CONTENTS

This Issue of the Journal

A summary of the original articles featured in this issue of the NZMJ

Editorials

Lung cancer management concerns in New Zealand
Jeff Garrett

Inhaled corticosteroids in asthma action plans—double or quits?
Julian Crane

Original Articles

Lung cancer treatment in New Zealand: physicians’ attitudes
Tim Christmas, Michael Findlay

Application of asthma action plans to childhood asthma: national survey repeated
Andrew McNally, Chris Frampton, John Garrett, Philip Pattemore

Economic cost of community-acquired pneumonia in New Zealand adults
Guy Scott, Helen Scott, Maria Turley, Michael Baker

End of life decision-making by New Zealand general practitioners: a national survey
Kay Mitchell, Glynn Owens

Caring for patients and families at the end of life: withdrawal of intensive care in the patient’s home
Sue Mann, David Galler, Pamela Williams, Paul Frost

Case Report

Familial primary pulmonary hypertension
Dan Park, Lutz Beckert

Viewpoint

Nutritional supplements: friend or foe?
Cheryl Krone, John Ely, Louis Harms

100 Years Ago in the NZMJ

The Benevolent Fund
Methuselah

Selected excerpts from Methuselah

Letters

Don’t forget about HIV
*Stephen Ritchie, Vanessa Cramond, Mark Thomas*

Osteomalacia: recovery of bone density
*Ronu Ghose*

Safety concerns about nuclear-powered vessels persist
*Nick Wilson*

Obituary

Gavin Watson O’Keefe

Notices

National Heart Foundation Grants

Foundation Fellowship of the Australasian Chapter of Sexual Health Medicine

Medical Benevolent Fund

Book Reviews

Migraine and other headaches (William Young, Stephen Silberstein)
*Deborah Mason*

ABC of antithrombotic therapy (Gregory Lip, Andrew Blann)
*Mark Smith*
This Issue in the Journal

Lung cancer treatment in New Zealand: physicians’ attitudes
T Christmas, M Findlay

The aim of this study was to determine treatment practices of New Zealand physicians who manage non-small cell lung cancer (NSCLC). A questionnaire was emailed to physicians asking them to choose what treatment they would offer for different stages of lung cancer. This study showed that treatment practices varied significantly between specialty groups (particularly for more advanced disease), and highlights the need for standardisation of treatment within New Zealand.

Application of asthma action plans to childhood asthma: national survey repeated
A McNally, C Frampton, J Garrett, P Pattemore

An increased dose of inhaled steroid medication has previously been used for acute asthma, and incorporated into paediatric action plans. Evidence now exists against the efficacy of an increased dose of inhaled steroid in acute asthma. Our repeat postal survey (from 1995) of New Zealand general practitioners, paediatricians and paediatric registrars aimed to identify whether any changes existed in the administration of an increased dose of inhaled steroid for acute childhood asthma, and in the way asthma action plans are used.

Economic cost of community-acquired pneumonia in New Zealand adults
G Scott, H Scott, M Turley, M Baker

This study estimated that in 2003 there were 26,826 episodes of community-acquired pneumonia in New Zealand adults; a rate of 859 per 100,000 people. The annual economic cost was calculated to be $63 million. The major generators of costs were the number of hospitalisations (particularly for the group aged 65 years and over) and loss of productivity.

End of life decision-making by New Zealand general practitioners: a national survey
K Mitchell, G Owens

A study of 1255 New Zealand general practitioners (GPs) indicates that a medical decision at the end of life is made prior to approximately two-thirds of deaths attended, including decisions that may hasten death, and decisions explicitly to hasten death. Moreover, in one year, 39 GPs indicated that they had supplied or administered drugs specifically to end life. These actions are reported within a context of high access to multidisciplinary palliative care. In this paper, events surrounding decision-making are explored, and doctors’ comments are reported.
Caring for patients and families at the end of life: withdrawal of intensive care in the patient’s home
S Mann, D Galler, P Williams, P Frost

The Department of Intensive Care at Middlemore Hospital has taken 17 patients home to die. These patients (in whom ongoing care was deemed either inappropriate or futile) were transported home and extraordinary means of care such as artificial ventilation were withdrawn. This was seen as a positive experience by the family members concerned.
Lung cancer management concerns in New Zealand

Jeff Garrett

Tim Christmas and Michael Findlay’s evaluation of lung cancer management in New Zealand raises a number of concerns. Their postal questionnaire-based survey sought responses from respiratory physicians, medical oncologists, and radiation oncologists on what treatment they (or their department) would currently offer six hypothetical patients with varying stages of non-small cell lung cancer (NSCLC).

Respiratory physicians were more likely than oncologists to state that chemotherapy for managing locally advanced or advanced NSCLC in their District Health Board (DHB) was not available. This diversity of opinion is concerning, as was the fact that many DHBs had obviously not implemented treatment guidelines for patients with lung cancer. The conclusion from this study is that lung cancer services in this country are suboptimal and that a diversity of opinion exists about which treatments are currently available and who should be offered them.

The inability to offer acceptable levels of lung cancer care in New Zealand is likely to be multifactorial and related to such things as: poor regional and national coordination of cancer services; poor networking and strategic planning; inadequate guideline development; poor implementation of guidelines; an absence of data collection to assess quality of care; slow assimilation and funding of new drugs and technologies; and unacceptable waiting times for radiotherapy.

At least some of these issues would be addressed if the New Zealand Cancer Control Strategy were to be immediately implemented with adequate resourcing by both the DHBs and the Ministry of Health (MOH). The strategy provides a framework for an integrated set of activities covering: primary prevention, screening and early diagnosis; treatment and symptom control; rehabilitation and support, and palliative care. Such a framework is of critical importance to the development of lung cancer management strategies, which have been implemented in most other developed countries.

Grade A level evidence of benefit (palliation of symptoms, prolongation of life, and occasional cure) exists as a result of utilising various combinations of chemotherapy, radiotherapy, and surgery in locally advanced NSCLC. Whilst insufficient funding is a frequently offered reason for non-implementation of new treatment strategies, it is pertinent to point out that less than 5% of direct costs of lung cancer management is spent on therapeutic modalities in New Zealand. Furthermore, many chemotherapeutic regimens have been shown to be more cost-effective than best supportive care.

Decisions on new treatment modalities would be better made by a national committee (with a more comprehensive overview of the economic and therapeutic issues) than by individual hospitals or DHBs.

Most DHBs in New Zealand have therefore not implemented the Australian Lung Cancer guidelines—which have been endorsed by the Thoracic Society of Australia.
and New Zealand (TSANZ). If we cannot implement Australasian treatment
guidelines, then at the very least this needs to be recognised and debated. Whilst we
could conceivably write our own guidelines to initiate new treatment strategies and
accommodate the lesser funding available in New Zealand, there is insufficient
funding or resources for guideline development.

Furthermore, no money exists to support the implementation of guidelines (developed
in New Zealand or by Australasian Societies), and no mandate exists for DHBs to
implement them. The amount of money each of the 21 DHBs spends on a variety of
medical treatments is largely self-determined and remains the most logical
explanation for the diversity of responses noted in Dr Christmas’ study.

This being the case, we need to maintain (at the very least) a lung cancer database in
New Zealand to compare the quality of care offered across the 21 DHBs and in turn to
compare New Zealand outcomes with those in Australia and elsewhere. Indeed, a
cancer register was established in New Zealand in 1975; and since 1994, all new cases
of lung cancer have been recorded.

The data provides basic information which allows age, sex and race standardised
incidence rates and survival figures to be calculated. The registry records insufficient
detail, however, to allow us to understand why 5 year survival rates for lung cancer in
New Zealand are only 5% (compared with 11% in Australia). Factors which may
account for the difference include:

- Late presentation.
- More co-morbidity.
- Delays in investigation and treatment.
- Lack of access to specialist advice and treatment.
- Under-treatment or therapeutic nihilism.

Dr Christmas’ results would infer that under-treatment and therapeutic nihilism may
indeed be part of the reason for the poorer survival rates in New Zealand. Financial
barriers to primary healthcare and poor access to radiology services by primary care
physicians (leading to delays in investigation) are also likely contributing factors.
However, without more detailed information, one cannot draw any strong conclusions
and healthcare planning is subsequently compromised.

There is, therefore, an overwhelming need to implement the New Zealand Cancer
Control Strategy immediately, and to develop the framework envisaged to provide
better coordination of care—only then will the treatment offered be of a more uniform
and higher quality standard.

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**References:**


Inhaled corticosteroids in asthma action plans—double or quits?

Julian Crane

In this issue of the New Zealand Medical Journal, McNally et al re-explore the use of childhood asthma action plans by general practitioners and paediatricians. The authors asked whether these practitioners might have changed their practice in advocating a doubling step for inhaled corticosteroids (ICS) since 1995.¹ They hypothesise that recent studies (suggesting that the doses of inhaled corticosteroid being prescribed are too high² and are well above the top of the dose response curve) might have influenced whether such a step was included in children’s asthma action plans. The fact that no space exists in the current Asthma and Respiratory Foundation Child Asthma Plan released in 2000, and that there is no evidence supporting the doubling step, might also be significant factors leading to change.

McNally et al found that use of a doubling step has significantly decreased since 1995—from 95% to 86% amongst general practitioners, and from 57% to 32% amongst paediatricians. It is interesting, therefore, to revisit the issues surrounding the doubling of inhaled corticosteroids (ICS) for asthma exacerbations, and to ponder why general and specialist paediatric practice might differ.

One of the first studies to suggest doubling ICS at the onset of exacerbations (as part of asthma self management in adult asthmatics) showed a significant benefit in a before-and-after trial when PEFR fell below 30% of the best value.³ The idea was rapidly incorporated into adult asthma-management plans in New Zealand (in response to the asthma mortality epidemic).

The mortality survey showed that many patients who died from asthma were under-treated—both chronically and in the final acute episode. Furthermore, it was recognised that many patients failed to identify the severity of their disease, as did some of their doctors. Thus, the elements of asthma-management plans were a pragmatic response to an urgent need to improve asthma management.

The idea of doubling inhaled corticosteroids (in response to changing peak flow or increasing symptoms) was seen as an important part of patient education—encouraging them to use inhaled corticosteroids and reinforcing their role in asthma management. Indeed, the fact that doctors considered doubling a treatment that has no immediate palpable benefit (compared to bronchodilators) emphasised the importance they placed on it. Subsequently, at least in adults, studies of management plans (incorporating this doubling-step) have shown evidence for improved asthma management compared to usual care in adults.⁴

Lahdensuo et al⁴ suggested that the improvement was unrelated to increased ICS use, although ICS adherence was not formally measured. Indeed, it has been difficult to identify which elements of these plans are important: the increased doses or compliance with ICS, early treatment of an exacerbation, improved education and understanding, or simply a Hawthorne effect.
Only one study has formally examined the value of this ICS doubling step in children and it is discussed in the McNally paper. That study (Garrett et al), although underpowered, failed to find any evidence that doubling ICS (for 3 days following the onset of a mild exacerbation in children) had any effect on symptom scores or the time course of improvement in lung function.

Recently, the doubling-step has been specifically examined in adults. Again, that study (Harrison et al) was underpowered for the main outcome of preventing an oral steroid requiring exacerbation, but was sufficiently powered for changes in PEFR or symptom scores. In addition, it failed to show any benefit from doubling ICS—with PEF rates returning to normal over 2 weeks regardless of increased ICS use.

However we should probably not be surprised at this failure, given that there is little evidence that large doses of systemic corticosteroids improve an asthma exacerbation either. Morell et al compared 2 mg/kg and 10 mg/kg of methyl prednisolone 4-hourly with a placebo and were not able to show any clinically significant differences in the degree or rate of improvement in the first 48 hours following an emergency attendance for asthma.7 Bowler et al compared 50, 100, and 500 mg of hydrocortisone 6-hourly for 48 hours (followed by oral prednisone, 20, 40, or 60 mg daily) in a reducing regimen for 12 days, and could find no differences between the three groups at any time. In both these studies, initial FEV1 was around 20% of predicted.

Systemic corticosteroids appear to offer little additional benefit over high doses of bronchodilators in acute severe asthma. In a study of the effects of oral prednisone on preventing early relapse after an emergency department attendance, Chapman et al showed a significant reduction in early relapse with oral corticosteroids in a group of less severe patients after an emergency room visit while they were taking the steroid.9

These studies suggest that once an exacerbation has developed, corticosteroids do little to reduce its severity or time course—because although they prevent inflammatory lights from coming on, they cannot switch them off. Presumably this is a clinical reflection of their major action to inhibit the expression of inflammatory genes; once these genes are expressed, steroids have much less effect in reducing downstream inflammatory events. If large doses of systemic steroids don’t improve an exacerbation, it is perhaps not surprising that doubling ICS do not help either.

When doubling ICS is compared to placebo (in the context of an asthma management plan), they don’t have any measurable effect in adults or children. When an asthma management plan incorporating the ICS doubling-step is compared to ‘usual’ management, the plans lead to an improved outcome—particularly in reducing exacerbations. The key ingredient appears to be the adherence to regular ICS as a preventer, which a double-dose step may help to reinforce—as recently emphasised by Masoli and Beasley.10

Thus it might be argued that the diverging practices of general practitioners (using a double step) and paediatricians (not using a double step) are both correct for different reasons. Paediatricians have increasingly adopted an evidence-based approach—recognising that doubling ICS doesn’t work. Indeed, they feel able to convince the parents of their patients of the importance of regular ICS as an asthma preventer.
General practitioners, on the other hand, temper this evidence with pragmatism. They recognise the therapeutic frailties of human nature (especially frail when it comes to adherence to ICS) and hope to emphasise the importance they attach to regular ICS by suggesting a doubling when asthma deteriorates, thereby transmitting the subliminal message that in order to double the dose you must already be on one. A follow-up study of why GPs and paediatricians do what they do with asthma plans would be of interest.

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References:

Lung cancer treatment in New Zealand: physicians’ attitudes

Tim Christmas, Michael Findlay

Abstract

**Aims**
To determine treatment practices of New Zealand physicians who manage non-small cell lung cancer (NSCLC).

**Methods**
A questionnaire on the treatment of NSCLC was emailed to all respiratory physicians, medical oncologists, and radiation oncologists in New Zealand. Respondents were asked to select the treatment they would offer in six lung cancer case scenarios.

**Results**
Thirty-one (81%) respiratory physicians, 15 (71%) medical oncologists, and 8 (30%) radiation oncologists responded to the questionnaire. Surgery was selected (by all groups) as the best option for early-stage disease NSCLC. Radiotherapy or combination chemo/radiotherapy (for locally advanced disease) was favoured by 37% of respiratory physicians for stage IIIa and 28% for stage IIIb—compared with medical oncologists (100% and 80%) and radiation oncologists (86% and 28%). Chemotherapy for ‘fit’ patients with advanced disease was favoured by only 11% of respiratory physicians, compared with 67% of medical oncologists and 33% of radiation oncologists. Best supportive care (BSC) was the favoured treatment for patients with advanced disease with poor performance patients.

**Conclusion**
This study demonstrates considerable heterogeneity in the choice of treatment for NSCLC between specialities, particularly for locally advanced and advanced disease. These findings suggest international guidelines are not being adhered to, and variations in treatment may potentially have outcome implications for patients.

Lung cancer remains the leading cause of cancer death in NZ with over 1500 reported cases presenting each year. The most common type of lung cancer is non-small cell lung cancer (NSCLC), which represents approximately 75% of cases. The 5 year survival is less than 10%.

The investigation and initial management of lung cancer in New Zealand is mainly undertaken by respiratory physicians, and subsequently referred on to oncologists or surgeons for treatment (either on an individual basis or via multidisciplinary meetings or clinics). Although surgery alone is currently considered the best available treatment (when a primary lung cancer is localised), there is considerable debate over the optimal treatment of locally invasive and extensive stage lung cancer.

In spite of several recent clinical trials that appear to show improved survival rates using newer chemotherapeutic agents and multi-modality treatments, there is still significant variation in the use of these therapies internationally. There are, however, several published international guidelines on the management of lung cancer published by different organisations, which include: The Scottish Intercollegiate
Network (SIGN), the British Thoracic Society (BTS), the American Society of Clinical Oncology (ASCO), and (recently) The Australian Cancer Network (ACN). Although there are no specific New Zealand Guidelines, the ACN guidelines have been contributed to and endorsed by the Thoracic Society of Australia and New Zealand (TSANZ).

The aim of our study was to determine treatment practices by New Zealand lung cancer specialists, and to determine whether the treatment decisions are in accordance with the currently available guidelines.

Methods

A questionnaire was developed and circulated to physicians involved in the non-surgical treatment of lung cancer. These physicians included all New Zealand adult respiratory physicians who were active members of the TSANZ, as well as all medical and radiation oncologists who were active current members of New Zealand Clinical Oncology Group (NZCOG).

The questionnaire consisted of six case scenarios of varying stages of NSCLC summarised in Table 1. The information provided in the case scenarios included a brief clinical summary, which included patient symptoms, performance status (ECOG), exercise tolerance, existing co-morbidities. Also, histology, simple spirometry, relevant blood test results, and results of staging CT and mediastinoscopy where appropriate (ie, enough to determine performance status and stage of tumour). The surveyed physician was asked to indicate which treatment they would offer. Results were then forwarded to the principal investigator (TC).

Table 1. Case summaries

<table>
<thead>
<tr>
<th>Case</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>56-year-old man with early-stage disease and good performance status, NSCLC, stage Ia, T1N0M0, ECOG performance I.</td>
</tr>
<tr>
<td>Case 2</td>
<td>72-year-old man, heavy smoker, poor lung function which clearly precluded surgery. NSCLC Stage I, T2N0M0, FEV1/FVC 0.9/2.0, ECOG II.</td>
</tr>
<tr>
<td>Case 3</td>
<td>65-year-old woman with locally advanced disease, NSCLC stage IIIa, T1N2M0, normal exercise tolerance, ECOG II.</td>
</tr>
<tr>
<td>Case 4</td>
<td>52-year-old man with locally advanced but unresectable disease, NSCLC stage IIIb, T2N3M0, ECOG I.</td>
</tr>
<tr>
<td>Case 5</td>
<td>46-year-old woman with extensive disease but good performance status, NSCLC, stage IV, T3N3M1, ECOG I.</td>
</tr>
<tr>
<td>Case 6</td>
<td>72-year-old woman with extensive disease and poor performance status, NSCLC, stage IV, T2N3M1, 10 kg weight loss, ECOG IV.</td>
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</tbody>
</table>

Treatment options for each scenario included surgery alone, surgery plus adjuvant treatment (chemo or radiotherapy) radical radiotherapy (RT), combined chemo/radiotherapy (chemo/RT), chemotherapy alone, best supportive care (BSC; defined as palliative treatment which could include analgesics, steroids and palliative radiotherapy but not including the other treatment options), and other.

