at least 1 Pacific employee who spoke English as a second language. One-third (33%) of the 154 facilities with Asian (including Indian) employees had 1 or 2 workers who spoke English as a second language.

Work time

In response to question *How many of the staff work at the facility more than 20 hours per week?*, 53% of facilities who employed Maori had at least 1 Maori staff member who worked more than 20 hours per week. Forty-eight percent of respondents who employed Pacific staff said that 1 or 2 of their Pacific staff worked more than 20 hours per week, and 43% of those who employed Asian staff had at least 1 Asian (including Indian) employee working more than 20 hours a week.

Of the 194 long-term care facilities answering this question about New Zealand European (Pakeha) and overseas European staff working more than 20 hours per week, 52% had up to 13 staff working full time (over 20 hours per week).

Employers were asked about the length of time employees had worked at the facility. There was an even spread, with employees who had worked at the facility for less than 12 months totalling 22%, while 21% had worked at the facility between 1 and 2 years. Long-term employees (particularly those who had been working between 2 and 5 years) comprised 29% of the workforce; 28% having worked 5 years or more. Table 5 shows breakdown of length of employment.

Table 5. Length of employment of New Zealand long-term care facility employees

Length of employment	Employees in long-term care facilities	
	n	(%)
Under 12 months	3187	(22)
Between 1–2 years	3048	(21)
Between 2–5 years	4138	(29)
Over 5 years	4003	(28)
Total	14376	(100)

*Totals do not reconcile with the values above them due to missing values.

Discussion

Overview— This study adds to our understanding of the nature of the residents and workforce in long-term residential care facilities in New Zealand. Most facilities are small, housing mainly New Zealand European (Pakeha) residents and staffed by an older workforce. Staff turnover in these facilities was as high as 43% over 2 years. Profiles of residents over a decade ago were similar⁷ and, although the current study

was unable to describe disability levels, workforce information will form a baseline for future evaluations.

It is concerning that most facilities are currently small, as contemporary thinking suggests that larger facilities may be more financially viable. It is also interesting that such a small number of facilities were offering respite beds. The *Health of Older People Strategy*¹³ emphasises 'ageing in place' and support for informal caregiving. Respite is a vital part of caregiver support, and one would therefore hope for an increase in available beds in line with that policy.

There are currently very few ethnic minority elders in long-term residential care. The reasons for under-representation of ethnic minorities are complex and related to cultural concepts of elder care.¹⁴ As Maori, Pacific, and Asian populations are living longer, increased numbers of ethnically diverse older people will potentially require long-term care in the future.

The ethnic make-up of the workforce is currently more diverse than those housed in residential care. There is, however, considerable regional variation in the distribution of facilities employing ethnically diverse staff. At present, there appears to be at least one staff member of Maori or Pacific ethnicity available in facilities that house ethnic minority elders. However, whether these staff are available round the clock could not be established by this survey.

Other research suggests that intercultural care may create difficulties due to ethnic and cultural misunderstandings between carer and care recipient.^{14,15} This current study suggests that the most common mismatch is between ethnic minority workers and majority New Zealand European (Pakeha) elders. It is also interesting that elders from new immigrant groups are as frequently housed as Maori and Pacific residents. This diversity will add complexity to the workplace in the future.

The residential care workforce is ageing, with the majority of registered and enrolled nursing staff being over 45 years of age. The implications are that there may be shortages as this workforce retires. This will affect the trained staff first, so younger registered and enrolled nursing staff need to be encouraged into the residential care workforce.¹⁶

Availability of residential care staff is at critically low levels in the US, with reports of very high staff turnover. While acknowledging the difficulty of measuring staff turnover, one recent report from the US estimated that the average nursing assistant turnover rate is between 38% and 143% a year.¹⁶ High turnover rates compromise continuity of care for the older residents and continuity of carer is closely linked with quality of care.

The situation in New Zealand is not ideal, as we found that the staff turnover in responding facilities was 22% annually and greater continuity is desirable. In comparison to the US it seems New Zealand is relatively fortunate in maintaining a reasonably stable workforce to staff residential care.

Reasons for staff dissatisfaction with residential care work include low rates of pay, no involvement in care planning, and low job security.^{15,16} Moreover, some of these issues, along with conflict related to intercultural caring, have been identified in New Zealand.¹⁴

Redress of these issues may include a career structure for healthcare assistants within the industry associated with training, increased involvement with care planning for residents, increased involvement in therapeutic care for older residents, and flexibility of working times for workers with families. There are some moves towards these changes in the industry, however more work is needed. Current work supports this suggesting that residential care management style dictates levels of nursing staff turnover.¹⁶

The list used for sampling for this study was the most up-to-date possible (as it was a combination of a commercial list and the Ministry of Health list). It is possible, however, that newer homes were not included in the available information.

Limitations of this study—The low response rate to this survey means the results must be interpreted with caution. The composition of non-responding facilities is not known, although the regional distribution of non-responding facilities is similar to those who responded.

Ascertainment of ethnicity for this survey was left to the judgement of the clinical managers completing the survey instrument. In some instances, respondents reported they kept records of staff and resident ethnicity, but there was no systematic enquiry about the validity of the reported data about ethnicity, and self-reported ascertainment of ethnicity (from those reported on) was beyond the scope of this study.

Facilities were asked how many New Zealand registered nurses they employed. This question was the cause of some confusion due to the inconsistency of terms used to identify specific roles in elder care facilities. Enrolled nurses were in some cases placed under caregivers/care assistants/nurses, while other facilities placed enrolled nurses along with registered nurses.

The perceived lack of clearly defined roles in facilities has also arisen in other countries. This study follows the US's lead, where caution has been advised against positioning all 'nursing assistants' together in statistical analyses because of vast differences found in their skill bases.¹⁶

Future implications—The New Zealand population is undergoing a major demographic transformation. New Zealand's older population is expected to live longer, and in increasing numbers, over the next decades. It is estimated that, by 2024, for the first time in New Zealand history, the population of those over 65 years of age will be greater than the number of children aged 0–14 years.³ Indeed, the population aged 65 years and over totalled nearly half a million at the time of the 2001 Census, and will double over the next 50 years. Of those people, 12.5% will be 75 years of age and over, and it has been projected that those aged 85 years and older will quadruple in the next two decades.⁴ This will result in growth in the absolute number of older people requiring long-term residential care.

The New Zealand Government has identified older adults as a high priority group likely to become increasingly reliant on health, disability, and social services. The trend for long-term care facilities moving away from the public sector (and into the private sector) is likely to continue. However, our knowledge about the people who live and work in long-term care facilities in New Zealand is scant. What little we do know is based mainly on overseas ethnographies, particularly those in the US and UK.

This paper aimed to establish the characteristics of long-term care residents, and the people that care for them. Results from the study provide an overview about the people living and working in long-term residential care in New Zealand. However, ongoing research is necessary to follow population changes in residential care and better understand this evolving 'carer/care recipient' population for effective policy development and implementation.

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Quality of residential care for older people: does education for healthcare assistants make a difference?

Barbara Smith, Ngaire Kerse, Matthew Parsons

Abstract

Aim To determine the impact of a healthcare assistant education programme on the quality of care for older people living in a residential home in Auckland, New Zealand.

Method A pre- and post-intervention evaluation study was undertaken within a residential home for older people. Quality of care was established by two periods of non-participant time-sampling observation of residents, separated by a programme of 10 interactive teaching sessions for healthcare assistants. Informed consent was gained from all observed residents and staff.

Results Using the Quality Assessment Project (QAP) quality measure,¹ the non-participant time-sampling observation data identified a 12.5% increase in resident care that was considered appropriate and adequate (chi-squared=12.05)—and an 11.53% decrease in resident care that was considered inappropriate and inadequate (chi-squared=11.43). The intermediate grades did not alter significantly. Residents with low functional activity scores (Barthel Index) received better care after the education intervention (chi-squared=32.99), as did residents with moderate cognitive impairment (Abbreviated Mental Test Score [AMTS]<8/10).

Conclusion Healthcare assistant education can positively impact on the quality of care given to older people in residential care.

Currently it is estimated that 28,000 adults over the age of 65 years are in residential care in New Zealand.¹ In residential care, older people are primarily cared for by healthcare assistants (nurse aides, nurse assistants, caregivers)—less than 25% of whom have vocational qualifications,³ thus confirming the belief of Foner⁴ that healthcare assistants are essentially untrained personnel reliant on the employer to provide training and professional supervision.

Healthcare assistants work without the obligation imposed by registration or enrolment, without a professional code of ethics, and without professional codes of practice enforced in courts of law.⁵ It is also a low-income workforce, and a significant number in the Auckland region have English as a second language.³

Ministry of Health contracts allow everyday supervision of healthcare assistants to be provided by a licensee who may not be a health professional.⁶ The mandatory employment of a registered nurse for at least 8 hours a week does not guarantee that the healthcare assistants will have access to professional guidance and advice. Older people are in long-term residential care because they are increasingly dependent on others to meet basic needs, and often have a multisystem reduction in physiological capacity that makes them uniquely vulnerable to external stressors.⁷ Quality of care is largely dependent on healthcare assistants, as they provide the majority of care.⁸

Most healthcare assistants learn to care for these older people ‘on the job’ and develop their skills and knowledge from experience and observation of other healthcare assistants. To assist in the provision of competent and compassionate care for a very vulnerable group of older people, ample opportunity exists to provide educational programmes that assist healthcare assistants in obtaining necessary knowledge and skills. It can be disputed, however, that healthcare assistant education by itself is sufficient to improve the quality of care for older people in residential care.^{9,10} This study, therefore, evaluates an educational programme for healthcare assistants.

Methods

Design—The impact of an educational programme for healthcare assistants was established by assessing the quality of care before and after the education programme implementation.

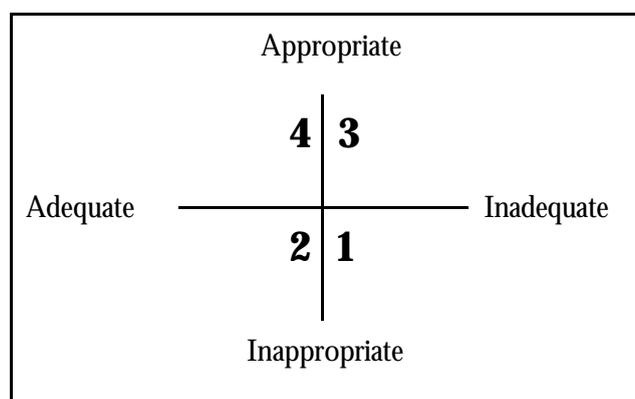
Study population—All residents and staff in one medium level dependency rest home in the Auckland area participated in the project. Residents in a rest home are at a variable level of dependency, invariably needing assistance with instrumental activities of daily living and some personal activities of daily living.

Written consent was obtained from all residents, all healthcare assistants, and other staff in the home. Ethics approval for this project was gained from the Auckland Ethics Committee.

Demographic data were obtained from the healthcare assistants and residents. The reduced item Barthel Index (BI)¹¹ and the Abbreviated Mental Test Score (AMTS)¹² were completed on each resident.

Quality assessment—Non-participant time-sampling observation was used for the data collection of the quality of care provided by healthcare assistants to residents. An independent gerontology nurse assessor observed six residents (and their care) at a time over 4-hour time periods. The assessor rated the care given to each resident as either *appropriate and adequate*; *appropriate and inadequate*; *not appropriate but adequate*; or *inappropriate and inadequate* using the Quality Assessment Project (QAP) scoring system developed by Norman and Redfern.¹ Numbers of each type of care were totalled and expressed as a percentage of total care observed.

Figure 1. The Quality Assessment Project (QAP) scoring system



Cell 1 is inappropriate and inadequate care—e.g. hot fluids left for a resident out of reach, the fluids slowly grow cold, and then removed with out the resident having drunk anything. Cell 2 is inappropriate and adequate care, Cell 3 is appropriate and inadequate care, and Cell 4 is appropriate and adequate care (e.g. a resident was served a hot meal, the healthcare assistant cut up the food and helped the resident eat the food, and chatting to them throughout the meal

The observer also took contemporaneous longhand recordings to describe the activities being observed. This method of observation identified care that was given and also care that was omitted. Each activity was later coded as one of 11 activities of daily living. The observer interspersed the observations with periods of event-sampling¹³ that provided narrative examples of observed interactions with the

residents. This combination of methods was used at baseline and on completion of the educational programme.

Sample size—Thirty residents (in groups of six per session) were observed every 6 minutes for 1 minute over ten 4-hour periods. It was estimated that this would generate sufficient observations to detect a relevant change in the distribution of scores observed before and after the intervention period (alpha 80%, $p < 0.05$).

The educational programme—The content of the teaching sessions was based on the Activities of Daily Living (ADLs)¹⁴ for residents, but was significantly influenced by the wishes of the healthcare assistants to know more about the everyday challenges faced by the residents in their care.

Case studies of residents were used to enable healthcare assistants to relate their knowledge of the resident to the explanation of the particular needs of that resident. Experiential teaching techniques enabled the healthcare assistants to experience (in some degree) the difficulties that frail residents faced, and to identify the care practices that could be used to ameliorate those difficulties.¹⁵

Visual tools such as photographs of various situations¹⁶ and story telling¹⁷ became the bases for discussion. The emphasis was on doing, experiencing, discussing, and team problem-solving—rather than didactic teaching. The healthcare assistant programme was delivered in ten 1-hour sessions. Focus groups were used to inform the development of the education sessions.

The topics for each session were:

- The grief, loss, and adaptation an older person may experience when entering residential care.
- Keeping a safe environment for residents and staff, including infection control.
- Helping a person to recover independence after a cerebrovascular accident (CVA).
- Caring for a person who has a dementia.
- Working with a person who has difficulty breathing.
- Eating and drinking. The social activity of the day.
- Keep my dignity and independence—Helping a resident manage continence, washing, and dressing.
- Caring for a person with compromised mobility—A resident who had Parkinson's disease.
- Hearing disability—What are you saying?
- Falls and injury prevention—Summary of course.

A strict sequence was observed to ensure that each part of the study was discrete and completed before the next phase started.

The sequence of the course was:

- Non-participant time-sampling observation of 39 residents over 1 week (pre-test),
- First focus group with healthcare assistants,
- Education programme of ten 1-hour teaching sessions over 5 weeks, followed by further observation, and the
- Study concluded with a second focus group to gather participant feedback about the education programme.

Analysis—The distribution of pre-education programme QAP scores was described and then compared with the post-programme scores distribution using the chi-squared test. QAPs were also correlated with the BI and AMTS to identify characteristics that may influence the quality of care

Results

All healthcare assistants, exclusive of the night staff and 39 of 41 residents participated in the study. The profiles of the healthcare assistants are shown in Table 1, and that of the residents in Table 2.

Table 1. Demographic characteristics of the 15 healthcare assistants who participated in the study

Age	Number
25–35 years	4
36–55 years	11
Female	15
Have dependent children at home	6
Years worked in this facility	
1–3 years	6
4–7 years	9
Vocational training	
Training in health-related work	3
Formal healthcare assistant training	3
Number of hours employed per week	
35–40 hours	4
15–34 hours	11
Ethnicity	
New Zealand European	6
New Zealand Maori	2
Pacific Islands	5
Philippines	1
British	1
English is my second language	6
Employment	
Primary employment	9
Worked as adjunct to another job	6
Worked extra shifts as required	4

The 15 healthcare assistant staff made up 7.2 full-time equivalent (FTE) positions. All of them were invited to join the programme of 10 teaching sessions but only the four full-time staff members consistently attended the 10 sessions. Two of the remaining staff members attended two sessions only. Two of the attendees worked as team leaders. All healthcare assistants attended the two focus groups.

Table 2. Demographic profile of the 39 residents who participated in the study

Characteristics	Male=9.2% (n=4)	Female=90.78% (n=35)
Place of birth		
New Zealand	2	24
England	2	9
Falkland Islands	0	1
Europe	0	1
Age range (years)	68–98	80–99
Support needs level		
Low dependency	2	4
Medium dependency	1	26
High dependency	1	5
First language	4=English	34=English / 1=Dutch
Marital status		
Widowed	3	33
Single	1	2
Barthel Index / Mean	12/20	15/20
AMTS / Mean	8.33/10	7.79/10
	1 man was admitted for short-term care	3 women died and 1 woman was transferred to a private hospital

AMTS=Abbreviated Mental Test Score.

QAP scores before and after the education programme are shown in Table 3.

Appropriate and adequate care observed after the educational programme was more frequent than before (chi-squared=11.426, p=0.001). Inadequate and inappropriate care was less frequent after the intervention (chi-squared=12.05, p=0.0005). (See Table 3.)

Table 3. Changes in quality scores before (Pre) and after (Post) an educational programme

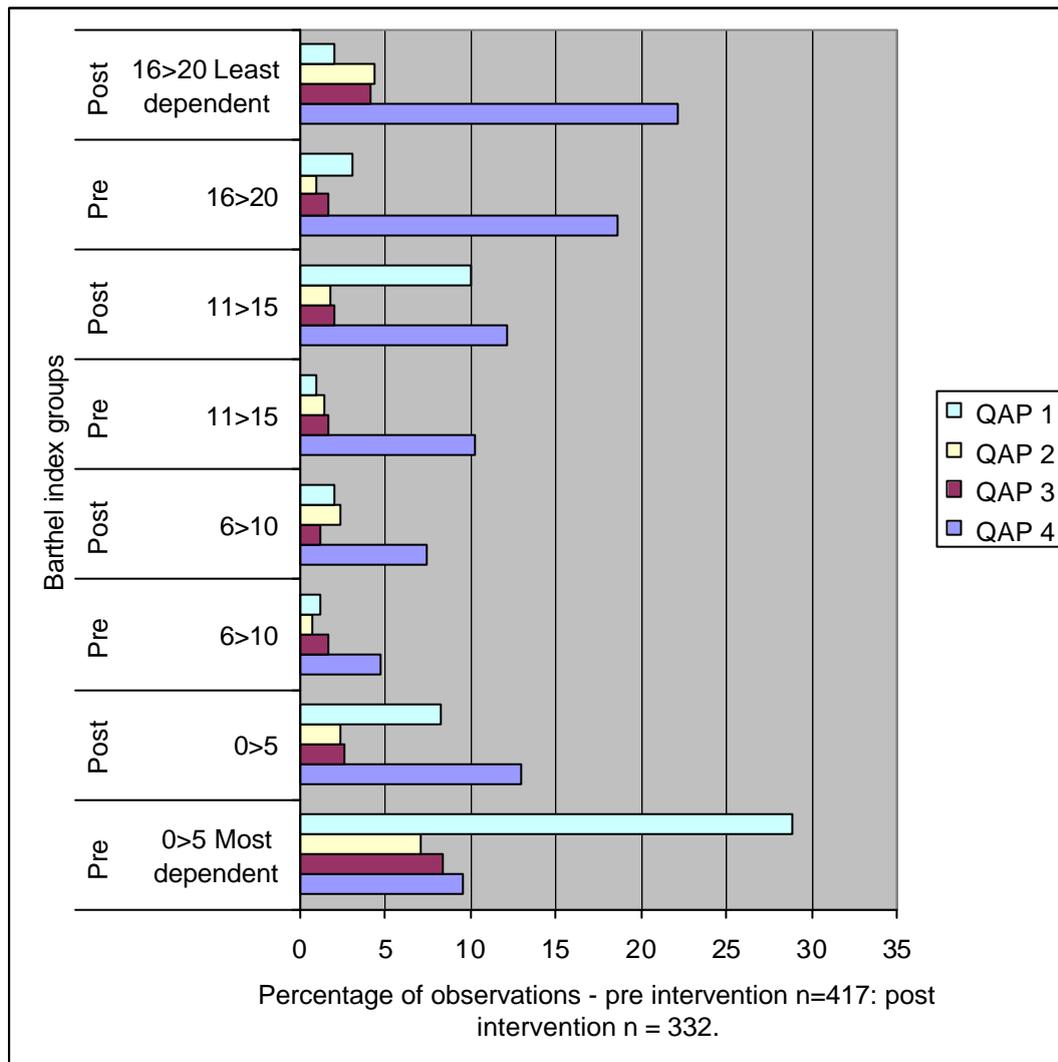
Period	Quality Assessment Project (QAP) Scores	Number of observations (Pre=417; Post=332)	Chi-squared value	P value
Pre Post	QAP 1 (inadequate and inappropriate care)	142/417 76/332	11.43	0.0007
Pre Post	QAP 2 (inappropriate and adequate care)	36/417 37/332	1.26	0.3
Pre Post	QAP 3 (appropriate and inadequate care.)	56/417 34/332	1.85	0.2
Pre Post	QAP 4 (appropriate and adequate care)	185/417 191/332	12.05	0.0005

QAP1=inadequate and inappropriate, QAP2=inappropriate and adequate, QAP3=appropriate and inadequate, QAP4=appropriate and adequate.

Subgroup analyses by disability and cognitive level—The study also sought to examine whether or not the functional dependency of the resident influenced the care that they received. Those with a BI score below 5/20 received 21% improvement in

the incidence of appropriate and adequate care after the education programme (chi-squared=32.99, $p \leq 0.001$). A 20% reduction in inadequate and inappropriate care for this group of residents was also observed. This indicated that the most functionally dependent residents received the greatest improvement in quality of care.

