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EDITORIAL

Big business and our public health. Creeping privatisation?

A starting point in New Zealand's 'health reforms' of the 1990s was claimed inefficiencies, particularly in our hospitals: operating theatres were not fully utilised; it was not possible to account for health spending; inequities existed in service provision between regions. Crown Health Enterprises were established to run along business lines in a competitive environment. Although measurement of the outcomes was strikingly absent (a scandal in its own right), the common consensus is of dismal failure.

Our politicians now claim to be moving us back to a collaborative, co-operative approach. Are we, indeed, seeing the dawn of a new, enlightened era? Is government now listening to the collective voice of health professionals through the New Zealand Medical Association, the professional colleges and the Association of Salaried Medical Staff?

Instead, the scenario encapsulated in a cartoon published in the Guardian Weekly could be threatening. Under the caption **Creeping Privatisation**, this cartoon showed the grovelling figure of Britain's Prime Minister Tony Blair approaching a bloated, cigar-puffing fat cat with 'Private Sector' inscribed on its tie, saying: "I bet you've got some fantastic ideas on improving our schools and hospitals. By the way, hope you don't mind me saying so but you look fantastic. Have you been working out? Love the tie. Really suits you….." The same newspaper[1] reports Tony Blair as reassuring trade union leaders that plans for more private sector capital and management in Britain's schools and hospitals will not undermine public services.

At issue is the development of public-private partnerships (PPTs) and private finance initiatives (PFIs) which, in the areas of public health and education, have aroused widespread anxiety in Britain. Indeed it appears that the British Labour government has, since the late 1990s, embraced PFI for major 'public' hospital building works. Author George Monbiot describes a recurring pattern of secrecy (commercial confidentiality), exorbitant expenditure of public money on new National Health Service (NHS) hospitals which deliver fewer beds, services and health professional staff, but big profits for the construction/service companies.[2] The British Medical Association calculated that the first ten privately financed hospitals will need an NHS subsidy of £220 million. By April 2000, the British government had commissioned 34 privately financed hospital developments at a cost of £3.5 billion. Every £200 million spent on privately financed hospitals for the NHS will result in the loss of positions for 1 000 doctors and nurses according to a consultancy working for NHS trusts and the Department of Health. This, says Monbiot, signals the corporate takeover of Britain's NHS.[2]

Concern has been expressed, at least in Europe, at the pressure to trade public health for private wealth. This pressure is attributed to US managed care companies, the World Trade Organisation and the General Agreement on Trade Services (GATS).[3-6] Are we exempt from these global pressures?

Need we concern ourselves with such matters in New Zealand? The publicly funded health system is being starved of funds and an inordinate (though undefined) amount of the residuum has shifted into administration. The public health sector, therefore, is desperate and morale is poor. At the same time flocks of business persons have migrated into the public health sector – onto boards and into management positions. Some (many?), while sitting on our District Health Boards have financial interests in big business including the private health industry. Finance Minister Michael Cullen "has floated the prospect of the Government entering into PPTs for large developments".[7] It is unclear whether public health is on his mind.

By design or default we may well fall into the situation now well established in Britain. This could prove expensive in the long term and is unlikely to deliver health services to the standard we expect. If indeed our public health system is being subjected to creeping privatisation, a number of questions need to be raised. Who will monitor the process? Who stands accountable for the outcomes? How will the process affect education of our medical students, junior resident medical officers and those entering medical specialties? Will medical professionals have even less say on how medical services are run than in the last decade? What effect will it have on medical research?

We need information from our politicians regarding plans for involvement of big business in our public health services. We must be vigilant, and any concerns should be expressed coherently and vigorously through our specialty colleges, the New Zealand Medical Association and the Association of Salaried Medical Staff.

The Editors

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Are Maori under-served for cardiac interventions?

Ian Westbrooke, ***New Zealand Health Funding Authority;*** **Joanne Baxter,** ***Te Roopu Rangahau Hauora a Eru Pomare, Wellington School of Medicine;*** **James Hogan,** ***New Zealand Ministry of Health, Wellington.***

Abstract

Aims. To examine hospitalisation rates for selected heart-disease-related diagnoses by age, gender, ethnicity and deprivation.

Methods. Four years' data on publicly-funded hospital discharges for: (i) heart failure and (ii) cardiac interventions were cross-classified by age group, gender, ethnicity (Maori/non-Maori) and deprivation (NZDep96). Population hospitalisation rates were calculated and displayed in multi-dimensional trellis graphs.

Results. The graphs show patterns of hospitalisation for chosen variables simultaneously. The expected increase in heart failure with age is found, as is an increase for the cardiac group up to ages 65-74 years. Clear gender differences were found. A further increase of heart failure with higher deprivation is evident throughout. For cardiac interventions, the relationship with deprivation is complex. Differences by ethnicity are disturbing. Hospitalisation rates for heart failure for Maori are typically more than double the non-Maori rates. In contrast, for the cardiac group Maori intervention rates are much lower.