A follow-up email of the questionnaire was sent to individuals who did not respond, and subsequent attempts to contact them were made by phone.

Results

Completed questionnaires were received from 31 (81%) respiratory physicians, 15 (71%) medical oncologists, and 8 (30%) radiation oncologists. Forty-four (77%) of those respondents reported having immediate access to thoracic surgery in their town/city, 51 (89%) have radiotherapy, and 100% have access to chemotherapy.
Survey results are summarised in Table 2.

**Table 2. Favoured treatment options by specialist for each case scenario (expressed as percentage)**

<table>
<thead>
<tr>
<th>CASE 1</th>
<th>Thoracotomy</th>
<th>Rad RT*</th>
<th>Res + adj Chemo or RT†</th>
<th>Chemo alone‡</th>
<th>Combined Chemo + RT§</th>
<th>BSC§</th>
<th>Other</th>
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<th>Res + adj Chemo or RT†</th>
<th>Chemo alone‡</th>
<th>Combined Chemo + RT§</th>
<th>BSC§</th>
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<th>Chemo alone‡</th>
<th>Combined Chemo + RT§</th>
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*Radical radiotherapy.
†Resection plus adjuvant chemotherapy or radiotherapy.
‡Chemotherapy alone.
§Combined chemotherapy and radiotherapy.
§Best supportive care.
Discussion

This study examines what treatment is likely to be offered to patients (with different stages of NSCLC) by New Zealand lung cancer specialists. It demonstrates there is considerable heterogeneity in treatment preferences between different specialties, and suggests that treatment for lung cancer may depend significantly on the type of specialist the patient is referred to. It also suggests that respiratory physicians tend to be the most conservative in their treatment preferences.

Although the actual treatment given to patients with lung cancer can only be determined by reviewing case notes of treated cases of NSCLC, this data is consistent with other studies. Access to treatment, particularly chemotherapy, does not appear to be a barrier to delivery of treatment.

There is consistent agreement among practitioners (and current guidelines) that surgery is the most appropriate treatment for early stage disease. However, treatment of locally advanced and extensive disease with good performance status appears to be more controversial. The preferred treatment for locally advanced disease (Case 3 and Case 4) by respiratory physicians was BSC, and only a small percentage considered active therapy for these cases compared with medical oncologists. Medical oncologists were much more likely to offer radical RT or combined/RT than respiratory physicians. In advanced disease, only 8% of respiratory physicians would consider the use of chemotherapy compared with 67% medical oncologists.

These results are similar to those found in a survey of UK lung cancer specialists (predominantly respiratory physicians) where only 9% would offer combined chemo/RT for locally advanced disease, and only 11% would consider chemotherapy for advanced metastatic disease.

Gregor et al showed that diagnosis of lung cancer in Scotland was made by respiratory physicians 66% of the time, and 75% of those patients were usually managed or reviewed by respiratory physicians during the first 6 months after diagnosis. However, only 8.2% of these patients received chemotherapy, and 10.4% radical RT for localised disease.

In contrast, Muers et al reported that respiratory physicians were more likely to refer for RT and chemotherapy than general physicians who often look after non-small cell cancer patients in UK District General Hospitals.

If this situation is similar to New Zealand, then lung cancer patients in smaller New Zealand provincial centres may be less likely to receive active treatment than patients in larger centres where there is easier access to thoracic surgery or oncology services.

Why is there so little agreement between these groups over the role of non-surgical treatments of lung cancer? In particular, what is the role of chemotherapy alone or in combination with RT? Are respiratory physicians too nihilistic, or is this a reflection of medical oncologists over enthusiasm with chemotherapy?

Firstly, the reluctance to offer chemotherapy to lung cancer patients may be due to the commonly held belief that lung cancer is a (self inflicted) disease of the elderly, which precludes them from chemotherapy. This is supported by Brown et al who found that chemotherapy was utilised in 21% of patients with NSCLC (aged under 65
years) compared with 0% in those over 65 years—thus suggesting age is an important factor in determining whether chemotherapy is adopted. However, performance status rather than age has been shown to be the major factor in determining benefit from chemotherapy.

Secondly, the failure by respiratory physicians to offer chemotherapy may reflect scepticism about the benefits of chemotherapy among physicians. In a UK survey, 60% of cancer specialists reported that they would seek an overall improvement in survival of greater than 10% before considering chemotherapy. This is an unrealistic expectation in view of published data.

The recently written ACN Guidelines recommend chemotherapy as an appropriate treatment option for good performance (ECOG <2) lung cancer patients with advanced disease. Radical radiotherapy is also recommended for good performance status patients with inoperable locally advanced disease as is combined chemo/radiotherapy. The low numbers of respiratory physicians prepared to offer chemotherapy in New Zealand does not appear to reflect inability to access chemotherapy.

The use of chemotherapy alone or in combination with radiotherapy in NSCLC is supported by a large meta-analysis of 52 published randomised controlled trials (RCTs) published in 1995. This analysis showed that the addition of modern chemotherapy (defined as platinum based chemotherapy) significantly improved survival for NSCLC, particularly the advanced-disease group where chemotherapy treatment resulted in a modest but highly statistically significant improvement in survival when compared with BSC alone. This has been confirmed in recent randomised trials.

Mean survival was however only increased by 6–8 weeks. Chemotherapy has also been shown to be cost-effective in palliation of symptoms and improving quality of life. The addition of chemotherapy to radical radiotherapy also showed a modest but significant improvement in survival in patients with locally advanced NSCLC. This has been confirmed in RCTs although improvement is traded off against increased toxicity.

Although it is difficult to show major improvements in 5-year survival in these studies, countries that have adopted more aggressive treatment policies seem to have greater overall survival rates. Based on the best currently available figures, New Zealand has a dismal survival rate—5%. This is comparable to Scotland, a country with similar clinical practice to New Zealand, but contrasts with Australia's 11% and 14% in some European countries.

The study design can be criticised on the basis that cases are hypothetical rather than actual cases (and there are obviously many factors other than stage of tumour and clinical fitness which determine treatment). This does not, however, detract from the finding that there appear to be significant differences in treatment preferences between lung cancer specialist groups, and (at worst) demonstrates concerning nihilism—particularly among respiratory physicians.

A possible bias in this study is that it is more likely to over-estimate the aggressiveness of treatment by physicians—as it does not take any account other factors such as patient preferences.
Major variation shown in the attitudes to treatment of lung cancer between specialty groups is likely to be multifactorial; however, it highlights a need for standardisation of treatment—this is best achieved through multidisciplinary clinics and implementation of guidelines.

There are many guidelines currently available; however, the most appropriate for New Zealand are the Australian Cancer Network guidelines, endorsed by the TSANZ and available in the Internet. These guidelines provide summaries of relevant RCTs and meta-analyses, as well as treatment statements that can be used to guide treatment decisions. However, it is likely that adherence to these guidelines will have implications in terms of increasing oncology services costs. These economic implications will have to be weighed up against the public’s expectations if we wish to improve outcomes for patients with lung cancer.

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Acknowledgements: We thank Colin Wong (for formatting the questionnaire and emailing it to TSANZ members) as well as Associate Professor John Kolbe and Dr Tanya McWilliams for their helpful advice in manuscript preparation.

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References:


Application of asthma action plans to childhood asthma: national survey repeated

Andrew McNally, Chris Frampton, John Garrett, Philip Pattemore

Abstract

Aims Define the way childhood asthma action plans are currently being used in New Zealand; determine New Zealand doctor’s recommendations about the use of an increased dose of inhaled steroids in asthma action plans; and determine if there has been any change (during the last 7 years) in the way asthma action plans are used.

Methods A postal survey was sent to all 297 paediatricians and paediatric registrars in New Zealand, and to a random sample of 500 general practitioners (GPs). The questions related to asthma action plan use, the inclusion of an increased dose of inhaled steroid in those plans, and details of the way doctor’s adjusted inhaled steroid dose. Comparisons were made for selected questions between this survey and the same survey conducted in 1995.

Results Valid responses were received from 179 (60%) paediatricians and paediatric registrars, and 233 (47%) GPs. 165 (70.8%) GPs and 137 (76.5%) paediatricians / paediatric registrars indicated that they used written action plans for children with asthma in their care. 184 (61.5%) respondents who used asthma action plans included a step involving an increase in the dose of inhaled steroid, compared to 83.6% in 1995 (p<0.001). GPs in 2002 were less likely to use action plans (p<0.001) and include a step with an increased dose of inhaled steroid (p=0.003).

Paediatricians and paediatric registrars in 2002 were just as likely to use action plans (p=0.549), but less likely to include a step with an increased dose of inhaled steroid (p<0.001). GPs in 2002 were significantly more likely (than paediatricians and paediatric registrars) to include a step involving an increased dose of inhaled steroid (p<0.001).

Conclusions There has been a change in the practice of New Zealand GPs, paediatricians, and paediatric registrars— with a decreased tendency to double the dose of inhaled steroids in childhood action plans, thus suggesting doctors are cognisant of conclusions drawn by ‘evidence-based medicine’. There has also been a decline in the proportion of asthmatic children receiving a written asthma action plan, and this is inconsistent with recommendations contained in consensus documents.

Asthma action plans facilitate early intervention at home when an exacerbation occurs. Increasing the dose of steroid medication (oral or inhaled) for mild-to-moderate exacerbations of childhood asthma, and incorporating this as a step in an asthma action plan, is done with the intention of avoiding consequences such as hospitalisation, visits to the emergency department, and rescue courses of oral steroid.

In 1997, Garrett et al published the results of a 1995 survey investigating the use of paediatric asthma action plans in New Zealand. Discrepancies were found between recommendations in asthma management guidelines and the way plans were utilised.
in clinical practice. The authors were interested in the use of an increased dose of inhaled steroid as part of asthma action plans, noting that this was a common practice lacking proof of benefit.

In the last 7 years, there have been several clinical trials investigating the efficacy of high-dose inhaled steroids in treating children experiencing asthmatic exacerbations of varying severity, and in different settings. There have also been updates to some of the major international asthma consensus documents.

We repeated the original survey to determine whether this new information had any effect on the clinical application of asthma action plans and whether doctors typically include an increasing-inhaled-steroid-dose step.

**Methods**

A postal questionnaire on the use of childhood asthma action plans was sent to all paediatricians and paediatric registrars in New Zealand (297 in total), and to a random sample of 500 of the 2639 registered GPs in New Zealand. The New Zealand Medical Council statistician carried out selection of the GP sample group and posted the questionnaires on our behalf. An initial mailout (5 November 2002) and one follow-up questionnaire (26 November 2002) were sent in order to maximise the response rate.

The structure of the questionnaire was identical to that used in 1995. The first question asked respondents whether they provided children (who were suffering asthma) with an asthma action plan. For those who answered ‘yes’ they were asked what proportion of these children were given a plan; expressed as <25%, 25–50%, 50–75%, >75%, or unknown. We also asked whether a step involving an increased dose of inhaled steroid was included in the plan and, if so, what were criteria determined the increase, its magnitude and duration. A blank copy of the plan used by the respondent was requested.

Respondents who had children with asthma in their care were then asked a series of questions to ascertain their opinion about the use of action plans—in particular, their perception of their usefulness in the management of childhood asthma, and their effect on patient understanding and compliance with asthma medications.

Demographic information on respondent’s age, sex, and geographic location was included in the questionnaire. To determine the representativeness of our sample, comparisons were made between demographic features of the sample and data provided by the New Zealand Medical Council Statistician for all New Zealand GPs, paediatricians and paediatric registrars. Ethical approval was not required for this study.

Comparisons (using chi-squared tests) were made between the responses of paediatricians / paediatric registrars and GPs for a selection of questions. We also compared responses to specific questions about the use of action plans, and compared their use of an increased dose of inhaled steroid between 1995 and 2002. A p value of <0.05 was regarded as statistically significant.

**Results**

**Response**—Of the 797 questionnaires sent out, 460 (58%) responses were returned. Paediatricians and paediatric registrars returned 199 questionnaires (67%), while GPs returned 261 (52%). Twenty questionnaires returned by paediatricians and paediatric registrars were not included for analysis; comprising 9 paediatricians who indicated they did not treat children with asthma, 6 who were no longer in clinical practice, and 5 who simply did not answer.

Similarly, 28 questionnaires returned by GPs were not included for analysis because 16 were no longer in active practice and 12 did not answer. Therefore, 412 valid responses were used for analysis—179 (60%) from paediatricians and paediatric registrars, and 233 (47%) from GPs.
Demographic data

Population statistics were obtained from the Medical Workforce 2000 publication supplied by the Medical Council of New Zealand statistician. The paediatrician/paediatric registrar sample showed no appreciable deviations from the entire New Zealand paediatrician/paediatric registrar population for any of the demographic variables. GPs sampled did not differ from the entire New Zealand GP population with regard to sex and geographic location. Our sample included more GPs in the older age groups (Table 1).

Table 1 Demographic data of surveyed GPs and paediatricians / paediatric registrars (GPs n=233; Paediatricians and Paediatric Registrars n=179)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Respondents to the survey</th>
<th>Entire GP population in New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GPs</td>
<td>Paediatricians and Paediatric Registrars</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;35</td>
<td>1.4%</td>
<td>32.4%</td>
</tr>
<tr>
<td>35–44</td>
<td>34.4%</td>
<td>30.6%</td>
</tr>
<tr>
<td>45–54</td>
<td>41.6%</td>
<td>22.4%</td>
</tr>
<tr>
<td>55–64</td>
<td>17.2%</td>
<td>12.9%</td>
</tr>
<tr>
<td>65&gt;</td>
<td>5.3%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>66.0%</td>
<td>59.6%</td>
</tr>
<tr>
<td>Female</td>
<td>34.0%</td>
<td>40.4%</td>
</tr>
</tbody>
</table>

Use of action plans

302 (73.3%) respondents (165 [70.8%] GPs, and 137 [76.5%] paediatricians / paediatric registrars) indicated that they used written action plans for children with asthma in their care—compared to 91.2% of GPs and 76.2% of paediatricians / paediatric registrars in 1995.

This difference was significant for GPs (p<0.001), but not for paediatricians and paediatric registrars (p=0.549). Overall, significantly fewer respondents were using asthma action plans for children with asthma (Table 2). GPs were less likely (than paediatricians / paediatric registrars) to use action plans in 2002 (p<0.001). The reverse was true in 1995 (Table 3).

Use of an increased dose of inhaled steroid

In total, 184 (61.5%) respondents who used asthma action plans included a step involving an increase in the dose of inhaled steroid—compared with a rate of 83.6% in 1995 (p<0.001).

When compared with their 1995 counterparts, GPs in 2002 were less likely to include a step that involved an increased dose of inhaled steroid (p=0.003), as were paediatricians and paediatric registrars (p<0.001) [Table 2]. GPs in 2002 were significantly more likely than paediatricians and paediatric registrars to include a step with an increased dose of inhaled steroid (p<0.001) [Table 3]. This was also the case in 1995 [Table 3].
Table 2. Use of action plans and an increased dose of inhaled steroid in action plans

<table>
<thead>
<tr>
<th></th>
<th>GPs Action plan use</th>
<th>Use of an increased dose of inhaled steroid</th>
<th>Paediatricians and Paediatric Registrars Action plan use</th>
<th>Use of an increased dose of inhaled steroid</th>
<th>Total Action plan use</th>
<th>Use of an increased dose of inhaled steroid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>91.2% (310/340)</td>
<td>94.5% (293/310)</td>
<td>76.2% (128/168)</td>
<td>57.0% (73/128)</td>
<td>86.2% (438/508)</td>
<td>83.6% (366/438)</td>
</tr>
<tr>
<td>2002</td>
<td>70.8% (165/233)</td>
<td>86.5% (141/163)</td>
<td>76.5% (137/179)</td>
<td>31.6% (43/136)</td>
<td>73.3% (302/412)</td>
<td>61.5% (184/299)</td>
</tr>
<tr>
<td>Significance</td>
<td>P&lt;0.001</td>
<td>P=0.003</td>
<td>P=0.549</td>
<td>p&lt;0.001</td>
<td>p&lt;0.001</td>
<td>p&lt;0.001</td>
</tr>
</tbody>
</table>

Note: Those who use an increased dose of inhaled steroid (in action plans) is given as a percentage of the total number of respondents who indicated that they used action plans for children with asthma.

Table 3. Comparisons of GPs and paediatricians / paediatric registrars in 1995 and 2002

<table>
<thead>
<tr>
<th></th>
<th>GPs (%)</th>
<th>Paediatricians and Paediatric Registrars (%)</th>
<th>GPs compared with Paediatricians and Paediatric Registrars (level of significance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action plan use</td>
<td>91.2</td>
<td>70.8</td>
<td>76.2</td>
</tr>
<tr>
<td>Inclusion of an increased dose of inhaled steroids in action plan out of those who use action plans</td>
<td>94.5</td>
<td>86.5</td>
<td>57.0</td>
</tr>
</tbody>
</table>

Discussion

Updates of major international consensus documents released in recent years have stressed the importance of written asthma action plans in the management of childhood asthma. In the last 7 years, there has been a reduction in the use of an increased dose of inhaled steroid in asthma action plans for the treatment of acute exacerbations. This may represent a lack of evidence supporting such an approach.

The British Thoracic Society (BTS) suggested (in 1997) doubling the dose of inhaled corticosteroid temporarily where there is a deterioration in asthma or the first signs of upper respiratory tract infection in children. However, recent guidelines published by the BTS group have indicated that doubling the dose of inhaled steroid at the time of an exacerbation is of unproven value. Furthermore, The National Heart, Lung and Blood Institute of America tentatively recommended that for home management of mild asthma exacerbations (Peak
Expiratory Flow >80% predicted or personal best, no wheezing or shortness of breath, patients should double their dose of inhaled corticosteroid for 7–10 days.\textsuperscript{4}

The 2002 Australian Asthma Management Handbook made no comment about increasing the inhaled steroid dose for exacerbations of paediatric asthma.\textsuperscript{5} However, space was provided in the handbook’s paediatric asthma action plan to increase the dose of preventer medication at the first sign of a cold, or a significant increase in wheeze or cough. Unfortunately, no such space exists in the Child Asthma Plan released by the Asthma and Respiratory Foundation of New Zealand in 2000, which stresses the importance of increasing reliever/bronchodilator medication in the case of an exacerbation.