Figure 2. Reduced-item Barthel Index (BI) assessment of residents related to their Quality Assessment Project (QAP) scores

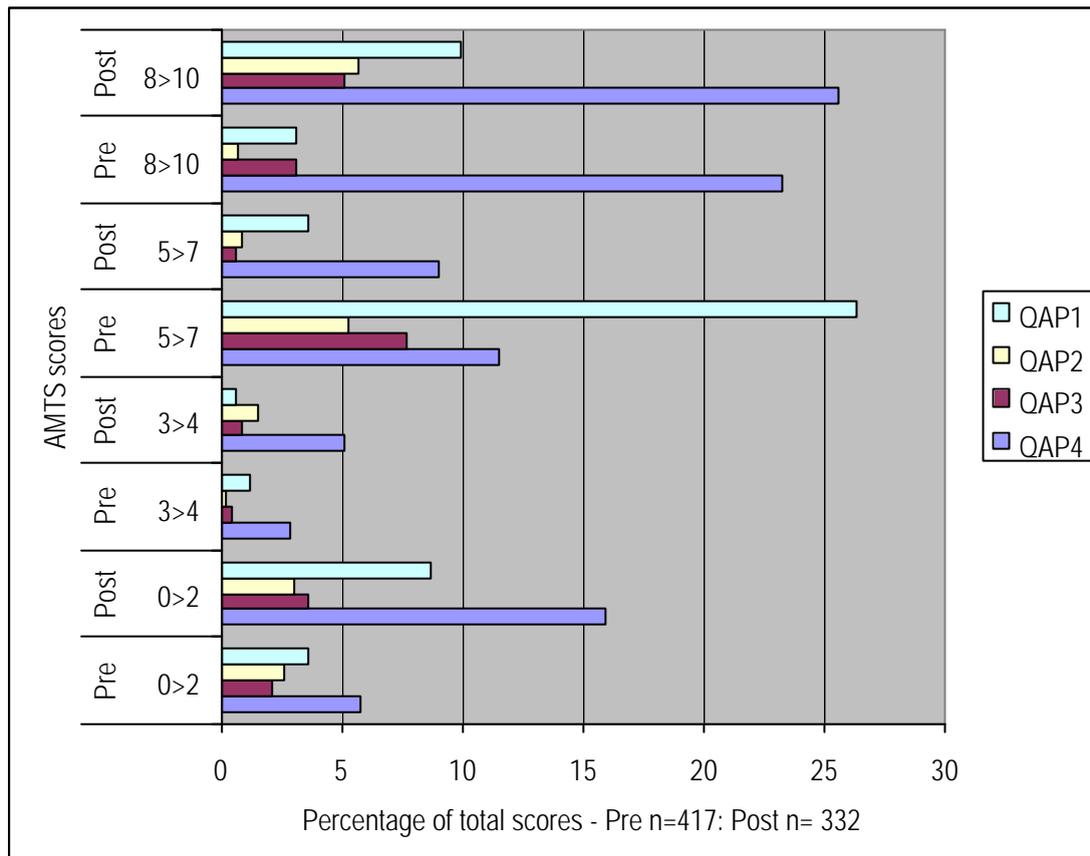


QAP1=inadequate and inappropriate, QAP2=inappropriate and adequate, QAP3=appropriate and inadequate, QAP4=appropriate and adequate; Pre=before education programme (intervention), Post=after education programme (intervention).

The other resident activities that showed significant improvement in quality of care were those of the residents who were scored as the most independent (chi-squared=10.198, $p=0.017$). For residents in the other Barthel groups, there was minimal change from pre- to post-intervention.

A previous study suggested that healthcare staff are much more likely to interact with residents who are deemed to be only moderately confused.¹⁸ To test this hypothesis, the resident AMTS scores for the testing of cognitive function were correlated with, the QAP scores before and after the education programme. Although there is no recognised consensus for the interpretation of the scores, it is generally believed that a score of less than 8 out of 10 suggests significant cognitive impairment.¹²

Figure.3. Abbreviated Mental Test Scores (AMTS) of residents related to Quality Assessment Project (QAP) scores



QAP1=inadequate and inappropriate, QAP2=inappropriate and adequate, QAP3=appropriate and inadequate, QAP4=appropriate and adequate.

Figure 3 shows a non-statistically significant trend for those residents with an AMTS score of two and under, towards an improvement in appropriate and adequate care, and a five percent increase in inappropriate and inadequate care (chi-squared=3.712, $p \geq 3.5$). For those residents with an AMTS of 5–7 there was a 22.75% decrease in those activities assessed as inappropriate and inadequate in the post intervention observations compared to the pre intervention observations (chi-squared=31.42, $p \leq 0.001$). In the group of residents most cognitively able, (AMTS 8–10), there was an increase in inappropriate and inadequate care scores (chi-squared=19.047, $p \leq 0.001$).

Resident interactions with staff—Resident interactions with healthcare assistant comprised the majority of staff-resident interactions. Registered and enrolled nursing staff interactions with residents were rare.

Discussion

Following completion of the education programme, there was significant increase in the proportion of care that was judged appropriate and adequate provided by healthcare assistants to residents than before (chi-squared=11.426, p=0.001). There was similarly a decrease in inappropriate and inadequate care after the programme (chi-squared=12.05, p=0.0005).

Ovreteveit¹⁹ defined quality as a service that gives people what they need as well as what they want, and to do so at the lowest possible cost. Safe, appropriate, intelligent and individualised care is possible in residential care facilities for older people with ongoing staff education and support. Such care can bring much comfort to older people in the latter years of their lives and to their families. Other studies that have evaluated programmes in residential care have also shown some impact on outcomes.^{20,21} These programmes were specifically designed to alter particular facets of care.

The fact that more dependent residents received the most change in care scores was interesting, as high resident dependency is believed to be negatively correlated with the quality of care.²² This shows that, even in the most difficult situations, there is potential for improved care.

In this study there was little input into resident care from the registered nursing staff. The paucity of qualified nursing staff interactions with the residents was surprising and not totally explained by the Hawthorne effect of behaviour changing when being observed. Most of the nurses' time seemed to be absorbed by talking with family, writing reports, working with the visiting medical officer, and dispensing medications. The presence of the observer did not appear to obviously influence the quality of care provided by the healthcare assistants, although this was difficult to quantify.

There were obvious limitations to this study. There was a small sample size of both residents and healthcare assistants. Two methods were used (i.e. non-participant time-sampling was interspersed with event sampling) but the observer used the mix in both pre- and post-periods of observation. There was a lack of consistency on the observation of the residents' activities. For instance, some residents who were observed with great frequency in the first observational period were not observed with the same frequency in the second period.

Not all the consenting residents were observed; only 82% being observed (not the 95% that was sought). The difficulties that the observer experienced were in part due to the long periods of resident inactivity. Another difficulty was that the residents were relatively mobile, while the observer (by necessity) remained relatively immobile.

The assessor was also not blinded, as she knew that there had been a programme in place in the rest home. Nevertheless valuable information was gained through the observation about the quality of residents' care. The contemporaneous long-hand

recording supporting the quality scoring, thus provided valuable information about the care that the residents actually received.

The attendees at the 10 teaching sessions were self-selected and very enthusiastic. All the education sessions related in some way to the people in the rest home. The teaching was experiential and highly interactive rather than didactic. Perhaps the key to improving quality of care is to target healthcare assistants who have the will and aptitude to benefit from the further education recognised by the New Zealand Qualifications Authority, and then enable them to work as team leaders and resource people, reflecting their better education and responsibilities in a graded pay structure.

It is not clear which part of the intervention was the most effective. Whilst it is likely that the staff delivered more appropriate care as a result of the increased understanding of gerontological issues through the education, it is also possible that the presence of the observer was also an influence in itself. Perhaps as Sheridan¹⁰ suggests, the presence of a registered nurse observer on the floor was necessary to improve quality.

The teaching of the healthcare assistants improved the quality of care in the short term, but whether this improvement was sustained is not known. The quality of residential care has many facets. From the residents point of view the primary determinant of quality is considered to be staff attitude²³—not only what care is delivered but how it is delivered.

For healthcare assistants, the recognition by other staff and management that they are doing a valuable job well, and that they are valued as staff and individual, are considered recognition of their worth.⁵ From a management perspective, however, a financially viable residential care facility that continues to attract residents and maintain high occupancy rates are indicative of success.

Currently, two agencies provide caregiver education distance-learning packages, but this is a cost incurred either to the employer or to the healthcare assistant. Similarly, some institutions provide healthcare assistant training at a cost to the learner.

Hence there is no dedicated government funding for the education of healthcare assistants who work in residential care, but there is a requirement that all healthcare assistants who work in dementia care have appropriate training.

Conclusion

This study showed that quality of care, as judged by an expert gerontological nurse using standardised observational techniques, was improved after an educational programme for healthcare assistants. This is one of the few healthcare assistants programmes formally evaluated to show such improvements in quality of care. Its findings show that there is potential to improve care in residential care, and healthcare assistant education programmes need to be disseminated throughout New Zealand. The effectiveness of the programmes currently in place also need to be evaluated.

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An evaluation of two respite models for older people and their informal caregivers

Anna King, Matthew Parsons

Abstract

Aim To evaluate two case-management models of respite relief care at Waitemata District Health Board.

Method The evaluation consisted of semi-structured interviews and postal surveys for clients utilising respite care and staff members involved in both the North/West and Rodney models of respite care in Auckland, New Zealand. Across the two regions, a total of 2 older people and their informal caregivers, 2 respite coordinators, and the Needs Assessment Service Coordination (NASC) Manager were interviewed. In addition, postal surveys were received from 21 older people, 36 informal caregivers, 11 NASC workers, and 3 allied health professionals.

Results Findings revealed there was generally high satisfaction with both the respite models. Caregivers believed the respite service did give them a break, although it was insufficient. Caregivers reported concerns regarding how respite facilities could improve and the older person's deterioration post respite. Staff identified improvements for each of the models.

Conclusions The respite models are flexible and provide control in decision-making for informal caregivers leading to an increase in choice for home-based respite. Case-managers need to form strong partnerships with caregivers to ensure that the needs of both the informal caregiver and older person are met. Short-term placement in residential respite facilities for respite care may be linked to worsening functional ability of the older person.

New Zealand's population is continuing to age, and therefore the demand for and cost of health and disability services is increasing.^{1,2} *Ageing in place* (the concept of supporting an older person to remain living in their own home until they die; reliant on adequate home care, caregiver support, and appropriate housing) allows the older person to remain in their home despite their health care needs increasing³ and literature reveals that many older people prefer to live at home for as long as possible, which is beneficial in a variety of ways.³⁻⁵ *Ageing in place* is strongly associated with participation, independence, and wellness—and is thought to be less expensive than long-term residential care.^{5,6}

An informal caregiver is usually a family member or a friend who is unpaid and offers a wide range of assistance to an older person.^{2,7,8} In contrast, a support worker is defined as a paid nursing assistant trained to provide coherent support for patient rehabilitation whose two major functions can be defined as the 'enabling' and 'assisting' role. *Enabling* encompasses housekeeping and administrative tasks, while *assisting* relates to technical tasks.^{9,10}

Despite the benefits of *ageing in place*, research shows that informal caregivers experience considerable stress, which affects the health and quality of life of the older person.^{11,12} Therefore, respite care has been developed and is defined as a service or services which provide temporary provision of care for the older person living at home, allowing the primary informal caregiver relief and rest from their caregiving responsibilities.^{11,12} These services can be provided in different settings (such as nursing homes, the home, or day care centres) and range from a few hours to a few weeks, either on a regular or irregular basis.^{13,14} The older people who utilise respite services are often frail, dependent, and have high needs. Consequently, respite care aims to alleviate the burden and stress experienced by the informal caregiver.^{13,14} Respite services can lead to increased caregiver satisfaction, the ability to provide higher quality of care with increased confidence, and an improved understanding of the caregiver role.¹⁴

In New Zealand, the health and disability support services currently have gaps, overlaps, and inconsistencies, which results in inefficiency and confusion for older people and caregivers trying to utilise service options.² In addition, even if accessible services are available for older people living at home, there can still be duplication and gaps without appropriate coordination.⁵ Therefore, case-management has been developed as it aids older people to identify and utilise the health and disability support services available to them while promoting ageing in place.^{3,5}

For the past 15 years, the respite care programme at Waitemata District Health Board (DHB) has remained unchanged, with respite care and Needs Assessment and Service Coordination (NASC) operating as distinct services. This led to fragmentation for the client and caregiver as they had two separate service coordinators. Therefore, two case-management models have been developed which aim to improve the delivery of respite care services by having one person involved with coordination of all support services (for both the client and caregiver).

Previously, the respite service had little flexibility—as older people and caregivers were allocated a set block of respite every few weeks or months. When a ‘maximum rotation’ of 2 weeks in care every 6 weeks was no longer adequate, permanent rest home or private hospital care was considered. However, with the introduction of the two new respite models, the caregiver and older person can use their allocated respite funding as they choose—as the choice of home-based respite, the use of a respite facility, an increase in support services, or a combination of all three.

The first model has been implemented in the North and West region of the Waitemata DHB area. When high-needs clients and their caregivers require relief care (*relief care* is defined as over 50 days a year of carer support [respite funding over \$70 per week]), the client’s current Needs Assessment Service Coordination (NASC) worker refers them to a respite coordinator who manages their care.

The second model has been implemented in the Rodney region of the Waitemata DHB area. For this model, clients who require relief care will have their NASC Manager coordinate their support and care. The respite coordinator will have a caseload of intensive service coordination (ISC) clients, with the additional role of budget management for respite clients.

These two models were trialled for 12 months over 2002 and 2003. The aim of this research study was to evaluate the two respite models of relief care for clients and

their unpaid caregivers in the Waitemata DHB area. The balanced scorecard approach was used to ensure multiple groups and perspectives were assessed enabling a comprehensive evaluation.¹⁵

Five research questions were devised using the balanced scorecard framework:

- How do older people and informal caregivers view the respite models of relief care?
- How do the respite models of relief care look to funders?
- How can the respite models of relief care continue to improve?
- What must the respite models of relief care excel at?
- How do the respite models of relief care impact on the health status of older people and informal caregivers?

Methods

Participants

Evaluation—The evaluation consisted of semi-structured interviews and postal surveys directed to clients (utilising respite care) and staff members involved in both the North/West and Rodney models. Two older people and their unpaid caregivers (one from each region), two respite coordinators (one from each region), and the NASC Manager for Waitemata DHB were included in the interviews.

Several older people utilising the respite services are in poor health and often unable to communicate effectively. Therefore, the respite coordinator (for each model) identified an appropriate older person and carer who consented to being interviewed. The allied health professionals surveyed included nurses and occupational therapists from North Shore Hospital and Waitakere Hospital who may have been involved with respite care.

Inclusion criteria—All older people (65 years and over) and their full-time unpaid caregivers who received respite care services from the Waitemata DHB. These participants had already met the NASC eligibility criteria. The cost of their caregiver relief was above NZ\$70.00 per week (50 days per year of carer support). All staff that had some involvement in assessing, case-managing, or providing respite care for the older person meeting the above criteria.

Exclusion criteria—Older people or caregivers who had (or were recently recovering from) a serious mental or physical illness or injury.

Interviews and postal surveys

The semi-structured interviews were audio taped, and lasted approximately 20 minutes. Interviews for older people and their caregivers were conducted in the participant's home. Other interviews were conducted in a private room at the participants' workplaces. After analysing the interviews (using a general inductive approach), relevant themes or categories were identified. From this data, postal surveys were then developed. The surveys consisted of approximately 10 questions using a five-point Likert scale (Strongly Disagree to Strongly Agree), with space for comments at the end.

Evaluation tool

The evaluation tool used for this study was the balanced scorecard developed by Leggat and Leatt.¹⁵ This scorecard is based on five key perspectives: customer, financial, innovation and learning, internal business, and community. Use of this framework ensured that multiple groups and perspectives were considered in the evaluation.

Ethical approval

Ethical approval was sought and approved by the Auckland Regional Ethics Committee, New Zealand. Approval was also sought and approved by the Waitemata DHB and the Maori Research Advisory group. All participants were sent an information sheet providing information regarding the study and a

consent form. All participants were ensured confidentiality and informed they could withdraw at any stage without having their care or employment compromised.

Results

This study displayed small sample sizes and low response rates for postal surveys, therefore only descriptive analysis was undertaken and no firm conclusions can be drawn from the results. There was a 100% response rate for all interviews. Across the two regions (North/West and Rodney), postal surveys were received from 21 older people (21.2% response rate), 36 informal caregivers (36.4% response rate), 11 NASC workers (50% response rate), and 3 allied health professionals (9.7% response rate).

The interview and survey findings of the older people and caregivers showed that a high percentage (94%) were satisfied with both of the respite models. Specifically, older people and caregivers (89%) felt satisfied with the availability, accessibility, and amount of contact they received from their case-manager (respite coordinator or NASC worker).

Several respondents wrote that the previous respite model was not flexible, and did not provide control in decision-making—as the older person and caregiver were told when and how they would receive respite (usually in a respite facility). However, older people and caregivers reported that the current respite services were flexible (87%) to meet their needs and they had more control in decision-making (79%).

Caregivers from the two respite models reported that, although they did receive a break, it was insufficient. One caregiver stated the *respite gave them a break 'physically' but not 'mentally'*.

Both interview and survey findings revealed that numerous older people and caregivers misinterpreted the respite service as the respite facility where the older person received respite. Consequently, many respondents (75% from interviews, 39% from surveys) identified improvements for the respite facility, rather than the respite service. In addition, caregivers made comments that the older person's condition deteriorated after staying at the respite facility and they did not believe it promoted independence. Survey comments from older people and caregivers in the North/West model identified the need for continuity of support workers with home-based respite.

Interviews with the NASC Manager and respite coordinators revealed there was high satisfaction with both respite models. Interviewees identified the following areas of excellence for the two models: Ageing in place, flexibility, client-centred, cost-effective, and case-management. In general, staff believed that the respite services do provide caregivers with a break to help alleviate their stress.

Both respite coordinators reported high job satisfaction, although they agreed it could be stressful at times. The NASC Manager and respite coordinators believed both respite services improved the health status of the older person and the caregivers.

Improvements were identified for both the respite models. In the North/West model, it was felt that there was a lack of back-up on a personal and professional level. It was suggested that two respite coordinators in the North region and two in the West region would be an improvement (at the time of this evaluation there was one coordinator in each of these areas). In the Rodney region, issues were raised regarding extra stress,

time, overlap, and resources spent on the NASC workers who had to learn the respite coordinator role. It was suggested that the NASC workers would benefit from an initial training programme, if the Rodney model were to be adopted.

NASC survey results found that NASC workers (38%) from both models reported allied health professionals require increased awareness about the respite service. Some NASC workers (25%) from the North/West region identified the requirement for extra staff to be trained in the respite coordinator role. A few NASC workers (25%) from the Rodney region stated that NASC workers should receive training for the respite coordinator role.

The Support Package Allocation (SPA) band is used to determine the amount of funding the respite coordinator can access to purchase services for the older person and their caregiver. The majority of older people having respite care are placed in the 'High' or 'Very High' SPA band category. For each individual area (i.e. Rodney, North, and West) the maximum SPA for clients is \$360 and \$600 per week for the 'High' and 'Very High' SPA band category, respectively. Financial findings revealed that the average actual expenditure of the SPA band, for older people in 'High' and 'Very High' categories combined, is 63% for the North/West model and 64% for the Rodney model, per week respectively

Since implementing the two new models of respite relief in 2002, the volume of older people receiving home-based respite has increased from less than 1% to 50% at the time of this evaluation. Although staff members reported their job as being stressful at times there still appeared to be high job satisfaction. At the time of this evaluation there was no staff turnover in respite care.

Discussion

This section will discuss the results of this study in relation to the five research questions. Interestingly, results revealed that the two models were similar in several aspects and therefore it may appear they have not been compared. However, when differences were noted between the two respite models this has been stated. In addition, results showed that clients found both the new models more flexible than the previous "old" model. Although this was not a direct comparison between the two new models, it was still a significant finding to be included in the discussion.

How do older people and informal caregivers view the respite models of relief care?—Older people and caregivers reported high levels of satisfaction with various aspects of both models, such as increased flexibility and control in decision-making about how they used their allocated respite funding. Flexible service delivery is vital as it allows for client needs to be met.⁵ Control in decision-making is significant—as a recent study revealed control over daily living is rated highly as an important need to be met for older people.¹⁶ Interestingly, since changing the respite models of relief care to enable the caregiver to have more control in decision-making, the amount of older people receiving home-based respite has dramatically increased.

Informal caregivers appear to find their respite relief insufficient and still report stress, despite support from the respite services. This may have been related to comments made that the older person's condition deteriorated once they returned from the respite facility. This could place increased stress on the caregiver, particularly once the older person returns from respite. Research overseas has shown

respite services can increase caregiver stress due to the quality of care and deterioration of the older person post respite.^{17,18} The issue of effectively meeting informal caregivers' needs and completely alleviating their stress requires further exploration. In addition, a strong partnership between case managers and informal caregivers should be developed to adequately meet their needs and alleviate stress.

When the North/West model was initiated, there were concerns regarding discontinuity—as coordination of care shifted from the NASC to the respite coordinator at a time when the client may be feeling particularly fragile and vulnerable. However, it was found that both clients and staff reported no problems when this shift in coordination of care occurred—possibly due to the successful teamwork of both the NASC and respite coordinator. Staff are aware of this potential problem and therefore work in effective collaboration to prepare each other and the client for this change.

How do the models of relief care look to funders?—For clients in the 'High' and 'Very High' SPA band categories the average actual expenditure for both the North/West and Rodney models was below the top range of the SPA band the older person was in. This means that the funders were spending less than the top range available on clients utilising respite care services.

In addition, there was little difference between the two models in terms of financial spending, as both spent very similar percentages of their SPA band. Although the actual expenditure was calculated by including expenses (such as personal care, household assistance, and caregiver support), the non-financial costs to the caregiver did not appear to be included. For example, these costs may include stress and isolation.⁸

How can the respite models of relief care continue to improve?—Comments about how the respite facilities could improve often related to the individual needs of the older person, and several caregivers appeared to be concerned with the care the older person received during their time at the respite facility. Research has shown that caregivers have found use of respite services stressful, as they are concerned about poor facilities and what happens to the older person while in care.^{17,19} This area needs further exploration as it would not only be of benefit to the older person and the care they receive, but may also help relieve added stress experienced by the caregiver.

Furthermore, in addition to forming a strong partnership, case managers should expand their role into the community and monitor the older person's care closely when they are at a respite facility.

The strengths and weaknesses of home-based respite are often debated.³ The benefits of home-based respite include the older person remaining in their own home, which is preferred as they feel independence and quality of life can be maintained.³ Furthermore, moving to different settings results in mental and physical deterioration for the frail older person.³

In addition, previous research and findings from this study have shown that many caregivers find using respite facilities distressing due to concerns including quality of care and the impact that other unwell people (using the same facility) has on the older person.^{17,18} This study, however, revealed that discontinuity of support workers is a drawback for using home-based respite. Caregivers often feel the support worker does

not understand the complexities involved with caring for the older person.^{17,18} and discontinuity compounds this concern.

For the support worker to truly engage and develop meaningful relationships with the older person over time, continuity of care is critical.²⁰ In addition, continuity of care is strongly associated with high satisfaction levels for older people and informal caregivers who utilise outpatient services.²¹ Moreover, to make home-based respite a more appealing option, case-managers need to facilitate the issues and ensure the caregiver and older person are satisfied with the care they receive at home.