Conclusions. Graphical analysis that displays age, gender, ethnicity and deprivation simultaneously provides great insight into hospitalisation rates. Ethnic differences are particularly concerning and raise important questions about how well Maori needs are being met and how equitable is access to cardiac interventions for Maori.

NZ Med J 2001; 114: 484-7

This paper aims to examine hospitalisation rates for selected heart disease diagnoses by age, gender, ethnicity and socio-economic deprivation. Identifying factors influencing hospitalisation for heart disease has obvious implications for New Zealand health policy and health service practice. Despite reductions in mortality due to heart disease over recent decades cardiovascular disease remains the leading cause of death among males and second leading cause of death among females in New Zealand.[1] Alongside the high levels of morbidity and mortality associated with heart disease, the cost of treatment and management remains high. 'Heart failure' and 'coronary bypass' rank within the top 100 most expensive diagnostic related group admissions/procedures. For the year ending June 1999, approximately $17 million was spent on heart failure (diagnostic related group 252) alone, making it the eighth most expensive reason for hospitalisation. The total of the coronary bypass costs published by the Health Funding Authority (diagnostic related groups 288, 290, 291) was $21.2 million.[2]

Table 1. Groupings of Diagnostic Related Groups.

Group	DRG 3.1	DRG 3.1 descriptor
Heart failure	252	Heart failure and shock
Cardiac interventions	287	Coronary bypass with invasive cardiac investigative procedure with major complications
	288	Coronary bypass with invasive cardiac investigative procedure age >64 or with non-major complications
	289	Coronary bypass with invasive cardiac investigative procedure age <65 without complications
	290	Coronary bypass without invasive cardiac investigative procedure with major complications
	291	Coronary bypass without invasive cardiac investigative procedure without major complications
	297	Trans-vascular percutaneous cardiac intervention

Methods

Using data derived from the New Zealand Health Information Service's National Minimum Data Set (NMDS),[3] together with the 1996 Index of Deprivation[4] and demographic information from Statistics New Zealand, this paper presents publicly funded hospitalisation rates for heart failure and cardiac interventions by age, ethnicity, gender and socio-economic deprivation. The unique feature of this analysis is the use of trellis graphs, which allow all four variables and their effect upon hospitalisation for selected heart-disease-related diagnoses to be graphed simultaneously. This overcomes the statistical problems concerning model selection and specification inherent in traditional statistical analysis and further provides a striking visual perspective on the relationship between these variables.

Characteristics of the hospital data. NMDS data spanning the period 1 July 1996 to 30 June 2000 for two groups of diagnoses were extracted for this analysis. The NMDS collects information concerning all publicly-funded hospital discharges for in-patient events lasting more than three hours. Clinical information records each event diagnosis according to the International Classifications of Diseases Version 9 (ICD9) diagnosis classification, together with all procedures undertaken. Based on this information, each event was assigned to a diagnostic related group (DRG) which represents an aggregation of broadly homogeneous types of diagnoses. Details of the groups of DRGs used in this paper are given in Table 1.

The NMDS also collects basic demographic information about each patient treated, including gender, ethnicity, usual domicile of residence and date of birth. All relevant hospitalisations were aggregated according to the patient's specific age, gender and ethnicity characteristics. The age variable was measured at the date of discharge and formed into groups. Four age groups are presented here: 25 to 44, 45 to 64, 65 to 74 and 75 to 84 years. The grouping was based on a judgement of appropriate life stages particularly in relation to health service utilisation. Any record that included Maori in any of the three NMDS ethnicity fields was identified as having Maori ethnicity. All remaining records, including those with no ethnicity specified, were classified as 'Other' ethnicity. There are longstanding concerns about the quality of ethnic data in the NMDS. Relevant to this paper, there is evidence of significant undercount of Maori ethnicity in morbidity data.[5,6] This issue is addressed in the discussion section.

The NMDS does not include a socio-economic indicator. However, each record does identify the patient's usual domicile of residence at census area unit level, which, together with the 1996 Index of Deprivation,[4] allows an area-based measure of deprivation to be derived. We derived deprivation scores at the 1991 area unit level using the methodology recommended by Salmond et al.[4] Small area measures of socio-economic deprivation are widely used in health research.[7-9]

Characteristics of the denominator population data. Structural demographic characteristics, obtained from the 1996 Census of

Population and Dwellings, were adjusted using population projections from Statistics New Zealand to derive population estimates by age, sex, and ethnicity at an area unit geographical level for the years required (unpublished: data available from the authors). Using area unit populations allowed the 1996 NZ deprivation index to be attached to the data. These populations were on a consistent basis with the NMDS data, allowing the derivation of national hospitalisation rates cross-classified by age, sex, ethnicity and deprivation.

Using multi-panel graphs. Recent developments in graphing methods and software allow the display of multi-dimensional data of this type in trellis displays.[10] This is implemented in the statistical package S-plus. The approach is deceptively simple. Conventional graphs, typically displaying two or three variables, are systematically arranged in a series of panels which allow the display of one, two or more additional variables. These multi-panel graphs allow users to see a number of variables and their interactions simultaneously. With careful allocation of variables to axes, it becomes possible to analyse complex interactions graphically, without needing to standardise, or to fit models that usually require the making of strong assumptions. Relationships within the data, obscured by the limitations of standard two or three variable graphs, are illuminated once other influential variables are controlled for within the trellis graph structure.