In 1994, New Zealand guidelines recommended that adults double the dose of inhaled steroid during an acute attack, but the same clarity of instruction was lacking for children.\textsuperscript{6} However, a 2001 meta-analysis by Holt et al, supported the growing evidence that doubling inhaled steroid in acute asthma is not clinically valuable in adults and adolescents.\textsuperscript{7} Therefore, there is no consistent evidence to suggest increased doses of inhaled steroid for exacerbations of asthma are appropriate, despite earlier consensus documents recommending it.

There has only been one clinical trial investigating an increased dose of inhaled steroids as a step in a written asthma action plan.\textsuperscript{8} Twenty-eight children aged 6–14 years (with mild-to-moderate asthma) were given asthma action plans to take home, and (if their peak expiratory flow rate (PEFR) dropped below 80% of baseline for 24 hours or more) they were instructed to double the dose of inhaled steroid (or their maintenance dose plus placebo) for 3 days.

In the 2 weeks following an exacerbation, there were no differences found in mean-morning and mean-evening PEFR symptom scores, spirometric parameters (FEV\textsubscript{1}, FVC, and FEF\textsubscript{25–75}) scores, or parent opinion scores.

Indeed, doubling the dose of beclomethasone had no beneficial effect when compared with placebo in treating an asthma exacerbation. This was considered evidence against using such an approach as a step in an asthma action plan. The results, however, could not be generalised to include children with severe asthma.

In further studies of pre-school children at home with acute asthma and without action plans, an increase in the use of inhaled steroid did not reduce the need for hospitalisation, emergency room visits, and the requirement of oral steroids (when compared with placebo).\textsuperscript{9,10}

Oral corticosteroids have been the standard treatment for severe asthma exacerbations for several years. In some instances, acute therapy with high-dose inhaled steroids has been found to be at least as effective as oral steroids; however, no study has found them to be more efficacious.\textsuperscript{11–13}

Although asthma consensus documents have previously suggested treating childhood asthma exacerbations with an increased dose of inhaled steroid, several studies highlight the insufficient evidence supporting this practice. Our results suggest that GPs, paediatricians, and paediatric registrars have taken note of this lack of evidence because fewer are including an increased dose of inhaled steroid as a step in childhood written action plans.
If the exacerbation is mild to moderate, an increase in reliever/bronchodilator medication may be adequate treatment. Another explanation in New Zealand may be the altered format of the pre-printed Childhood Asthma Action Plan. Specifically, for the last 6 years, the plan has not specifically included instructions for parents to increase the dose of their child’s preventer medication.

The other significant finding from our study is the overall decline in the use of written Asthma Action Plans for children with asthma. This decrease was significant for GPs in particular. Many GPs, however, may be giving their patients verbal asthma management plans, which incorporate an increased dose of inhaled steroid where an exacerbation occurs. GPs have short consultation times so a brief verbal explanation may be viewed as more efficient than explaining a written asthma action plan in depth.

Furthermore, verbal action plans may be considered more conducive to enhancing effective communication between child, parent, and doctor, ultimately strengthening the patient-doctor relationship. Our survey did not account for the use of verbal asthma plans. Indeed, there is no strong evidence showing that written action plans are beneficial\(^{14}\)—they are believed to promote better self-management, however.\(^{15}\)

On analysis, our use of a random sample, and the ability to ascertain the representativeness of respondents, diminished selection bias. The capacity of respondents to precisely remember aspects of behaviour (recall bias) and their perception of the preferred answer (response bias) were, however, beyond our control.

Although our survey’s overall response rate (58%) was below expectations, it is comparable to that achieved in other postal surveys. In retrospect, it would have been helpful to break the ‘paediatric’ component into ‘registrars’ and ‘practicing paediatricians’—to identify any difference in practice between ‘registrars’ and ‘practicing paediatricians’ and to identify any effect from relatively recent education in the role of inhaled steroids in acute asthma versus longstanding practice.

In attempting to be consistent when comparing the two surveys we did not break the ‘paediatric’ component into ‘registrars’ and ‘practicing paediatricians’. Interpretation of results depends on the severity and number of asthmatics seen by GPs, paediatricians, and paediatric registrars. We assumed that paediatricians and paediatric registrars see children with severe asthma more often.

In conclusion, the application of childhood asthma action plans by New Zealand GPs, paediatricians, and paediatric registrars has changed. Specifically, there has been an overall decline in the use of written asthma action plans, and fewer practitioners are incorporating an increased dose of inhaled steroid in these plans.

Part of this change is evidence based, as recent results from clinical trials do not support the role of high-dose inhaled steroid in treating childhood asthma exacerbations. Despite this, 86.5% of GPs continue to include a step that increases the dose of inhaled steroid.

GPs generally have a looser control of their patients compared to paediatricians and paediatric registrars, so it is likely that significant numbers of children will be taking higher doses of inhaled steroids for longer periods of time—this is still far from ideal, and potentially dangerous.
Finally, inconsistency remains (between recommendations in consensus documents) about the use of asthma action plans and the actual application of them in New Zealand. Our survey shows that not all children with asthma are receiving a written asthma plan, despite this plan being recommended in asthma consensus documents.

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**References:**


Economic cost of community-acquired pneumonia in New Zealand adults

Guy Scott, Helen Scott, Maria Turley, Michael Baker

Abstract

Aims The aim of this study was to evaluate the economic cost of community-acquired pneumonia (CAP) in New Zealand adults. Although this is an important illness, there is little published information on the national costs of treatment. Without such information, new treatment options cannot be evaluated in economic terms.

Methods Costs were estimated from a societal perspective for the adult population (aged 15 years and over) using New Zealand age-specific hospital admission rates (average of 2000–2002), population data (2003), and unit costs (2003) in combination with international data on the proportion of pneumonia cases hospitalised. Univariate and multivariate sensitivity analyses were used to determine the major cost drivers and evaluate uncertainty in the estimates.

Results It was estimated that in 2003 there were 26,826 episodes of pneumonia in adults; a rate of 859 per 100,000 people. The annual cost was estimated to be $63 million, (direct medical costs of $29 million; direct non-medical costs of $1 million; lost productivity of $33 million).

Conclusions The major generators of costs for community-acquired pneumonia are the number of hospitalisations (particularly for the group aged 65 years and over) and loss of productivity. Intensified prevention and effective community treatment programmes focussing on the 65 years and older age groups should be investigated (as they have the greatest potential to reduce healthcare costs).

The prime objective of economic evaluations in healthcare is to provide policy analysts and decision-makers with information on the costs and effects of medical interventions. Both incremental costs and effectiveness data are required for these evaluations.

Community-acquired pneumonia is an important cause of morbidity and mortality from infectious disease in developed countries. Both pneumonia incidence and mortality rates increase with age. The elderly and people with co-morbid illnesses have the highest risk of illness or death from pneumonia.¹

There are few published studies attempting to quantify national costs of treating this disease. ‘Without such data, it is difficult to assess whether new therapies and treatment strategies are needed to improve patient outcomes’.² Accordingly, the aims of this study were to estimate the incidence and economic cost of pneumonia in New Zealand adults.

Methods

New Zealand age-specific hospital admission rates (average of 3 years 2000–2002),³ 2003 population data,⁴ and international rates of hospitalisation were used to estimate resource utilisations for pneumonia. The target population was adults aged 15 years and older.

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Resource utilisations related to the 2003 year. Costs were measured incrementally from a societal perspective and reported in 2003 NZ dollars (NZ$1=US$0.5809 mid-rate June 2003). Market prices (exclusive of goods and services tax [GST]) and wages were used as proxies for unit costs. All identifiable transfer payments were excluded from the analysis. Discounting was unnecessary as costs related to a single year.

We have chosen to classify health costs as: (a) direct medical, (b) direct non-medical and (c) indirect. The literature provides a number of different cost classifications. A US authority classifies costs as: (a) direct costs (direct healthcare costs and direct non-healthcare costs and the value of patient time for treatment), and (b) productivity costs (changes in production or output). Another system described by British and Canadian authors delineates costs by sector or perspective as: (a) health sector, (b) patient and family, and (c) other sectors.

Hospitalisation data were only sourced from the New Zealand Health Information Service, National Minimum Dataset, and cover public hospital discharges. (These data are adjusted for transfers, patients whose usual residence is outside New Zealand, and inconsistent stays.) Records were extracted for adults with a first (primary) diagnosis of pneumonia (ICD-10-AM 2nd edition J10.0, J12-18).

Age-specific hospitalisation rates were calculated using the average number of public hospital discharges for 2000–2002 (three years) and the mean resident estimated population at June 30 for 2000–2002. To estimate 2003 volumes, these age-specific rates (2000–2002) were applied to the population as at 30 June 2003.

Hospitalisation rates for community-acquired pneumonia suggest that the actual number of cases of pneumonia in the population is between 3 and 10 times the number hospitalised. In developed countries, the proportion of patients with community-acquired pneumonia admitted to hospital ranges from just under 10% to just over 70%. (Table 1).

### Table 1. Hospitalisation rates for community-acquired pneumonia (CAP)

<table>
<thead>
<tr>
<th>Rate</th>
<th>Population</th>
<th>Source (references 9 - 16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5</td>
<td>USA, patients initially treated as outpatients for CAP</td>
<td>(Minogue; Coley; Fine; et al 1998)</td>
</tr>
<tr>
<td>21.4</td>
<td>France, patients with CAP consulting GP</td>
<td>(Laurichesse; Gerbaud; Baud; et al 2001)</td>
</tr>
<tr>
<td>32</td>
<td>UK, general population</td>
<td>(Guest and Morris 1997)</td>
</tr>
<tr>
<td>33.3</td>
<td>USA, &gt; or = 65 years with pneumonia or bronchitis</td>
<td>(Houston; Silverstein, and Suman 1995)</td>
</tr>
<tr>
<td>39.7</td>
<td>Israel, patients with a positive laboratory test for Streptococcus pneumonia</td>
<td>(Yigla; Finkelstein; Hashman; et al 1995)</td>
</tr>
<tr>
<td>61</td>
<td>USA, adults with clinical or radiographic evidence of pneumonia</td>
<td>(Fine; Smith, and Singer 1990)</td>
</tr>
<tr>
<td>61.4</td>
<td>Spain, general population &gt; or = 14 years with CAP</td>
<td>(Almirall; Bolivar; Vidal; et al 2000)</td>
</tr>
<tr>
<td>70.3</td>
<td>Switzerland, emergency department patients with CAP</td>
<td>(Stauble; Reichlin; Dieterle; et al 2001)</td>
</tr>
</tbody>
</table>

The proportion of patients admitted to hospital is likely to increase with age. Accordingly, we estimated the proportion of pneumonia cases hospitalised as follows: 20% in those aged 15–64 years, 40% in those aged 65–74 years, 60% in those aged 75–84 years, and 70% in those aged over 85 years (31% over all ages).

To establish the total number of pneumonia episodes, the number hospitalised in each age group was divided by the proportion hospitalised. Episodes of pneumonia managed in the community were calculated by subtracting the number of hospitalised cases from the total number of episodes of pneumonia in the population.

Two general practitioner (GP) consultations were allocated per patient treated in the community, and one consultation per hospitalised admission was evaluated in the base case (we assumed that all hospitalised cases were first seen by a GP). The cost per GP consultation was obtained from Statistics New Zealand.

A course of medicine for community treatment of pneumonia was defined as an antibiotic and an analgesic for 10 days. A frequently prescribed antibiotic (amoxycillin clavulate) and an analgesic (paracetamol) formed a course of drug treatment. The medicine unit costs were the pharmacy selling
price (including dispensing fee) (Hataitai Pharmacy, Wellington. Personal communication, 4 June 2004).

An informal telephone survey of GPs indicated that one sputum test and one chest X-ray could be allowed for each episode of pneumonia but variations in practice suggested a range of values should be investigated in the sensitivity analysis. The laboratory test used for the analysis was ‘sputum (excluding tuberculosis)’. Chest X-rays were valued using the price charged by a private provider (Standard chest X-ray, Wakefield Hospital, Wellington. Personal communication 17 April 2003).

Hospital unit costs were derived from diagnosis-related group (DRG) costings. This is a case-mix classification system in which cases with similar costs are categorised within broader groupings relating to the same or similar organ or system of the body.

New Zealand uses the Australian National Diagnosis Related Groups (AN-DRGs). The study used AN-DRG (version 3.1), which provided the average base contract price paid to public hospitals in 2001. A weighted average AN-DRG cost was derived by using hospital discharge volume data and the average contract prices paid for AN-DRGs in 2001.

The following AN-DRGs accounted for most of the volume of pneumonia cases: AN-DRG 170 respiratory infections/inflammations age >54 with complications and/or co-morbidities [w cc]), 171 respiratory infections/inflammations (age >54 without complications and/or co-morbidities [w/o cc] or (age <55 w cc), and 172 respiratory infections/inflammations age <55 w/o cc. This weighted average price was inflated to 2003 prices using the Producers Price Index (Inputs for Health and Community Services).

Transport costs for each patient visit to a GP (to obtain an X-ray, or to return from hospital) were based on a single trip of 2.5 kilometres by private motor vehicle at $0.62 per kilometre. Base case private motor vehicle trips were: 2 trips for each GP consultation, 2 trips per X-ray in the community, and 1 trip home for those hospitalised. We used an ambulance call-out charge of $61.33 for the cost of transport to hospital. For ambulance call-outs, the base case was 1 trip per hospitalised case.

Production loss and leisure time foregone for all pneumonia patients was assessed as follows: 2 weeks for those treated in the community, and 3 weeks for hospitalised cases (1 week in hospital, 2 weeks at home). Patients’ time for consultations and X-rays was assumed to occur within the period off work. Productivity and leisure time foregone was valued using average weekly earnings for males and females combined for June 2003 ($539 per week).

Univariate sensitivity analysis (to determine the main cost drivers) involved increasing variables of interest by 10% (holding all other factors constant) and recording the change in total costs induced. Multivariate sensitivity analysis using Monte Carlo sampling was conducted to assess the impact of simultaneous changes in key assumptions.

Results

We estimated that there were 26,826 episodes of community-acquired pneumonia in New Zealand adults in 2003; a rate of 859 per 100,000 population (Table 2). In those persons aged 65 years and over, the incidence of pneumonia was 1,882 per 100,000. Pneumonia caused 8,278 hospitalisations (265 per 100,000) in New Zealand adults.

It was found that pneumonia in New Zealand incurs direct medical costs of $29 million ($1,095 per episode), direct non-medical costs of $1 million ($26 per episode), and productivity loss of $33 million ($1,244 per episode). Total costs amounted to $63 million or $2,366 per episode (Table 3).

The cost per case treated in the community was $1,280 compared with the total cost of a hospital treated case of $4,800 (Figure 1).
Table 2. Incidence of community-acquired pneumonia in New Zealand adults in 2003

<table>
<thead>
<tr>
<th>Age group</th>
<th>Population (000)</th>
<th>Number</th>
<th>Age specific rate per 100,000</th>
<th>Proportion hospitalised</th>
<th>Number</th>
<th>Age specific rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-44</td>
<td>1,736.0</td>
<td>8,263</td>
<td>476.0</td>
<td>20%</td>
<td>1,653</td>
<td>95.2</td>
</tr>
<tr>
<td>45-54</td>
<td>524.5</td>
<td>3,861</td>
<td>736.2</td>
<td>20%</td>
<td>772</td>
<td>147.2</td>
</tr>
<tr>
<td>55-64</td>
<td>386.4</td>
<td>5,711</td>
<td>1,478.1</td>
<td>20%</td>
<td>1,142</td>
<td>295.6</td>
</tr>
<tr>
<td>65-74</td>
<td>256.7</td>
<td>3,875</td>
<td>1,509.6</td>
<td>40%</td>
<td>1,550</td>
<td>603.8</td>
</tr>
<tr>
<td>75-84</td>
<td>168.5</td>
<td>3,468</td>
<td>2,058.4</td>
<td>60%</td>
<td>2,081</td>
<td>1,235.1</td>
</tr>
<tr>
<td>85+</td>
<td>52.6</td>
<td>1,648</td>
<td>3,129.9</td>
<td>70%</td>
<td>1,153</td>
<td>2,191.0</td>
</tr>
<tr>
<td>Total 15+</td>
<td>3,124.6</td>
<td>26,826</td>
<td>858.5</td>
<td>31%</td>
<td>8,278</td>
<td>264.9</td>
</tr>
<tr>
<td>Total 65+</td>
<td>477.8</td>
<td>8,990</td>
<td>1,881.7</td>
<td>53%</td>
<td>4,748</td>
<td>993.7</td>
</tr>
</tbody>
</table>

Notes
(4) Estimated proportion of cases hospitalised (primary diagnosis)

Individual items may not add exactly to the totals shown because of rounding

Univariate sensitivity analysis demonstrated that the two major cost determinants were productivity and hospital costs. When productivity loss rose by 10\% (holding all other factors constant) total costs increased by 5\% and when hospital admissions rose by 10\% total costs rose by 4\% over the base case result. If these cost drivers were altered by 20\% instead of 10\% the resultant impact on total costs doubled.

For example, when productivity loss rose by 20\% over the base case, total costs increased from 5\% to 10\%. When the productivity loss of those aged 65 years and over was excluded, total costs fell by 15\% (Table 4).