Implementing changes to the two models, as suggested by staff, could prove effective long term, although further resource and cost would be required to employ extra staff and run a new programme.

At what must the respite models of relief care excel?—Staff members identified the same areas of excellence that both models achieved. In light of the evidence, these are all important areas that the models of respite care should be achieving.

In general, there appeared to be high job satisfaction for respite coordinators and NASC workers, although both of the respite coordinators who were interviewed agreed their job could be stressful at times. In addition, there was no turnover for respite staff since implementing the new models of respite care to the time of this evaluation.

How do the respite models of relief care impact on the health status of older people and informal caregivers?—Staff from both models believed that, if an older person's health deteriorated, appropriate referrals were made as part of the ongoing intensive service coordination function and the respite services provided informal caregivers with a break—thus reducing their stress, which had a positive impact on their health. Furthermore, research has shown that the health of the caregiver directly affects the health of the older person.¹² Therefore, by relieving the caregiver's stress and improving their health, the older person may benefit too.

A few informal caregivers felt the older person's condition deteriorated once returning from the respite facility. This does not relate to the respite models but reflects more on the individual respite facility, however it is an important point to mention. International research has shown that the older person can experience difficulties after the respite period due to factors such as the quality of care and poor facilities.^{17,18} This situation could worsen the health status of the caregiver as they experience increased stress.^{17,18} As previously mentioned, case managers should ensure that the older person is having their needs met at the respite facility, which assists in reducing caregiver stress.

This study was limited by small samples sizes and low response rates. As many older people who receive respite services have poor health and are highly dependent, it was expected there would be a low response rate from these participants. The reason for a low response rate from caregivers is unknown. This could have been related to many informal caregivers being stressed or burnt out and therefore reluctant to participate in the research. In particular, there was a very low response rate for allied health professionals.

The time constraints and short turn-around to wait for survey returns may have contributed to the low response rates, although it may have been avoided if follow-up

phone calls had been undertaken. Nevertheless, the results of this study are still important, and may give guidance for future respite care programmes and further research in this area.

In conclusion, several strengths and weaknesses were identified in the two models of respite relief care. Flexibility within the respite models of care, allows the caregiver more control over decision-making about the support services they receive. Continuity of support workers for home-based respite could make this option more appealing. Placement in respite facilities may be linked to the older person's condition deteriorating. Lastly, case managers need to form strong partnerships with caregivers to ensure that the needs of both the informal caregiver and older person are met.

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New Zealand's psychiatry of old age services. Revisiting 'the view from the bottom of the cliff'—have we made any progress since 1998?

Pamela Melding

Abstract

Aim In 1998, the New Zealand Branch of the Faculty of Psychiatry of Old Age (FPOA) surveyed psychiatry of old age (POA) services in New Zealand for their resource levels. At that time, they were low by international and Mental Health Commission 'Blueprint' levels. In 2003, POA services in New Zealand were resurveyed to determine how much progress had been made in the ensuing 5 years.

Method All POA services in New Zealand who had Faculty members were surveyed for information on their service's administrative structure; access to acute, long stay and day hospital places; staffing levels of the different disciplines; the range of services they provided, and what they considered were strengths, gaps and potential improvements.

Results Thirteen services responded, providing services for 387,000 elderly people. Since 1998, acute bed numbers and day hospital places had proportionately decreased nationwide, with disparity of access across the country. Inpatient nursing staff had decreased by 34%, with community nurse numbers barely increasing. There were modest increases in the number of psychiatrists, junior doctors, clinical psychologists, and social workers.

Conclusions There has been little progress towards achieving 'Mental Health Commission Blueprint' benchmark levels of service of 1998, and nationally there has been a decrease in access to acute beds, without a concomitant increase in staff to support older people in community settings.

In 1998, there was much confusion about the status of old age psychiatry services in New Zealand. A major difficulty for administrators was a lack of knowledge about resource levels and the range of patient problems treated by psychiatry of old age (POA) services. Provider contracts were based on incorrect assumptions, such as the notion that POA services did not treat patients with dementia.

In 1998, the Mental Health Commission published the *Blueprint for Mental Health Services in New Zealand; how things need to be*¹ and *The funding needed for Mental Health Services In New Zealand*.² However, the Commission had inadequate data on which to base its recommendations.³ The authors of the Blueprint erroneously assumed that old age psychiatry services did not treat organic or age-related disorders and excluded services given to this group from their assessment of benchmark levels for service provision.

The Commission suggested a national guideline of 4 acute specialised inpatient beds per 100,000 total population¹ (p101), plus 1.3 beds per 100,000 in general psychiatry

units (p100) as an appropriate service level for assessment and treatment of *functional* mental disorders in older people.

However, as many old-age psychiatrists were treating patients with dementia in their inpatient and community services, they felt that provider contracts and benchmark levels that excluded age-related disorders were incongruous with their case-mix of patients. The Commission's estimates for day ward places and community staff were more pertinent.

To assist administrators gaining a clearer picture of the work of the specialty, the New Zealand Branch of the Faculty of Psychiatry of Old Age (FPOA) of the Royal Australian and New Zealand College of Psychiatrists (RANZCP) surveyed its New Zealand members.

During a 1-month period in September 1998, respondents were asked to record diagnoses, acuity, and medical comorbidity for every patient seen (inpatient, outpatient and community). Managers were asked to provide bed numbers, day places, and personnel resources available for their catchment's case-mix.³ Thirteen services responded, who provided service delivery for 70% of New Zealand's older population.

The survey demonstrated that all services dealt with a wide variety of psychiatric problems. Twenty-six percent of all patients seen in the survey month had an age-related organic brain disorder, such as dementia, as the main diagnosis. Inpatient units had a greater predominance of patients with age-related brain disorders (mean 36.07%; median 33.3%; range 18–87.5%).

Up to half of all patients had some degree of cognitive impairment *in addition* to other psychiatric diagnoses. Considerable comorbidity between psychiatric illness and other medical conditions was present in many patients.³ The survey indicated that, by disregarding organic brain disorders, the 'Blueprint' had underestimated the required acute bed resource for the case mix by at least one-third. Even so, the survey indicated that overall resources in New Zealand were low by 'Blueprint' benchmarking. However, since 1998, there have been significant developments for healthcare of older people.

Firstly, the 4 Regional Health Authorities (RHAs) were replaced by 21 District Health Boards (DHBs), who have responsibility for providing for the health needs of people of all ages within their catchments. Currently, elderly people make up 12% of the New Zealand population.

Secondly, population projections suggest that the number of people in the over-65 age-group will increase by 158% (from 12% to 26% of the total population by 2051), with the greatest expected proportional increase of 485% being for the over-85 age-group.⁴ In contrast, the New Zealand population as a whole is expected to increase by only 20%. Already, some DHB areas have disproportionately higher percentages of older people.⁴

Thirdly, there is worldwide recognition that health services must plan for the future health needs of ageing populations. In New Zealand, more attention has focused on older people with the Ministry of Health forming a Health of Older People Team and producing several key documents such as *Health and Well-being of Older People and Kaumatū*,⁵ *Health of Older People Strategy*,⁶ *Assessment Processes for Older People*

*Best Practice Guideline*⁷ and *Guideline For Specialist Health Services For Older People*⁸.

Fourthly, older people's health and mental health are priority areas for the Health Research Council. In view of the higher profile of older people's mental health since 1998, it was expected that resources would have improved in the five years since the last survey.

Method

Old age psychiatry services throughout New Zealand were surveyed in mid-2003 asking for the following information:

- Total catchment;
- Number of elderly people in the catchment;
- Collocation with geriatrics or mental health;
- Services provided;
- Bed access numbers;
- Staffing levels;
- Perceived strengths;
- Challenges; and
- Areas for improvement.

Results

Responding services were Auckland; Bay of Plenty; Waitemata; Capital and Coast; Christchurch; Counties Manukau; Hawke's Bay; Hutt; Mid Central; Otago; Taranaki; Waikato; Waitemata; and Whanganui.

Bay of Plenty, Hawke's Bay, and Whanganui, were not included in 1998, but responded to the 2003 survey. The responding units provided services for population areas of over 3,300,000 (83% total population), of whom 389,000 were adults over 65 years. This was an increase from the 1998 survey (total catchment areas of all responders covered a population of 2,800,000). Non-responders were Lakes, Nelson and Marlborough, Northland, South Canterbury, Southland, Tairāwhiti, Wairarapa, and West Coast.

The population of non-responding DHBs totalled 651,347—thus excluding 87,599 elders from this survey. A stocktake by the Ministry of Health in 2003⁹ indicated limited or no provision of specialised POA services in these areas and that older people's mental health was generally subsumed under adult mental health or generic Assessment, Treatment, and Rehabilitation (AT&R) services. Data on what proportion of AT&R services went to mental health patients was unavailable.

Catchment areas

The population catchments for each service had changed since 1998 due to the replacement of the 4 RHAs with 21 DHBs. The catchments of three Auckland DHBS (i.e. Waitemata, Auckland, and Counties Manukau) all increased substantially. Christchurch and Capital and Coast also had significant growth but to a lesser extent and there were small decreases in population catchments elsewhere.

As in 1998, only three services (Auckland Central, Hutt Valley, and Capital and Coast) in 2003 confined their activities to urban areas. Most services in New Zealand continue to serve large rural areas. Many areas in New Zealand, including the cities of Rotorua and Gisborne, still lacked any publicly funded dedicated specialist POA services.

Management of services

Fifty-four percent of services were fully integrated with Geriatric Services, a rise of 9% since 1998. Thus, Bay of Plenty, Capital and Coast, Christchurch, Hawke's Bay, Mid Central and Otago all received their funding from Disability Support Services (DSS). Counties Manukau had joint management with Geriatric Services, but their funding came from Mental Health. The remaining services continued to be separate and were funded and administered by Mental Health. Data reporting depended upon the funding stream and was different for each group, with the integrated services reporting output and case-mix information to DSS and the other group to the Mental Health Information National Collection (MHINC). The two datasets are not equivalent.

National bed resources

Acute beds—Figures given in Table 1 are given for 100,000 total population to allow comparison with the recommendation of the Mental Health 'Blueprint' (which was 5.3/100,000 exclusive of age-related conditions). As the proportion of older people varies considerably in individual DHB areas the bed ratios are also given per 10,000 older people for each catchment.

Table 1. Psychiatry of old-age acute-assessment bed ratios for each DHB per 100,000 total population, and per 10,000 over-65 population

DHB (in order of elderly population size)	1998 beds/100,000 total population	2003 beds/100,000 total population	2003 Number people aged 65+	2003 Acute beds/10,000 over 65
Canterbury	12	8.90	59,395	6.73
Waitemata	4	3.62	49,830	3.41
Waikato	3	3.30	39,485	2.79
Auckland	4	2.94	39,450	3.04
Counties Manukau	4	3.66	35,525	3.80
Bay of Plenty	0	2.63	28,380	1.76
Capital Coast	5	4.58	26,465	4.53
Otago	16	17.37	25,255	12.27
Mid Central	10	9.27	21,620	6.94
Hawke's Bay	0	1.35	19,830	1.01
Taranaki	5	3.79	15,165	2.64
Hutt	4	2.92	14,780	2.71
Whanganui	No data	1.53	9,470	1.1

In 1998, the mean number of acute beds was 6.8/100,000 of total population surveyed (6.18/10,000 over 65). In 2003, for the slightly larger population surveyed, the mean dropped to 5.9/100,000 (4.91/10,000 over 65). However, high bed numbers in Otago,

Christchurch, and Mid Central bias the ratio. Nationally, there is wide disparity ranging from over 12/10,000 to 1/10,000 older people.

As the non-responding services to this survey also did not indicate they had any specialist POA services to the MOH 2003 stocktake,⁹ presumably they are absent or minimal in these areas. Thus, an estimate of the national dedicated psychiatry of old age acute assessment and treatment bed resource is 4.25/100,000 total population (3.8/10,000 elderly population).

Only Mid Central (with 10 beds) retained any access to long stay geriatric beds in public hospitals. However Counties Manukau and Waitemata DHBs each have a shared care arrangement for regional access to a total of 47 long-stay beds in two private hospitals.

Day hospital places—The ‘Blueprint’ recommended 4 ‘packages of care’/100,000. A total of 60 places for 2,800,000 population was reported in 1998. In 2003, this figure reduced to 52 places for 3,300,000 or 1.57/100,000; 1.31 places/10,000 older people for the population surveyed. Four units (Bay of Plenty, Christchurch, Otago, and Waikato) had day hospitals, down from five units in 1998. Auckland had lost all its day places.

Service delivery

There was no change in the range of services supplied. All responding DHB services provided community assessment. Larger DHB services (Waitemata, Auckland, Counties Manukau, Canterbury, Capital and Coast, Waikato) provided a good range of inpatient services; community assessment and management; geriatric psychiatry liaison; and daytime crisis management. Smaller DHB services (Bay of Plenty, Hawke’s Bay, Hutt, Taranaki, Whanganui) provided community assessment, crisis management, some liaison, and limited inpatient services—usually dedicated psychiatry of old age beds in either geriatric or mental health units.

Special components of service had increased since 1998. Five years previously, 4 DHB services had memory, anxiety, or depression special clinics—and 3 had rural outreach clinics. In 2003, 5 services had memory clinics, 3 had anxiety clinics, 3 had developed a special delirium service, and 5 had rural outreach.

Clinical work

All teams saw a full range of psychiatric disorders, both functional and organic. Most teams considered that their workload had increased—but were unable to substantiate this by accurate figures as they lacked information systems to collect the data. Caseloads for key workers in the teams were still 30–50—i.e. no change from 1998.

Human resources

Psychiatry of Old Age Services are delivered by multidisciplinary teams but their composition varied throughout the country. Larger services had several disciplines represented, more than 1 (range 2–5) psychiatrist of old age, and 2 or more teams.

Smaller DHBs usually had only one team composed of a psychiatrist, nurse and, sometimes, a social worker. Excepting nursing and medical staff specifically employed for inpatient units, the majority of multidisciplinary personnel divided their time between inpatients and community assessment and treatment.

Medical staff

In 1998, medical staff employed in psychiatry of old age services were 19 full-time equivalent (FTE) specialist psychiatrists, 2.8 Medical Officers of Special Scale (MOSS), 11 psychiatry trainees (registrars), and 8.5 house surgeons.

In 2003, the specialist psychiatrist workforce for the slightly larger population surveyed was 20.8 psychiatrists, and 5 medical officers (MOSS). Pre-fellowship psychiatry trainees increased to 12.8 FTE plus an additional 5 FTE senior trainees undergoing vocational advanced training. Six of the 13 DHBs (Bay of Plenty, Hawke's Bay (0.5, increased in 2004 to 1), Hutt, Mid Central, Otago, and Whanganui (0.2) had one specialist psychiatrist or less.

Nursing staff

In 1998, the majority of nurses (193.9 FTEs) were employed in the inpatient units. A third were enrolled nurses or care assistants. Community team nurses totalled 35.5 FTEs (1.25/100,000 total population; 1.15/10,000 older people) and day ward nurses, 6.7 (0.24/100,000; 0.21 / 10,000 older people) for the populations surveyed.

In 2003, the inpatient nursing workforce had decreased to 144.5, with a similar proportion to 1998 being enrolled staff. The community team nursing personnel had increased to 46.1 FTEs—but for the higher population surveyed, this represented only marginal improvement of 1.16/10,000 older people. Similarly, the number of FTE day ward nurses had remained static but served a larger population. Since the 1998 survey, 3 services offered a new delirium service for which there was 2.5 FTE nursing staff.

Other personnel

In 1998, other disciplines employed were clinical psychologists (7.6 FTEs), social workers (16.3 FTEs), occupational therapists and aides (17.3 FTEs), and physiotherapists (2.25 FTEs). In 2003, for the larger population surveyed, the clinical psychologists were 13.3 inclusive of 1.4 FTE specialist neuropsychologists.

The physiotherapists increased to 4 FTEs whilst occupational therapists remained the same at 17.5 FTEs. Social workers increased to 20.6 FTEs and Christchurch reported an additional 5.8 FTE Needs Assessment Service Co-ordinators (NASC) attached to their mental health of older people teams.

Additional staff were the introduction of 3 FTE diversion therapists and 22.2 FTE administration and support staff. Thus, there were very modest gains overall in clinical psychology, physiotherapy, social work, psychiatry, and advanced trainees. Larger units fared better than the smaller services.

Academic positions

In 1998, Christchurch had 0.3 FTE and Auckland 0.3 FTE senior lecturers in psychiatry of old age. In 2003, the situation had marginally improved with Auckland recruiting a 0.5 FTE Associate Professor from overseas. Unfortunately, this position was vacated, and in 2005 there are still only 0.6 FTE academic positions in POA nationally.

Table 2. Blueprint recommendations (1998) versus actual resources allocated for psychiatry of old age services (1998 and 2003)

Variable	Acute beds per 100,000 total population	Day hospital places per 100,000 total population	Community clinical FTEs (all disciplines) per 100,000 total population
1998 Blueprint benchmark	5.3 (excludes age-related disorders)	4	8.5
1998 FPOANZ Survey³	5 (includes age-related disorders)	2.14	2.8 (estimated FTEs dedicated to community teams)
2003 FPOANZ survey	4.25 (includes age-related disorders)	1.58	3 (estimated FTEs dedicated to community teams)

FPOANZ=Faculty of Psychiatry of Old Age (New Zealand). FTEs=full-time equivalents.

Strengths

Ten of the 13 services surveyed in 2003 cited their strengths as ‘the multidisciplinary team’, ‘good clinical skill mix’, and ‘stability’ of their teams. Another strength frequently cited was either integration with geriatrics or collaboration with geriatrics.

Gaps and challenges

There was a long list of perceived gaps and challenges. The most frequent were lack of acute beds, waiting lists for acute beds, and high caseloads. Smaller services highlighted under-resourcing in all service areas. Some services targeted their resources into specialised clinics. Other problem areas included service delivery to rural areas (due to few staff and large travelling distances).

Services mentioned poor provision for dementia care, intellectually handicapped older people, younger demented patients, patients with drug and alcohol problems, and patients with long-standing psychiatric disorders who had grown old and frail. Lack of community resources and support for caregivers were other deficient areas highlighted. Whilst most services saw integration with other geriatric services a strength, others considered the interface with general psychiatry to be a challenge. A particular concern, for DHB services with only one psychiatrist or less, was lack of cover for holidays or sickness.

Potential improvements

The ‘wish list’ included development of community and specialised services such as memory, anxiety, or depression clinics. The concept of the ‘one stop shop’ (single referral and triage point from which a patient can access health and disability support for physical, mental health, social, cultural, or spiritual needs) also evoked favourable comment from several survey respondents.

Discussion

The results of this survey were disappointing and show little improvement in POA Services during the 5 years from 1998 to 2003. Indeed, in some respects, services

appeared to have lost ground. Only 13 DHBs provided specialist services. For over 87,000 older New Zealanders, there are minimal, if any, specialist mental health services.

Access to acute beds decreased in some areas through actual loss or relatively, due to increasing populations in some catchments without proportional increases in bed resources. Expansion in community team staff was minimal, barely keeping up with population growth and had not decreased caseloads. Only a few services in the larger DHBs had the full range of disciplines. Despite older people and mental health being priority areas for the Health Research Council, academic positions remain minimal.

The *1998 Mental Health Commission Blueprint* was an important document, as it has been the only attempt to quantify mental health resource needs for New Zealand. However, for older people's services, it had to do so with woefully inadequate data. Unsurprisingly, some of its assumptions were incorrect.

The Blueprint recommendations for 5.3 older person's beds in 1998 did not include beds for people with age-related conditions (dementia or behavioural and psychological symptoms of dementia [BPSD]). Yet, the 1998 survey indicated age-related brain disorders comprised 25–30% of the work of POA services, with patients with dementia being over-represented in inpatient units (mean 36.07%, median 33.3% range 18.18-87.5%). Thus, if the 'Blueprint' benchmark resource is 5.3, a further 1.5 BPSD/Dementia assessment beds needs to be added to give 6.8 (as a minimum acute bed resource) per 100,000 total population (5.66/10,000 older people).

This, whilst being a more reasonable resource level, is still below the benchmark of 8/100,000 total population (6.66/10,000 older people) recommended by Australian and UK experts.^{10,11} The Royal College of Psychiatrists in the UK recommends even more beds (15 beds/10,000 older people¹²).

Evidence points to greater effectiveness of specialised POA inpatient services over older people being managed in general psychiatry units.^{13–15} However, access to such specialised services varies widely throughout the country. Specifically, many of the smaller DHBs, have to rely on general psychiatry or geriatric beds for their mentally frail older people that are currently well below minimum acceptable levels. South Island services are comparatively better off than their northern counterparts. However, even taking their riches into account, a national average of 3.8 acute beds/10,000 older people falls well short of desirable.

Whilst acute beds are needed for patients who require specialised treatment, are suicidal, or whose disorder leads to challenging behaviours, some older people (even with acute psychiatric conditions) might be manageable in the community, if given sufficient resources. The *Blueprint* recommended 4 places/100,000 total population day hospital places (p101). However, in 2003, instead of day places increasing, they had reduced to 1.6 places/100,000 (1.3/10,000 elderly people) for the population surveyed.

A lack of acute beds or day places means community teams have to manage patients with acute conditions in their place of residence, and the burden of care often falls on families who need extra support. The *Blueprint* recommended a national resource of 321 FTEs (8.5/100,000 total population [p.101]; 7.08/10,000 elders) for older people's community teams. While there have been some increases in medical, clinical

psychology, and social work personnel, these are disciplines that enhance assessment and diagnosis. The day-to-day management of patients in the community and provision of support is mostly done by community nursing staff and the paltry increase in their numbers in the 5 years (1998–2003) from 1.15 to 1.16 /10,000 elders for the population surveyed is insufficient to keep up with the increased catchments, never mind managing acute patients outside a specialised unit.

Overall, the community personnel resource is still a long way off the *Blueprint* recommendation of 8.5/100,000 total population (p101) (7.08/10,000 elders). Caseloads of 30–50 had remained the same in the 5 years, and are too high to manage acute psychiatric conditions adequately in the community.

The Ministry of Health supports ‘Aging in place’ in New Zealand¹⁶ whereby older people are managed with support in the community rather than institutions—but to realise this policy’s full potential, adequate resources must be available, including sufficient acute care beds (when required) and enough community personnel to support older people in the home environment. At the present time there is neither.