Figures 1 and 2 show this approach applied to the hospital data. Within each figure there are a series of individual graphs showing the hospitalisation rate on the horizontal (x) axis, and groupings of deprivation level on the vertical (y) axis. The shape of the symbols indicates ethnicity. Each small graph displays one continuous variable (the rate) and two sets of categories (deprivation and ethnicity). The arrangement of these small graphs as panels in the trellis graphic allows the display of two further dimensions – with a column of graphs for each of female and male; and the rows displaying successive age groups up the page.

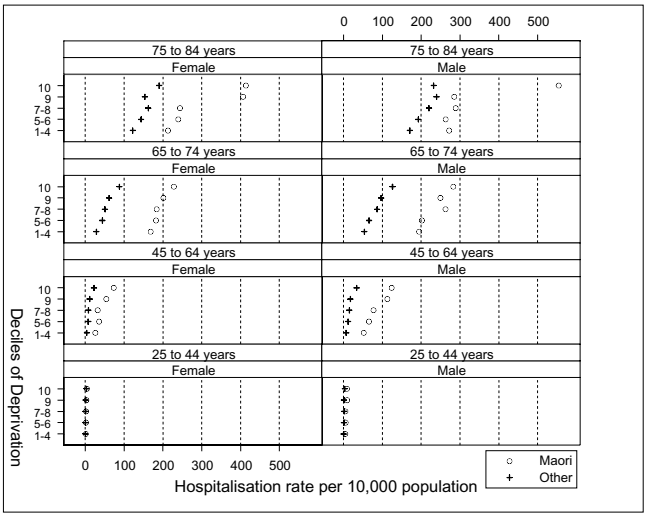

Figure 1. Average annual hospitalisation rates for heart failure (DRG 252) publicly-funded New Zealand discharges for four years (1 July 1996 to 30 June 2000) by age, gender, deprivation and ethnicity. Each of the individual graphs shows the hospitalisation rate on the horizontal (x) axis, and groupings of deprivation level on the vertical (y) axis. The shape of the symbols indicates ethnicity. Each small graph displays one continuous variable (the rate) and two sets of categories (deprivation and ethnicity). The arrangement of these small graphs as panels in the trellis graphic allows the display of two further dimensions – with a column of graphs for each of female and male; and the rows displaying successive age groups up the page.

Results

Age and sex. As age increases, going up the panels, for each sex-deprivation-ethnicity grouping, there is an increase in the rate of heart failure as expected (Figure 1). The general pattern is similar for cardiac interventions up to the age group 65-74 years, then the rate declines for the oldest age group (Figure 2). There are very clear differences between male and female rates for both groups of diagnoses, with male rates higher in virtually every case.

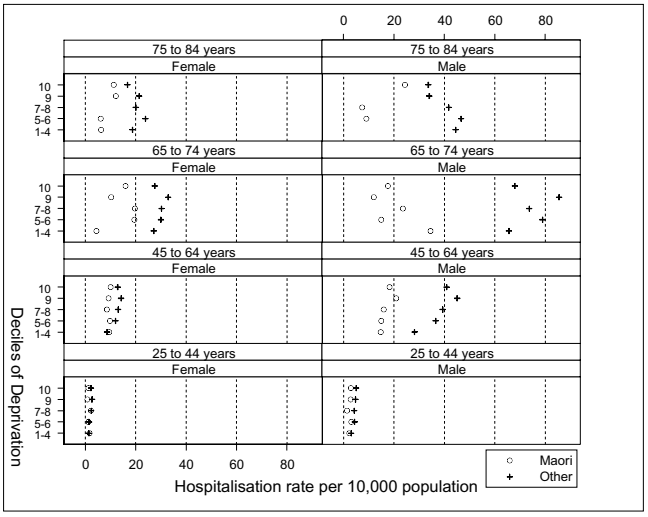

Figure 2. Average annual hospitalisation rates for cardiac interventions (DRGs 287-291 & 297). Publicly-funded New Zealand discharges for four years (1 July 1996 to 30 June 2000) by age, gender, deprivation and ethnicity.

Deprivation. A clear increase of heart failure with higher deprivation is evident throughout, except where data become sparse in the oldest age groups (Figure 1). In contrast, for cardiac interventions, the relationship with deprivation appears more complex (Figure 2). For males, there is an increase with deprivation similar to that for heart failure up to age group 45-64, and for Maori to age group 65-74. For age 65-74 non-Maori males, there is no clear relationship with deprivation, and it appears that the relationship between hospitalisation and deprivation for males aged 75-84 may reverse, with rates decreasing with increasing deprivation. The deprivation effects for females are not as clear, but may be consistent with the male patterns.