Figure 1. Treatment pathways for community-acquired pneumonia in New Zealand adults

<table>
<thead>
<tr>
<th>Pathway probability P</th>
<th>Pathway cost C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6914</td>
<td>$1,280</td>
</tr>
<tr>
<td>0.3086</td>
<td>$4,800</td>
</tr>
</tbody>
</table>

Cost per episode $2,366
Sum of Pi x Ci
Table 3. Economic cost of community-acquired pneumonia in New Zealand adults (base case)

<table>
<thead>
<tr>
<th>Resource item/ cost</th>
<th>Unit cost (1)</th>
<th>Treated in the community</th>
<th>Treated in hospital</th>
<th>All episodes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$/Units</td>
<td>$/Units</td>
<td>$/Units</td>
<td>$/Units</td>
</tr>
<tr>
<td><strong>Episodes</strong></td>
<td>18,548</td>
<td>6,278</td>
<td>26,826</td>
<td></td>
</tr>
<tr>
<td><strong>Direct medical costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General practitioner consultations</td>
<td>36.89</td>
<td>37,096</td>
<td>1,369</td>
<td>8,278</td>
</tr>
<tr>
<td>Drugs: courses</td>
<td>26.67</td>
<td>18,548</td>
<td>495</td>
<td>18,548</td>
</tr>
<tr>
<td>Laboratory tests</td>
<td>16.39</td>
<td>18,548</td>
<td>304</td>
<td>18,548</td>
</tr>
<tr>
<td>X-ray</td>
<td>75.56</td>
<td>18,548</td>
<td>1,401</td>
<td>18,548</td>
</tr>
<tr>
<td>Hospital admissions</td>
<td>3,092</td>
<td>26,826</td>
<td>25,510</td>
<td>25,510</td>
</tr>
<tr>
<td><strong>Sub total: Direct medical costs</strong></td>
<td>3,569</td>
<td>25,815</td>
<td>29,384</td>
<td></td>
</tr>
<tr>
<td><strong>Direct non medical costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport: Private motor vehicle trips</td>
<td>1.55</td>
<td>111,287</td>
<td>172</td>
<td>16,556</td>
</tr>
<tr>
<td>Transport: Ambulance trips</td>
<td>12.28</td>
<td>8,278</td>
<td>508</td>
<td>8,278</td>
</tr>
<tr>
<td><strong>Sub total: Direct non medical costs</strong></td>
<td>172</td>
<td>533</td>
<td>706</td>
<td></td>
</tr>
<tr>
<td><strong>Total costs</strong></td>
<td>3,741</td>
<td>26,349</td>
<td>30,090</td>
<td></td>
</tr>
<tr>
<td><strong>Indirect costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity: weeks</td>
<td>539.00</td>
<td>37,096</td>
<td>19,995</td>
<td>24,834</td>
</tr>
<tr>
<td><strong>Total cost $(000)</strong></td>
<td>23,736</td>
<td>39,734</td>
<td>63,470</td>
<td></td>
</tr>
<tr>
<td><strong>Total cost per case $</strong></td>
<td>1,280</td>
<td>4,800</td>
<td>2,366</td>
<td></td>
</tr>
</tbody>
</table>

Notes
(1) Unit costs are in 2003 dollars
(2) All resource utilizations relate to 2003
(3) 2 consultations for those treated in the community and 1 per hospital admission
(4) 1 course of both an antibiotic and an analgesic per episode for those treated in the community.
(5) 1 sputum test per episode for those treated in the community
(6) 1 chest x-ray per episode for those treated in the community
(7) Unit costs are the volume weighted average of AN-DRGs 170 $4,297, 171 $3,352, 172 $1,775 inflated to 2003 dollars using the Producers Price Index Inputs for Health and Community Services increase between June 2001 and June 2003
(8) 2 trips for each GP consultation, two trips for each X-ray in the community and 1 trip home from hospital
(9) 1 ambulance trip per hospital admission
(10) 2 weeks per episode treated in the community and 3 weeks per hospital admission
Individual items may not add exactly to the totals shown because of rounding

Figure 2. Multivariate sensitivity analysis
The multivariate sensitivity analysis using Monte Carlo methods found that when the simulation model was run through 10,000 iterations total costs ranged between $56 million at the 5th percentile to $72 million at the 95th percentile (in other words, there is a probability of 90% that an estimate would fall between the 5th and 95th percentiles). (Table 4 and Figure 2).

Table 4. Sensitivity analysis of the cost of community-acquired pneumonia in New Zealand adults

<table>
<thead>
<tr>
<th>Univariate sensitivity analysis</th>
<th>Total cost</th>
<th>Change from base case</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% increase in cost of:</td>
<td>$(000)</td>
<td>$(000)</td>
</tr>
<tr>
<td>Base case total cost</td>
<td>63,470</td>
<td>3,338</td>
</tr>
<tr>
<td>Productivity: weeks</td>
<td>68,808</td>
<td>5,918</td>
</tr>
<tr>
<td>20% change</td>
<td>70,146</td>
<td>6,676</td>
</tr>
<tr>
<td>Hospital: admissions</td>
<td>66,021</td>
<td>2,551</td>
</tr>
<tr>
<td>20% change</td>
<td>68,572</td>
<td>5,102</td>
</tr>
<tr>
<td>General practitioner consultations</td>
<td>63,807</td>
<td>335</td>
</tr>
<tr>
<td>20% change</td>
<td>63,805</td>
<td>335</td>
</tr>
<tr>
<td>X-ray</td>
<td>63,610</td>
<td>140</td>
</tr>
<tr>
<td>Transport: Ambulance trips</td>
<td>63,521</td>
<td>51</td>
</tr>
<tr>
<td>Drugs: courses</td>
<td>63,510</td>
<td>40</td>
</tr>
<tr>
<td>Laboratory tests</td>
<td>63,500</td>
<td>30</td>
</tr>
<tr>
<td>Transport: Private motor vehicle trips</td>
<td>63,487</td>
<td>17</td>
</tr>
<tr>
<td>Excluding productivity loss of the 65 years and over</td>
<td>53,779</td>
<td>-9,691</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multivariate sensitivity analysis using Monte Carlo sampling</th>
<th>Low (000)</th>
<th>Base case (000)</th>
<th>High (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age specific hospitalisation rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-44 years</td>
<td>0.15</td>
<td>0.20</td>
<td>0.25</td>
</tr>
<tr>
<td>45-54 years</td>
<td>0.15</td>
<td>0.20</td>
<td>0.25</td>
</tr>
<tr>
<td>55-64 years</td>
<td>0.15</td>
<td>0.20</td>
<td>0.25</td>
</tr>
<tr>
<td>65-74 years</td>
<td>0.35</td>
<td>0.40</td>
<td>0.45</td>
</tr>
<tr>
<td>75-84 years</td>
<td>0.55</td>
<td>0.60</td>
<td>0.65</td>
</tr>
<tr>
<td>85+ years</td>
<td>0.65</td>
<td>0.70</td>
<td>0.75</td>
</tr>
<tr>
<td>Consultations for those treated in the community (number)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Drugs for treating pneumonia in the community (courses)</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Diagnostic lab tests for all treatment modalities: Sputum M18 (number)</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>X-ray chest all treatment modalities (number)</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Productivity loss for those treated in the community (weeks)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Productivity loss for those treated in hospital</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>General practitioner consultation unit cost ($)</td>
<td>27.69</td>
<td>36.93</td>
<td>46.16</td>
</tr>
<tr>
<td>Inpatient stay unit cost ($)</td>
<td>2,311</td>
<td>3,082</td>
<td>3,852</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effect on total cost</th>
<th>5th percentile</th>
<th>Base case</th>
<th>95th percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost $(000)</td>
<td>56,000</td>
<td>63,470</td>
<td>72,000</td>
</tr>
</tbody>
</table>

Notes
Percentiles rounded to the nearest 1000

Discussion

There are no actual recorded data on the total incidence of pneumonia (and the number of cases treated in the community in New Zealand or internationally). Accordingly, all estimates of incidence must be based upon recorded hospital discharge data.

The overall incidence of pneumonia in the population is likely to be much higher than indicated by hospitalisation data (as the majority of patients diagnosed with pneumonia are managed at home). Similarly, there are no accurate data on the community management and treatment (diagnostic tests and drugs used).
We employed Monte Carlo analysis to investigate uncertainty in our estimates of incidence of pneumonia and cost of treatment. As we did not have sufficient information to specify the distributions relating to the inputs under investigation, the multivariate sensitivity analysis used triangular distributions. A triangular distribution assumes that there is an equal likelihood of sampling any value between the ‘low’ and ‘most likely’, and an equal probability of selecting any number between the ‘high’ and ‘most likely’ values.

As leisure time and paid (and unpaid) productive activity have value for all people, we estimated these time costs in the same manner for all ages. In many instances, an elderly patient may require care provided by another family member who cannot be otherwise employed. Thus, the inclusion of productivity and leisure time loss can be justified on both willingness-to-pay and opportunity cost criteria. If analysed from a societal perspective, these indirect costs are as important as the hospital costs.

If indirect costs were confined to those patients in paid employment, productivity costs would be substantially reduced. However, this would imply that unpaid production and leisure time activities are not valued by society. The frictional cost method\textsuperscript{28–30} was not used to estimate productivity loss—as we wished to evaluate the full potential cost of production and leisure time foregone (and did not wish to deduct an allowance for the degree of scarcity of labour in the economy). Our cost estimates are conservative, as we did not estimate intangible costs relating to quality of life or death.

The univariate sensitivity analysis showed that hospital costs were one of the two major cost determinants. The major generator of direct medical costs for pneumonia is the number of hospitalisations, which will become increasingly important as the population ages.

The results of this cost of illness study indicate that prevention and community treatment programmes should focus on the 65 years and older age groups. Potential savings in hospital costs alone would justify this approach.

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Acknowledgements: We thank Craig Wright, Statistician Ministry of Health (who extracted the hospitalisation data from the National Minimum Dataset for us) and the unknown referee (who provided valuable information and suggestions that enabled us to improve our paper).

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Fax: (04) 801 2794; email: G.Scott@massey.ac.nz

References:


End of life decision-making by New Zealand general practitioners: a national survey

Kay Mitchell, Glynn Owens

Abstract

Aim To explore type and incidence of medical decisions at the end of life that hasten death made by general practitioners in New Zealand, within the context of access to palliative care.

Method An anonymous questionnaire investigating the last death attended in the previous 12 months was sent to 2602 general practitioners (GPs) in New Zealand.

Results From a 48% (1255) response, 88.9% (1116) GPs indicated access to an interdisciplinary pain management or palliative care team. Of those attending a death in the previous 12 months, 63% (693) had made a prior medical decision. These decisions included withdrawing/withholding treatment or increasing pain relief with (a) probability death would be hastened 61.8% (428) or (b) partly or explicitly to hasten death 32.6% (226). Moreover, death was caused by a drug supplied or administered by the GP in 5.6% cases (39), actions consistent with physician-assisted death.

Conclusion Physician-assisted death provided by some general practitioners in New Zealand is occurring within the context of available palliative care.

Early in 2002, Belgium became the fourth country/state/territory in the world to legalise physician-assisted death1—after the Netherlands,2 Oregon (in the United States),3 and the Northern Territory (in Australia)4—although the Northern Territory legislation was subsequently overturned.

The laws controlling assisted death in Oregon and the Northern Territory were predicated on the patient being terminally ill, and this was also proposed in the failed Death with Dignity Bill in New Zealand in 1995.5 Belgium has adopted similar policies to the Netherlands,6 in that the patient does not have to be terminally ill but must be experiencing unbearable, intractable suffering. A failed Private Member's Bill recently debated in New Zealand proposed physician-assisted death for terminally or incurably ill persons, on request.7 Research indicates that patients with cancer,8 HIV/AIDS,9 and amyotrophic lateral sclerosis10 would like the option of physician-assisted death. Similarly, physicians have also indicated that this option may be justified for some patients.8,11 (The official stance of the New Zealand Medical Association is that it is opposed to physician-assisted death.)12

Prior to legalisation, research in Australia, the Netherlands, and Belgium indicated that physicians were nevertheless providing physician-assisted death to their patients.13–15 In each of the studies, a similar questionnaire was used, developed for the Remmelink investigation into physician-assisted death in the Netherlands in 1990.
Interpretation of previous studies has in part been problematic due to lack of information regarding the range of physician options, particularly the extent of access to specialist palliative care. The present study was thus designed to obtain information on end of life decision-making in New Zealand within the context of palliative care availability.

The aim of this study was to explore type and incidence of medical decisions at the end of life (MDELs) that hasten death made by general practitioners (GPs) in New Zealand, within the context of access to palliative care.

**Method**

A survey methodology was adopted using the questionnaire from the Remmelink Death Certificate study of the Dutch investigation. The questionnaire was administered to GPs in New Zealand (in August and September, 2000). It asked for details on the last death in the previous 12 months for which the physician was the attendant doctor, and whether that physician had access to a multidisciplinary palliative care team.

Whilst confining responses to the last death means the incidence can only be assessed indirectly, the format was used both to anchor responses to minimise bias and to retain consistency with prior studies. There are approximately 3000 practising GPs in New Zealand and a questionnaire was sent to 2602 on a commercial mailing list.

Demographics were changed to suit the New Zealand environment—i.e., ethnicity and place of practice. An additional section was added related to access to palliative care services. Analysis was done using SPSS (version 9) software.

Throughout this article, ‘physician-assisted death’ and ‘euthanasia’ refer to the intentional ending of the patient’s life by the physician and ‘physician-assisted suicide’ refers to drugs supplied by the physician to end life, but administered by the patient.

Ethics approval was given by the University of Auckland Human Subjects Ethics Committee on 10 February 2000, reference 1999/Q032.

**Results**

There was a 48% response rate from two mail-outs. Thirty-two questionnaires could not be delivered (unknown at address). Returned questionnaires numbered 1302 of which 47 were returned blank, some with comments for non-response, which left 1255 useable questionnaires.

Of these, 1100 respondents had access to the patient prior to death and therefore there was the potential to make an end of life decision. Non-response was attributed to the sensitive nature of the research and the workload of general practitioners.

Demographic breakdown of responders is in Table 1.

Of the 1100 physicians who had contact with the patient prior to death, 693 (63%) reported making MDELs. The last action before death ranged from decisions to withdraw or withhold treatment or increase the alleviation of symptoms with the probability that death would be hastened 61.8% (428), through to actions partly or explicitly taken to hasten death 32.6% (226).

Moreover, of the 693 physicians who reported a MDEL, 5.6% (39) attributed death to a drug that had been prescribed, supplied or administered for that purpose—i.e., euthanasia or physician-assisted suicide (see Table 2).
Table 1. Demographic breakdown of general practitioners participating in study (n=1255)

<table>
<thead>
<tr>
<th>Gender</th>
<th>% *</th>
<th>Age (years)</th>
<th>% *</th>
<th>Religious</th>
<th>% *</th>
<th>Ethnicity</th>
<th>% *</th>
<th>Location</th>
<th>% *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>64</td>
<td>&lt;35</td>
<td>11</td>
<td>Extremely</td>
<td>4</td>
<td>NZ European</td>
<td>78</td>
<td>City</td>
<td>45</td>
</tr>
<tr>
<td>Female</td>
<td>35</td>
<td>36–45</td>
<td>45</td>
<td>Very</td>
<td>12</td>
<td>Maori</td>
<td>1</td>
<td>Small city</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>DM</td>
<td>46–55</td>
<td>32</td>
<td>Moderately</td>
<td>22</td>
<td>Pacific Is</td>
<td>0.5</td>
<td>Town</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56–65</td>
<td>9</td>
<td>Slightly</td>
<td>30</td>
<td>Asian</td>
<td>5</td>
<td>Rural</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;65</td>
<td>4</td>
<td>Not</td>
<td>30</td>
<td>Indian</td>
<td>2</td>
<td>DM</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td>DM</td>
<td>3</td>
<td>Other</td>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Percentages may not total 100 due to rounding; DM=data missing; City (>100,000 people); Small city (30,000–100,000 people); Town (<30,000 people).

Table 2. Medical decisions at the end of life (MDELs) by general practitioners for the last death attended in the previous 12 months (n=1100)

<table>
<thead>
<tr>
<th>Number (% of deaths attended in last year (n=1100))</th>
<th>Number (% of actions before death* (n=693))</th>
<th>Number (% of last actions before death (n=693))</th>
</tr>
</thead>
<tbody>
<tr>
<td>No MDEL actioned</td>
<td>407 (37.0)</td>
<td></td>
</tr>
<tr>
<td>First contact after the death</td>
<td>35 (3.2)</td>
<td></td>
</tr>
<tr>
<td>Sudden and totally unexpected death</td>
<td>75 (6.8)</td>
<td></td>
</tr>
<tr>
<td>No MDEL was performed (No ‘yes’ to Q 3-6)</td>
<td>279 (25.4)</td>
<td></td>
</tr>
<tr>
<td>Missing data (no response)</td>
<td>18 (1.6)</td>
<td></td>
</tr>
<tr>
<td>MDEL actioned</td>
<td>693 (63.0)</td>
<td></td>
</tr>
<tr>
<td>Taking into account the probability that end of life hastened by:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Q3a withholding a treatment</td>
<td>258 (37.2)</td>
<td>28 (4.0)</td>
</tr>
<tr>
<td>- Q3b withdrawing a treatment</td>
<td>200 (28.9)</td>
<td>27 (3.9)</td>
</tr>
<tr>
<td>- Q3c intensifying alleviation of pain and/or symptoms</td>
<td>588 (84.8)</td>
<td>373 (53.8)</td>
</tr>
<tr>
<td>Q4 In part with intention of hastening the end of life by:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- intensifying the alleviation of pain and/or symptoms</td>
<td>172 (24.8)</td>
<td>94 (13.6)</td>
</tr>
<tr>
<td>With the explicit purpose of not prolonging life or hastening the end of life and death caused by:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Q5a withholding a treatment</td>
<td>130 (18.8)</td>
<td>75 (10.8)</td>
</tr>
<tr>
<td>- Q5b withdrawing a treatment</td>
<td>71 (10.2)</td>
<td>57 (8.2)</td>
</tr>
<tr>
<td>Q6 Death caused by drug prescribed, supplied or administered with the explicit purpose of hastening the end of life (or patient ending own life)</td>
<td>39 (5.6)</td>
<td>39 (5.6)</td>
</tr>
</tbody>
</table>

Q=Question; *More than one question could be answered.
There was no discussion with the patient before the last MDEL in 380 (54.8%) cases (see Table 3). The patient not being competent (or not being fully competent) to make the decision was the main reason given for no discussion. However in 23.1% (88) cases where the patient was judged competent by the doctor, there was no discussion. In 17% (65) cases, the patient had expressed a wish to have death hastened at a previous time (see Table 4).

Table 3. Discussion with patient about possible hastening of death by proposed action

<table>
<thead>
<tr>
<th>Last-mentioned MDEL</th>
<th>Q3a*</th>
<th>Q3b*</th>
<th>Q3c*</th>
<th>Q4*</th>
<th>Q5a*</th>
<th>Q5b*</th>
<th>Q6*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=28</td>
<td>n=27</td>
<td>n=373</td>
<td>n=94</td>
<td>n=75</td>
<td>n=57</td>
<td>n=39</td>
<td>N=693</td>
</tr>
<tr>
<td>Discussed at the same time</td>
<td>25.0%</td>
<td>14.8%</td>
<td>8.6%</td>
<td>12.8%</td>
<td>18.7%</td>
<td>26.3%</td>
<td>23.1%</td>
<td>13.4%</td>
</tr>
<tr>
<td>Discussed beforehand</td>
<td>10.7%</td>
<td>11.1%</td>
<td>12.6%</td>
<td>31.9%</td>
<td>29.3%</td>
<td>29.8%</td>
<td>33.3%</td>
<td>19.5%</td>
</tr>
<tr>
<td>No discussion took place</td>
<td>53.6%</td>
<td>59.3%</td>
<td>58.7%</td>
<td>53.2%</td>
<td>50.7%</td>
<td>43.9%</td>
<td>43.6%</td>
<td>54.8%</td>
</tr>
<tr>
<td>Missing data (no response)</td>
<td>10.7%</td>
<td>14.5%</td>
<td>20.1%</td>
<td>2.2%</td>
<td>1.3%</td>
<td>-</td>
<td>-</td>
<td>12.2%</td>
</tr>
</tbody>
</table>

*See Table 2 for details of action; †May not total 100% due to rounding; Q=Question, MDEL=Medical decisions at the end of life.