On a more positive note, one of the most gratifying aspects of the 2003 survey was the increased number of senior trainees electing advanced training in POA, showing there is growing professional interest in the field. In addition, the number of clinical psychologists had doubled and they have formed their own national interest group. Caution expressed in 1998 about amalgamation of POA with other older people’s services in some areas was dispelled in 2003, with services naming integration as a strength. As the national policy trend moves from funding programmes to funding populations this, at least, seems to auger well for the future.

The older population of New Zealand has increased in accordance with predictions over the past 5 years. As increasing age is the major risk factor for dementia, the unprecedented expected increase in the over-80 year cohorts will mean larger numbers of people with dementia will require services. Approximately 25–30% of these patients need psychiatric assessment for the behavioural and psychological symptoms of dementia.¹⁷

Whilst ‘younger old’ (65–80 years of age) have about the same prevalence of mental disorders as other adults, the ‘oldest old’ have the greatest disability, comorbidity, and high social loss,¹⁸ which increase the risk for depression and poor psychological adjustment.¹⁹ As the population continues to age, demand for mental health services will increase, and future planning must take the projected demographic changes into account. The lack of progress in the past 5 years should be a clarion call to planners of mental health services for older people to become more proactive.

Conclusion

In 1998, the Mental Health Commission’s *Blueprint for Mental Health Services* set some benchmark levels of resources for older people’s mental health services. For day hospital and community team resources, the resource levels seemed realistic but the levels of acute assessment beds were underestimated for need. Unfortunately, there has been little progress towards achieving *Blueprint* minimal levels of service, even in DHBs who have specialist services for POA.

Currently, many DHBs lack any services or have minimal provision. Nationally, there has been a net decrease in access to acute beds without a concomitant increase in staff

to support older people in community settings. This latest survey highlights that there is still considerable work to do to achieve minimum levels of service for older people with mental health problems and that inequities of access persist throughout the country. New Zealand's ageing population is increasing and this will impact on all health services, including mental health, within the next two decades. Planning for future mental health needs to begin by paying attention to current deficiencies.

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Twelve-month experience of acute stroke thrombolysis in Christchurch, New Zealand: emergency department screening and acute stroke service treatment

John Fink

Abstract

Aims To determine the safety and efficiency of an acute stroke thrombolysis service in a New Zealand public hospital setting.

Methods A 12-month audit of patients referred to the Christchurch Hospital Stroke Thrombolysis Service (STS) between 1 April 2002 and 31 March 2003 was undertaken.

Results Sixty-one patients were referred to the STS during the study period, of whom 16 were treated with tissue plasminogen activator (t-PA). For treated patients, the median time from stroke onset to hospital presentation was 60 minutes, 'door-to-CT' time was 60 minutes, and the 'door-to-needle' time was 99 minutes. Minor protocol violations were recorded in two patients, but did not influence outcome. No patient was treated after 3 hours of stroke onset. Intracerebral haemorrhage occurred in two patients: one patient was significantly improved compared with pre-treatment status; a minor temporary deterioration occurred in the other patient. Eight of 16 patients had improved by 4 or more points on the NIH Stroke Scale Score at 24 hours.

Conclusions Acute stroke thrombolysis can be delivered safely and in accordance with internationally accepted guidelines using the Christchurch Hospital STS model of emergency department screening and acute stroke service treatment. Further improvements in performance of the STS remain possible.

Following publication of the National Institute of Neurological Disorders and Stroke (NINDS) t-PA Stroke Study Group trial in 1995,¹ thrombolytic treatment for acute ischaemic stroke within 3 hours of stroke onset (with intravenous tissue plasminogen activator [t-PA]) was approved by the United States Food and Drug Administration in 1996.

Since then, widespread adoption of this treatment outside of the USA has been slow; important factors being concerns regarding the safety of this treatment outside of a clinical trial setting² and logistical difficulties inherent in the rapid delivery of this acute stroke treatment. While review of randomised evidence shows that treatment with intravenous t-PA is associated with a substantial reduction in the outcome of death and disability for carefully selected patients within 3 hours of stroke onset,³ deviation from accepted treatment protocols is known to be associated with increased mortality.⁴

Acute stroke thrombolysis was introduced to Christchurch Hospital in April 2002. An audit of the first 12 months' experience of this service was planned to establish whether the treatment could be delivered safely and in accordance with established guidelines for this therapy.

Methods

All referrals to the acute stroke thrombolysis service (STS) between 1 April 2002 and 31 March 2003 were recorded in a prospective database. Data including time of stroke onset; hospital arrival; emergency department (ED) screening; computed tomography (CT) scanning; stroke service assessment; and administration of thrombolytic treatment, inclusion, and exclusion criteria for thrombolysis and neurological examination findings at presentation were recorded prospectively on ED screening and STS proforma specifically developed to enhance comprehensive but rapid assessment of these patients (Appendix 1).

Times of ambulance call-out, dispatch, patient location, scene departure, and hospital arrival were obtained from ambulance service patient reports. All patients who received t-PA were admitted to a special care unit with established protocols for post-thrombolysis care—including frequent nursing observations for 24 hours; rigorous blood pressure control; protocols for avoidance, recording, and management of bleeding complications; and neurological deterioration.⁵

Full neurological examination at 24 hours, and repeat CT scanning within 48 hours, were part of the standard clinical protocol for patients who received t-PA. National Institutes of Health Stroke Scale (NIHSS) scores were calculated retrospectively according to a validated algorithm.⁶ The clinical records of patients treated with t-PA were examined to determine final discharge destination, total length of hospital stay (including rehabilitation facilities), and level of function at discharge, recorded using the modified Rankin scale (mRS).⁷

Formal radiology reports of pre-treatment CT scans were compared with the acute CT assessment of contraindications to t-PA treatment. All follow-up brain imaging was examined for signs of haemorrhage. The total number of ischaemic stroke patients admitted to Christchurch Hospital over the same 12-month period was determined by search of the hospital discharge coding database.

Statistical analyses (using Student *t* test for parametric data, Wilcoxon rank sum test for non-parametric data, and Fisher exact test for 2x2 tables with low cell count) were performed for data comparing patients assessed by the STS and excluded from treatment versus those patients who were prescribed t-PA.

Results

Sixty-one patients were referred to the STS over the 12-month audit period. This represented 11.8% of the 519 patients with stroke admitted to Christchurch Hospital (as identified from discharge coding data over the same period).

Of the 61 patients referred, 15 were excluded as candidates for thrombolysis following their telephone consultation, and 46 proceeded under the acute stroke protocol for STS review. Sixteen patients were treated with t-PA—comprising 26% of those referred from ED, 35% of those reviewed by the STS; and 3.1% of the total number of stroke admissions.

Among patients reviewed by the STS, there was no age or gender difference between patients treated with t-PA and those not treated, however stroke severity was significantly greater at baseline in the treated group (Table 1).

Pre-hospital transport—Forty-four of 61 patients referred to the STS arrived by ambulance, 8 by car, and 7 had in-hospital stroke. For the 44 patients seen by the ambulance service, median time from receipt of call to ambulance departure was 2 minutes (range 0–12 minutes), median time at the scene was 13 minutes (range 2–31 minutes) and total travel time was 20 minutes (range 12–101 minutes).

Table 1. Comparison of tissue plasminogen activator (t-PA)-treated and untreated patients

Variable	Patients treated with t-PA	STS screening but no t-PA	P value	NINDS trial ¹
Baseline patient characteristics				
Number of patients	16	45		312
Mean age, years	64.9 [33-84]	64.7 [40-83]	0.94	68
Gender	M8, F8	M27, F18	0.56	M58%, F42%
Median NIHSS score	16 [5-23]	4.5 [0-22]	<0.001	14 [1-37]
STS time performance measures				
Median onset time*	0955 [0720-1530]	1222 [0700-2130]	0.14	
Onset to door†‡	59 [41-128]	68 [16-656]	0.87	
Door to CT†	60 [30-106]	87 [16-611]	0.01	
CT to CT reading†	5 [2-10]			
Door to bolus†	99 [47-2:40]			100-110
Onset to bolus†	150 [60-177]			
Bolus to infusion†	16 [5-30]			

Figures in square brackets denote the range. 'Door' refers to time of presentation to the emergency department, as recorded by the ED admission clerk, or time of stroke onset for in-hospital strokes. *24 hour clock; †times expressed as medians, in minutes; ‡excludes 7 patients who were in hospital at the time of stroke onset (3 t-PA, 4 no t-PA).

In-hospital time performance—The key time performance measures of the STS service, including time from hospital arrival to CT ('door to CT') and 'door to bolus' time are shown in Table 1. For patients presenting to ED, the median time from hospital arrival to ED medical assessment was 12 minutes (range <1 minute to 89 minutes, mean 14 minutes). Accurate time of STS assessment was recorded in 37 of 46 patients accepted by the STS. Mean door to STS assessment time was 70 minutes (range 25–160), while mean door to CT time was 82 minutes in these patients. The STS assessment preceded or was within 10 minutes of CT time in all but 8 patients. Median bolus-infusion time was 22.5 minutes for the first 8 patients, and 12.5 minutes for the last 8 patients treated ($p=0.21$).

Exclusion from t-PA—The reasons for exclusion from thrombolysis of 45 patients reviewed by the STS were: minor or resolving deficits (12 patients); time >3 hours (12 patients); intracerebral haemorrhage (ICH) on CT (7 patients); INR >1.3 (4 patients); non-stroke diagnosis (5 patients); and other (5 patients)—(comorbidities, recent myocardial infarction [MI], past history of sub arachnoid haemorrhage, early CT signs, logistical).

Of the 12 patients excluded because of 'minor' deficits (NIHSS 0–3), 10 patients were discharged home from Christchurch Hospital, 1 patient was transferred to a provincial hospital, and the records were lost for the remaining patient. Median length of Christchurch Hospital stay for these patients was 4 days (range 1–17 days); and at discharge, 6 had mRS score of 0–1, 4 patients had mRS=2, and 1 patient had mRS=3 (no data for 1 patient).

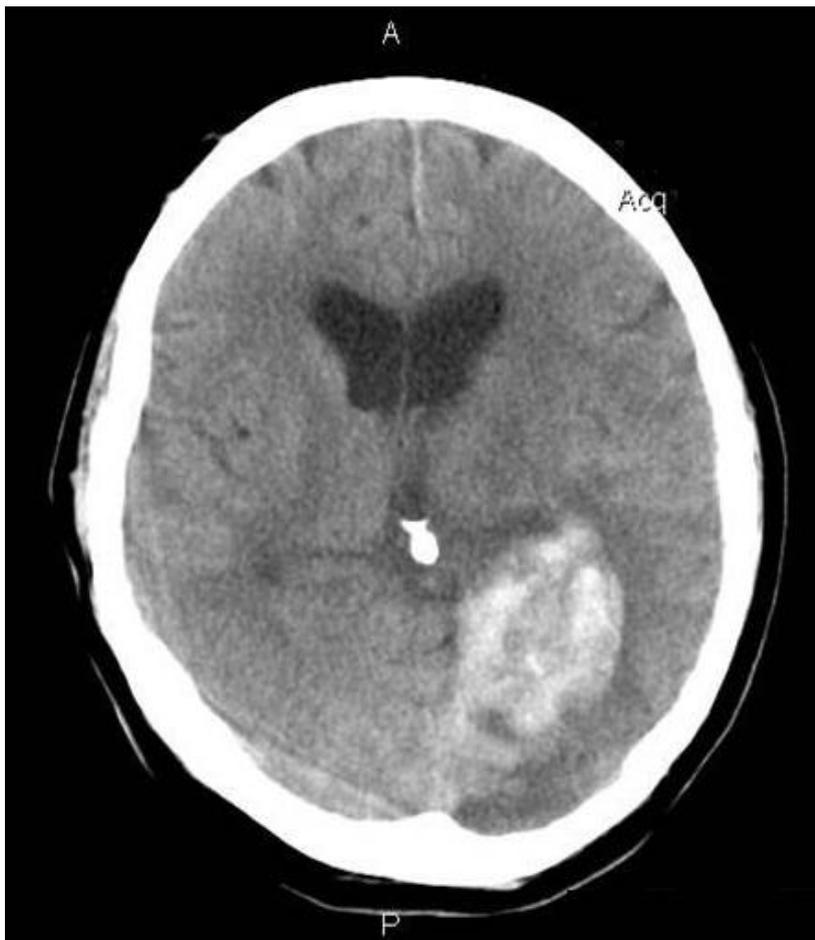
Protocol violations—Two patients treated with t-PA had documented protocol violations (12.5%): one patient had received subcutaneous low molecular weight heparin on the same day prior to stroke onset (no bleeding complications), and one patient had no documented blood glucose result prior to t-PA administration.

No patient had treatment initiation after 3 hours. No patient was treated with t-PA with BP >180/100. Two patients were treated with IV labetalol to reduce blood-pressure prior to t-PA.

Acute CT assessment—The acute CT assessment (performed by a radiology consultant, radiology registrar, or neurology consultant) was concordant with the formal radiology report for exclusion criteria for t-PA treatment in all patients. The CT scans of 13 of the patients treated with t-PA were reported as showing no signs of acute cerebral infarction, the “insula ribbon” sign⁸ was seen in 1 patient, subtle reduction in grey-white differentiation was seen in 1 patient, and subtle swelling with reduced sulcation was seen in 1 patients.

Haemorrhagic complications—No patient required cessation of t-PA treatment or administration of blood products due to haemorrhage. Two patients had intracerebral haemorrhage following t-PA. One patient had minor haemorrhagic transformation of a large left MCA territory stroke associated with a transient deterioration in deficits which subsequently returned to baseline. The second patient presented with aphasia and right hemiparesis, consistent with a left MCA territory stroke. The following day, he was alert and his hemiparesis and dysphasia had substantially resolved, but a new right homonymous hemianopia was noted, due to ICH (Figure 1).

Figure 1. CT head image taken 24 hours after t-PA administration in a patient presenting with left MCA stroke. An obvious new left occipital lobe ICH is present, with little evidence of infarction in left MCA territory.



The NIHSS score had improved from 12 at initial assessment to 4. Three patients required treatment for extracerebral bleeding: cauterisation of epistaxis was required in one patient, suturing of a scalp laceration (due to a fall at the time of stroke) was required in one patient, and empiric treatment with ranitidine was required in one patient who had a single episode of suspected 'coffee-ground' vomitus within 24 hours of t-PA but normal cardiovascular status and negative gastroscopy.

Outcome after t-PA—For the 16 patients treated with t-PA, the median NIHSS score was 16 (range 5–26) at presentation, and 8 (range 3–26) the following day. Eight of 16 patients improved by 4 or more points on the NIHSS, while 7 patients had either no change or improvement by 1 point; 1 patient had worsened (by 3 points).

Improvement of >10 NIHSS points within 24 hours was seen in 3 patients, including 1 patient with dramatic recovery during t-PA infusion from reduced consciousness, quadriplegia, and impending respiratory failure due to acute basilar artery occlusion.

At final discharge from hospital or rehabilitation facility, five patients had recovered to mRS score of 0–2 (indicating full independence), seven patients had mRS=3, three patients had mRS=4, and one patient had died. The death occurred 12 days after t-PA at a time of slow neurological improvement; no definite cause was determined, but pulmonary embolism was suspected. Median length of acute plus rehabilitation hospital stay was 49 days.

Discussion

This audit of 12 months' experience of an acute stroke thrombolysis service in Christchurch shows that we are able to provide this acute stroke treatment safely and in accordance with established treatment guidelines. Protocol violations occurred in two patients, were recognised by the treating physician prior to the decision to continue with treatment, and did not influence patient outcome.

Direct comparison of our cohort with that of the NINDS trial is not possible. The baseline characteristics appear similar, except that the range of baseline stroke severity is narrower in our cohort (due to exclusion of patients with very mild or very severe stroke from thrombolysis in Christchurch). This protocol difference also likely accounts for the lower death rate recorded in Christchurch (6% vs 17% in NINDS t-PA group).¹

The outcome for patients excluded because of minor deficits at presentation was generally favourable in our series, although others have found that as many as a third of patients excluded for this reason were dead or dependent at follow-up.⁹ Intracerebral bleeding occurred in two of our patients: it was clinically insignificant in one of the patients, while the other patient appeared to have a net benefit from treatment with t-PA, despite the bleed. Extracerebral bleeding was more common, but generally minor with no lasting adverse sequelae in any patient.

ED triage and acute assessment of acute stroke patients was a critical first step in the STS pathway. Close to 10% of the total number of stroke admissions were referred to the STS, with a median time from arrival to referral of 12 minutes. However, it is possible that this figure overestimates the efficiency of the ED assessment process—as patients for whom delayed ED assessment resulted in failure to meet the 3-hour time-window will not have been captured in the audit.

A European community stroke study recorded that 25% of patients admitted to hospital with stroke had presented within 3 hours,¹⁰ and an American community stroke study recorded 20–28% of patients presenting within 2 hours of stroke onset.¹¹

Referral practices seemed to vary over the course of the audit period, suggesting the need for improvement in the continuing education of resident medical officers rotating through the ED and Neurology service regarding acute stroke thrombolysis.

The response times of the ambulance service to acute stroke calls appeared excellent. However, we cannot exclude the possibility that higher ambulance service prioritisation for acute stroke call-outs may have enabled a larger number of patients to be considered for referral to the STS. There is also evidence that education programmes for paramedics regarding acute stroke recognition may allow more efficient notification and mobilisation of hospital services, thus reducing in-hospital delays.^{12,13}

In general, the performance of the STS appeared satisfactory. Time to CT scan was more frequently a rate-limiting factor, with a longer door-to-CT time in patients who were ultimately declined t-PA treatment than in those who received it. However, there were eight recorded cases where the STS review was delayed more than 10 minutes after the CT scan, indicating that STS performance can also be improved.

After-hours cover appeared as a significant issue. Our protocol allows assessment of patients up to 10pm, and although patients with stroke onset as late as 9.30pm were referred to the STS, no patient with stroke onset later than 3.30pm was actually treated with t-PA during the study period. Although after-hours performance would be expected to improve with time (indeed, several patients have subsequently been treated at later time points), no specific additional resources have been allocated to STS staffing.

Although no specific data are available, our impression was that delays to CT scanning were not due to waiting time after patient arrival in the radiology department, but instead resulted from delays in earlier steps of the protocol (including transport of the patient from ED or the hospital wards to CT scanning). CT reporting was not a significant delay in t-PA-treated patients. Most patients' scans were read off the CT scanner console while the patient was being taken from the scanning room.

ICH is an absolute contraindication to thrombolysis and easily recognised on CT by trained observers. The Christchurch Hospital Thrombolysis Protocol also considers early oedema (defined as hypodensity less than white matter intensity) or mass effect (significant effacement of cerebral sulci, sylvian fissure, or other basal cisterns; or compression of the ventricular system) as relative contraindications to thrombolysis. These signs are known to be associated with increased haemorrhage rate, although patients with such signs treated with t-PA in the NINDS trial still had a more favourable outcome than placebo-treated patients.¹⁴

Acute STS assessment and t-PA bolus administration were generally performed in the CT scanning annex. Transfer to the SCU and initiation of t-PA infusion was a source of further delay in treatment, but appeared to improve over the course of the audit period.

Prior to the establishment of the safety and effectiveness of this service, no specific attempts were made to publicise the acute stroke thrombolysis service to the general

public during the audit period. Although public education campaigns through mass media have been shown to increase public knowledge about stroke symptoms and risk factors,^{15,16} they may not result in more rapid presentation to hospital.¹¹ Education campaigns that have included professional education to paramedic and emergency personnel have been associated with an increase in acute stroke thrombolysis.^{11,17}

Intravenous t-PA is now licensed treatment for acute stroke in the USA, Canada, the European Union, Australia and New Zealand. Ongoing safety monitoring of treatment is a condition for approval of t-PA in the European Union.¹⁸ Meta-analysis of community studies confirms that comparable outcomes to those of randomised trials can be achieved, especially when established treatment guidelines are followed,⁴ and an Australian incremental cost-effectiveness analysis suggests that t-PA for stroke is cost-saving due to reduction in nursing home and rehabilitation costs.¹⁹

The New Zealand Stroke Guidelines (published in November 2003) recommend the use of thrombolytic treatment with intravenous t-PA following the NINDS protocol,^{1,5} with the caveat that 'thrombolytic treatment should be administered only in specialist centres by physicians with expertise in the assessment and management of people with acute stroke and where protocols for use of thrombolysis are in place.'²⁰

To our knowledge, Christchurch, Auckland, and Middlemore Hospitals are the only centres in New Zealand where acute stroke thrombolysis is currently offered as a standard treatment with established local protocols for eligible patients, although the treatment has been used occasionally elsewhere.²¹ The main prerequisite for adoption of this treatment is identification a stroke physician or neurologist with the necessary expertise and motivation to develop and maintain a robust stroke thrombolysis protocol. Detailed published guidelines for use of thrombolytic therapy and management of patients post-thrombolysis are available⁵ and should be incorporated into hospital nursing and medical standing orders with appropriate education for staff who will be involved prior to the use of thrombolysis.

Other important prerequisites include the need for close cooperation with the hospital emergency department physicians and triage nurses, front-line medical staff with sufficient expertise to distinguish stroke from 'stroke mimics', rapid access to CT imaging and interpretation, a immediate access to t-PA (preferably without the need to involve pharmacy staff), and a 'Special Care' nursing unit or equivalent where the close cardiovascular and neurological observations needed may be performed (cardiac monitoring is not essential).

Clinical audit following establishment of an acute stroke thrombolysis protocol should also be considered a prerequisite. These requirements do not necessarily limit this therapy only to major teaching hospitals. In Christchurch, however, pre-existing infrastructure (such as the presence of two dedicated neurology registrars, the neurology/neurosurgery special care unit, and previous local experience with acute stroke clinical trials) greatly facilitated the establishment of the acute stroke thrombolysis care pathway.

While introduction of acute stroke thrombolysis may not currently be feasible in all New Zealand centres, the establishment of organised acute and rehabilitation stroke services that are available to all patients presenting with stroke has been identified as an important health priority in New Zealand,^{21,22} and is considered to be the single

most effective change needed in the management of stroke.²⁰ In most larger centres, this is likely to take the form of a geographical stroke unit.^{20–22}

Although the benefit of stroke units is not dependent on the provision of stroke thrombolysis,²³ the establishment of stroke units and the development of improved pathways for (and expertise in) stroke management may allow a larger number of New Zealand centres to offer acute stroke thrombolysis in the future.