Ethnicity. Differences by ethnicity are striking. Hospitalisation rates for heart failure for Maori are typically four or more times higher under 65 years, and more than double the non-Maori rates for the age group 65-74 (Figure 1). Beyond this age the Maori population becomes very small and the rates for Maori do not show clear patterns. There is a stark contrast with the cardiac group where Maori intervention rates are much lower, typically between a third to a half the rates for the rest of the population (Figure 2). For both groups of diagnoses, this analysis controls for differences in deprivation, age, and sex, and represent contrasts between Maori and non-Maori taking these other factors into account.

Reliability of rates. Both the hospitalisation and population data are based on censuses, which means the rates are not subject to sampling error. They may be subject to non-sampling error, for example due to mismatches in ethnic coding, or unreliability of age reporting. However, patterns in the data can be obscured in categories that have small numbers of reported cases. Table 2 shows the numbers of discharges used to calculate the rates. For Maori aged 75-84 years some of the numbers are as low as zero and are suppressed on the plots.

Discussion

This study provides a range of findings related to patterns of hospitalisation rates for heart failure and cardiac interventions. A key finding concerns differences between Maori and non-Maori rates of cardiac intervention (Maori considerably lower) and of heart failure (Maori considerably higher). With regards to heart failure, the concern lies both

Table 2. Publicly-funded New Zealand cardiac discharges (DRGs 287-291 & 297), heart failure discharges (DRG 252), and average population for four years (1 July 1996 to 30 June 2000) by age, gender, deciles of deprivation and ethnicity. Average annual rates are derived by dividing discharges by four then by population.

Female

		Cardiac discharges		Heart failure discharges		Average population	
Age	Deprivation	NZ Maori	Other	NZ Maori	Other	NZ Maori	Other
75-84	10	3	38	110	432	665	5680
years	9	2	70	67	501	412	8177
	7-8	0	156	49	1263	502	19 448
	5-6	1	186	39	1121	407	19 519
	1-4	1	249	34	1626	399	33 271
65-74	10	13	95	186	303	2039	8625
years	9	5	146	98	271	1217	11 099
	7-8	12	325	112	544	1522	26 848
	5-6	9	325	84	474	1154	27 101
	1-4	2	532	76	552	1129	49 015
45-64	10	38	119	277	205	9445	23 142
years	9	22	157	129	124	5965	27 630
	7-8	27	346	101	209	7872	66 436
	5-6	23	344	84	209	5878	71 974
	1-4	25	575	68	249	6559	166 899
25-44	10	11	32	34	43	21 743	35 952
years	9	5	46	17	16	14 454	43 360
	7-8	17	90	15	30	19 114	97 408
	5-6	7	59	10	20	14 350	101 910
	1-4	11	128	9	31	15 734	223 008

Male

		Cardiac discharges		Heart failure discharges		Average population	
Age	Deprivation	NZ Maori	Other	NZ Maori	Other	NZ Maori	Other
75-84	10	4	52	91	359	410	3868
years	9	0	71	34	500	298	5216
	7-8	1	211	39	1111	337	12 622
	5-6	1	237	29	979	276	12 704
	1-4	0	401	33	1538	303	22 546
65-74	10	12	226	193	419	1705	8315
years	9	5	343	104	388	1042	10 026
	7-8	13	709	145	833	1379	24 066
	5-6	6	771	81	643	1002	24 403
	1-4	14	1221	79	1000	1014	46 518
45-64	10	63	391	428	320	8621	23 884
years	9	46	491	248	194	5494	27 227
	7-8	48	1022	232	386	7517	64 889
	5-6	35	1034	153	335	5839	70 673
	1-4	41	1892	145	452	6938	168 052
25-44	10	21	68	63	44	17 833	34 177
years	9	14	79	46	15	12 377	41 983
	7-8	10	161	37	60	17 719	94 877
	5-6	17	172	30	42	13 775	98 906
	1-4	15	258	29	44	16 307	212 088

in the high overall level of hospitalisation for Maori and in the high rates of hospitalisation relative to non-Maori within the same deprivation deciles. For cardiac interventions, the finding is in stark contrast, where it is shown that within deprivation groups, Maori are much less likely to receive cardiac interventions. Both findings highlight a large difference in hospitalisation relating to ethnicity that is separate and in addition to that associated with deprivation.

While there are some concerns about the quality of ethnic data, including possible undercount of Maori, data quality problems cannot adequately explain the large gap in heart failure rates. Nor can they simultaneously explain higher Maori heart failure rates and lower Maori cardiac intervention rates when these are derived in the same way from the same data sources.

These findings raise many questions including why Maori have such high relative hospitalisation rates for congestive heart failure. Do Maori and non-Maori with congestive heart failure have differing patterns of aetiology, severity, hospital utilisation or outcome? There is very little research that explores these issues. One South Auckland study investigating diabetes among patients with congestive cardiac failure found that Maori were more likely to have a secondary diagnosis of diabetes (34%) when compared with European (17%).[11] There has been little other published research that has investigated congestive heart failure in Maori.