Table 4. Informant in decision-making when no discussion with patient about possible hastening of death.

<table>
<thead>
<tr>
<th>Last-mentioned MDEL</th>
<th>Q3a*</th>
<th>Q3b*</th>
<th>Q3c*</th>
<th>Q4*</th>
<th>Q5a*</th>
<th>Q5b*</th>
<th>Q6*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=15</td>
<td>n=16</td>
<td>n=219</td>
<td>n=50</td>
<td>n=38</td>
<td>n=25</td>
<td>n=17</td>
<td>N=380</td>
</tr>
<tr>
<td>Patient not capable/not fully capable of discussion</td>
<td>86.7%</td>
<td>81.3%</td>
<td>60.7%</td>
<td>84.0%</td>
<td>84.2%</td>
<td>88.0%</td>
<td>94.1%</td>
<td>71.3%</td>
</tr>
<tr>
<td>Patient competent to discuss (Missing)</td>
<td>13.3%</td>
<td>6.3%</td>
<td>32.4%</td>
<td>14.0%</td>
<td>15.8%</td>
<td>4.0%</td>
<td>-</td>
<td>23.1%</td>
</tr>
<tr>
<td>Patient had expressed a wish to have death hastened</td>
<td>13.4%</td>
<td>18.8%</td>
<td>11.9%</td>
<td>30.0%</td>
<td>21.0%</td>
<td>16.0%</td>
<td>35.3%</td>
<td>16.9%</td>
</tr>
<tr>
<td>Doctor informed of wish by:†</td>
<td>-</td>
<td>6.3%</td>
<td>10.0%</td>
<td>22.0%</td>
<td>13.2%</td>
<td>12.0%</td>
<td>23.5%</td>
<td>12.1%</td>
</tr>
<tr>
<td>- Verbally by patient</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.3%</td>
</tr>
<tr>
<td>- Written Directive</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.1%</td>
</tr>
<tr>
<td>- Partner/Relative of patient</td>
<td>13.3%</td>
<td>6.3%</td>
<td>2.7%</td>
<td>6.0%</td>
<td>10.5%</td>
<td>12.0%</td>
<td>23.5%</td>
<td>6.1%</td>
</tr>
<tr>
<td>- Nursing staff</td>
<td>6.7%</td>
<td>-</td>
<td>0.9%</td>
<td>-</td>
<td>2.6%</td>
<td>-</td>
<td>-</td>
<td>1.1%</td>
</tr>
<tr>
<td>- Colleague</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Otherwise</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Explicit request to hasten death made by:†</td>
<td>13.4%</td>
<td>18.8%</td>
<td>11.9%</td>
<td>30.0%</td>
<td>21.0%</td>
<td>16.0%</td>
<td>35.3%</td>
<td>16.9%</td>
</tr>
<tr>
<td>- Partner/relative</td>
<td>6.7%</td>
<td>6.3%</td>
<td>2.7%</td>
<td>16.0%</td>
<td>21.1%</td>
<td>24.0%</td>
<td>23.5%</td>
<td>8.9%</td>
</tr>
<tr>
<td>- Colleague</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.0%</td>
<td>-</td>
<td>4.0%</td>
<td>-</td>
<td>0.5%</td>
</tr>
<tr>
<td>- Nursing staff</td>
<td>6.7%</td>
<td>-</td>
<td>0.5%</td>
<td>-</td>
<td>2.6%</td>
<td>8.0%</td>
<td>23.5%</td>
<td>2.4%</td>
</tr>
<tr>
<td>- Others</td>
<td>-</td>
<td>-</td>
<td>0.5%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.3%</td>
</tr>
<tr>
<td>- No explicit request</td>
<td>86.7%</td>
<td>81.3%</td>
<td>85.4%</td>
<td>70.0%</td>
<td>73.7%</td>
<td>60.0%</td>
<td>52.9%</td>
<td>78.9%</td>
</tr>
</tbody>
</table>

*See Table 2 for details of action; †More than one answer could be indicated; Q=Question, MDEL=Medical decisions at the end of life.

In half of the cases where a MDEL was actioned, the doctor estimated that life was either not shortened or was shortened by less than 24 hours. A further 26.8%
estimated that was life shortened by less than 7 days. In the three cases where life was estimated to be shortened by more than 6 months, death was caused by actions taken explicitly for that purpose; in two cases, withholding treatment; and in one case; administering a drug. There was a high (13.5%) non-response to this question (see Table 5).

Table 5. Estimate of life shortened by last action taken.

<table>
<thead>
<tr>
<th>Last-mentioned MDEL</th>
<th>Q3a*</th>
<th>Q3b*</th>
<th>Q3c*</th>
<th>Q4*</th>
<th>Q5a*</th>
<th>Q5b*</th>
<th>Q6*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=28</td>
<td>n=27</td>
<td>n=33</td>
<td>n=94</td>
<td>n=75</td>
<td>n=57</td>
<td>n=39</td>
<td>N=693</td>
</tr>
<tr>
<td>Missing (not answered)</td>
<td>10.7</td>
<td>14.8</td>
<td>22.5</td>
<td>2.1</td>
<td>1.3</td>
<td>-</td>
<td>-</td>
<td>13.5</td>
</tr>
<tr>
<td>Probably not shortened</td>
<td>32.1</td>
<td>55.6</td>
<td>44.2</td>
<td>14.9</td>
<td>12.0</td>
<td>8.8</td>
<td>7.7</td>
<td>31.7</td>
</tr>
<tr>
<td>&lt;24 hours</td>
<td>3.6</td>
<td>3.7</td>
<td>15.5</td>
<td>37.2</td>
<td>17.3</td>
<td>17.5</td>
<td>35.9</td>
<td>19.0</td>
</tr>
<tr>
<td>1 to 7 days</td>
<td>50.0</td>
<td>18.5</td>
<td>15.0</td>
<td>31.9</td>
<td>49.3</td>
<td>43.9</td>
<td>48.7</td>
<td>26.8</td>
</tr>
<tr>
<td>1 to 4 weeks</td>
<td>3.6</td>
<td>-</td>
<td>2.4</td>
<td>13.8</td>
<td>13.3</td>
<td>22.8</td>
<td>5.1</td>
<td>7.2</td>
</tr>
<tr>
<td>1 to 6 months</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
<td>-</td>
<td>4.0</td>
<td>7.0</td>
<td>-</td>
<td>1.2</td>
</tr>
<tr>
<td>&gt;6 months</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.7</td>
<td>-</td>
<td>2.6</td>
<td>-</td>
<td>0.4</td>
</tr>
</tbody>
</table>

*See Table 2 for details of action; MDEL= Medical decisions at the end of life; Q=Question.

In 8 of the 39 cases where death was caused by a prescribed, supplied, or administered drug, more than one person was identified as administering the drug to the patient (introducing the drug into the body). In two cases, the patient was identified as ingesting the drugs acting alone. The doctor administered the drug alone in 13 cases, a nurse alone in 15 cases, and in one case it was not specified who administered the drug (see Table 2).

Of the 1255 respondents, 88.9% (1116) indicated access to a multidisciplinary pain management or palliative care team, and 97.8% (1090) of these indicated that they consulted with such a team. Twenty-two doctors (2%) stated that they had access to such a team but did not use them; the main reason given being the physician had sufficient palliative care knowledge (see Table 6).

Of those reporting physician-assisted death, 34 had access to an interdisciplinary pain management or palliative care team. In the remaining 5 cases, 3 said they would use a team if available. One of these cases involved the death of a child. The remaining 2 did not respond.

Of those who had the potential to make a MDEL males were significantly more likely to have done so (chi squared=6.422, df 1, p=0.011). There was no significant difference between those who had made a MDEL and those who did not for age, ethnicity, religion, place of practice or access to palliative care.

Doctors who performed euthanasia/physician-assisted suicide were significantly older (z=-3.198, p=0.001) and less religious (z=-2.309, p=0.021) than those who had not but had performed another type of MDEL action. There was no significant difference between these two groups for gender, place of practice, or access to palliative care. Ethnicity was not compared due to low numbers.
Table 6. Access and use of interdisciplinary palliative care or pain services (N=1255)

<table>
<thead>
<tr>
<th></th>
<th>Yes, Access to Palliative Team (88.9%, N=1116)</th>
<th>%</th>
<th>No Access to Palliative Team (9.8%, N=123)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consult team</td>
<td>97.8</td>
<td></td>
<td>Would consult if available</td>
<td>80.5</td>
</tr>
<tr>
<td>Don’t consult team*</td>
<td>2.0</td>
<td></td>
<td>Would not consult*</td>
<td>13.8</td>
</tr>
<tr>
<td>Missing</td>
<td>0.2</td>
<td></td>
<td>Missing</td>
<td>5.7</td>
</tr>
<tr>
<td>How often consult team</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=1090)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very occasionally</td>
<td>8.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasionally</td>
<td>23.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequently</td>
<td>50.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>18.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Missing)</td>
<td>0.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Reasons don't consult/would not consult with team (n=40) %
- GP has sufficient palliative care knowledge 38.5
- Advice/consultation unhelpful in past 2.6
- Services are inaccessible 12.8
- Difficulty in past with shared care 10.2
- Other 30.8
- (Missing) 5.1

Note: Totals rounded.

Discussion

Perhaps the most interesting study finding is that, despite legal constraints, 39 doctors had performed some kind of action which would conform to everyday concepts of physician-assisted suicide or euthanasia. Moreover this did not appear to be a consequence of the non-availability of palliative care. Of the 1100 general practitioners that had the opportunity to make a MDEL, 3.5% (39) provided a physician-assisted death. This compares with 3.7% of general practitioners (n=2356) in the Dutch study.16 p139

Information that nurses introduced the drug into the patient, alone, in 15 cases requires some comment. The use of syringe drivers to deliver medication is widespread in end-of-life care, when oral medication is no longer possible. Invariably this regime would be established by a nurse, acting under physician orders thereby rendering the nurse the person to have ‘introduced’ the drug into the patient’s body. If drugs charted are presumed to be dangerous for the patient, the nurse is obliged to refuse to carry out the drug order. In these cases, this has not happened, which suggests that either the nurses colluded with doctors in providing assisted death or alternatively they were unaware that the drug was charted explicitly to end the life of the patient. Either way, nurses are clearly involved in end of life actions and decision-making (see Table 4).17,18

There is a commonsense issue in discussions of euthanasia concerning the extent by which life is estimated to have been shortened by the action. The present results...
indicate that the more serious the action taken, the more likely respondents were to estimate that life had been shortened and by a longer period (see Table 5). A similar effect was noted in the Dutch study.16

The majority of respondents in the New Zealand study estimated that the action taken had shortened life but in 78% of cases this was by less than 7 days (see Table 5). It is notable that this question had one of the higher rates of non-response at 13.5%. The wording of the questionnaire, which gave the mildest option of ‘life probably not shortened’ rather than ‘life not shortened’ may have been implicated, with respondents reluctant to imply any shortening of life if this, in their judgement, had not occurred. Several respondents noted difficulties with the wording of the questionnaire.

If this is the case, and it seems plausible, life was estimated “not shortened” or shortened by less than seven days in over 90% of cases (see Table 5). Arguably then, the actions could be seen as a compassionate response to distress experienced in the last few days of expected life when the dying phase had been diagnosed.19

In 54.8% (380) of cases the MDEL-action was taken without discussion with the patient, rendering the action legally dubious (see Table 3). It is plausible that the missing cases (12.2%) indicate no discussion, which leaves only one third of cases where a discussion took place with the patient at some time, indicating that life could be shortened by the action being considered. The physician not believing that death was hastened by the action seems to be implicated in some instances of no discussion with the patient given (a) that some respondents indicated this and (b) that the likelihood of a discussion having taken place increased with the seriousness of the action taken. However in 17 cases, there was no discussion when physician-assisted death occurred (see Table 3).

While in some cases the patient had previously expressed a wish to have death hastened (see Table 4), it should be noted that a persistent request expressed at the time the action is performed is one criteria necessary for the provision of physician-assisted death wherever this is, or has been, legalised.1,3,4,6

So-called life-terminating acts without the request of the patient drew widespread criticism of Dutch practices (see, for example, reference number 20). However subsequent research suggests that similar practices are occurring elsewhere14,15 and clearly have occurred in New Zealand. However, these figures may not be as sinister as first appears. The combined factors of closeness to death and probable moribund state (see Tables 4 and 5) also evidenced by nursing involvement (see Table 2) probably indicating use of syringe driver or IV medications, suggests that the actions were a compassionate response to patient need—ie, shortening dying rather than shortening life.

Alternatively, these actions may indicate a lack of knowledge by the physician of what is palliatively achievable without ending the life of the patient as a way of meeting need (10% indicated they had no access to palliative care services, see Table 6). Another explanation is that the doctor acted in ‘palliative’ terms—ie, may have provided terminal sedation which is defensible under the principle of double effect, but interpreted this in "euthanasia" terms as an action knowingly taken to hasten death.21
The data discussed above, together with the supplementary qualitative data obtained from the questionnaires gives us some insight into issues for the physician when providing end of life care. Physicians of course have their own personal views and there is a requirement that they reconcile those with external demands - on the one hand to reduce suffering, on the other to preserve life. The following captures the potential polarity of these views:

I have no problems withholding medication to hasten death in a terminally ill patient. I would have a problem administering medication to hasten death, even on request from the patient or relatives. This of course does not apply to terminating an unwanted pregnancy - no problem here. (NZ GP 189)

The laws re euthanasia vs termination of pregnancy are, in my opinion, completely arse about face! If you will excuse the vernacular. (NZ GP 797)

In many instances such attempts at reconciliation were problematic for the physician concerned and it is perhaps unsurprising that some physicians called for greater external guidance:

Often patients don't ask about choosing the time and mode of death in a terminal illness and I do not initiate discussion as this is not yet a clearly legally available option. So in my opinion I am not yet obligated to offer this option (but I would prefer to be able to either offer and/or respond better to the occasional request for euthanasia). (NZ GP 447)

Although several physicians indicated they would like to be able to offer physician-assisted death in some instances, others emphasised that they would never consider this an option.

It seemed clear from comments that the general practitioners assumed responsibility for providing a good death for the patient. In order to do so some felt that they required access to specialist drugs they deemed necessary for palliative care:

GP should have unrestricted access to all specialist drugs for palliative care. (NZ GP 448)

My purpose is to save life and to make dying as pleasant as possible and pain free - dignified. I find this latter can be virtually always achieved with morphine and would be easier with heroin which for some reason is unobtainable in NZ. (NZ GP 373)

A team approach to care (implying open communication and shared decision-making) was deemed desirable by many:

In the area we share care with district nurses and rest homes. Together with local hospital. A team approach exists therefore. (NZ GP 203)

The current system of doctor and patient and families together making decisions at the end of life have worked well for generations. (NZ GP 246)

Many other physicians commented on the issue of communication around end of life actions, some wanting openness and transparency:

I feel much more respect must be made of the wishes of the person dying. More discussion needs to be had on the influence/wishes of caregivers. I support a more liberal attitude with the correct legal/ethical oversight being provided. Perhaps some "guidelines" (dare I use the word) are in order. (NZ GP 48)

And others insisting that only the patient and doctor should be involved in decision-making:

Very dangerous territory. Only the doctor and patient; don't include anyone else. (NZ GP 41)
This latter statement appears to be a reflection of the fear some physicians expressed that their actions may have legal repercussions:

It is such an emotional and value-dependent issue. I will do anything to protect myself medico-legally, some of the actions taken are futile and wasteful and not of any "benefit" to the patient. (NZ GP 307)

Constraints on open communication when hastening death is considered can provide the physician with challenges. One doctor articulated the difficulty for the physician in managing communication within the caring group when the law inhibited the patient's preferred (implied) end of life action:

I was more concerned about what the relatives (wife, adult daughter) thought rather than legislation. Indeed, when the patient pleaded with me for him not to have another night of extreme respiratory distress he cautioned me to "protect myself" (against the relatives) however they had previously introduced the idea! (NZ GP 63)

When physician-assisted death is secretly provided for the patient, the emotional coping of those persons who knew or were having euthanasia may be complicated by being unable to share their experience with loved ones and leave-take appropriately. Research indicates that the psychological effect for doctors providing physician-assisted death is profound, suggesting that doctors who do so in secret are at risk when they cannot talk through the actions they propose, or have taken.22

Conclusion

Legal or not, physician-assisted death is an international reality, and New Zealand is no exception with such actions occurring in an apparently palliative rich environment. Moreover the results of this study indicate that physician-assisted death is at times occurring without consultation with the patient.

There exists a confusing state of affairs where doctors and family are torn between conflicting demands - on the one hand to relieve suffering, on the other to conform to professional and legal requirements. The current situation is problematic for everyone: doctors carry a heavy burden; patients are unable to have access to options to which they may feel entitled; families are kept in the dark or carry a similar burden to the physician.

Limitations

It is of course, important to exercise a degree of caution in interpreting the above findings. Trying to access empirical data on such a complicated and potentially sensitive activity such as medical decision-making at the end of life is extremely difficult. A questionnaire cannot do justice to the complexity of such decision-making. The wording of the questionnaire may have “forced” respondents to indicate an action performed that did not correctly reflect the actual action. Fifteen respondents criticised the wording in the questionnaire.

A very difficult questionnaire to complete - complex issues that I do not believe are able to be determined by yes/no answers. Hence my revisiting some of the questions. NB My response to the questions may have been quite different if Q3 had stated possibility rather than probability. (NZ GP 292)

Moreover, some rationalisation of actions may have occurred between the time of the death and completing the questionnaire, responses maybe reflective of cognitive processing invoking defence-mechanisms rather than action per se. However no death
occurred more than 12 months previously and it is plausible that many were within weeks of the questionnaire being filled out.

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**References:**


4. Rights of the Terminally Ill Regulations 1996 Darwin: Legislative Assembly of the Northern Territory; 1996.


16. van der Maas PJ, van Delden JJM, Pijnenborg L. Euthanasia and other medical decisions concerning the end of life. Health Policy. 1992;22/1+2(Special Issue).


Caring for patients and families at the end of life: withdrawal of intensive care in the patient’s home

Sue Mann, David Galler, Pamela Williams, Paul Frost

Abstract

Aim To describe our experience of transporting 17 intensive care patients home to die.