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CT SCANNING

Time of CT ____:____ Time CT read ____:____ Read by: rad reg / consultant
CT Result: Haemorrhage No Yes Hypodensity* No Yes
 Mass effect No Yes (* less than white-matter density)

STROKE TEAM ASSESSMENT

Time of assessment ____:____ Initials:_____

Confirm clinical diagnosis of ischaemic stroke	<u>EPITHET candidate?</u>			
Onset <3h, Age 18-85y	No	Yes	Presumed septic embolus	No Yes
CT exclusion	No	Yes	Stroke/head trauma < 3 months	No Yes
SBP>185, DBP>110	No	Yes	Major surgery <30 days	No Yes
(or aggressive antiHT Rx required)			Organ biopsy / MI <30 days	No Yes
Trivial (non-disabling) deficits	No	Yes	GI or GU haemorrhage <21 days	No Yes
Coma & complete hemiplegia	No	Yes	Non-compressible puncture <21d	No Yes
Seizure at onset*	No	Yes	Pregnancy, parturition, lact <30 d	No Yes
Presentation suggestive of SAH	No	Yes	PHx ICH, aneurysm, AVM	No Yes
On warfarin:	No	Yes	PHx other serious neurol d.	No Yes
- if yes, is INR >1.3? (=_____)	No	Yes	N/A PHx bleeding diathesis	No Yes
Glucose <2.8 or >22.0 (=_____)*	No	Yes	Other serious/terminal illness	No Yes
Platelets <100 or HCT <0.25	No	Yes	RISKS/BENEFITS discussed	
*warnings, not absolute contraindications			& documented in chart	No Yes

NEUROLOGICAL EXAMINATION AT ACUTE ASSESSMENT:

Level of consciousness:	Alert	Arousable	Hard to arouse	Coma
Orientation:	Full	Partial	Disoriented	
Obeys simple commands/gesture :	Yes	Partial	No	
Dysphasia:	No	Mild/Mod	Severe	Total
Dysarthria:	No	Mild/Mod	Severe	
Gaze palsy:	No	Partial	Total forced deviation	
Hemianopia:	No	Partial	Complete	Bilateral/blind
Facial weakness:	No	Minor	Marked lower	Complete upper & lower
Power [proximal]	R arm: ____/5		R leg: ____/5	NIHSS Score
	L arm: ____/5		L leg: ____/5	
Incoordination (?weak)	No	one limb	two limbs	
Hemisensory deficit:	No	Mild/Mod	Severe	
Extinction / inattention:	No	extinction bilat simultaneous	profound inattention/neglect	

BLOOD PRESSURE: _____/_____ (<185/110) **Temperature:** _____°C
 Stroke Neurologist called Time ____:____ Time from stroke onset ____:____

PATIENT WEIGHT: _____kg

Total dose t-PA (0.9 mg/kg, max90mg):_____mg Bolus 10% _____mg Infusion 90%_____mg

IV t-PA bolus given Time ____:____ Time from stroke onset ____:____

IV t-PA infusion commenced Time ____:____

Acute Stroke Unit transfer Time ____:____ If not ASU, where?_____

ANY PREVENTABLE DELAYS? Details: _____

PROTOCOL VIOLATION? Details: _____

CONSENT FOR ACUTE STROKE TREATMENT WITH t-PA

Treatment Information

Your doctors have determined that you have had a stroke, and that you might benefit from treatment with t-PA (tissue plasminogen activator).

Your stroke has been caused by a blockage to a blood vessel in the brain. The blockage to the blood vessel is caused by a blood clot. t-PA is a drug which causes blood clots to dissolve [thrombolysis] and may help restore blood flow to your brain. The treatment is given intravenously (through a 'drip') over one hour. If it is to be used, this treatment must be given within 3 hours of the first sign of stroke.

Thrombolysis with t-PA under strictly controlled conditions is a recommended treatment for acute stroke according to the New Zealand Guideline Group New Zealand Stroke Guidelines (2003). This treatment is estimated to result in one more patient recovering full independence after a stroke for every 8 patients treated. Other patients may get smaller benefits. But thrombolysis with t-PA can also cause bleeding into the brain and worsening of the stroke. This occurs to around one in twenty patients treated with t-PA. On occasion, this bleeding may cause death.

Your consent for treatment with this medication is voluntary (your choice). If you do not wish to receive this treatment, you will receive full standard hospital treatment for stroke, which may include aspirin or other anticoagulants.

Consent for treatment with intravenous t-PA

I have read and understood the treatment information regarding the use of t-PA for acute stroke. I understand that t-PA does not benefit all patients with stroke and can cause worsening of stroke in some people.

I have had a chance to have my questions answered about this treatment.

I consent to treatment of myself / my relative with intravenous t-PA for stroke.

Signed: _____ Print: _____

Date: ____/____/____ Capacity: patient / next-of-kin / other (state): _____

Witness: _____ Print: _____

Date: ____/____/____

Verbal Consent Only: from _____ reason: _____

Treatment without formal consent:

reason: _____

second witness or authorising consultant: _____ Date: ____/____/____

Drug administration

- Reconstitution: dilute with sterile water to 1mg/1ml
 - Swirl gently if necessary to mix, DO NOT SHAKE
 - Small amount of frothing is normal. Allow to settle.

- Dose: 0.9 mg/kg (max 90mg):
 - 10% total dose given as bolus over 1 minute
 - remaining 90% as infusion over 60 minutes: given undiluted via burette.
 - **Estimated** weight may be used if measured weight would result in significant delay in treatment

- No other anticoagulant or antiplatelet agents are to be given within 24 hrs of t-PA administration.

		Vol of 1mg/1ml t-PA				Vol of 1mg/1ml t-PA	
Patient Weight (kg)	Total dose (mg) [0.9mg/kg]	10% Bolus (ml)	90% 1hr infusion (ml)	Patient Weight (kg)	Total dose (mg) [0.9mg/kg]	10% Bolus (mL)	90% 1hr infusion (ml)
40	36	3.6	32.4	70	63	6.3	56.7
41	36.9	3.7	33.2	71	63.9	6.4	57.5
42	37.8	3.8	34.0	72	64.8	6.5	58.3
43	38.7	3.9	34.8	73	65.7	6.6	59.1
44	39.6	4.0	35.6	74	66.6	6.7	59.9
45	40.5	4.1	36.4	75	67.5	6.8	60.7
46	41.4	4.1	37.3	76	68.4	6.8	61.6
47	42.3	4.2	38.1	77	69.3	6.9	62.4
48	43.2	4.3	38.9	78	70.2	7.0	63.2
49	44.1	4.4	39.7	79	71.1	7.1	64.0
50	45.0	4.5	40.5	80	72.0	7.2	64.8
51	45.9	4.6	41.3	81	72.9	7.3	65.6
52	46.8	4.7	42.1	82	73.8	7.4	66.4
53	47.7	4.8	42.9	83	74.7	7.5	67.2
54	48.6	4.9	43.7	84	75.6	7.6	68.0
55	49.5	5.0	44.5	85	76.5	7.7	68.8
56	50.4	5.0	45.4	86	77.4	7.7	69.7

57	51.3	5.1	46.2		87	78.3	7.8	70.5
58	52.2	5.2	47.0		88	79.2	7.9	71.3
59	53.1	5.3	47.8		89	80.1	8.0	72.1
60	54.0	5.4	48.6		90	81.0	8.1	72.9
61	54.9	5.5	49.4		91	81.9	8.2	73.7
62	55.8	5.6	50.2		92	82.8	8.3	74.5
63	56.7	5.7	51.0		93	83.7	8.4	75.2
64	57.6	5.8	51.8		94	84.6	8.5	76.1
65	58.5	5.9	52.6		95	85.5	8.6	76.9
66	59.4	5.9	53.5		96	86.4	8.6	77.8
67	60.3	6.0	54.3		97	87.3	8.7	78.6
68	61.2	6.1	55.1		98	88.2	8.8	79.4
69	62.1	6.2	56.0		99	89.1	8.9	80.2
					100kg	90.0	9.0	81.0

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Guideline recommendations for management of patients admitted with acute stroke: implications of a local audit

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Abstract

Aim To assess the feasibility of implementing the New Zealand guideline for management of stroke by auditing the gap between recommended care and that provided in Hawke's Bay Hospital (HBH).

Methods Fifty randomly selected records of patients discharged with acute stroke between 1 June and 30 November 2003 were retrospectively reviewed using an audit tool developed from the guideline.

Results Eight patients (16%) with non stroke syndromes were incorrectly diagnosed or coded as stroke on the basis of computed tomography (CT) scan reports. Brain imaging compliance was 100%; 86% within first 48 hours. Aspirin use or documented contraindications occurred in 62% patients within 48 hours, although the delay after imaging averaged 12.55 hours. At discharge, aspirin compliance was 100% in the surviving 42 patients. Twenty-nine (69%) patients were discharged on antihypertensive therapy, but two patients were readmitted with hypotension. Compliance with recommended multidisciplinary assessments within 48 hours included swallowing (88%), mobility (88%), communication (78%), and self care ability (60%). Patients not admitted directly to the stroke unit (19, 38%) were less likely to receive recommended interventions. Compliance with recommended pre-discharge assessments included suitability of accommodation (100%) and home supports (92%), but only 19% received documented advice about driving.

Conclusions Management of inpatients with acute stroke in HBH is close to most of the guideline recommendations. The identified deficiencies in patient care are potentially easily rectifiable and full implementation of the guidelines is feasible.

Stroke is a leading cause of death and disability in New Zealand (NZ). Annually, over 7000 New Zealanders will suffer a stroke but less than half will be alive and independent at 1 year. Stroke can be prevented,¹ and stroke mortality and morbidity reduced, if patients with stroke are managed in a coordinated system of stroke care.²

The need to establish organised stroke services (OSS) in each District Health Board (DHB) is the single most important recommendation of the NZ guideline for management of stroke.² An OSS usually includes admission to a stroke unit, care coordinated by a multidisciplinary team (MDT), early assessment and rehabilitation, use of written protocols, involvement of families and caregivers, and access to community stroke teams. The new guideline clarifies how this should be done.

There is recent information about the provision of hospital services in NZ for people with stroke^{3,4} and improvements in acute medical management.⁵ However there is no information about actual compliance with the latest guideline's recommendations especially at an individual patient level or for MDT aspects of inpatient care.

We report the results of a multidisciplinary audit of the management of patients admitted to Hawke's Bay Hospital (HBH) with acute ischaemic stroke or intracerebral haemorrhage (ICH). The primary aim of this study was to identify the size of the gap

between the type of care provided in HBH in the 6 months immediately prior to the release of the new guideline and that recommended by the guideline. This information would then be used to target further interventions at those aspects of patient care requiring improvement and to assess the feasibility of fully implementing the guideline recommendations within HBH.

Methods

HBH provides acute inpatient services for over 90% of the regional population of 145,000. It has an acute stroke unit within a general medical ward, rehabilitation facilities on the same floor, and a ward based MDT. Stroke patients are admitted under general physicians who have a variety of sub-specialty interests.

Computed tomography (CT) scanning (after hours) requires radiologist call-back, and one neurologist is available for consultation. HBH does not provide a thrombolysis service for patients presenting with acute ischaemic stroke. Patients needing prolonged rehabilitation transfer to the on-site assessment treatment and rehabilitation (ATR) unit.

We identified all patients discharged from HBH in the 6 months immediately prior to the release of the guidelines (between 1 June and 30 November 2003) with a primary discharge diagnosis code (ICD-10) of I61, I62, I63, or I64. For final inclusion into the audit sample, we used the World Health Organization (WHO) definition of stroke⁶: *'a clinical syndrome typified by rapidly developing signs of focal or global disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin.'*

We excluded patients with transient ischaemic attack (TIA), subarachnoid haemorrhage, subdural haematoma, or traumatic brain injury; those transferred from other hospitals; and any whose stroke occurred after admission. A random sample of at least 30% of these patients, with a minimum of 50 cases, was then selected for audit.

The NZ best-practice evidence-based guideline for management of stroke was published in late November 2003. An audit tool based solely on recommendations from this guideline was developed in April 2004 by a local audit team that included medical (JG & AM), nursing, therapy, and social work representatives; a neurologist; and a clinical nurse auditor (DS).

Recommendations for management of stroke that were audited included MDT assessments (guideline section 6.1, MDT assessments within the first 48 hours and prior to discharge), diagnosis of stroke (section 6.4, imaging and investigations), acute interventions (section 6.6), and secondary prevention measures (section 6.9, use of blood pressure lowering therapy, statins, aspirin, and warfarin).

Acceptable reasons for not complying with a recommendation were also defined prior to performing the audit—e.g. not using warfarin for patients with atrial fibrillation (AF) who had ICH or other documented contraindications to anticoagulation. This tool was then used to retrospectively assess the acute and rehabilitation inpatient care of each selected case. Data collection included review of physical health records and electronic enquiry of laboratory and radiology systems and the data warehouse.

To protect confidentiality, all health records remained within the records department throughout the audit (national health index numbers were the only identifiers on the audit data collection tool and data were then entered into an Excel spreadsheet for final analysis). Compliance was deemed to have occurred if the guideline recommendation was met or if any of the predetermined contraindications or acceptable reasons for not complying could be identified, either by being specifically documented by the MDT or readily apparent to the reviewers from information documented in the patient's health record.

Results

137 qualifying health records were identified during the 6-month audit period. Fifty records were therefore randomly selected from this group for audit, and all were available for review. Demographics and patient outcomes are shown in Table 1.

Table 1. Demographics and outcomes

Item	(n=50)
Age	
-mean	74 years
-range	45–89 yrs
Sex	66% male
Ethnicity	
-European	88%
-Maori	12%
Stroke type	
-Ischaemic	86%
-Intra-cerebral haemorrhage	6%
-Unknown (no scan)	8%
Pre-stroke domicile	
-Own home	92%
-Family	2%
-Residential Home	6%
Outcomes	
-Return home	50%
-Family care	2%
-Return to residential home	2%
-Residential home care	14%
-Long stay hospital care	16%
-Death	16%

Diagnosis—In the opinion of the reviewers, 8 (16%) of the first 50 cases selected did not satisfy the WHO definition of acute stroke. Five patients who presented with ‘funny turns’, dizziness, or confusion had acute stroke diagnosed by medical teams following a CT brain scan report that included ischaemic changes, although the reported location of lesions did not explain acute symptoms and the age of any abnormalities was uncertain.

Two cases were clinically identified as non-stroke syndromes, but were coded as ischaemic stroke as a result of scan reports and one patient whose symptoms fully resolved within a few hours had their clinical diagnosis of TIA changed to stroke following an abnormal scan report. These 8 cases were removed from the audit sample and a further 8 ‘true’ stroke cases were randomly selected to maintain the audit sample at the minimum 50 cases planned.

Length of stay (LOS)—The mean total (acute and rehabilitation) LOS was 20.9 days (median 12.5, range 1–119). Acute LOS was 9.4 days (median 8, range 1–35). Half of our patients (25, 50%) formally transferred onto a rehabilitation contract for part of their stay, 12 (24%) having all their rehabilitation under the care of the acute stroke unit MDT (mean rehabilitation LOS 4 days, range 2–10). Thirteen patients (26%) were transferred to the ATR unit (mean rehabilitation LOS 39 days, median 27, range 8–107).

Compliance with MDT assessments—Compliance with the guideline recommendations for acute and pre-discharge assessments is shown in Table 2. Accepted reasons for not performing recommended therapy assessments within the first 48 hours were largely restricted to patients with coma, impaired consciousness, or medical instability. Weekend admissions first assessed the following Monday accounted for a small proportion of non-compliance—e.g. communication (12%), self-care ability (8%), and mobility and falls-risk assessments (12%).

Patients discharged from the ATR unit were more likely to receive pre-discharge assessments—e.g. 100% had MDT discharge meetings and social worker input. Only 19% of discharged patients had documented advice about driving after stroke but another 48% were known non-drivers prior to their stroke or were discharged to institutional care.

Table 2. Compliance with recommended multidisciplinary team assessments

Assessments	Compliance
Within 48 hours of admission	(n=50)
Level of consciousness	94%
Pressure ulcer risk	90%
Swallowing	88%
Mobility and handling	88%
Urinary continence	84%
Communication	78%
Hydration	62%
Self care ability	60%
Faecal continence	54%
Prior to discharge (survivors)	(n=42)
Discharge accommodation:	100%
-Home visit*	22%
-Institutional care*	30%
Home supports:	92%
-Social worker review*	67%
-MDT discharge meeting*	60%
Stroke information provided	76%
Cognition	69%
Long-term goals	64%
Driving advice	67%

*Not a guideline recommendation; MDT=Multidisciplinary team.

Medical management and investigations—Compliance with the guideline recommendations for medical care is shown in Table 3. All 50 patients either had a CT head scan (46 patients) or a documented decision not to scan (4 patients) agreed with their families because of frailty or terminal care status.

Twenty-three (46%) patients had this done on the day of admission and another 17 (34%) the following day. A total of 43 (86%) patients achieved this within the recommended maximum of 48 hours from admission. Aspirin compliance within 48 hours was low (62%). Of the 23 patients given early aspirin for ischaemic stroke, 3 started this before their scan; while in the remaining 20, the average delay from the scan until the first dose of aspirin was 12 hours 55 minutes (range 33 minutes to 22

hours). Others, given aspirin after 48 hours, received their first dose up to 3 days after their scan. Documentation of vascular risk factors was suboptimal, usually the result of a failure to specifically note the absence of a risk factor—e.g. non-diabetic status.

Table 3. Compliance with recommended medical management

Recommendations	Compliance
Within 48 hours of admission	(n=50)
Investigations (within 24 hours):	
–Electrocardiogram	100%
–Blood tests [#]	98%
–ESR	62%
Brain imaging	86%
Aspirin use	62%
Stroke risk factor assessments:	
–Hypertension	68%
–Smoking	64%
–Diabetes	46%
–Raised Cholesterol	34%
–Atrial Fibrillation (AF)	50%
VTE risk assessment	58%
At discharge (survivors)	(n=42)
Brain imaging	100%
Aspirin use	100%
AF and Warfarin use	86%
Statin use	76%
BP lowering therapy	69%
Discharge BP <130/80 mmHg*	55%

[#]Full blood count, urea, creatinine, electrolytes, and glucose; *Not a guideline recommendation for discharge; ESR=Erythrocyte sedimentation rate; VTE=Venous thromboembolism; BP=Blood pressure.

Secondary prevention in the 42 discharged patients included 100% compliance with aspirin use, 29 of these patients (69%) actually given aspirin, 10 (24%) instead on warfarin for AF or valvular heart disease, and the remaining 3 patients had ICH or terminal care status. Sixteen patients had AF; 13 (81%) of whom were compliant with warfarin recommendations (9 on therapy, 2 ICH, and 2 with major falls risk).

Statin compliance occurred in 32 patients (76%); 21 (50%) discharged on statin therapy, 1 patient with previous adverse reaction to a statin, and 10 (24%) with limited life expectancy—e.g. terminal care status or discharged to institutional care. Blood pressure lowering therapy was used in 29 patients (69%). It was not possible to clarify if this was used for secondary prevention or management of a multitude of comorbidities. Twenty patients were on angiotensin converting enzyme (ACE) inhibitors, 13 on beta-blockers, 7 on calcium channel blockers, 5 on diuretics, 2 on alpha blockers, and 1 patient on an angiotensin II inhibitor.

Stroke unit care—Thirty-one patients (62%) were admitted directly to the stroke unit and 19 to other wards; 13 of these patients were subsequently transferred into the stroke unit within 48 hours. Only 3 patients (6%) did not spend any time in this unit. Once in the stroke unit, patients remained there for the duration of their acute stay. Patients admitted directly to the stroke unit were more likely to have recommended

early medical management and therapist input than those admitted to general wards (Table 4).

Table 4. Management of patients according to admission unit

Assessment or management (within first 48 hours)	Stroke Unit (n=31)	Other ward (n=19)	P value*
Speech language therapist	25 (81%)	7 (37%)	<0.01
Physiotherapist	24 (77%)	8 (42%)	0.02
Occupational therapist	14 (45%)	5 (26%)	0.24
Swallowing, using protocol	21 (68%)	8 (42%)	0.09
CT scan done or not indicated	27 (87%)	15 (79%)	0.46
Aspirin given or not indicated	22 (71%)	9 (47%)	0.14

*Fisher's exact test; CT=Computed tomography.

Complications—Respiratory and urinary tract infections occurred in 7% and 5% of acute patients, and in 3% and 6% of the rehabilitation patients, respectively. Falls occurred in 9.5% of acute and 12% of rehabilitation patients, none of whom suffered fractures or other significant sequelae. No patient developed new pressure areas in hospital or was diagnosed with venous thromboembolism during their admission.

Readmissions—Eight (19%) of the 42 patients surviving to discharge were readmitted within 28 days. None discharged from the ATR unit were readmitted. One patient on warfarin for mitral valve replacement had a TIA associated with a sub-therapeutic INR of 1.8, and one patient waiting for an outpatient carotid ultrasound had a recurrent stroke and was subsequently shown to have severe ipsilateral carotid stenosis. Three patients were readmitted with new medical problems (chest pain, new AF, heart failure), and one failed to manage for social reasons. Two patients with satisfactory blood pressures at discharge were readmitted with significant hypotensive episodes (systolic blood pressures less than 70 mmHg) attributed to their blood pressure lowering medications.

Discussion

This study is the first to report compliance with the 2003 guideline for management of stroke and to include both the acute and rehabilitation phases of inpatient care. It confirms that the medical and MDT care of patients (with acute stroke admitted to HBH in 2003) was largely compliant with the guideline's recommendations, even though these were not published at the time.

Some aspects of patient care were suboptimal—e.g. provision of information about stroke, driving advice, early aspirin use and assessments of stroke risk factors, hydration, self-care ability, and cognitive problems.

Most of these identified deficiencies are potentially easily rectifiable without significant resource implications; thus the size of the gap between current and recommended care and the potential cost of fully implementing OSS (at least for inpatient services) is manageable. This degree of compliance is not surprising as the latest guideline represents an evolution of information and recommendations contained in earlier guidelines.⁷⁻⁹

Several reports published during the last 10 years confirm that the care of patients with stroke in NZ has steadily improved and become more compliant with that recommended by international evidence and earlier guidelines.^{3,4,10-12} Compared with the recently published improvements in care between 1995 and 2001 in Auckland Hospital,⁵ this audit shows further gains—e.g. at discharge, the increased (from 20% to 64%) use of warfarin in ischaemic stroke patients with AF (not including those with contraindications), and increased prescription of statins (from 20% to 50%) and blood pressure lowering therapy (from 46% to 69%).