The issue of whether access to elective procedures such as bypass grafts is equitable for Maori is also raised, particularly given the high level of cardiac morbidity in Maori. Again, there is little research that has investigated access to bypass grafts by ethnicity in New Zealand. Previous research on mortality in Maori males has identified that not only is Maori mortality higher than non-Maori but Maori are also more likely to die of conditions amenable to health service intervention.[12-14] These studies support suggestions that health service utilisation and outcome differs by ethnicity when social class or deprivation are controlled for.

It is beyond the scope of this paper to explore these findings further. However, key questions arise including that of how accessible are elective procedures within New Zealand health services for Maori and whether Maori needs for management of conditions such as heart failure are being met by primary care. These issues and the important need to understand the relationship between ethnicity and deprivation strongly support the need for more research in this area.

We conclude that undertaking analysis of hospital utilisation taking into account age, gender, ethnicity and deprivation simultaneously is indeed useful as highlighted by the range of information obtainable within this analysis. Not only can patterns of hospitalisation for specific groups (eg, age or gender groups) be viewed, but also the

relationship between factors can be viewed. In particular, in this analysis the relationship between ethnicity and deprivation provides a disturbing picture that requires further research, understanding, and consideration in policy development.

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Note: The comments, analysis and opinions presented in this paper should be solely attributed to the authors. They do not necessarily reflect the comments, analysis and opinions of the Ministry of Health.

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Cervical cancer concerns

The pathologists in Leicester decided to audit the cervical smear history of 403 women who developed cervical cancer. They discovered that 20% had never had a smear – raising, in passing, questions about equity and screening and that 84 had been given a false negative result and 38 had had their smears undergraded. Twenty of the 122 patients died, and in 14 cases diagnostic delay was a factor. Sixty four patients had treatment that was more radical than necessary. These results are not uniquely bad. Leicester seems to be as good as most other places.

The results were made public, patients were informed, and Symonds and others were left to pick up the pieces – with little preparation. Some patients and relatives were calm, but about a quarter were angry. "Some shouted, and relatives especially tended to blame the messenger," says Symonds. He discusses the lessons he has learnt from the episode – one is that "perhaps the test has been oversold. Any screening test that relies on visual interpretation of a few abnormal cells against a background of many thousands of normal cells can never be 100% accurate." Precisely. Doctors should spell out the difficulties of much of what they do, although it might be that testing for human papillomavirus infection would be much more effective.

Editors Choice. BMJ 2001; 323: Oct 6th.

Community-acquired pneumonia in Christchurch and Waikato 1999-2000: microbiology and epidemiology

Richard Laing, *Senior Research Fellow, Canterbury Respiratory Research Group;* **William Slater,** *Respiratory Registrar;* **Clare Coles,** *Respiratory Research Co-ordinator, Waikato Respiratory Department;* **Stephen Chambers,** *Associate Professor, Department of Infectious Disease;* **Christopher Frampton,** *Biostatistician, Department of Medicine;* **Rodger Jackson,** *Radiologist, Department of Radiology;* **Lance Jennings,** *Virologist, Department of Microbiology, Christchurch Hospital;* **Noel Karalus,** *Respiratory Physician;* **Graham Mills,** *Respiratory and Infectious Diseases Physician, Waikato Respiratory Department, Health Waikato, Hamilton;* **David Murdoch,** *Microbiologist, Department of Microbiology, Christchurch Hospital;* **Ian Town,** *Professor in Medicine, Canterbury Respiratory Research Group, Christchurch School of Medicine and Health Sciences, University of Otago, Christchurch.*

Abstract

Aims. To prospectively record current epidemiology and microbiology of community-acquired pneumonia in two New Zealand centres.

Methods. Between July 1999 and 2000 all adults admitted to Christchurch and Waikato Hospitals with community-acquired pneumonia were screened for study inclusion. All those enrolled had their medical history, clinical variables, inpatient management and clinical outcomes recorded and standardised microbial diagnostic testing carried out.

Results. 474 participants were enrolled with a mean age of 64 years and a microbial diagnosis was made in 197 cases (42%). *Streptococcus pneumoniae* (14%), *Haemophilus influenzae* (10%) and Influenza A virus (7%), Legionella spp (4%) and *Mycoplasma pneumoniae* (3%) were the most commonly isolated organisms. An 'atypical' organism was diagnosed in 8% of cases compared to 30% and 23% in previous Christchurch and Waikato studies respectively. Fourteen of the 67 *S pneumoniae* isolates (21%) had reduced susceptibility to penicillin, all with a MIC ≤ 2µg/mL, a level of reduced susceptibility not associated with worse patient outcomes. Clinical outcome included a mean hospital stay of 6.7 days and a 6 week mortality of 6%.

Conclusion. Although *S pneumoniae* was the most commonly isolated organism in this study there have been significant changes in the prevalence of atypical organisms since previous surveys. Ongoing surveillance of antibiotic resistance and variations in the prevalence of organisms causing community-acquired pneumonia is required to guide clinicians' empiric antibiotic use.