Design A brief report.

Setting Mixed medical/surgical intensive care unit (ICU).

Results After discussions with their families, 17 adult patients in whom ongoing care was deemed either inappropriate or futile were transported home. Once there, intensive care modalities of ventilation and vasopressor therapy were withdrawn. The patients were sedated initially with intravenous morphine and if death was not immediately imminent, subcutaneous morphine was administered. In these cases where death took longer than 2 hours, the patients were managed with the assistance of district nurses, the family general practitioner, or staff from the South Auckland Hospice.

Conclusions All the patients in this report were Maori or Polynesian and all families reported this as a positive experience. Since completion of this report, we have taken our first European patient home to die.

As providers of intensive care, we are advocates for individual patients and our duty is to alleviate their suffering and assist them to return to a life with an acceptable level of functioning. Whilst the intensive care unit is generally portrayed as a place where lives are saved, there are times when ongoing support is deemed to be inappropriate or futile. Under these circumstances, the primary focus of care is shifted from active organ support and life saving to the individual patient’s comfort and the support of the family—hence the management of death is a major part of intensive care practice. This is time-consuming and emotionally draining, but very rewarding when done well. Certainly, there are occasions where it can be appropriate for the patient to die at home.

In this report, we present 17 such cases in which intensive care modalities were withdrawn in their own homes, to highlight the importance of this option to individual patient and family groups. The purpose of this article is to raise awareness (amongst the intensive care healthcare community) that this may be a well-accepted and desirable endpoint for appropriate patients and their families.

Method

Each year in our ICU, around 100 patients will die (Table 1). Until recently, all of these deaths have been managed in the ICU. This decision (to withdraw or withhold life-sustaining therapies in any patient) is only made when all of the attending medical staff have reached a consensus view that is the correct management in each case. This position is then discussed with the family from whom agreement is sought and invariably given.
Table 1. Outcome statistics for the Department of Intensive Care, Middlemore Hospital

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Survivors</td>
<td>686</td>
<td>652</td>
<td>627</td>
<td>691</td>
<td>741</td>
<td>732</td>
<td>801</td>
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<tr>
<td>Death after established brain dead</td>
<td>6</td>
<td>9</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Death after full therapy</td>
<td>20</td>
<td>10</td>
<td>25</td>
<td>17</td>
<td>19</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Death after limited therapy</td>
<td>12</td>
<td>12</td>
<td>23</td>
<td>35</td>
<td>26</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Withdrawal of care (brain injury)</td>
<td>18</td>
<td>23</td>
<td>25</td>
<td>14</td>
<td>21</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>Withdrawal of care (other reason)</td>
<td>42</td>
<td>41</td>
<td>32</td>
<td>30</td>
<td>30</td>
<td>19</td>
<td>31</td>
</tr>
</tbody>
</table>

Following a direct request from the family of one of our Maori patients (in whom active treatment was to be withdrawn following a devastating intra-cerebral haemorrhage), we transported that patient home to die. As a result of that experience, and the very positive feedback that we had following it, we now approach selected families of those patients facing imminent death, to discuss whether this would be a desirable option for them. Not all families of appropriate patients are approached. This decision is made on the basis of subjective criteria, which relies heavily on the relationship between the treating nursing/medical staff and the patient’s family.

Before allowing the patient to die at home, the following conditions need to be met (and fully explained to the patient’s family):

- Further treatment is futile or inappropriate, and death is inevitable.
- The patient will be extubated and their inotropes stopped on arrival at the family home.
- A palliation plan has been established and in place prior to the patient leaving hospital. (This may involve the general practitioner, district nurse, palliative care practitioner, or hospice service.)
- The in-house bereavement team is involved in the planning and always meets the family prior to transfer home.
- The patient’s home is within a reasonable distance of the hospital (15 kilometres) and transporting the patient is logistically possible.
- Cultural and spiritual support is always offered and made available if required.
- When the patient finally passes away, a death certificate can be issued without referral to the coroner (medical examiner). If there is any doubt, the coroner should first be approached about referral (before the subject is mentioned to the patient’s family).

Whilst most staff recognise the inherent good in such an approach, some nurses feel uncomfortable with transferring patients home and withdrawing support. Nurses (who accompany the patient to their home) must be experienced, confident, and have already established a close relationship with the grieving family. In addition, the nurses’ security must be assured.

Our current practise is for two nurses to be accompanied by paramedics and for them to be in frequent communication with the ICU by cell phone. This provides continuity of care and ensures that the process is performed in a smooth manner. (These ICU nurses are well versed in the transportation of critically ill patients who are transferred home by road ambulance.)

The patients themselves usually require the same supportive treatment en route that they have required in the ICU. Some require even more support. During this process, the patients are sedated with infusions of morphine and midazolam. Muscle paralysis is not used.
On arrival at the family home, intubated patients are extubated and inotrope and other supportive treatments are stopped. Extubating the patient and removing nasogastric tubes and intravenous lines helps restore the patient’s normal appearance, and is well accepted by the family.

If the patient is not expected to pass away quickly, our staff will stay longer at their home—to ensure that they and the family are comfortable, and so that a proper handover is given to the district nurses, general practitioners and the Hospice Service. We are fortunate in that the Hospice Service will visit regularly to ensure that the patient is comfortable and that the needs of the family are being met. Our own nursing staff are able to treat discomfort with IV morphine whilst the district nurses and hospice staff administer morphine subcutaneously using a Graseby pump.

Following each death, we make contact with the family and health professionals involved, as a form of debrief to ensure that we continue to adequately meet both the needs of the deceased and their family members.

**Results**

We managed the deaths of 17 Intensive Care patients in their own homes (Table 2). All of the patients were Maori or Polynesian, who comprise almost 35% of our ICU population but only 20% of the region’s total population. The patients were relatively young; average age 51 years (range 19–83 years). (The average age of our adult ICU population is only 54.)

Sixteen out of the 17 patients were ventilated for transport (and extubated in their homes) whilst 7 of the 17 had inotropes withdrawn there. Their co-morbidities represent the range that we frequently see in our Maori and Pacific populations; in particular, ischaemic heart disease, hypertension, diabetes mellitus, and chronic renal impairment.

Four patients (patient 6, 9, 12, and 13) suffered a severe hypoxic ischaemic brain injury following cardiac arrest; one patient (10) suffered a community cardiac arrest as a result of severe intra-abdominal sepsis—she had poor neurological recovery in the face of ongoing multi-organ failure. Three patients (1, 4, and 16) had massive intra-cerebral haemorrhage secondary to hypertension; one patient (8) developed brain death following pneumococcal meningitis. One patient (5) had severe bronchiectasis resulting in multi-organ failure, and the tenth patient (2) had cellulitis resulting in multi-organ failure. One patient (11) had irreversible respiratory failure, and two patients (14, 15) had ongoing complications following surgery, which could not be resolved.
Table 2. Patients taken home to die (1996–2002)

<table>
<thead>
<tr>
<th>Patient</th>
<th>1</th>
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<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Condition</td>
<td>ICH</td>
<td>Cellulitis</td>
<td>CAP; metastatic carcinoma sepsis</td>
<td>ICH</td>
<td>Bronchiectasis</td>
<td>CCA</td>
<td>CORD, CP</td>
</tr>
<tr>
<td>Co-morbidities</td>
<td>HT</td>
<td>NIDDM; CRF; AF; IHD; CCF.</td>
<td>IHD; CORD; CRF; CCF; NIDDM</td>
<td>HT; RVD; Starr Edwards Aortic valve.</td>
<td>CP</td>
<td>IHD, AF, HT, gout, alcohol-ism</td>
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<td>NZ Maori</td>
<td>NZ Maori</td>
<td>NZ Maori</td>
<td>NZ Maori</td>
<td>NZ Maori</td>
<td>NZ Maori</td>
<td>Cook Is Maori</td>
</tr>
<tr>
<td>Ventilated</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Time from admission to ICU to decision to withdraw</td>
<td>72 hs</td>
<td>72 hrs</td>
<td>5 days</td>
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<td>24 hrs</td>
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<td>72 hrs</td>
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<td>Time to death at home</td>
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<td>72 hrs</td>
<td>5 hrs</td>
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<td>12 hrs</td>
<td>6 hrs</td>
<td>72 hrs</td>
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Table 2. Patients taken home to die (1996–2002) continued

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<tr>
<th>Patient</th>
<th>8</th>
<th>9</th>
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<td>F</td>
<td>F</td>
<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Condition</td>
<td>Pneumococcal meningitis; Brain dead</td>
<td>CCA</td>
<td>CCA</td>
<td>Intra-abdominal sepsis</td>
<td>Pneumonia following RTC</td>
<td>CCA</td>
<td>CCA</td>
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<td>IHD, Chronic AF, CHF, Gout, IDDM, renal impairment</td>
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<td>Samoan</td>
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<td>NZ Maori</td>
<td>NZ Maori</td>
<td>NZ Maori</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Inotropes</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Time from admission to ICU to decision to withdraw</td>
<td>48 hrs</td>
<td>36 hrs</td>
<td>7 days</td>
<td>18 days</td>
<td>48 hrs</td>
<td>72 hrs</td>
<td>12 days</td>
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<tr>
<td>Time to death at home</td>
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<td>unsure</td>
<td>4 hrs</td>
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<td>2 hrs</td>
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<table>
<thead>
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<th>Patient</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>59</td>
<td>41</td>
<td>62</td>
</tr>
<tr>
<td>Sex</td>
<td>M</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Condition</td>
<td>SUR</td>
<td>ICH</td>
<td>SEP (necrotising fasciitis)</td>
</tr>
<tr>
<td>Co-morbidities</td>
<td>Type II diabetes, ESRF (on haemodialysis), CVA,</td>
<td>Diabetes, hypertension, LVF, CABG, IHD, hypertension, gout.</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>NZ Maori</td>
<td>NZ Maori</td>
<td>NZ Maori</td>
</tr>
<tr>
<td>Ventilated</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Inotropes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Time from admission to ICU to decision to withdraw</td>
<td>4 days</td>
<td>3 days</td>
<td>48 hrs</td>
</tr>
<tr>
<td>Time to death at home</td>
<td>unknown</td>
<td>12 hrs</td>
<td>1 hr</td>
</tr>
</tbody>
</table>

SAH=subarachnoid haemorrhage; ICH=intracerebral haemorrhage, CAP=community-acquired pneumonia; CP=cor pulmonade; CORD=chronic obstructive respiratory disease; IHD=ischaemic heart disease; PH=pulmonary haemorrhage, CCA=community cardiac arrest; HT=hypertension, CCF=congestive cardiac failure; CRF=chronic renal failure; AF=atrial fibrillation; SEP=sepsis, SUR=complications following surgery; RVD=rheumatic valvular disease.
The length of time from admission to the decision to withdraw active treatment ranged from 36 hours to 24 days. The length of time from the arrival home of the team together with the patient and withdrawal of active treatment to death of the patient ranged from immediate (8, the brain-dead patient) to 72 hours. We were unable to obtain the exact time of death in the case of patient number 9.

Discussion

The literature specific to taking critically ill patients home to die is scarce—only one article has been found and this is in reference to neonates.\(^4\) In contrast, there is substantial literature that addresses the terminally ill cancer patient being cared for at home.\(^5,6\) Although there are many similarities in approach, there are also many obvious differences, both philosophical and logistical.

Bascom and Tolle\(^7\) compiled a list of family requirements during the final stages of a relative’s illness. They emphasised the need for frequent and frank communication between staff and patient or their family; the need to be aware of family dynamics; the need to focus on what the patient would want, and the need to attend to their comfort. These are the principles on which we try to conduct our relationships with families. It is on this basis (full disclosure and trust) that we approach families to discuss limiting or withdrawing active treatment in favour of comfort care.

In New Zealand, living wills are still relatively uncommon and families are seen to make decisions and act on the basis of the ‘perceived values’ of their loved one. We believe this to be an example of substituted judgement—ie, the family are acting in accordance with what they believe the patient would want.

In the intensive care setting, it is the family who must act as the patient’s proxy (as well as the family having to accept that the illness is terminal, irreversible and the treatment futile). The process of decision-making around limitations in therapy and withdrawal of care requires time and patience. Although family wishes are always respected, it is not a decision that they are equipped to make alone, nor one that they should carry the responsibility for. In New Zealand, it is the medical staff who ultimately take on this burden.

Dunlop\(^8\) stated that ‘given a choice, most patients prefer to die at home’. Whilst this seems so intuitively correct, it is not a decision that most families or staff can come to easily. With this in mind, it is interesting to note that all of our patients (who were taken home to die) were of Maori or Pacific Island descent. Whether this truly represents a cultural difference or is the result of a practice bias is difficult to ascertain—to answer this, we would need to have records of all the families in whom this option of care was considered or was offered and refused. To date, we have not done this.

In our experience, we see Maori and Pacific Island families openly exhibiting a powerful sense of family and familial duty. They have no tradition of rest home or hospice-based care, and are usually accompanied and surrounded by large groups of extended family, many of whom appear to be willing and able to share the burden of caring for a dying relative. Since completing this paper, we have taken our first European patient home to die, and in the future we will ensure that this option of care will be more closely considered for all patients in this position.
The time period (from admission to making the decision to withdraw life support) ranged from 36 hours to 18 days. Given the diagnostic categories of these patients, this range is not unusual and reflects our collective ability to reach a consensus view that ongoing active support is inappropriate or futile.

Despite cultural differences, all families need to be assured that the medical care, comfort, and dignity of their loved one will not be compromised by the move. This is a concern raised in the literature 10 years ago by Wanzer et al, when they stated ‘patients and their families need reassurance that dying at home will not entail medical deprivation’.

We have found that our patients’ families need to understand (as much as possible) about what is likely to occur, and to be given the necessary support to make this experience a positive one. A multidisciplinary approach is an essential feature in ensuring success for a venture such as this.

Of those 17 patients who died at home, we have records relating to all but one of them. Patient 8 was Brain Dead and died within minutes of extubation, whilst patient 4 had a high oxygen and inotrope requirement and died thirty minutes after arriving home. Those patients that survived at home for greater than 12 hours were either visited by their family doctor, district nurse or the hospice nurse. The feedback that we received from the families and people that visited them in their homes has all been positive.

We may be unique in having a dedicated bereavement team—a group of professionals from varying backgrounds who facilitate all post-death activity in the hospital. This team ensures all necessary paperwork is completed and coroner’s rules are adhered to. In addition, they manage the bureaucracy of death in a smooth and compassionate way. This service is available 24 hours a day, 7 days a week, and has substantially improved this aspect of our care to these families.

In conclusion, we believe that this new initiative is a positive practical option for some intensive care patients.

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**Acknowledgements:** We thank Middlemore Hospital’s Bereavement Team, palliative practitioners, hospice care practitioners, and Cultural Resource Unit; as well as district nurses and the local general practitioners; for their assistance and guidance in such a sensitive area. We also thank the staff of our ICU, who made this study possible.

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**References:**


5. McWhinney IR, Bass MJ, Orr V. Factors associated with location of death (home or hospital) of patients referred to a palliative care team. CMAJ. 1995;152:361–8.


Familial primary pulmonary hypertension

Dan Park, Lutz Beckert

Primary pulmonary hypertension (PPH) is a rare disorder of uncertain aetiology affecting 1–2 people per million. Possibly as many as 20% percent of cases are thought to be familial—defined as those affecting at least two first-degree relatives.\(^1\) PPH shows an autosomal dominant pattern of inheritance, with highly variable penetrance and genetic anticipation.

We present the first documented familial New Zealand case.

Case report

At the age of 29, the patient presented to her general practitioner with fatigue, headaches, weight gain, and episodic flushing. Her only past medical history was mild asthma. She was married without children. She had never smoked. As she was adopted, she was not initially aware of any family history. Later, however, it become apparent that her mother had died from PPH at the age of 26.

At the time of her presentation to a cardiologist, several classical signs of pulmonary hypertension were noted on physical examination, including narrow splitting of the second heart sound with gross accentuation of the pulmonary component. She had a right ventricular gallop and, although her jugular venous pressure (JVP) was not raised, she had mild peripheral oedema and a moderate degree of ascites.

Chest X-ray showed the characteristic pattern of cardiomegaly—markedly prominent central pulmonary arteries with clear lung fields. Electrocardiography demonstrated tall peaked P waves indicative of right atrial enlargement, and gross right axis deviation with 'clockwise rotation' of the chest leads indicative of right ventricular pressure overload.

Echocardiography revealed a normal left ventricular size and function, but her right heart was grossly dilated with mild incompetence of the pulmonary valve and moderate tricuspid regurgitation. This was confirmed by right heart catheterisation studies measuring the right atrial pressure at 19/25 mmHg (mean: 17 mmHg), and right ventricular pressure of 105/8 mmHg (mean: 25 mmHg). Pulmonary artery pressure was 107/56 mmHg (mean: 77 mmHg).

Repeated right heart catheterisation performed a few years later (when under the respiratory service) confirmed ongoing pulmonary artery hypertension measured at 108/40 mmHg (mean 70 mmHg), with a pulmonary artery resistance of 1352 dyne-s/cm\(^5\).

She was given a trial of two vasodilators—receiving intravenous adenosine at doses escalating up to 6000 mcg/min, and nebulised iloprost without side effects (see Figure 1). Neither the pulmonary artery pressure nor the pulmonary artery resistance changed significantly following either challenge.
Figure 1. The patient undergoing pulmonary artery pressure measurements and vasodilator testing a few weeks before her death

(It had been her wish that her case would be published to raise awareness of this fatal but treatable condition. Her husband signed the consent form to publish this photograph.)

Given the negative response, the patient was offered long-term oxygen and long-term warfarin therapy. She was considered for bilateral lung transplantation and bridging iloprost therapy, but unfortunately (a few weeks after lung transplantation was considered) she passed away due to right heart failure.

In the past, the therapeutic options for the management of treating pulmonary artery hypertension only included oxygen therapy, anticoagulation, and lung transplantation. Subsequently 10–15% of patients have been shown to respond to vasodilator administration; these patients have an almost 90% chance of surviving 5 years on high dose calcium antagonists.²

Over the last few years promising new vasodilator therapies have become available, with different mechanisms of action. Treprostinil, beraprost, and iloprost are analogues of epoprostenol, which itself can be given by intravenous infusion. Bosentan blocks endothelin receptors A and B, and sildenafil inhibits phosphodiesterase type 5. Epoprostenol has been proven to improve survival and exercise tolerance; iloprost and bosentan have been shown to improve exercise tolerance.³ Several trials of newer agents and combination of these agents are still ongoing.⁴ Currently epoprostenol, iloprost and bosentan are licensed for the treatment of PPH in New Zealand.
Our patient and her mother represent the first recorded cases of familial PPH in New Zealand. No other family members have so far been found to suffer from the disease.