Our results may not be representative of other DHBs. In a recent survey, HBH was one of only 4 hospitals in NZ with an acute stroke unit,³ although at least 2 others now also have stroke units.^{5,10} The presence of a stroke unit and location of important MDT members (physiotherapist, occupational and speech therapist) in this unit will facilitate compliance with protocols and access to early therapy assessments. One author (JG) was a member of the NZ stroke guideline writing group and therefore able to influence local practice towards compliance prior to their launch.

This audit was restricted to inpatient services. Hawke's Bay DHB does not provide a rapid-access specialist outpatient assessment service for those not admitted or a community stroke rehabilitation service at the level recommended in the guidelines. Providing these services and stroke unit care (for inpatients in those DHBs whose services fall significantly below that recommended for OSS) will have resource implications, although evidence suggests that the resultant improved outcomes (including the reduced need for institutional care and the reduced length of stay) should make this investment cost-effective.^{11,13}

Only a quarter of our patients transferred to the ATR unit, and this group had a long LOS—the reasons remain speculative but most likely reflect good access to rehabilitation in the acute stroke unit for patients with milder strokes, and selection of only those patients with greatest disability and requiring prolonged rehabilitation for transfer to the ATR unit. The small proportion of patients transferring to our rehabilitation unit is also consistent with results from the Middlemore Hospital Acute Stroke Unit.¹⁰

Other possible reasons for the long rehabilitation unit LOS include: less efficient practice within the ATR unit (as it does not have a specific stroke rehabilitation area); inadequate community rehabilitation and support services; and inability to discharge patients with disability due to delays accessing necessary home alterations, equipment or institutional care placement.

Our audit also identifies issues that may have wider implications for other DHBs. While 94% of our patients spent most of their acute stay in the stroke unit, 38% were not admitted directly to this unit and these patients were less likely to receive care at the standard recommended in the guidelines.

Failure to receive recommended processes of care or treatment is likely to be associated with poorer outcomes.^{2,14} Identification of the reason was not part of the audit but potentially could include a combination of high occupancy rates, bed managers lacking awareness of the importance of patient aggregation in specialty units, and selection bias against those for terminal cares.

Although we demonstrated good access to early brain imaging, some patients were still given aspirin before their scan, and others had significant delays between their scans and the first dose of aspirin. The reasons were not formally assessed but appear to include lack of medical team access to scans or scan reports, failure to review these, and 'nil by mouth' status due to inability to swallow safely.

Systems improvements could reduce delay due to the first two possibilities. Nasogastric tube insertion solely for the purpose of giving aspirin is inappropriate as these are not without risk. Results from the recent FOOD trial show a significant gastrointestinal haemorrhage rate in stroke patients with tube feeding.¹⁵ Use of sublingual or lingual aspirin is a potential solution.

The diagnosis of acute stroke remains clinical⁶ as CT scans may be normal early in acute stroke and are primarily used to exclude other diagnoses and identify ICH. Cerebrovascular disease, however, is common and up to a quarter of older people will have abnormalities on brain imaging consistent with cerebral infarctions that are apparently clinically silent.^{16,17} With good access to CT scans for people presenting acutely with confusion, turns, or collapse; the finding of these silent infarctions is increasingly common in clinical practice. This has the potential to complicate diagnostic or coding accuracy.

Indeed, the 16% misdiagnosis rate in our study is similar to that recently reported in England.¹⁸ Patients with silent infarctions warrant intervention with secondary prevention strategies as they have an increased risk of future cerebrovascular events and dementia.^{19,20} However if physicians are misled by a CT scan report showing ischaemic changes (and incorrectly diagnose an acute stroke), this may: delay diagnosis of the true cause of the patient's presenting symptoms; cause distress; and adversely effect driving ability, travel plans, or health insurance.

Over half of our patients had blood pressures below 130/80 mmHg at discharge; the recommended target for those with cardiovascular disease.¹ Blood pressure lowering treatment is also recommended for all patients after stroke, regardless of their blood pressure—unless the person has symptomatic hypotension.

Although the optimal timing of therapy is unknown, the guidelines state that it is usually advisable to wait 7–14 days after an acute stroke.^{1,2} The potential consequences of implementing this research-based recommendation for routine blood pressure lowering therapy in the possibly older and frailer general stroke population is unknown. Two-thirds of our patients were on blood pressure lowering therapy at discharge, although we did not determine if this was primarily for secondary prevention after stroke or for management of other comorbid conditions. The early readmission of 2 (7%) of these patients with profound hypotension attributed to their medication is therefore of some concern, and supports advice to delay routine initiation of hypotensive therapy (especially in 'normotensive' patients) and to escalate doses with caution.

Almost one in five of our surviving patients were readmitted within 28 days of discharge, although those with unrelated acute medical problems or hypotension may reflect the age and frailty of the stroke population. Sub-optimal anticoagulation in primary care may have contributed to one readmission. Urgent investigation and management of suspected carotid stenosis is now recommended.²¹

A third of our patients had no documented advice about their fitness to drive or any restrictions on their driving—despite an obligatory minimum stand-down period²² and the potential for visual field defects, inattention, reduced motor processing, and impaired dexterity following stroke.

This study has some limitations. For instance, our randomised sample may not be fully representative—as two-thirds were male and half had atrial fibrillation which is usually associated with more severe strokes. Assessment of compliance with recommendations relied on information documented in the records and did require some clinical judgment by the auditors, although the use of predetermined criteria minimised the potential consequences of this.

Some of the compliance attributed to predefined exceptions (that were identified by the reviewers) may not have been the result of conscious decisions by clinical staff involved—e.g. patient frailty exclusions for statin use. The quality and effectiveness of any of the assessments made or treatments/services actually provided was not assessed. Several of the guideline recommendations proved difficult to review in this chart audit (e.g. cultural issues; and requirements for assessments of nutrition, mood, work, and leisure interests), hence they were excluded from analysis. The study also covered a period of full MDT staffing and results would be significantly affected by any shortfall or reduction in staffing.

Our study confirms that the size of the gap between current management of patients with acute stroke in HBH and that recommended by the latest guideline is manageable. Moreover, local full implementation of the guideline should be feasible without significant additional resources—at least for inpatient care. It also confirms that admission to a stroke unit facilitates compliance with best-practice recommendations and that good-quality care for people with stroke is not restricted to those admitted to tertiary teaching hospitals.

Our study also identified issues with diagnostic inaccuracy; failure to access stroke unit care; limited advice about driving; delayed use of aspirin; and readmissions with hypotension and on blood pressure lowering therapy that may be of wider concern.

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Salamol asthma inhaler fails roadside alcohol breath testing

Shane Reti

A failed roadside alcohol breath test to the Salamol asthma inhaler is presented.

Case report

In early April 2005, a 62-year-old non-alcohol-drinking Maori woman was assessed by a New Zealand Police roadside breath-testing (RBT) unit. A few minutes prior to testing, she had taken one puff of her Salamol inhaler. She was instructed to speak into a roadside breath testing device (RBTD), and was immediately informed that she had failed. She explained that she had just used her inhaler and was allowed to proceed on her journey. She then presented to her GP concerned that she had failed a breath test.

Discussion

In early 2005, PHARMAC advised that Ventolin would be replaced by Salamol (Figure 1) as a subsidised metered-dose asthma inhaler (MDI). Salbutamol is the active ingredient in both inhalers, however Salamol also contains ethanol (an alcohol) as a co-solvent whereas Ventolin does not. There are, to date, no reports of failed RBT to MDIs under New Zealand evidential breath-testing conditions.

Figure 1. Salamol asthma inhaler



A review of the overseas literature details positive alcohol breath tests to various MDIs containing ethanol as a co-solvent.^{1,2} Airomir, a MDI similar to Salamol (and containing salbutamol and ethanol), is reported as showing immediate post-inhalation breath-alcohol levels up to 350 ug/L.³ The active bronchodilator in some non-alcohol-containing MDIs has also been reported as giving elevated breath-alcohol recordings.⁴

With the assistance of Inspector Rob Lindsay (Road Policing Manager, Northland Police District Headquarters), and under the technical direction of Constable Kerry Neil, the author undertook further testing at the Whangarei Central Police Station in early April, 2005. The author is a 41-year-old Maori male weighing 85 kg, who is non-asthmatic and a lifelong non-alcohol drinker.

The first stage of roadside breath testing (RBT) in New Zealand involves speaking into the RBTD (Alotech AR1005). The author firstly established a baseline alcohol free 'pass', and then took two puffs of Salamol before speaking into the RBTD. The author recorded a 'fail' at the immediate assessment (alcohol was detected), and also a 'fail' at 1 and 2 minutes but a 'pass' at 3 minutes. This was repeated over a total of three attempts with one 'pass' at 2 minutes instead of 3 minutes.

For the second stage of RBT, a baseline 'pass' was again established, the two inhalations were repeated, and then the author blew into the Alotech AR1005 (this time through a mouthpiece). The result was an immediate 'pass' (no alcohol detected). This was confirmed over three attempts.

The third stage of alcohol breath-testing is a quantitative assessment blowing twice (2.5 minutes apart) into an Ethylometer (679T). A driver 'fail' in New Zealand is greater than 400 ug/L. Anecdotal reports suggest testing with a mouth rinsed in wine records approximately 40 ug/L. A negative baseline was established, and two puffs of Salamol inhaled. The results over three trials to the first blow were 1201, 1283, and 1861 ug/L respectively. The results to the second blow (2.5 minutes later) were all zero.

Further testing is required to confirm the significance of these findings, however the preliminary evidence shows that the alcohol in Salamol inhalers may cause failing of certain aspects of RBT under New Zealand evidential breath-testing conditions. Overseas recommendations for post-MDI re-testing range from 2–20 minutes.

Pending further studies, it is suggested that where Salamol has been recently used, RBT protocols wait for a minimum of 3 minutes before assessing 'spoken' RBTD testing or proceeding to stage-2 RBTD 'blow'-activated breath-testing.

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Colo-colonic intussusception secondary to a colonic lipoma diagnosed with preoperative CT scan

Timothy Eglinton, Philip Bagshaw, Sophie Bayliss

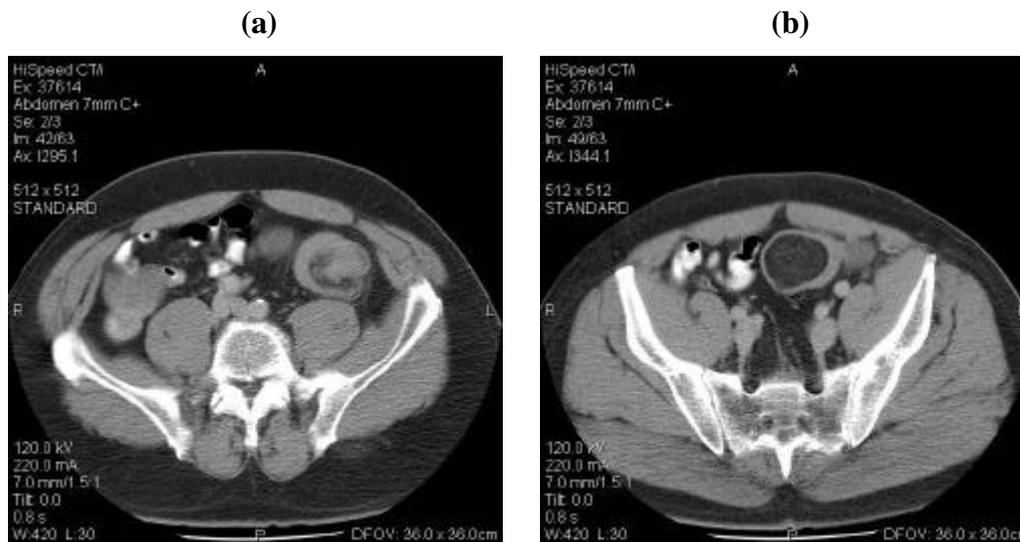
A case of colo-colonic intussusception caused by a 45 mm diameter submucosal lipoma (diagnosed definitively with a preoperative abdominal CT scan) is presented.

Case report

A 49-year-old Maori man presented acutely with a 2-week history of severe, intermittent, cramping, central abdominal pain on a background of less severe pain over several months. There was associated diarrhoea and intermittent fresh blood mixed in with the bowel motion. He had no previous abdominal surgery. There was a history of hypertension treated with quinapril.

On examination he was afebrile; pulse 68 per minute. The abdomen was mildly distended with a mass palpable in the left para-umbilical region. Digital rectal examination did not reveal any masses or blood.

Figure 1. CT scan of the abdomen showing target lesion in sigmoid colon (a) with a fat density area occupying the colonic lumen below this (b)



A computed tomography (CT) scan of the abdomen (Figure 1) revealed a ‘target’ lesion in the lower descending colon with a 50 mm fat density lesion just below this in the colonic lumen—suggesting a colo-colonic intussusception with a lipoma as the lead point. Colonoscopy confirmed a large, smooth, rounded polypoid mass prolapsing into the upper sigmoid colon (Figure 2).

Figure 2. Large pedunculated polyp in lumen of sigmoid colon at colonoscopy

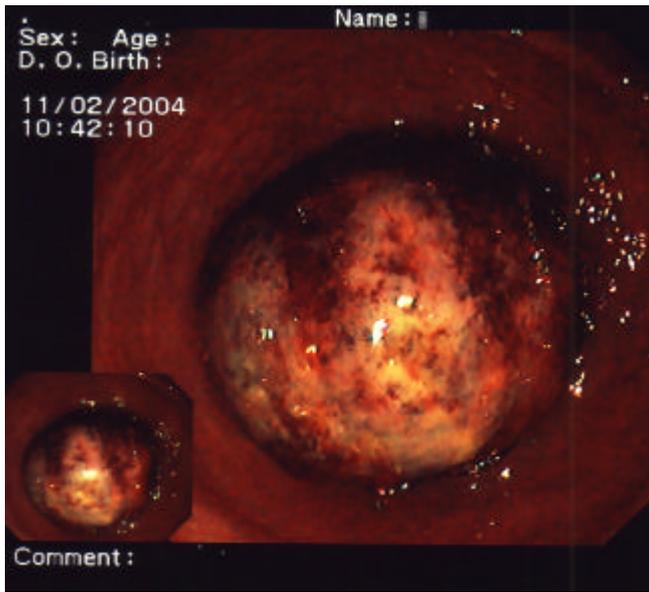
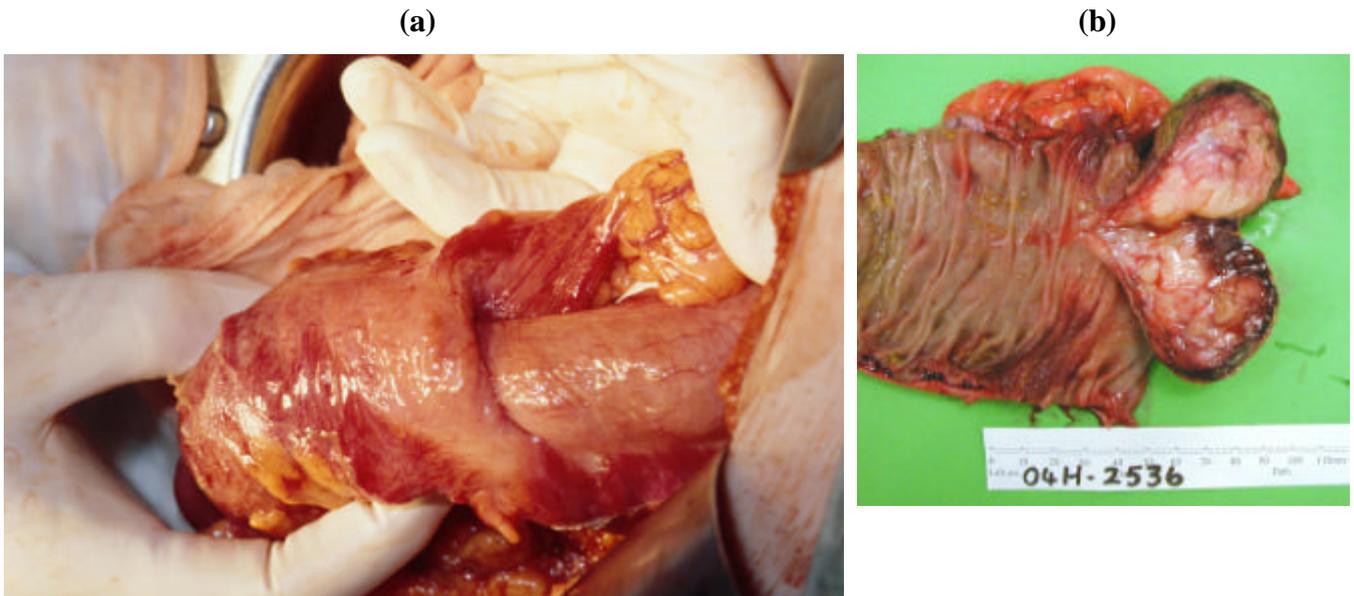


Figure 3. Intraoperative finding of intussusception of sigmoid colon (a). Resected specimen showing fatty submucosal lesion (b)



A laparotomy was arranged after preoperative bowel preparation. At surgery, a colocolonic intussusception of the descending colon was confirmed. See Figure 3 (a) (b). A wedge resection of the affected segment of colon with primary end-to-end anastomosis was then performed.

The patient made a satisfactory postoperative recovery. Histology confirmed the preoperative findings, with a 45 mm submucosal lipoma acting as a lead point for the intussusception.

Discussion

Intussusception occurs when a segment of bowel (intussusceptum) telescopes into the segment adjacent to it (intussusciens). The condition occurs more frequently in children, where enlarged Peyer's patches are the most common lead-point for the intussusception. In children, the condition is often managed non-operatively with pneumatic reduction.

In contrast, intussusception in adults is rare, accounting for 5% of all intussusceptions and 1% of bowel obstructions.¹ Here the intussusception is associated with a pathological lead-point in 90% of cases.² A variety of such lesions have been described as the lead point.

Begos et al³ reviewed the causes of 1048 cases of adult intussusception from nine different series. They found the frequency of intussusception occurring in the small bowel was approximately twice that of the large bowel. In the small bowel, the aetiology was more often benign, including; adenomatous polyps, Meckel's diverticulum, inflammatory lesions, lipomas, and other soft-tissue neoplasms and adhesions. Fourteen percent of the small bowel intussusceptions harboured a malignancy including; metastases (especially melanoma), adenocarcinoma, carcinoid, and lymphoma. In contrast, the majority (58%) of intussusceptions in the large bowel had a malignant lead point. Most often this was adenocarcinoma, but, lymphoma and leiomyosarcoma were also reported. Benign colonic lead points included adenomatous polyps, endometriosis, and previous surgical anastomoses.

Colo-colonic intussusception caused by a lipoma, as in the present case, has previously been reported on at least 33 occasions.⁴ Colonic lipomas are rare in the general population⁵ and the majority are asymptomatic. They occur more commonly in the caecum and ascending colon, although left-sided lesions may cause intussusception more frequently.⁶

Adult intussusception usually has a chronic or sub-acute presentation and is often difficult to diagnose. Symptoms of bowel obstruction are most common, followed by rectal bleeding. An abdominal mass is palpable in 24–42% of patients.³ Abdominal CT is the most accurate imaging modality in diagnosis⁷ with the pathognomonic appearance of a 'target' lesion. In the present case, the CT scan not only demonstrated the intussusception, but also provided a definitive diagnosis of the lipoma as the lead point which facilitated appropriate surgical management. Magnetic resonance imaging (MRI), barium studies, and ultrasound scanning can also demonstrate intussusception.

Due to the high incidence of pathological lesions associated with adult intussusception, laparotomy is almost always necessary. Both intraoperative reduction and resection without reduction have been advocated. The advantages of intraoperative reduction are that if a benign cause is identified then an unnecessary major resection can be avoided. However, attempted reduction of a malignant lesion carries the theoretical risk of dissemination of that malignancy. In instances of small bowel intussusception with a previous history of surgery or trauma then reduction can be attempted and this, in combination with adhesiolysis, may constitute definitive treatment. For colonic intussusceptions, resection without reduction is recommended due to the high incidence of malignancy.^{1,3} For smaller, benign lesions, successful

colonoscopic hydrostatic reduction followed by colonoscopic polypectomy has been reported.⁸

In summary, intussusception is rare in adults, but should be considered as a cause of chronic and sub-acute abdominal symptoms due to the high incidence of associated pathological lesions.

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Valuing prevention: discounting health benefits and costs in New Zealand

Richard Milne

It is generally agreed that *prevention is better than cure*: the fence at the top of the cliff is preferable to the ambulance at the bottom. Public health programmes such as the National Cervical Screening Programme, BreastScreen Aotearoa, tobacco control, neonatal screening, prophylaxis against recurrent rheumatic fever, and the Immunisation Schedule were developed on this premise. The same principles apply to smoking cessation, antihypertensive and lipid-lowering therapies, and tamoxifen.

But is *prevention* a good use of healthcare resources? How can benefits that are realised immediately (such as resolution of an acute infection) be compared with benefits that occur in the future (such as avoidance of the disability ensuing from breast or lung cancer, meningitis or stroke)?