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Community-acquired pneumonia is a major health problem in New Zealand affecting all ages and ethnic groups. It is the most common cause of admission to hospital for adults and has a reported mortality of between 6.5 and 8%.[1,2] Due to difficulties identifying causative pathogens in many cases of community-acquired pneumonia, international guidelines recommend that initial antimicrobial therapy should be empiric, based upon the severity of illness.[3-5]

The choice of antimicrobial agents for patients with community-acquired pneumonia necessitates knowledge of the local microbial epidemiology. In New Zealand such information has been derived from two separate studies, one undertaken at Waikato Hospital in 1988 and one at Christchurch Hospital in 1992-1993.[1,2] As with most other series[6-8] *Streptococcus pneumoniae* was the most common pathogen identified in both centres (33-39% of cases), followed by *Mycoplasma pneumoniae* infection (16-18%), while Christchurch identified a high incidence of pneumonia due to Legionella spp. (11%). As a direct result of these data, plus evidence that outcomes for those with *M pneumoniae* infection were improved when appropriate antibiotics were used, we developed recommendations for empiric antibiotic selection.[9]

Previous epidemiological surveys have demonstrated variation in the prevalence of causative agents in community-acquired pneumonia both between geographically separate areas[10] and over time within one geographic area.[11,12] Over the last decade there has also been an increasing prevalence of antimicrobial resistance amongst common causative pathogens, especially *S pneumoniae* resistance to penicillin.[13,14] This phenomenon is likely to influence future management recommendations.[15] In response to these observations it has been stressed in a recent commentary that periodic epidemiological surveys of the local prevalence of causative pathogens of community-acquired pneumonia and their antimicrobial susceptibility should be undertaken to validate current prescribing guidelines.[16]

This collaborative project, involving groups based at Waikato and Christchurch Hospitals, aimed to document the prevalence of common causative pathogens of community-acquired pneumonia; to document levels of antibiotic resistance in common causative pathogens in community-acquired pneumonia; to document the characteristics and clinical outcomes of a population of patients hospitalised with community-acquired pneumonia; and to compare the current epidemiology and microbiology of community-acquired pneumonia to that documented in two previous studies.

Methods

Participants. Patients over eighteen years of age admitted to Christchurch and Waikato Hospitals between July 27 1999 and July 27 2000 with a diagnosis of community-acquired pneumonia were screened for inclusion into the study. Christchurch Hospital has 660 and Waikato Hospital 600 beds and serve populations of 421 000 and 218 000 respectively. Inclusion and exclusion criteria for this study were based on those used in previous studies.[1,2,6,7] Pneumonia was defined as an acute illness with radiographic pulmonary shadowing which was at least segmental or present in one lobe, and was neither pre-existing nor of other known cause.[6] Inpatient care remained the responsibility of the admitting clinical team.

Patient characteristics and admission clinical findings were recorded on a standardised proforma. Disease severity was determined using the modified British Thoracic Society severity prediction rule.[17] Co-morbidity, malignancy and complications of pneumonia were defined as per the definitions used by Fine et al.[18] The definition in the PORT Cohort Study for immunosuppression was used when immunosuppression did not reach the level requiring exclusion.[19] Patients identified their own

ethnicity, which included dual and multiple ethnicity. At the time of enrolment, blood was drawn for haematological, biochemical and microbiological analysis. Sputum, urine, throat swabs and a nasopharyngeal swab were sought. Pleural and transthoracic needle aspiration[20] were undertaken in selected cases.

Follow-up was arranged for survivors six weeks post admission for clinical assessment, chest radiograph and convalescent sera and urine. Chest radiographs were reviewed by a designated radiologist in each centre to confirm entry criteria and to document the extent of consolidation and associated abnormalities at presentation and at six weeks.

Microbiological methods. Blood cultures were incubated aerobically and anerobically using the BacT/Alert Microbial Detection System (Organon Teknika, Durham, NC, USA). Sputum was examined by Gram stain microscopy for the presence of bacteria and the quantity of squamous epithelial cells and polymorphonuclear (PMN) leukocytes. Sputum samples were cultured on sheep blood agar, chocolate agar, buffered charcoal yeast extract agar supplemented with α-ketoglutarate, and modified Wadowsky-Yee medium. Antimicrobial susceptibility testing was performed according to National Committee for Clinical Laboratory Standards guidelines.[21] Cellular material from nasopharyngeal swabs was either directly examined by immunofluorescence microscopy, and/or cultured for respiratory viruses. Serum samples were tested by complement fixation for antibodies to influenza A and B viruses, adenovirus, respiratory syncytial virus, and parainfluenza viruses, by particle agglutination for antibodies to *Mycoplasma pneumoniae*, by microimmunofluorescence for antibodies to *Chlamydia pneumoniae*, and by indirect immunofluorescence for antibodies to Legionella spp. Urine was tested for *Legionella pneumophila* serogroup 1 antigen by the NOW® Legionella Urinary Antigen Test (Binax, Portland, ME) after 25-fold concentration. Methods were standardised at both sites. Once standard diagnostic techniques were undertaken, all clinical samples were separated into multiple aliquots and stored in 1.8 mL micro centrifuge tubes at -70ºC.