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**References:**


Nutritional supplements: friend or foe?

Cheryl Krone, John Ely, Louis Harms

Dietary supplements are of interest to many New Zealanders, including health professionals. Although frequent use of nutritional supplements is common in New Zealand (circa 20% of persons aged from the 20s to 70s consume supplements),1,2 reliable data from human studies on the appropriateness of supplementation is insufficient for many nutrients.

Recognised benefits for specific populations (such as pregnant women) have been identified. Folate and iron supplements for females prior to and during pregnancy can help prevent birth defects in offspring and anaemia in the mothers.3 However, such supplements may not be advantageous for everyone.

An excess of iron has been associated with poor outcome in stroke and has been implicated in the development of cardiovascular disease4—this has led to the recommendation that iron supplements should only be prescribed when there is a clear deficiency state.4

Recently, a large prospective cohort study found that zinc intake of greater than 100 mg/day, as well as long term (ie, more than 10 years) use of supplemental zinc, was associated with an increased risk of advanced prostate cancer.5 As an illustration of some of the complexities surrounding supplement usage, this viewpoint article focuses on prostate cancer versus diet and nutrition; specifically zinc supplements.

Prostate cancer and chemopreventive agents

Prostate cancer is one of the most common malignancies in affluent nations. In New Zealand, it is the third-most common cause of cancer-related death in men after lung and bowel cancer. Although debate continues around the benefits and risks of prostate cancer screening,6,7 the control of prostate cancer is based on early detection and treatment. This is due primarily to the non-modifiable nature of the known risk factors for carcinoma of the prostate (eg, increasing age, family history, ethnicity).

However, evidence is accumulating that environmental factors (notably diet and nutrition) may impact on the risk of prostate cancer.8 For example, levels and types of dietary fat appear to be influential. High animal-fat consumption is associated with an increased risk,8 while New Zealand studies have suggested that diets high in fish oils, or in vegetable oils rich in mono-unsaturated fatty acids such as canola or olive oil, may provide a protective effect.2,9

Other potentially valuable chemopreventive agents have been identified. These include vitamin E (alpha-tocopherol), selenium, zinc, and lycopene as dietary supplements.8,10,11

The most powerful evidence for a protective effect of alpha-tocopherol comes from the Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study (ATBC)12—a large randomised controlled trial. This study was designed to examine the influence of alpha-tocopherol on lung cancer prevention, but found an unexpected 30% reduction
in prostate cancer incidence in subjects who received 50 mg alpha-tocopherol (compared to controls). Another randomised controlled trial that tested 100 µg of organic selenium for protection against skin cancer revealed an unforeseen 60% decrease in prostate cancer in the participants receiving selenium. An extension of this trial using 200 µg daily confirmed the potent beneficial selenium effect.

In a large population-based case-control study of middle-aged men, individual supplements of zinc, vitamins C and E (but not multivitamins) were associated with protection against prostate cancer. A borderline statistically-significant 45% reduction in prostate cancer risk was found among men using zinc supplements daily. There was a significant test for trend—ie, more frequent use was associated with decreased risk.

**Zinc and prostate health**

The highest human soft tissue zinc concentration occurs in the normal prostate. The ability to accumulate zinc is retained in benign prostatic hyperplasia. However, the zinc level in prostate adenocarcinoma is significantly decreased. A protective effect of supplemental zinc found by Kristal et al is consistent with these observations and with studies that associate zinc with suppression of prostate cancer cell growth and inhibition of prostate tumour cell invasion. Uzzo et al have provided strong evidence of a protective role for zinc in the development and progression of prostate malignancy. Physiological levels of zinc were shown to suppress activity of nuclear factor-kappa-B. This inactivation sensitises human prostate cancer cells to apoptosis, and inhibits the tumourigenic and metastatic properties of prostate tumour cells.

However, other findings suggest that very high intraprostatic zinc levels could increase the activity of telomerase, an enzyme believed to cause proliferation of tumour cells. In prostate cancer, telomerase activity is increased. Moreover, other evidence, not specifically linked to prostate cancer, suggests that high zinc intake can have systemic effects that adversely impact metabolic processes related to cancer. These effects include immune dysfunction, impaired antioxidant defence, and elevated insulin-like growth factor-1 and testosterone; the latter two are growth factors directly related to prostate carcinogenesis.

Recent analysis (by Leitzmann et al) of data from the Health Professionals Follow-Up Study of nearly 47,000 males lends support to the possible deleterious effects of excess zinc intake. An increased risk of advanced prostate cancer was associated with zinc intake of greater than 100 mg/day. Use of supplemental zinc for more than 10 years was also linked to an increased risk. No strong evidence could be identified in support of any specific mechanisms for the observed association.

**Cadmium in zinc supplements**

One possible explanation for these findings is the presence of the carcinogenic metal cadmium in some zinc supplements. Zinc and cadmium invariably occur together in nature because of their very similar chemical properties.

All commercially available zinc supplements that we analysed contained detectable cadmium. However, the amount varied by almost 40-fold when based on a fixed amount of zinc (eg, 12 mg zinc, the New Zealand Recommended Dietary Intake). In Leitzmann's high intake group, the median daily supplemental zinc intake was 143
mg. This group exhibited a relative risk of advanced prostate cancer of 2.29 compared to nonusers of zinc supplements. Consuming this amount of zinc using the product we analysed (that contained the highest cadmium-to-zinc ratio) would yield a cadmium dose circa 19 µg. This is nearly double the total mean daily lifetime exposure to cadmium from foods, excluding shellfish, as estimated in the US Food and Drug Administration's Total Diet Study (ie, 10 µg cadmium/person/day).

Food is the major route of cadmium uptake for the non-occupationally exposed general public. Human tissues, including the prostate, accumulate cadmium with age. The biological half-life of cadmium is on the order of decades. It has been suggested that even small repeated low doses could accumulate and mimic zinc, leading to the adverse effects observed for cadmium on the prostate.23

Satarug et al recently summarised the data on cadmium in soils, foods, human tissues, etc in Australia, and related them to the burden on health of non-occupational cadmium exposure.24 A long-term chronic total intake of 30–50 µg cadmium/day was associated with adverse health effects—including renal dysfunction, especially in regard to hypertension. Thus, it is advisable to avoid any unnecessary cadmium intake.

Cadmium has been implicated epidemiologically and experimentally in causation of prostate cancer.25 Malignant transformation of normal human prostate epithelial cells in vitro was demonstrated using a cadmium concentration at the low end of the concentration range found in human prostates of men without occupational cadmium exposure.23 These malignant cells showed increased secretion of active metalloproteinases, which are associated with prostate cancer invasion and are typical of aggressive tumours.26 When the transformed cells were injected into mice, they rapidly produced poorly differentiated invasive adenocarcinomas.23

Furthermore, cadmium has been shown to replace zinc in the tumour-suppressor protein, p53, thereby impairing p53’s DNA binding activity. This impairment can decrease the ability of cells to respond to DNA damage.27

The supplement conundrum

Zinc is an essential nutrient that must be continually obtained in the diet. A deficiency of this element ranks among the top ten leading causes of death in developing countries.28 An estimated 800,000 annual deaths worldwide could be prevented by correcting zinc deficiency. Certain populations in developed counties also are at risk for poor health linked to inadequate zinc intake.

New Zealand infants had intakes of less than the reference values at ages under 18 months.29 Many adolescent females and young women in New Zealand, have inadequate dietary zinc intake and or low plasma zinc levels.30,31 Indeed, in a group of New Zealand rheumatoid arthritis patients, less than 10% reached the necessary dietary intake for zinc.32 The recommended treatment for moderate zinc deficiency is supplementation.30–32

Our results suggest that safe zinc supplements with relatively low cadmium levels can be produced (eg, supplements containing the gluconate form of zinc uniformly had lower levels of cadmium than those containing zinc sulfate or zinc as an amino acid chelate).22
Regardless of whether it is proven that cadmium in zinc supplements presents a health hazard in high-zinc consumers, or whether zinc contributes to the observed increase in advanced prostate cancer, the findings point out that caution in adopting supplement regimens is necessary—as there can be undetected or unknown concomitant chemicals in supplements. In addition to cadmium in zinc supplements, 25% of 70 brands of calcium supplements contained potentially hazardous levels of lead.33

Furthermore, the action of pure dietary components at pharmacologic doses does not always produce the expected effects. An example of this is the ATBC trial in which an unanticipated and undesirable increase in lung cancers was observed among the cigarette smokers given pharmacologic doses of beta-carotene.12

Yet, for correction of zinc deficiency states in several at-risk populations, zinc supplements are very effective. Also, for prostate cancer, the large randomised controlled studies mentioned earlier have indicated benefit from alpha-tocopherol and selenium supplementation12,13, as did the large population-based case-control study find utility from zinc, alpha-tocopherol and ascorbic acid (AA) supplementation.15

In two prospective studies, dietary intake of AA was not associated with a reduced risk of prostate cancer.34,35 However, there was a non-significant reduction in relative risk for supplement users,35 and 30-year overall survival was positively associated with AA intake.34

Two other prospective studies measuring plasma levels of AA have not revealed differences between cases with prostate cancer and controls.36,37 However, few of the study participants supplemented AA (less than 2%) and the mean plasma levels of AA were quite low (ie, below the renal threshold for AA). A small number of prospective studies have found a reduced risk of other cancers associated with increased AA intake, or (in some cases) increased plasma AA levels.38 In the older British population (ages 75–84 years), low blood AA levels are strongly predictive of mortality.39

A major limitation in the above studies of AA is the relatively low AA intake (below 400 mg/day). This is much lower than the AA produced endogenously by any one of the circa 4000 AA-synthesising mammals—or the amounts that have been found necessary in the diet for optimum health in the very few mammals that are not AA-synthesisers, such as the primates (ie, ~50 mg/kg body weight or about 3.5 g for a 70 kg human). These amounts (eg, ~3 g/day) appear necessary and are safe for humans, who are also non-AA-synthesisers. Recently, a randomised prospective study of critically ill surgical patients given 1 g ascorbate (intravenously) three times daily (along with oral alpha-tocopherol) found significantly decreased pulmonary morbidity, incidence of organ failure, and length of ICU stay.40

Conclusions

Consumption of nutritional supplements is reasonably common in New Zealand. In older males (mean age 69 years) who served as controls for studies of dietary factors and prostate cancer, about 20% reported regular use of dietary supplements.2 The prevalence of supplement use is about 17% in young New Zealanders age 26 years.1 Twenty-four percent of a large US probability sample of the general population reported daily use of supplements.41
Although the possibility of adverse effects from supplements exists, few individuals consume these nutrients in amounts considered toxic.\textsuperscript{42} For example, of the nearly 47,000 participants in the American Health Professionals Follow-up Study, only 412 were supplementing more than 100 mg zinc daily.\textsuperscript{5}

Thus, current levels of vitamin and mineral supplementation do not appear to pose a health risk for most of the population.\textsuperscript{42} Furthermore, there are important roles for supplements in treating deficiency states. Conceivably, supplements could form the basis for inexpensive and easy methods for preventing various disorders, including malignancies. These potential benefits of dietary supplements deserve further study. For use in prostate cancer prevention, this is particularly true because of the non-modifiable nature of the known risk factors.

However, confirmation of the beneficial effects of nutritional factors should be a priority before public health recommendations regarding dietary changes or supplemental nutrients are made.

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**References:**


The Benevolent Fund

This extract is taken from the Presidential Address published in the New Zealand Medical Journal 1904 Vol 3 (11), p238.

I wish to draw the attention of the profession to the Benevolent Fund. The Benevolent Fund contains only seventy-one members, and has now to its credit a little over £700. No use can be made of this capital until £1,000 has been subscribed, when the interest of that amount will always be available for any deserving case. I would urge members to subscribe to this fund, and I would remind those who wish to do so that a donation of £10 would make them life-members. The committee of the fund, without touching the capital, have already made several grants in specially urgent cases.

I also wish to draw your attention to the Medical Defence Union, which only numbers about a hundred members. The subscription to this is very small, only 5s for members of the New Zealand Branch, and it is hoped that a large number of members will join this year.
Of mice and (no) men?

Some insects and reptiles can reproduce via parthenogenesis: the unfertilized egg retains two sets of chromosomes and begins to develop as if it had been fertilized. In mammals, though, successful parthenogenesis has been regarded as virtually impossible.

However, a recent report from a group of Japanese scientists has shaken that belief. The first parthenogenesis pup, ‘Kaguya’, grew to be a healthy adult female mouse able to reproduce normally. The key to this feat is a gene knockout, affecting the \textit{H19} gene in the oocyte donor, that appears to short-circuit the requirement for paternal imprinting.

\textit{Nature} 2004;428:860–64

Nurse practitioners in general practices

Expansion in the workload of general practitioners has led many countries to shift care to other health professionals, notably nurses. Nurses can undertake health promotion work and routine management of chronic diseases such as asthma, diabetes, and coronary heart disease. A systematic review has shown that nurses can achieve health outcomes that are as good as those of general practitioners and that they may have superior interpersonal skills. It is unclear, however, whether nurses reduce the workload of general practitioners.

In a recent Dutch study involving 34 general practices, the effects of this nursing intervention has been documented. The number of contacts during surgery hours increased in the intervention group compared with the control group ($P<0.06$), particularly for patients with chronic obstructive pulmonary disease or asthma ($P<0.01$). The number of consultations out of hours declined slightly in the intervention group compared with the control group, but this difference did not reach significance. Adding nurse practitioners to general practice teams did not reduce the workload of general practitioners. This implies that nurse practitioners are used as supplements, rather than substitutes, for care given by general practitioners.


Medical carousel or czechmate?

Hundreds of Czech medical staff have moved abroad to take up lucrative contracts—and many more are expected to do so when the country becomes a member of the EU (1/5/04).

There are already 700 Czech physicians, working in Germany, which in 2002 became the first European country to begin hiring Czech physicians without requiring them to take additional medical exams.
The migration of medical staff from the east of Europe westwards is already well documented. Doctors in the economically less well-off east of Germany have been leaving to work in the relatively more prosperous west of the country and have been gradually replaced by Czech doctors.

In turn, staff mainly from Slovakia—where health-sector workers’ wages are lower than the Czech Republic—have been taken on to fill the gaps in the neighbouring state.

But with Slovakia also becoming a new member of the EU, Czech doctors fear that their Slovak counterparts will look to western countries where they can now find work that pays far better than equivalent jobs in the Czech Republic.

Lancet 2004;363:1443–6

Polio eradication in Nigeria

The northern Nigerian state of Kano is preparing to reverse its boycott of polio inoculations, which caused a resurgence of the crippling disease and threatened an international campaign to eradicate it. Last year Kano boycotted the World Health Organization (WHO) vaccination campaign because some Muslim clerics had warned that the vaccines were tainted and would make women sterile. Rumours spread that the vaccines were a plot by the West to reduce the Muslim population. The WHO welcomed the news as it opened a week-long conference in Geneva to re-evaluate its chances of eradicating polio worldwide.

Guardian Weekly (UK), 28 May–3 June 2004, p29

Hernia repair—laparoscopic technique gives inferior results

In a recent large, multicenter, randomized trial comparing laparoscopic mesh and open mesh repair of inguinal hernias, men randomly assigned to laparoscopic repair had a higher rate of recurrence at two years and a higher rate of complications than those assigned to open repair.

At two years, the relapse rate in the laparoscopic group was 10.1% vs 4.9% in the open repair group (odds ratio 2.2). The authors concluded that the open technique is superior to the laparoscopic technique for mesh repair of primary hernias.

Don’t forget about HIV

The incidence of human immunodeficiency virus (HIV) infection is rising in New Zealand. In 2003, there were 154 new diagnoses of HIV infection in New Zealand, more than in any previous year, and less than half of these were amongst men who have sex with men.¹

The following cases are presented briefly to encourage health practitioners to think of the possibility of HIV infection and to test for it when appropriate.

Case 1

A 33-year-old man, who had come to New Zealand from Kampuchea (formerly known as Cambodia) in 1997, presented to his general practitioner (GP) with chronic cough and weight loss. He was anaemic (Hb=126g/L) and lymphopaenic (0.83x10^9/L); and had a polyclonal hypergammaglobulinaemia (IgG=28.8g/L). He failed to respond to sequential treatment with doxycycline for 10 days, erythromycin for 7 days, and roxithromycin for 14 days. He was referred to the respiratory medicine clinic of a large metropolitan hospital where further investigation showed right upper lobe and lingular infiltrates, normal bronchoscopic appearances, no evidence of infection with routine respiratory pathogens or *Mycobacterium tuberculosis*, and no evidence of malignancy.

At follow-up, his weight (which had been 96kg at the onset of his illness) had fallen to 68 kg. Two weeks later, he attended another general practitioner complaining of a cough, which had disturbed his sleep for the previous 6 months. He was tachypnoeic (30/min) but had no other abnormal findings on respiratory examination. He was discharged home where he was found dead by his family the next day. A coroner’s post mortem examination demonstrated *Pneumocystis jiroveci* (previously *P. carinii*) pneumonia and cytomegalovirus infection of the adrenal glands. An HIV-antibody test was positive.

This man died as a result of the acquired immune deficiency syndrome (AIDS), which was not recognised despite contact with his GP and a hospital service. Any progressive, unexplained illness in an otherwise healthy person should arouse suspicion of HIV infection, especially when that person has emigrated to New Zealand from an area of the world with high endemic rates of HIV infection.

Case 2

A 2-year-old Polynesian boy had been investigated since birth for seizure disorder and developmental delay. An HIV test was recommended, but was not performed until 6 weeks after the birth of a younger sibling. Both children and their mother were found to have HIV infection, and the father was HIV-antibody negative. The younger child became unwell with pneumocystis and cytomegalovirus pneumonia. It is likely that the mother was infected with HIV several years ago via heterosexual intercourse with a man from Papua New Guinea.
The offer of routine HIV testing to all pregnant women in New Zealand remains contentious. Early diagnosis of HIV infection in this woman would almost certainly have prevented transmission of perinatal HIV infection. Five children are known to have acquired perinatal infection in New Zealand during 2003.\(^1\) Most of these infections could have been prevented if the mother’s HIV infection had been recognised.

**Summary**

HIV infects people from all walks of life at all ages. The overall prevalence of HIV infection in adults aged 15–49 years is approximately 8% in sub-Saharan Africa, and 1% in Thailand, Kampuchea, and Vietnam.\(^2\) In Port Moresby (Papua New Guinea), the prevalence of HIV infection among pregnant women attending antenatal clinic is estimated to be 1%.\(^2\)

In the cases above, recognition of sexual intercourse with a person from a high prevalence country should have raised concerns about the possibility of HIV infection. Earlier diagnosis has the potential for huge benefit—by preventing perinatal infection, and by provision of treatment to prevent life-threatening illnesses due to immune-deficiency.