Internationally, it is well recognised that *future* costs and benefits of healthcare expenditure must be adjusted downwards to take into account both the 'social opportunity cost' of investment (i.e. alternative uses for expenditure) and the 'social rate of time preference' (individuals prefer to defer costs but to enjoy benefits sooner rather than later). With this adjustment ('discounting to present value'), a healthcare funder can compare programmes that deliver future benefits with those that deliver immediate benefits.¹⁻⁴

Discounting reduces future annual costs and/or benefits by multiplying them by $1/(1+d)^n$ where d is the annual 'social discount rate' and n is the year in the future. There is consensus that future costs should be discounted and that future health outcomes or benefits should also be discounted, usually at the same rate.¹⁻⁸

Discounting is independent of inflation and the 'real discount rate' excludes inflation.³

Discounting allows Government departments, funding agencies, and formulary managers to compare and rank programmes with future costs and/or benefits against those with present costs and/or benefits. Treasury's discount rate for *costs* can be proxied by the real (i.e. inflation adjusted) interest rate on a *risk-free* long term investment⁵—this is consistent with international thinking about discounting.²

In 2002, the discount rate was estimated at 5.6% per annum, based on the nominal rate of return of 7.2% on a forecast 10-year Government bond rate adjusted for inflation.⁵ In practice, Treasury utilises an historic discount rate of 10% per annum in policy development⁹ and has not been able to provide information on why 10% was originally selected. Importantly, the discount rate (used by Treasury to guide policy development) was not developed for comparison of health benefits or outcomes, nor was it mandated for use by the health sector.⁹

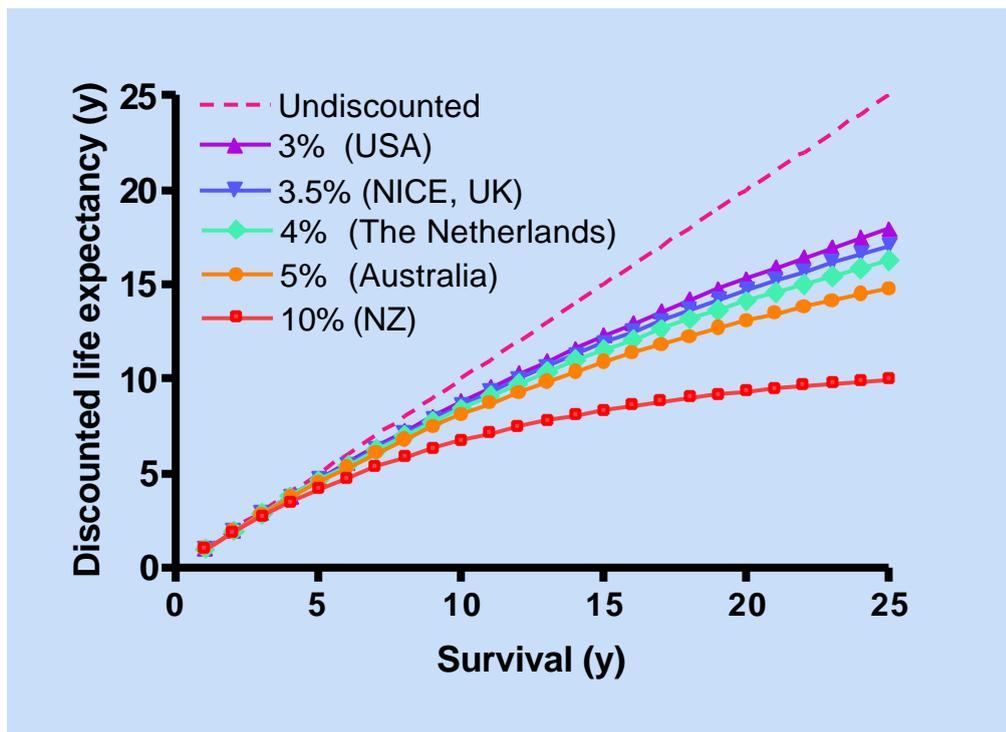
When a country develops a discount policy for use in the health sector, it must carefully consider the impact on future health benefits and costs. Recent 'burden of disease' analyses by the Ministry of Health¹⁰ discount future health benefits at 3% per annum, consistent with US⁸ and WHO¹¹ recommendations. In contrast, PHARMAC

mandates a 10% discount rate for both costs and health benefits in the cost utility analysis that it ‘prescribes’ to assist in ranking new therapies and new indications for funding. This rate was based on the *risk-inclusive* long term cost of capital to the Health Funding Authority in July 1999.⁶

Discounting can have a profound impact on the present value of future health benefits. For example, a benefit that is achieved 10 years from now is reduced by 29% (i.e. $1 - [1/1.035]^{10}$) if the discount rate is 3.5% per annum (as in the UK) but by 61% ($1 - [1/1.1]^{10}$) if the rate is 10%. The same applies to future cost savings to the healthcare system. For example, a \$5000 hospitalisation that is averted 10 years in the future by lipid lowering therapy would be valued by PHARMAC at about \$2000, thereby implicitly devaluing the intervention providing that economic benefit.

Cumulative health benefits are reduced even more; for example, preventing the death of one infant by vaccination would achieve a gain of nearly 80 life-years, which amounts to 28 life-years discounted at 3.5% (as in the UK) but only 11 life years discounted at 10% (as in New Zealand). Discounting at 10% per annum virtually extinguishes incremental survival benefits beyond 20 years (Figure 1).

Figure 1. The present value of survival for up to 25 years, at various discount rates



Since the cost-effectiveness ratios that are used to compare health programmes are inversely proportional to incremental health benefits, discounting these benefits at 10% per annum can profoundly increase cost-effectiveness ratios of preventive healthcare programmes, particularly those targeted to children. This will drastically reduce the apparent value of such programmes or therapies relative to programmes

with short-term health benefits. The issue is compounded if the preventive programme reduces future healthcare expenditure (e.g. by averting hospital admissions), because this is also devalued by discounting.

High discount rates are particularly debilitating for preventive healthcare and public health programmes that target fatal illnesses in young people. For example, the life-years gained by immunisation against paediatric meningococcal disease cumulate for many years after the period of vaccination. Furthermore, many of the costs of the disability experienced by some survivors of meningococcal disease are incurred well into the future. The cost to the Ministry of Education for a child who is profoundly deaf can be as much as \$25,000 per year for up to 15 years; and the cost of residential care for an adult with severe intellectual and/or physical impairment can be as high as \$50,000 per year. If these costs in the distant future are heavily discounted, their significance for policy development is diminished enormously.

Table 1 shows the results of an economic analysis of the current paediatric meningococcal vaccination programme.¹² Because ‘future life-years gained’ and ‘future costs averted’ are both discounted, the cost per quality adjusted life year (QALY) or life year gained from a Government perspective is over 10-fold higher at 10% compared to 5% discount rate, when all relevant costs are included. From a societal perspective, immunisation even provides ‘net present value’ savings (negative costs) at the 3% discount rate that is recommended for use in the US.⁴

Table 1. Incremental cost-effectiveness ratios for meningococcal vaccination of individuals under 20 years of age, from a societal or Government perspective¹²

Discount rate	Cost per QALY (x1000)		Cost per life year gained (x1000)	
	Societal	Government	Societal	Government
0%	-\$36	-\$19	-\$48	-\$25
3%	-\$14	\$27	-\$19	\$36
5%	\$6	\$68	\$8	\$91
10%	\$64	\$191	\$90	\$266

Although each country must decide on its own social rate of discount, international usage can guide New Zealand. All but 2 of the 21 countries that have formal guidelines for pharmacoeconomic analysis (including our major trading partners) have discount rates between 3% and 5%. The exceptions are Spain (6%) and New Zealand (10%). International discount rates bear no relationship to population or per capita GDP. Compared to the rest of the world, New Zealand is discriminating against prevention in general and against public health programmes in particular. Reducing the discount rate would change priority rankings for healthcare programmes in favour of prevention, at no additional cost to the healthcare budget.

The New Zealand Health Strategy, the Primary Healthcare Strategy, the Child Health Strategy, the National Drug Policy, the New Zealand Strategic & Action Plan for Public Health, the National Mental Health Strategy, and the Maori Health Strategy are directed towards improving population health (including prevention of disease and injury as fundamental principles). A high discount rate runs counter to all these initiatives, however.

Now that economic analysis is increasingly required as an input to healthcare funding decisions (both internationally and locally), it is time to reconsider discounting. Since the budget for public health in New Zealand is dwarfed by that for personal health, and could be further compromised by continued use of a high discount rate, those who work in the public health sector should take the lead, along with a national panel of stakeholders including Treasury, the Ministry of Health, District Health Boards, and PHARMAC.

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Faecal calprotectin: the case for a novel non-invasive way of assessing intestinal inflammation

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The human gut is long and tortuous

Thus begins the 'bible' of endoscopy training *Practical Gastrointestinal Endoscopy* by Cotton and Williams.¹ The diagnosis of intestinal disorders has been revolutionised by the advent and development of flexible endoscopy which has been embraced by gastroenterologists and surgeons worldwide.

Flexible endoscopy has provided a window into the gastrointestinal tract, improving diagnosis of gastrointestinal disorders. Patients with gastrointestinal symptoms that may be attributable to inflammation are usually investigated with a combination of endoscopy, blood tests, radiology, and clinical findings. However each of these investigations has limitations. Endoscopy is invasive and involves risk for the patient. Blood tests such as erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are non-specific for intestinal inflammation, while both blood tests and radiological investigations are not sufficiently sensitive for the diagnosis of luminal disorders. There is also a poor correlation between gastrointestinal symptoms and the presence of gastrointestinal pathology.

Faecal calprotectin (FC), a novel marker of intestinal inflammation, may play a role in clarifying the presence of pathology, reducing the need for endoscopy in some patients, and may also provide good prognostic information. Calprotectin is a 36kDa protein comprising one light and two heavy chains. This cytosolic protein is found in neutrophils and certain macrophage subtypes (CD14+) but is not present in T or B lymphocytes.

Soluble calprotectin has both bacteriostatic and cytokine-like actions² and has been measured clinically in a variety of body fluids (including pleural and synovial fluid)^{2,3} and is present in concentrations proportional to the degree of inflammation. However it has displayed the most promise in the measurement of intestinal inflammation for which conventional diagnostic modalities are often invasive. It is also able to identify inflammation in the small bowel, an area which is not able to be examined fully with standard endoscopy equipment.

Faecal calprotectin is measured at Canterbury Health Laboratories, Christchurch at a cost of \$(NZ)90 per assay. Calprotectin is measured by a single step enzyme linked immunosorbant assay (ELISA) using antibodies against six epitopes found on the calprotectin molecule. Commercially available calprotectin kits such as the Phical (Eurospital, S.p.A. Trieste, Italy) ELISA has between and within assay variations of 14.8% and 1.9% respectively. The within subject variation for faecal calprotectin concentration was found to be 22%.^{4,5} This variation is not usually clinically relevant as most abnormal results tend to be elevated well above the normal range, although care should be taken in the interpretation of marginally elevated results.

Faecal calprotectin can be measured in a single stool, rather than a 24-hour or four-day stool collection, thus improving convenience for patients and laboratory staff. Only 5 grams of faeces is required to be collected in a standard faeces collection pottle. Additionally, calprotectin is very stable due to calcium binding, and specimens can be stored for up to 7 days at room temperature before being processed. This allows specimens from other centres to be sent to a reference laboratory.^{6,7}

Concentrations of faecal calprotectin are strongly correlated with more invasive measures of intestinal inflammation including colonoscopy, radioactive white cell excretion, and intestinal permeability studies (Table 1). These investigations are the most sensitive available for diagnosing and assessing inflammatory bowel disease but are also invasive, expensive, and may be poorly tolerated by patients.

While faecal calprotectin is a very sensitive measure of intestinal inflammation, it is not specific for the cause of inflammation. Any cause of intestinal inflammation is able to produce an elevated concentration including inflammatory bowel disease (IBD), infective colitis, diverticulitis and colorectal cancer. Therefore the use of this investigation has potential application in clinical situations where the result will be clinically useful, namely distinguishing intestinal inflammation from functional disorders, and to monitoring the extent of inflammation during therapy for patients with IBD.

Table 1. Studies correlating faecal calprotectin (FC) with other measures of intestinal inflammation used in inflammatory bowel disease (IBD)

Author	IBD	No of Subjects	Compared Test	r ²
Berstad et al, 2000 ⁸	UC & CD	38	Intestinal Permeability ⁵¹ Cr-EDTA urinary excretion	0.79
Roseth et al, 1999 ⁹	CD	19	¹¹¹ Indium-labelled Granulocyte excretion	0.87
Tibble et al, 2000 ¹⁰	CD	22	¹¹¹ Indium-labelled Granulocyte excretion	0.80
Tibble et al, 2000 ¹¹	CD	43	Crohn's Disease Activity Index (CDAI)	'significant correlation'
Roseth et al, 1997 ¹²	UC	62	Endoscopic and Histological grading	'significant correlation'
Thomas et al, 2000 ¹³	Pouchitis	24	Endoscopic, Histological, and Symptom-based grading	0.6

UC=Ulcerative colitis; CD=Crohn's disease

Triage of patients for colonoscopy

Faecal calprotectin has been shown to reliably discriminate between patients with inflammatory bowel disease and those without.^{11,14,15} Faecal calprotectin thus offers the potential for triage of patients presenting with diarrhoea, and to accord an appropriately high priority to those most likely to have bowel pathology.

In an unselected group of 220 patients presenting with chronic diarrhoea to a general gastroenterology outpatient clinic in the United Kingdom, a normal faecal calprotectin value (<30 mg/L) was shown to be highly predictive of the absence of intestinal inflammation.¹¹ Patients with faecal specimens that were positive for pathogens as well as patients with inflammation seen on rigid sigmoidoscopy were excluded from analysis as these diagnoses can be easily made in the outpatient setting.

The patients gave a stool specimen that was analysed for faecal calprotectin. They were then investigated normally for chronic diarrhoea with a variety of investigations including colonoscopy. The diagnoses for the 220 patients included Crohn's disease [CD] (31), irritable bowel syndrome (169), diverticulosis (19), colorectal cancer (5), and several miscellaneous conditions (19). The sensitivity and specificity of faecal calprotectin for distinguishing Crohn's disease from irritable bowel syndrome were 100% and 97% respectively with a cut-off of 30 mg/L.¹⁴

These results were significantly better than those obtained for C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) in the same group of patients. Similar results were obtained by Limburg et al who found that faecal calprotectin was superior to faecal haemoglobin for identifying colorectal inflammation.¹⁵

In a study of adults and children presenting with chronic diarrhoea of unknown origin, faecal calprotectin was found to be an accurate marker of IBD in both adults and children.¹⁶ False negatives were seen in coeliac disease and false-positive results in cirrhosis or users of non-steroidal antiinflammatory drugs.¹⁶

These studies show that faecal calprotectin may be a useful triage tool for identifying those patients who are most likely to have intestinal inflammation. Waiting lists for non-urgent colonoscopy may be many months in some centres and an elevated faecal calprotectin result may indicate that a patient requires urgent colonoscopic assessment. On the other hand, a faecal calprotectin concentration less than 30 mg/L is unlikely to be associated with intestinal inflammation and investigations can be tailored appropriately.

Faecal calprotectin and colorectal cancer

Faecal calprotectin has also been investigated in the context of colorectal cancer. One study suggested that faecal calprotectin has a negative predictive value for colorectal neoplasia of 99% (using a cut off of 50 ug/g), thus making it especially useful for ruling out colorectal malignancy.¹⁴

In a multicentre study of first-degree relatives of patients with colorectal cancer undergoing screening colonoscopy, faecal calprotectin was found to have a sensitivity and specificity of identifying colorectal cancer and adenomatous polyps of approximately 80% and 70% respectively.¹⁷ Moreover, faecal calprotectin has been shown to be more sensitive than Haemoccult II, although less specific (Haemoccult II sensitivity 40%, specificity 90%).¹⁸

In a study of patients with newly diagnosed colorectal cancer, all patients had faecal calprotectin elevated above 10 mg/L.¹⁹ Median concentrations did not differ between tumour stages, although concentrations were slightly lower in Dukes stage A than in the rest of the stages.¹⁹ There were no differences in concentration of faecal calprotectin related to the localisation, size, or histological grading of the carcinoma.¹⁹

In another prospective study of 412 high-risk subjects, however, faecal calprotectin levels did not differ significantly between subjects with and without colorectal neoplasm, and faecal haemoglobin was found in this study to be a better biomarker of colorectal neoplasia.²⁰

While these results suggest that faecal calprotectin is a promising screening test for colorectal cancer in high-risk populations, similar studies have not been performed in the general population.

Patients previously diagnosed with Crohn's disease

As noted in a previous section, there may be a poor correlation between a patient's symptoms and the presence of intestinal pathology or inflammation. Symptoms caused by IBD can be very similar to the symptoms of functional diseases such as irritable bowel syndrome. Therefore it is important (for therapeutic and prognostic reasons) to distinguish between these two conditions. Additionally, patients with IBD are at least four times as likely as controls to experience irritable bowel syndrome-like symptoms.^{21,22} Faecal calprotectin is a useful tool to distinguish whether a symptomatic patient with Crohn's disease has active intestinal inflammation, or is experiencing functional disease symptoms.

Furthermore, faecal calprotectin has been shown to be a prognostic marker for relapse in patients with IBD who are in remission. Tibble et al assessed 80 patients with IBD (43 CD and 37 UC) who were all in remission as defined by clinical disease indices or Harvey Bradshaw Index.¹⁰ Patients with significant comorbidities and those who had required an increase in IBD treatment in the previous month were excluded. A single stool sample for faecal calprotectin was obtained in addition to blood tests for ESR and CRP. Patients were followed up for 12 months. If they developed symptoms attributable to IBD they contacted their physician for an appointment and disease indices were repeated.

Twenty-five of 43 (58%) CD patients and 19 of 37 (51%) UC patients relapsed over the 12-month period. Comparison of laboratory parameters between those who did and those who did not relapse showed that the baseline faecal calprotectin was significantly higher in those whom relapsed (mean of 123 mg/L) compared to those who did not (mean of 32 mg/L). These findings were statistically significant for both patients with CD and UC ($p < 0.0001$).

Baseline ESR and CRP did not differ between those who relapsed and those who remained in remission. Receiver Operator Curve analysis showed an optimal cut-off of 50mg/L, with a sensitivity and specificity of 90% and 86% respectively for predicting relapse in this group of IBD patients in remission. This equates to a relative risk of relapse of 13.4 if faecal calprotectin is greater than 50 mg/L in IBD patients in remission.

Clinical assessment of intestinal inflammation is problematic. The subjective nature of many gastrointestinal symptoms, including abdominal pain, may cause clinicians to under- or overestimate the degree of inflammation present in the intestine. The majority of medical therapies for IBD, such as 5-aminosalicylates, corticosteroids, immunomodulators and biologic agents, exert their effect by reducing inflammation. Therefore the use of these agents is best guided by the degree of inflammation present in the intestine. Faecal calprotectin is a non-invasive means of assessing intestinal

inflammation and is superior to ESR and CRP, both of which do not measure intestinal inflammation directly. Additionally, faecal calprotectin has been shown to improve, along with clinical indices, when IBD patients are treated with corticosteroids or azathioprine.²³ This has led to investigators using faecal calprotectin in some clinical trials as an intermediate marker of efficacy.

Elevated faecal calprotectin concentrations in IBD patients in clinical remission may become an indication for more aggressive medical treatment with the aim of maintaining remission. A similar approach can be seen in other inflammatory conditions such as rheumatoid arthritis where the aim of therapy is reduction in inflammation, not only palliation of symptoms.²⁴ Such an approach may even reduce long term complications of these diseases such as epithelial dysplasia, colorectal cancer and fibrous stricture formation.

Conclusions

Faecal calprotectin offers a non-invasive yet sensitive method of assessing the intestine for inflammation. The major application of the test is in distinguishing inflammation from a functional bowel disorder, however there is a limitation in that the test does not determine the cause of inflammation. Clinical scenarios (where faecal calprotectin measurement has been shown to be useful) include diagnostic resource allocation for patients presenting with chronic diarrhoea and in determining whether or not gastrointestinal symptoms are inflammatory or functional in patients with known IBD.

For patients with IBD, we would suggest that this investigation is particularly useful for symptomatic patients who have a normal or slightly raised ESR or CRP. It is likely to also provide useful prognostic information concerning the likelihood of future relapse. It is likely that faecal calprotectin could be incorporated into diagnostic algorithms to provide potential patient benefit and financial cost savings.

Finally, faecal calprotectin may provide the impetus for a paradigm shift in the way in which IBD patients are treated. In the future, the aim of therapy may be complete mucosal healing as measured by faecal calprotectin, rather than symptom palliation. The non-invasive yet sensitive nature of faecal calprotectin may provide a more acceptable window into the 'long and tortuous' human gut.

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The scope and limitations of balneological treatment: diseases of the nervous system

This extract comes from an article by Dr Arthur Wohlmann that was published in the New Zealand Medical Journal 1905, Volume 4 (14), p104–16

Turning next to the group of *diseases of the nervous system*, we may for convenience divide them into those of central and those of peripheral origin. It is, of course, in the former class that we are most confronted with the limitations of balneological treatment.

It goes without saying that we cannot expect to undo the pathological conditions in the central nervous system; but we can sometimes minimise the evil *results* of those changes. Thus, provided the nervous legion has not gone too far, degeneration may be delayed or recuperation may be hastened in tissues whose innervation is so feeble that without such aid they would have lacked the necessary *vis a tergo* for recovery.

A case in point is the *hemiplegia* left after cerebral haemorrhage. Few cases require more careful handling, and it is always a most difficult thing to decide whether in any given case one should advise the inevitable risk of treatment. Unless the patient is going to be under absolute supervision, I would always advise that the risk is too great; but, given due supervision, it is worth while for many cases to run the risk.

In *ataxic spinal* cases, again, while the disease itself is untouched, I have seen markedly beneficial results from carefully graduated educative exercises of the affected limbs in cases in which the central disease is either stationary or only very slowly progressive. Such treatment can be obtained at Rotorua, and is exceedingly difficult to carry out at home.

Neurasthenics often do surprisingly well at Rotorua. It is almost a selfish regret that I say this, as any one who has had the care of many of these cases will readily understand. Douche massage, and especially the Scotch douche, is the form of treatment generally indicated, and this is generally combined with electric treatment and frequently drugs, with, of course, such moral suasion as is possible.

The same remarks apply to many *hysterical cases* and functional paralyses, and here again the suggestive influence of the novel surroundings doubtless assists the operator.

Insomnia, especially when associated with high blood-pressure, is frequently relieved at any of the spas.



Jaundice

A 65-year-old man presented with painless jaundice. He underwent an imaging investigation (Figure 1 and Figure 2).

Questions:

What is the investigation shown in Figure 2 and what is the large hyper-intense mass (white arrow) shown on the T₂ Axial MRI in Figure 1?