Criteria for aetiological diagnoses. Microbial diagnosis was classified as definite when one of the following criteria was met: the isolation of a bacterial pathogen from a sterile sample such as blood, pleural fluid, or lung aspirate; detection in respiratory secretions of pathogens that do not colonize the upper airways (eg Legionella spp., Influenza A and B); a positive *Legionella pneumophila* serogroup 1 urinary antigen test; or a four-fold or greater rise in antibody titre in paired serological tests. The diagnosis was classified as presumptive when one of the following criteria was met: the isolation of a bacterial pathogen from purulent sputum (> 25 PMN per high-powered field) in which a compatible organism was seen in moderate or large amounts on sputum Gram stain; or antibody titres ≥ 1:512 to *C pneumoniae*, ≥ 1:160 to *M pneumoniae*, or ≥ 1:128 to respiratory viruses, in the absence of a four-fold rise in antibody titres.

Statistical analysis. Data were entered into a specifically designed Microsoft Access database. The SPSS for windows 10.0 statistical package was used for the analysis (SPSS Inc., Chicago, USA). Qualitative variables were compared between groups with the chi-squared test and continuous variables with the Student's *t* test. The level of significance was set at $p < 0.05$.

Results

Patient characteristics and clinical history (Table 1). During the twelve-month study period 474 participants were enrolled, 304 from Christchurch, 170 from Waikato. 71 additional patients were potentially eligible but consent could not be obtained. The mean age of those enrolled was 63.7 years (range 18-99) and 53% were men. The mean duration of symptoms prior to admission was six days. 130 patients (27%) had received antibiotics prior to admission, of whom 44 (34%) received co-amoxyclavulanate, 44 (34%) received a macrolide and 27 (21%) received amoxycillin. Comparing those who received antibiotics prior to admission with those who had not, there was no significant difference in outcomes such as mortality or length of hospital stay. 274 participants (58%) had significant co-morbidity at presentation (Table 1). Those with co-morbidity were significantly more likely to have severe pneumonia at admission (39% versus 25%, p=0.01), a longer duration of admission (8 versus 5 days, p<0.001) and increased six week mortality (8% versus 3%, p=0.02) compared to those without co-morbidity.

Microbiology results (Table 2). Sputum was obtained in 331 cases (70%), blood culture in 443 cases (94%) and paired acute and convalescent serum samples in 383 cases (81%). A microbial diagnosis was established in 197 cases (42%), of which 76 met the criteria for a definite diagnosis. More than one organism was diagnosed in 44 cases (9%). Blood cultures were positive in 32 cases (7%). Sputum Gram stain and culture provided a presumptive diagnosis in 96 (20%) cases. Sputum culture for Legionella spp was undertaken on 79% of available sputum samples with no positive results. A viral diagnosis was made in 15% of cases, more than half being due to influenza viruses.

Table 1. Characteristics of community-acquired pneumonia population.

Variable	Combined Centres (n=474)	Christchurch (n=304)	Waikato (n=170)	p value*
Age (years)	64 (19.1)	64 (19.3)	63 (18.7)	NS
Female sex (%)	48	48	48	NS
Prior antibiotic (%)	27	29	25	NS
Influenza vaccination (%)†	50	54	44	NS
Pneumococcal vaccination (%)‡	4	5	2	NS
Current smoker (%)	21	19	24	NS
Co-morbidity (%)	58	58	58	NS
-COPD (%)	26	29	19	0.02
-Asthma (%)	14	13	17	NS
-Diabetes (%)	11	11	12	NS
-Heart failure (%)	20	16	28	0.001
-Cerebrovascular disease (%)	11	12	10	NS
-Renal disease (%)	6	7	4	NS
Maori (%)§	12	5	24	<0.001
Immunosuppression (%)	5	7	2	0.03
Malignancy (%)	4	5	3	NS
Dementia (%)	5	6	4	NS

Values are mean (SD) or percentages. *Significance value for comparison between those who enrolled in Christchurch and Waikato Hospitals. †Influenza vaccination in 12 months prior to admission. ‡Pneumococcal vaccination in 5 years prior to admission. §Participants were asked which ethnic group they identified with.

Antibiotic use prior to admission was associated with a significant reduction in the incidence of positive *S pneumoniae* culture in either blood or sputum (17% of cases for those who did not receive prior antibiotic compared to 8% of those who did, p=0.01). None of the 22 individuals with positive blood cultures for *S pneumoniae* had received antibiotic prior to admission. Of the 67 participants with positive cultures of *S pneumoniae* in blood or sputum, 22 (33%) were found to have reduced antibiotic susceptibility. Of these, eight were resistant to cotrimoxazole alone, while fourteen had reduced susceptibility to penicillin of which eight had a MIC from 0.1 µg/mL to 1.0 µg/mL and six had a MIC of 2.0 µg/mL. None were found to have a MIC of > 2.0 µg/mL for penicillin or > 1.0 µg/mL for ceftriaxone. Of the fourteen with reduced susceptibility to penicillin, six were multi-drug resistant, with resistance to tetracycline, cotrimoxazole and erythromycin. In those patients with *S pneumoniae* isolated there was no significant difference in clinical outcomes for those with reduced susceptibility to penicillin compared to those without.