Dr Stephen Ritchie, Ms Vanessa Cramond, Associate Professor Mark Thomas
Infectious Diseases Unit
Auckland City Hospital

**References:**


Osteomalacia: recovery of bone density

A 78-year-old Caucasian woman presented to Tokoroa Hospital with long-term severe back pain, proximal limb myopathy, and walking difficulty—associated with biochemical features of osteomalacia and radionuclide bone scan pseudofractures.

In the preceding 25 years, she had sustained four separate fractures of bone after minor trauma, indicating preceding postmenopausal osteoporosis. Serum calcium at 76 years was 2.41 mmol/L, and phosphate was 1.37 mmol/L.

At 78 years of age, her pre-treatment biochemical results were: serum calcium (corrected) = 1.98 mmol/L (n = 2.15–2.57), phosphate = 0.93 mmol/L (n = 0.9–1.55), alkaline phosphatase (ALP) = 457 u/L (n = 40–120 u/L), parathyroid hormone (PTH) = 66 pmol/L (n=1.2–6.2), creatinine = 0.08 mmol/L, 25 hydroxy vitamin D = 5.5 nmol/L (n>50), 1,25 dihydroxy vitamin D = 55 pmol/L (n= 40–155).

Pre-treatment dual energy absorption (DXA) test for bone mineral density (BMD): at lumbar spine L2–L4, mean BMD = 0.4676 g/cm$^2$, T score = -3.69. Proximal radius/ulnar: BMD = 0.2627g/cm$^2$, T score = -7.20.

Treatment was commenced with oral calcium 1.0 g/day; oral vitamin D 2, 50,000 u/day for 7 days and thereafter 800 u/day; plus oral alendronate 70 mg/week (single dose). Therapy was maintained for 24 months.

### Table 1. Effect of treatment on bone mineral density (BMD) at lumbar spine (L2–L4)

<table>
<thead>
<tr>
<th>Time</th>
<th>BMD (g/cm$^2$)</th>
<th>% increase in BMD</th>
<th>ALP (u/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-treatment</td>
<td>0.4676</td>
<td>0</td>
<td>457</td>
</tr>
<tr>
<td>Post-treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 months</td>
<td>0.5833</td>
<td>24.8</td>
<td>499</td>
</tr>
<tr>
<td>4 months</td>
<td>0.5909</td>
<td>26.4</td>
<td>143</td>
</tr>
<tr>
<td>5 months</td>
<td></td>
<td></td>
<td>94</td>
</tr>
<tr>
<td>10 months</td>
<td>0.6832</td>
<td>46.1</td>
<td>98</td>
</tr>
<tr>
<td>18 months</td>
<td>0.7437</td>
<td>59.1</td>
<td>94</td>
</tr>
<tr>
<td>24 months</td>
<td>0.7567</td>
<td>61.8</td>
<td>88</td>
</tr>
</tbody>
</table>

ALP=alkaline phosphatase.

Observations made throughout treatment:

- After 2 weeks: vitamin D stores were almost replete, 25 hydroxy vitamin D = 47.5 nmol/L (n >50), 1,25 dihydroxy vitamin D >160 pmol/L, PTH had fallen to 8.8 pmol/L, calcium was now normal = 2.31 mmol/L, and phosphate =1.23 mmol/L, ALP had risen to 540 u/L.

- After 4 weeks, vitamin D stores were fully replete : 25 hydroxy vitamin D =130 nmol/L, 1,25 dihydroxy vitamin D > 160 pmol/L. PTH was now suppressed at 1.6 pmol/L, ALP was now 499 u/L.

- At 4 weeks, back pain disappeared completely and walking improved.
Over the next 23 months, 25 hydroxy vitamin D levels remained >67.5 pmol/L, and 1,25 dihydroxy vitamin D levels >160 pmol/L, calcium, phosphate, PTH remained normal. ALP slowly fell to normal over 5 months (to 94 u/L).

Prospective DXA tests showed a progressive, incremental rise in lumbar spine BMD at 2, 4, 10, 18, and 24 months. By 24 months, there was an overall increase of BMD to 61.8%. (see Table 1)

Much of this rise in BMD occurred in the post-vitamin D-replete phase with secondary hyperparathyroidism inhibited (ie, after 1 month) when vitamin D metabolites were constantly raised.

There was only a small incremental increase in BMD at proximal (7.3%) and distal (5.8%) radius/ulnar over 24 months.

The patient’s body weight at the start of treatment was 53 kg with body mass index (BMI) = 21 kg/m²; and after 24 months, weight was 68 kg, with BMI = 27 kg/m². Muscle mass, strength, balance, and walking ability improved gradually.

No fractures occurred during the treatment period.

Vitamin D deficiency is common in elderly people in Australasia. Lack of sunlight, poor vitamin D intake, and diminished ageing skin response to sunlight contribute. Oral calcium and vitamin D2 is efficient in restoring vitamin D status, occurring within 4 weeks here, accompanied by inhibition of secondary hyperparathyroidism. Prolonged therapy thereafter continued to increase lumbar BMD. Alendronate, a potent inhibitor of calcium-resorbing osteoclasts, contributed to some rise in BMD (about 9.6% over 3 years) resulting from osteoporosis.

When monitoring long-term bone recovery BMD measurements are superior to ALP, which underestimates the duration of the skeletal recovery process. ALP fell to normal by 5 months. At 4 months, lumbar spine BMD had increased to 26.4%; at 10 months, BMD was 46.1%; and at 24 months, BMD was 61.8%.

Back pain disappeared completely at 4 weeks when vitamin D status had returned to normal. ALP rose at 2 weeks (to 540u/L), and at 4 weeks (to 499 u/L), indicating that ALP is sensitive indicator for early bone response. Lumbar spine BMD had probably risen (as judged by an increase in BMD at 2 months of 24.8%).

Ronu Ghose
Physician
Tokoroa Hospital

References:

1. Sambrook PN, Cameron ID, Cumming RG. Vitamin D deficiency is common in frail institutionalised older people in northern Sydney. MJA. 2002;176:560.
Safety concerns about nuclear-powered vessels persist

New Zealand’s major opposition political party has released a discussion paper on improving the relationship between New Zealand and the United States.\(^1\) One key aspect of the paper considers changing New Zealand’s nuclear-free legislation by dropping the section banning nuclear-propelled vessels (section 11).

However, the safety concerns around nuclear-propelled vessels are glossed over by this discussion paper. For example, it does not consider reports of past radiation releases by the US nuclear navy (eg, involving the USS Guardfish and the USS Nimitz\(^2\)). Also ignored are recent accidents involving US nuclear submarines, including the collision of the USS Greeneville with a fishing vessel\(^3\) and the grounding of the USS Hartford on the Italian coast in 2003.\(^4\) Fortunately, none of these events have had major consequences, but the potential for such an event cannot be ignored given the inherent safety limitations of complex and tightly coupled technologies such as nuclear power.\(^5\)

Even the grounding of a nuclear-powered vessel could still have serious implications for the country’s trade and tourism—which could then have downstream health impacts if the economy was disrupted.

A new consideration that is not mentioned in the discussion paper is the potential for terrorist attacks on shipping. There have been such attacks on US naval vessels (eg, the USS Cole in Yemen\(^6\)) and on other shipping (eg, on the Limburg, a French oil tanker\(^7\)).

It is therefore of concern that this discussion paper, which could ultimately become government policy, does not have an appropriate evidence base. Surely, it is time for New Zealanders to demand of their politicians a higher standard of policy analysis, and to make sure that the potential health impacts of policies are appropriately considered.

Dr Nick Wilson
Chairperson, International Physicians for the Prevention of Nuclear War (IPPNW)
(New Zealand Branch)

References:


Gavin Watson O’Keefe

Rotorua general practitioner, Dr Gavin Watson O’Keefe, 53, died in a motor vehicle accident near Atiamuri on the morning of 29 June 2002.

Dr O’Keefe was born in Wellington, and lived there for 6 years, before his parents moved to Taupo and then Hamilton, where he completed his schooling. He graduated from Auckland University with a Masters degree in Marine Biology before enrolling at the Auckland School of Medicine and completing his medical degree.

In 1978, he became part of the Rotorua medical community, working initially as a house surgeon at Rotorua Hospital, then as a paediatric registrar, earning the respect and trust of all who worked with him.

In 1981 he and his wife Bev (also a general practitioner) set up their practice at Westbrook Surgery, and since then he has had an important influence on general practice in the Rotorua community.

Dr O’Keefe loved general practice, and applied his keen intellect and tremendous energy to the care of his patients. He was a friend and confidant to his patients; and the long service of his staff reflects their fulfilment in working with him. Gavin and Bev worked as a team, sharing the duties of their practice and the enjoyment of raising their three children.

Dr O’Keefe’s enquiring mind and boundless enthusiasm for knowledge involved him in many activities outside his general practice. The Rotorua General Practice Group has a reputation for quality and innovation, and Dr O’Keefe was actively involved in its early development as an Independent Practitioners Association, and as a member of its pharmaceutical and information standards committees. He was also a director of the Rotorua After Hours Clinic, and served on the executive of the Rotorua-Taupo branch of the New Zealand Medical Association (NZMA). For the last 10 years, Dr O’Keefe has been a member of the Premac Advisory Board. Early in 2002, the Lakes District Health Board appointed him as their first general practitioner (GP) liaison officer, where his role was to improve the integration of patient care by the GPs and hospitals of Rotorua and Taupo.

In addition to Dr O’Keefe’s huge contribution in the medical field, he was involved in many community groups and organisations. He was a member of the Mount Ruapehu Volunteer Ski patrol for 8 years in the 1970s and 1980s, president of his local Ford Block Community Association for 2 years, chairman of the Rotorua SWAP club, and a keen member of Toastmasters. He loved the outdoors, enjoying skiing, tramping, mountain climbing, kayaking, mountain biking, and orienteering—as well as playing a mean game of squash. He actively supported the arts in Rotorua and regularly attended chamber music and other concerts.
Dr O’Keefe was a man of enormous vitality and enthusiasm and his death was a great loss to the Rotorua Community.

He is survived by his wife, Bev (Chairwoman of the Rotorua General Practice Group); their daughter, Joanna; and two sons, Simon and Michael.
NATIONAL HEART FOUNDATION GRANTS
Grants awarded March 2004

At the March meeting of the Scientific Committee of the National Heart Foundation a total of 14 grants were awarded. The awards included nine small project grants and five travel grants.

The National Heart Foundation also funded 7 Summer Studentships for Medical Students.

SMALL PROJECT GRANTS

**Dr James Baldi**
Department of Sport and Exercise Science, University of Auckland
The effects of age and training status on cardiac output and diastolic myocardial function during exercise.
$15,000 for 1 year.

**Dr Pranesh Jogia**
Department of Intensive Care/Cardiology, Waikato Hospital
Brain natriuretic peptide in the cardiac intensive care.
$10,000 for 18 months.

**Dr Gregory Jones**
Department of Medical & Surgical Sciences, Dunedin School of Medicine, University of Otago
Plasma metalloproteinase activity as a marker for coronary artery in-stent restenosis.
$13,200 for 6 months.

**Dr Michael Kalkoff**
Department of Intensive Care/Cardiothoracic Surgery, Waikato Hospital
Cytokine and alpha adrenergic expression in patients post cardiac surgery.
$12,000 for 18 months.

**Dr Murray Laugesen**
Health NZ Ltd
Testing of cigarettes with and without charcoal filters to measure the reduction in cardio-respiratory toxicity of the smoke.
$13,000 for 6 months.

**Dr Sanjeevan Pasupati**
Cardiovascular Research Unit, Green Lane Hospital
New blood test to assess cardiac ischaemia during exercise.
$15,000 for 1 year.

**Ms Tania Slatter**
Department of Biochemistry, School of Medical Sciences, University of Otago
The prevalence of ABCA1 mutations in New Zealanders with coronary artery disease and low levels of HDL.
$13,253 for 1 year.

**Assoc Professor Christine Thomson**
Department of Human Nutrition, University of Otago
Bioavailability of selenium from Brazil nuts, and health effects of Brazil nuts and selenium.
$14,180 for 1 year.
Dr Cara Wasywich
Department of Medicine, University of Auckland
Plasma surfactant protein-B in heart failure.
$8,000 for 1 year.

TRAVEL GRANTS

Assoc Professor Richard Milne
Department of Pharmacology, University of Auckland
9th Annual Scientific Meeting of the International Society for Pharmacoeconomics and Outcomes Research in Washington DC, and conduct training in Montreal

Assoc Professor Keith Petrie
Division of Health Psychology, University of Auckland
American Psychological Association Convention, Hawaii, USA.

Dr Harry Prapavessis
Department of Sport and Exercise Science, University of Auckland
8th International Congress of Behavioural Medicine, Mainz, Germany.

Ms Nicola Scott
Christchurch School of Medicine and Health Sciences, University of Otago

Ms Gillian Whalley
Department of Medicine, University of Auckland
Annual Scientific Sessions of the American Society of Echocardiography.
Call for Applications for

Foundation Fellowship of the Australasian Chapter of Sexual Health Medicine

The RACP has formed the Australasian Chapter of Sexual Health Medicine within the Adult Medicine Division. Foundation Fellowship will be available to experienced registered medical practitioners who practice in Sexual Health Medicine in Australia and New Zealand.

Those applying for admission will be considered on the basis of the following criteria:

1. Fellowship of the Australasian College of Sexual Health Physicians (FACSHP);
2. Broad experience in all aspects of clinical Sexual Health Medicine;
3. Ongoing contribution to Public Health policy development in the control of sexually transmitted infections on a population basis in Australasia or overseas;
4. Full-time academic position in Health Sciences relevant to Sexual Health Medicine at senior lecturer level or above;
5. Evidence of clinical training in Sexual Health Medicine;
6. Attainment of academic qualifications in Sexual Health Medicine;
7. Evidence of participation in Continuing Medical Education and Quality Improvement in the field of Sexual Health Medicine;
8. Evidence of contributions to the field of Sexual Health Medicine by:
   - participation in research in the field with appropriate supervision and collaboration
   - development of professional or academic activity
   - regular contributions to undergraduate/postgraduate education; and/or
   - publications in scientific journals and/or contributions to scientific meetings.

For specific details concerning eligibility, please refer to the detailed criteria in the Guidelines for Determining the Eligibility of Candidates for Foundation Fellowship in the Application Package.
Applicants must demonstrate a satisfactory practice history (no professional misconduct, or disciplinary issues).

Foundation Fellows will participate in ongoing professional activity in the field of Sexual Health Medicine and are strongly encouraged to supervise trainees and participate in a Maintenance of Professional Standards (MOPS) Program. Payment of the annual subscription for Fellows is a requirement of the Chapter. Continued Fellowship is conditional upon a satisfactory practice history.

**Application Process**

or obtained from:

Australasian Chapter of Sexual Health Medicine  
Telephone: +61 (0)2 9382 7457  
Email: sexualhealthmed@racp.edu.au

**Closing date for applications: Wednesday 28 July 2004**
Medical Benevolent Fund

NZMA Members, and families of deceased Members, may apply for aid when in situations of financial hardship or distress.

Applications should be directed through the NZMA:

Central Office
P O Box 156
Wellington
Tel: 0800 656161
Migraine and other headaches


This book is part of a series of ‘Quality of Life’ guides commissioned by the American Academy of Neurology to answer ‘basic and important questions faced by patients and their families’. It succeeds in providing a comprehensive review of headache syndromes that is eminently readable both by patients and their doctors. The largest portion of the book is devoted to the understanding and management of migraine but there are also comprehensive sections devoted to atypical headache syndromes and the more serious and secondary causes of headache.

The authors, who are highly regarded headache specialists, begin by outlining the enormous cost headaches pose to society. It is sobering to learn that, in the United States, headache accounts for 4% (10 million) of all visits to doctors, and is estimated to cause a loss of productivity totalling 13 billion dollars a year. Several patient testimonies attest to the social and personal costs.

The chapter outlining the history of headache is fascinating, and all will be relieved to learn that ancient treatments such as trepanation (drilling a hole in the skull) have largely been superseded. The authors also devote several chapters to modern day treatments. These provide an excellent review of not only conventional treatments but also alternative therapies.

The book contains some excellent information for patients and doctors alike. My only criticism is that for a book whose target audience is patients and their families, it is (at times) a little over inclusive, and some of the information appears more directed toward a medical audience.

Deborah Mason
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ABC of antithrombotic therapy

Gregory Lip and Andrew Blann, editors. Published by BMJ Books.

This short text delivers informative reviews on thrombotic issues pertaining to a diverse range of medical and surgical specialties. The book’s concise style, typical of the ABC series in the British Medical Journal, offers a mix of relevant research and clinical data, focusing on patient management. Included are useful references to North American and British antithrombotic guidelines, and each chapter provides a "further reading" list for enthusiastic readers. The text is mainly written by staff at the Haemostasis, Thrombosis and Vascular Biology Unit at the University Department of Medicine, City Hospital, Birmingham.

Chapters 1 and 2 offer useful overviews of antithrombotic drugs and bleeding risk; covering antiplatelet agents, anticoagulants and thrombolytics. There are clear tables, bullet point fact lists, and explanatory diagrams. Safety criteria for prescribing these drugs are reviewed.

The chapter on diagnosis and prevention of venous thromboembolism covers the important principles of pre-test probability assessment for DVT and clinical probability criteria for PE. Prevention strategies are classified according to risk assessment. A very good evidence-based guide on thromboprophylactic strategies is presented for various risk settings and for various anticoagulant products, adapted from ACCP guidelines.

The chapter on atrial fibrillation tackles the challenge of ‘who to treat’, based on risk stratification schemes. The cardiology section covers anticoagulation guidelines for cardioversion and acute coronary syndromes. Sub-specialised areas of thrombosis in pregnancy, and in the paediatric setting, are covered conservatively—while not forgetting to address useful recent developments, such as appropriate strategies for managing LMWHs, the anti-phospholipid syndrome, and prosthetic cardiac valve thromboprophylaxis during pregnancy. Finally, the perennial issue of chronic oral anticoagulant management is reviewed for the UK setting, which is equally applicable to the New Zealand environment.

That such a diverse range of topics is covered in a 67-page text underscores its concise layout. I would recommend this book to generalists seeking an update, and to students as a concise learning tool covering antithrombotic interventions across a spectrum of clinical settings.

Mark Smith
Consultant Haematologist
Canterbury Health Laboratories
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