Figure 1

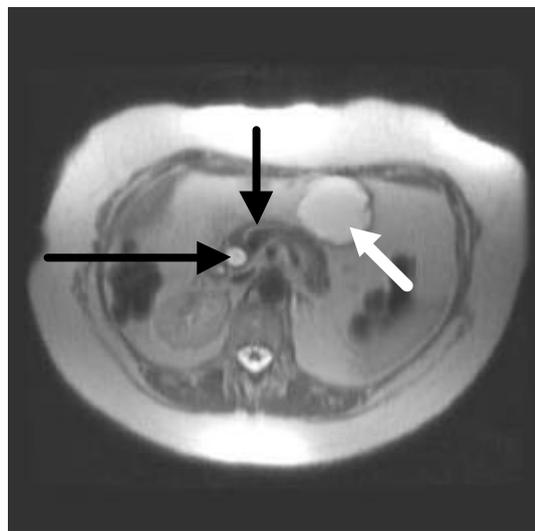
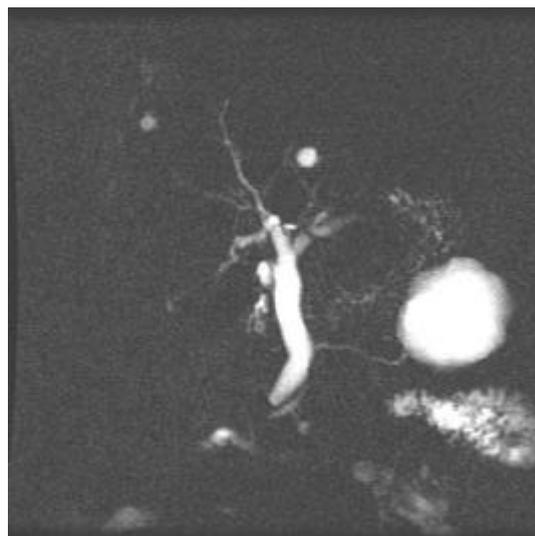


Figure 2



Answers:

The patient has undergone a magnetic resonance cholangiopancreatogram (MRCP). This is a non-invasive method of evaluating the biliary tree in patients with obstructive jaundice, and has replaced diagnostic endoscopic retrograde cholangiopancreatography (ERCP) in many circumstances.

The bile and pancreatic ducts are shown as hyper-intense tubular structures. The signal arising from the water in the intraluminal secretions. The large hyper-intense mass is a hepatic cyst as in the MRCP fluid is hyper-intense on T₂ images. The long black arrow indicates the common bile duct and the short black arrow indicates the pancreatic duct.



Transient ischaemic attack (TIA) or stroke?

Most physicians learned that a TIA was a neurologic deficit that began rapidly, disappearing within 24 hours, and was caused by underlying cerebrovascular disease. This definition is under seige—and why not? In most areas of human endeavour it would be nonsensical to define 24 hours as transient. A more realistic timing would be 1 hour, however most true TIAs (that is, not strokes) last less than 15 minutes. Furthermore, in a recent review, it is stated that “we have now learned, by using diffusion-weighted magnetic resonance imaging (MRI), that many spells that were formerly called TIAs are actually strokes.

So, should all TIA patients have MRI of their brains? Commonsense would say not, as the management of TIA and small stroke is identical.

Ann Intern Med 2005;142:28-36

Ximelagatran versus heparin/warfarin

Clinicians are aware that heparin and warfarin can be used successfully for the prevention of venous and arterial thromboembolism for a wide range of clinical indications, including atrial fibrillation and venous thromboembolism.

But, particularly in the aged, they are underused mainly because of the risk of bleeding—the overall incidence of major haemorrhage due to oral anticoagulants has ranged from 1.2% to 7.0%, but is lower (0.5%–4.2%) in clinical trials with rigorous management of selected patient populations.

Enter Ximelagatran, an orally absorbed thrombin inhibitor with a predictable effect, no monitoring of thrombin time needed and it is cleared entirely by renal excretion within 12 hours. Many randomised trials, including two in JAMA (9 February 2005) confirm that ximelagatran is as effective as heparin/warfarin without the hassles of monitoring blood tests and with somewhat less bleeding.

There must be a catch (yes of course)—it is more expensive. Also ximelagatran has been associated with a 6% incidence of asymptomatic increases in alanine aminotransferase (ALT) levels to more than 3 times the upper limit of normal. This decreased over time whether or not the drug was discontinued.

JAMA 2005;293:736–9

Masculine osteoporosis

Androgen-deprivation therapy, orchidectomy, antiandrogens such as cyproterone, and gonadotropin-releasing hormone agonists have been shown to be beneficial in decreasing morbidity and improving survival in metastatic prostate cancer patients.

The obvious adverse effects—impotence and gynaecomastia—are well known. And now a less well-known problem has been documented.

After perusing the records of 50,613 men with a diagnosis of prostate cancer, researchers in Texas have found that androgen-deprivation therapy for prostate cancer increases the risk of fracture.

Of men surviving at least five years after diagnosis, 19.4% of those who received androgen-deprivation therapy had a fracture, as compared with 12.6% of those not receiving androgen-deprivation therapy ($P < 0.001$).

N Engl J Med 2005;352:154–64

Screening for cervical cancer

Papnicolaou screening for cervical cancer was introduced in the United States in 1941. This simple test has been an enormous success—both in terms its widespread acceptance and the sustained reduction in cervical cancer mortality that followed—the Pap smear has come to exemplify a model cancer screening test against which other such tests are now measured.

Recently, however, expert opinions (for example both the American College of Obstetricians and Gynecologists and the American Cancer Society) state that cervical cancer screening intervals can be extended to every 2 or 3 years in women aged 30 years and older with three or more prior normal Papanicolaou test results, a group at low risk for cervical neoplasia.

A recently reported study investigated how women in the United States responded to this development. Somewhat surprisingly, they report that most women in the United States prefer annual Pap smears and are resistant to the idea of less intense screening.

Am J Med. 2005;118:151–60.

Thoughts on blood transfusion

Methuselah and other pundits used to tell their juniors that a 1-unit blood transfusion should never be given—if you don't need at least 2 units, you don't need any. Now that also may be incorrect as a recent small study trial found that 2 units of red cells had no effect on oxygenation in patients in intensive care units whose haemoglobin concentration was below 80 g/L.

And in a similar vein (no pun) another paper in the same journal stated that blood transfusion in otherwise stable patients with acute coronary syndrome who acutely develop anaemia during hospitalisation may increase the risk of death, especially if the haematocrit level is higher than 25%. Then of course there is the risk of adverse reactions such as Hep B, Hep C, and HIV transmission—fortunately all very rare.

Finally I was staggered to find that a unit of blood cost £120—about \$310 in NZ I guess.

BMJ 2005;330:104–5



Is the Internet as essential as a stethoscope for patient care?

Janes et al surveyed North Island rural general practitioners and reported in the *Journal* that less than 10% of the respondents used the Internet more than twice-a-week to help with patient care.¹ Nearly a third of practitioners did not have Internet access at work.

These findings raise an interesting issue: should Internet access be required for every health professional? There is increasing evidence on the value of computers in providing clinical support and how that support needs to be structured.² The Internet potentially allows “evidence adaptive” support, with automated and continuous updating to reflect the most recent advances in clinical science and local practice knowledge.³ Use of the Internet is also likely to be of benefit by providing ready access to up-to-date high quality guidelines and clinically relevant information,⁴ as well as email contact with colleagues, laboratories and (even!) patients. (Email patient consultation could be problematic, but could help access and cost-effectiveness health care—if properly managed and current financial incentives were changed.)

In addition to its *potential* value for improving patient care, there are compelling public health reasons for universal Internet access by all health professionals. The Internet provides a means to rapidly disseminate urgent public health messages, for example, to highlight awareness of a new threat. We saw this work effectively with SARS, where the Internet was a key tool for information dissemination to health professionals. It would also be relevant to other emerging threats such as pandemic influenza. For example, information resources for both health professionals themselves and for them to give to patients on influenza are available on authoritative Internet sites (eg, the CDC site⁵). In addition to global alerts, practitioners could also be immediately advised of local outbreaks.

Given the limited time that busy practitioners have to look for information on the Internet, the Ministry of Health should consider establishing an email list for providing information that can instantly be disseminated to all health professionals. There would need to be judicious use of such email to avoid information overload, by limiting the amount of communication (both the number of emails and the size of each one) and to give an indication of the priority of each message. In general, the email alerts should be limited to important public health threats or key information needed for service delivery (as for example the supply of influenza vaccine).

The Internet also provides a potential way to rapidly obtain surveillance data from practitioners on either a routine basis or for the emergency surveillance that would be needed as part of an early response to pandemic influenza or another SARS-like pandemic.

Given these potential benefits, how can they best be realised? Already, ACC has established a benefit of up to \$1200 for general practices that lodge forms via a broadband Internet connection.⁶ The Ministry of Health and health professional faculties and colleges now need to develop a strategic vision on how Internet use can improve both public health responsiveness and individual patient care.

It must soon be time that practising medicine without Internet access would no more be contemplated than doing so without a stethoscope.

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Single embryo transfer in IVF treatment

Murray, Hutton, and Peek have written a thought-provoking article regarding elective single embryo transfer in IVF (in vitro fertilisation) treatment (*Responsible IVF treatment in New Zealand is the preferential transfer of a single embryo*. N Z Med J. 2005;118(1212). URL: <http://www.nzma.org.nz/journal/118-1212/1383>). They state that 'Unfortunately, there is no prospective randomised study to compare outcomes of single and double embryo transfer.'

However, I would like to bring to the readers' attention that there are at least three published prospective randomised trials assessing single versus double embryo transfer.

In 1999, Gerris et al published a small, randomised study of a very select group of women undergoing one fresh IVF/ICSI (intracytoplasmic sperm injection) cycle in Belgium.¹ They found a lower ongoing pregnancy rate and lower multiple pregnancy rate in the single embryo transfer group, probably because frozen transfers were not included.

In 2001, Martikainen et al from Finland published a larger trial, still of 'good prognosis' women, but including both fresh and subsequent frozen transfers in the follow-up.² The live birth rate was 39% in the single embryo transfer group and 51% in the double embryo transfer group. The difference was 'not significant'. The percentage of twin pregnancies was 7% and 31% respectively.

The largest trial, published last year, is a multicentre prospective, double-blinded, randomised trial of 661 patients from Scandinavia.³ Women under 36 years of age with at least two good-quality embryos were randomised to receive either a fresh single embryo transfer and subsequent frozen single embryo transfer if no live birth ensued, or to a fresh double embryo transfer. The cumulative live birth rate was 39% in the single embryo transfer group and 43% in the double embryo transfer group, which was not a statistically significant difference. Multiple pregnancies accounted for 0.8% and 33% of live births respectively, a significant difference with p value <0.001.

There is also a multicentre randomised trial of single versus double embryo transfer underway in the UK at present.

All the published studies specifically recruited younger women with good embryos. In this group, it would appear that a reduction in multiple pregnancies can be achieved through elective single embryo transfer, without a significant reduction in the live birth rate. However, not all women undergoing IVF/ICSI treatment fall into this group and therefore a blanket policy of only single embryo transfer is not appropriate.

I would agree with the authors conclusion that it is time to consider a policy of single embryo transfer in selected women.

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Raloxifene for Hormone Replacement Therapy (HRT)

If a benign neurological capacity in women switched off their periods and made them infertile at the age of 50 years, one would not dream of interfering. However, as the menopause is caused by the ovary running out of eggs, and the pituitary responds to the resulting ovarian hormone deficiency by unavailingly increasing its secretion of gonadotrophic hormones, one is tempted to correct the ovarian hormone deficiency, especially as it is associated with distressing vasomotor and mood symptoms and osteoporosis with danger of hip and other fractures.

As a Clinical Endocrinologist, I was tempted to prescribe ovarian hormone replacement therapy many years ago, but was restrained by awareness that this would increase the risk of breast cancer. This danger has now been demonstrated by epidemiological studies. The very good news for women comes from superbly successful research in a drug company called ICI Pharmaceuticals, now AstraZeneca.

Research workers in this company, exploring the effects of modifying the oestrogen molecule, produced tamoxifen (trade name Novaldex). This modification of the oestrogen molecule is a competitive antagonist for the breast receptors but an agonist elsewhere in the body. This is a providentially useful therapeutic characteristic, with benefit comparable to that of penicillin!

Tamoxifen is a first-line adjuvant treatment for breast cancer and is excellent for hormone replacement therapy. However, it slightly increases the risk of uterine tumours,¹ so it is now second to its close relative, raloxifene (Evista), which does not appear to do this,² as the ideal hormone replacement treatment for post-menopausal women.

As well as protecting against breast cancer and osteoporosis, raloxifene also improves cardiovascular risk factors.³ One of my patients, following surgically-treated adenocarcinoma of a breast by Mr Phipps, was on tamoxifen for 12 years, with wonderful postmenopausal preservation of youthful feminine assets, and is now continuing on raloxifene, indefinitely, as recommended by the US Food and Drug Authority (FDA).¹

Like pregnancy and economy-class air travel, hormone replacement treatment slightly increases the risk of thromboembolic mishaps, but in my opinion, the numbers involved mean that the benefits far outweigh this slight risk. Because gamma rays from outer space act on cellular water to produce free radicles that can cause cancer by altering nuclear DNA sequences (somatic mutations), all hormone-stimulated tissues, such as breasts and prostates, are subject to risk of cancer. However, no-one dreams of avoiding this by early castration! Life is a matter of sensibly weighing risks and acting accordingly.

In my opinion, all post-menopausal women should be offered raloxifene, as hormone replacement therapy, and PHARMAC should encourage this by subsidising it.

Duncan Adams

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Kenneth Ross Tyler

Kenneth “Ross” Tyler, a much loved and respected physician, died in Rotorua on the 12th November 2003.



He was born in Auckland and went to Auckland Grammar School before attending university and gaining a BSc.

He shifted to Dunedin (Knox College and Otago University Medical School) where he graduated in 1945 with his MBChB. He filled house surgeon posts at Waikato Hospital before being appointed medical registrar in 1948.

In that year, he also married staff nurse Rachel Kay who was to become his lifelong companion and the mother of his family.

In 1950, they sailed for the United Kingdom with Ross as ship’s surgeon aboard the *Port Dunedin*. He spent time in both London and Edinburgh gaining his MRCP (Ed) in 1953. At Hammersmith Hospital (London) he worked with Crofton and Scadding, which stimulated his interest in Chest Medicine. The family returned to Waikato Hospital in 1953 and on to Rotorua the following year where Ross took up his first appointment as Chest Physician to the Bay of Plenty.

Pulmonary tuberculosis was still a common incapacitating illness and the area had a widespread Maori population with a serious incidence of infection. In those early days, he held clinics in Tauranga, Whakatane, and Opotiki (as well as Rotorua) so he travelled extensively. Ross soon became known for his commitment to his work and patients and the particular skills he brought to bear. The treatment of people with tuberculosis required great patience and often considerable tolerance and understanding as the treatment was long term and often literally distasteful. His powers of persuasion and his persistence were rewarded as the disease was gradually brought under control and eventually almost eradicated.

Rotorua had meantime been growing apace, and the general medical workload had steadily increased and become more demanding. Ross took a particular interest in acute medicine and paediatrics. There were several additions to the hospital staff in the early 1960s and he was very much involved in the establishment of a Special Care Baby Unit, the Coronary Care Unit, and Intensive Care. Until then, the hospital had been then rather surgically orientated and Ross worked hard to persuade the administration to allocate funds to redress the balance.

Ross went into private practice as well (in 1966) and continued in this beyond his retirement from hospital practice in 1987, although he was persuaded to continue in a locum capacity for some time. He was appointed to the Bay of Plenty Regional Health Board in the early 1990s.

His family life was full and entertaining. He took great interest in his family as they developed and served on their numerous school committees for many years. He remained their guide and mentor. Holidays at the beach were a feature, and often

included other families and much hilarity. A renowned storyteller, the tales were usually against himself, well-embellished, and were a feature of his teaching in the wards.

Ross had great skills in committee; a good listener he was adept at summing up the diverse arguments of a variety of colleagues and usually suggesting a reasonable course to follow. Active over many years in the Medical Association, he was on numerous committees and the local representative on Council before becoming President of the Association in 1973. For many years he was also a member of the Toxic Substances Board.

An active member of Rotary for many years, he later carried on with Probus. In addition, he enjoyed playing recreational golf until, as he said, the infirmities of his ageing group deprived him of partners.

Ross is survived by his wife, Rachel, 5 children, and 12 grandchildren.

We are grateful to James L Jardine of Rotorua for writing this obituary, and Richard Tyler for sending it to us with the photo.



John Xavier Louw

John Louw died from a postoperative pulmonary embolus at Christchurch on 20 March 2005.



John immigrated with his family to New Zealand in 1969. Born in South Africa in 1930, he graduated from the University of Witwatersrand (Johannesburg, South Africa) in 1954.

After graduation, he specialised as a general surgeon but also included some training in obstetrics, orthopaedics, and anaesthesia.

During that time, he met Joyce whom he married in 1958. His desire was to work in a mission hospital. Thus, at the completion of his surgical training, he moved with his family to The Swedish Mission Hospital in Eastern Transvaal where he worked for 7 years before coming to New Zealand.

Upon his arrival in New Zealand, he worked initially as a surgeon and/or general practitioner—firstly in Tokoroa then subsequently in Methven (including nearby Ashburton Hospital). Two years later, the Louw family returned to South Africa spending 2 years in Durban before once again returning to Australasia. After some time in Launceston (Tasmania, Australia), the Louws returned to Mid Canterbury and settled in Ashburton, which would become their home.

Whilst predominantly working as a general surgeon, John also worked in General Practice and Anaesthesia. This proved to be a very busy workload with considerable on-call commitments. In addition, he took on the role of Ashburton Hospital Medical Superintendent in later years.

Upon retirement, John spent several periods as a surgeon at Mission hospitals in South Africa, and the Solomon Islands where he was the sole doctor to 30,000 people.

In addition to his medical commitments, John enjoyed and participated in numerous interests and pursuits—retirement allowed more time for these, which included Rotary, Forest & Bird, the Methodist church, golf, Probus, Age Concern, Grey Power, and The Ashburton Music Club.

John loved both New Zealand and his South Africa homeland, and during Super 12 and Tri Nations rugby matches his allegiance changed. An unassuming and giving man, John was also blessed with a unique and wry sense of humour.

John is survived by his wife (Joyce), one son (David), and two grandchildren.

We are grateful to Trevor G Cook (Chair, Senior Medical Staff, Ashburton Hospital) for this obituary, as well as Liz Quaid from *The Ashburton Guardian* newspaper for sending us the photograph from their obituary published on 28 March 2005.



GRANTS AWARDED APRIL 2005

At the April meeting of the Scientific Advisory Group of the National Heart Foundation, a total of 10 limited budget grants were awarded. The awards included 5 Small Project Grants and 5 Travel Grants.

SMALL PROJECT GRANTS

Ms Sarah Carne

Department of Sport & Exercise Science,
University of Auckland

Evaluating a school-based physical activity
programme targeting overweight/obese
children

\$15,000 for 12 months.

Dr Darren Hooks

Bioengineering Institute, University of
Auckland

The role of myocardial structural
discontinuities in electrical propagation in the
heart, and successful ventricular
defibrillation

\$15,000 for 2 years.

Dr Ivan Sammut

Department of Pharmacology & Toxicology,
University of Otago

Synthesis and initial pharmacological testing
of a novel, cardioprotective, carbon
monoxide releasing drug

\$14,914 for 17 months.

Dr Brett Shand

Lipid and Diabetes Research Group,
Christchurch Hospital

Comparison of established and new markers
of insulin resistance to predict deterioration
in glucose control

\$15,000 for 2 years.

Dr Murray Laugesen

Health NZ Ltd

Toxicological trial of a presumed reduced
toxicity cigarette

\$14,974 for 9 months.

TRAVEL GRANTS

Dr Sarah-Jane Guild

Department of Physiology, University of
Auckland

*IUPS 2005/EB2005 meeting and visit to
the laboratory of Dr Susan Pyner,
University of Durham, UK*

Assoc Professor Richard Milne

Department of Pharmacology, University of
Auckland

*International Health Economics
Association 5th World Congress,
Barcelona*

Mr Steven Niederer

Bioengineering Institute, University of
Auckland

*35th Congress of the International Union
of Physiome Sciences (IUPS), San
Diego, USA*

Ms Adele Pope

Department of Physiology, University of
Auckland

*35th Congress of the International Union
of Physiome Sciences (IUPS),
San Diego, USA*

Ms Gillian Whalley

Department of Medicine, University of
Auckland

*American Society of Echocardiography
Scientific Sessions*

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Short Course for Medical Journal Editors

This well-established course, now in its 10th year, will be run twice in 2005—in England and Australia. Its aim is to give journal editors, particularly scientists and clinicians who are new to the post, an informed overview of their role and a good understanding of the varied core skills required.

The courses will take place at:

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Email: barbara@timalbert.co.uk

What they have said about this course:

- ‘Excellent teaching materials—a course I would recommend to anyone.’
- ‘A stimulating course which brought up a lot of issues I had not thought of... Exercises were very stimulating.’
- ‘Lively atmosphere—relevant information presented by experts—attention to individual needs, at all times.’
- ‘Having come here deeply suspicious of being lectured to, I found myself being provoked and stimulated.’

TIM ALBERT
TRAINING

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Practical Ophthalmology: A survival guide for doctors and optometrists

Anthony Pane and Peter Simcock. Published by Elsevier Churchill Livingstone, 2005. ISBN 0443101124. Contains 255 pages. Price GBP19.99

This book is intended to be a guide to dip into when you are confronted with a clinical situation and need guidance. As such, the book states that it is a survival guide and this is very much the case.

Rather than take the usual disease-based approach, it takes a symptom-based approach and provides well-highlighted key points, flow charts, and sufficient good quality-colour illustrations to make the point. It covers all the essentials including visual loss, the acute red eye, eye trauma, and so on. It also has a very brief but useful section on anatomy, examination, and basic eye procedures—and a useful section on who needs screening for eye disease.

The book is a little smaller than A5 size. As such, it would easily fit into your white coat pocket. It is ideally suited for medical students, any doctor in the emergency department, and every GP. It is well written, very useable, and could be read cover to cover as a comprehensive refresher course, used as the core material for an undergraduate syllabus, or be just dipped into when one is confronted with a clinical problem.

In short, this is a thoroughly excellent book. I believe it should be on the shelves of every emergency department in the country, in the collection of every house surgeon in New Zealand, and probably on the shelves of every general practice as well. It comes with my strongest endorsement.

Mark Elder

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