Clinical outcomes (Table 3). The mean hospital stay was 6.7 days. Sixteen patients (3%) required admission to the intensive care unit (ICU) ten of whom required mechanical ventilation while six were managed with non-invasive ventilation alone. Three of the sixteen ICU patients died during the study period, all as inpatients. 29 participants (6%) died prior to the six week follow-up, nineteen of whom died as inpatients. Those who died were significantly older than survivors (mean age 81 vs 63 years, p<0.001). Of the 445 participants alive at six weeks 382 (86%) were seen at a follow-up clinic. Neither rate of resolution of symptoms nor rate of return to normal levels of activity was related to the severity of pneumonia at presentation, the presence of co-morbidity or age. At follow-up, persisting abnormality on chest x-ray attributable to pneumonia was significantly associated with increased age, duration of admission and the

Table 2. Microbiological diagnosis.

	Combined		Christchurch		Waikato		Diagnosis†
	Number (n=474)	%	Number (n=304)	%	Number (n=170)	(%)	Definite
Streptococcus pneumoniae	67	14	47	16	20	12	22
Haemophilus influenza	47	10	34	11	13	8	1
Influenza A Virus	31	7	21	7	10	6	14
Legionella species	19	4	11	4	8	5	7
Mycoplasma pneumoniae	13	3	8	3	5	3	6
Respiratory Syncytial Virus	16	3	12	4	4	2	7
Adenovirus	10	2	9	3	1	1	8
Staphylococcus aureus	8	2	7	2	1	1	2
Influenza B Virus	8	2	6	2	2	1	6
Parainfluenza Virus 1,2 & 3	8	2	5	2	3	1	6
Moraxella catarrhalis	5	1	3	1	2	1	0
Pseudomonas species	3	1	3	1	-	-	1
Chlamydia pneumoniae	3	1	3	1	-	-	1
Others‡	4	1	3	1	1	1	1

*Criteria for diagnosis in methods. 153 participants had a single organism identified, and 44 had two organisms identified. †For combined community-acquired pneumonia population. ‡Corynebacterium spp. (1), Nocardia farcinica (1), Coliform spp. (1), Streptococcus pyogenes (1).

Table 3. Outcomes for community-acquired pneumonia population.

Variable	Number recorded	Combined Centres (n=474)	Christchurch (n=304)	Waikato (n=170)	p value*
Duration hospital stay (days)	474	6.7 (6.3)	7.3 (5.47)	4.4 (7.41)	<0.001
ICU admission (%)†	474	3.4	2.6	4.7	NS
Severe pneumonia (%)‡	474	33	30	40	0.02
Pneumonia complications (%)	474	24	24	24	NS
-Acute renal failure (%)		4	5	3	NS
-Septic shock (%)		2	2	2	NS
-Lung abscess (%)§		1	1	0	NS
-Pleural effusion (%)§		20	20	21	NS
Inpatient mortality (%)	474	4	4	4	NS
6 week mortality (%)	474	6	6	7	NS
6 week follow-up					
-Symptom resolution (%)	383	61	60	64	NS
-Normal activity (%)	384	52	49	56	NS
-CXR resolution (%)	381	55	51	63	0.02

Values are mean (SD) or percentages. *Significance value for comparison between those who enrolled in Christchurch and Waikato Hospitals. †ICU admission – defined as requiring assisted ventilation or inotrope support. ‡Using modified BTS severity prediction rule. Deemed severe community-acquired pneumonia if two or more of four criteria are present on admission:

1. Respiratory Rate ≥30/minute
2. Diastolic Blood Pressure ≤60 mmHg
3. Blood urea >7.0 mmol/L
4. MSQ ≤8 See reference 29. §Lung abscess and pleural effusion identified on chest radiograph or CT thorax.

presence of COPD (p<0.001 for all), but not with pneumonia severity at admission.

Maori population. 57 study participants (12%) identified as being Maori, of whom 41 (72%) were admitted to Waikato Hospital. Compared to non-Maori, Maori were younger (mean 50 vs 66 years, p<0.001) and had a significantly higher rate of smoking (35% vs 19%, p=0.02). There was no difference in six week morbidity or mortality between these two groups.

Comparison between Christchurch and Waikato (Table 3). Using 1996 New Zealand census data the incidence of community-acquired pneumonia requiring hospitalisation for the twelve month study period was 72/100 000 in the Christchurch Hospital and 78/100 000 in the Waikato Hospital catchment areas. Participant characteristics were comparable for both centres except for a significantly higher proportion of participants with COPD (p=0.02) in the Christchurch cohort and with heart failure (p=0.001) in the Waikato cohort. Using the modified British Thoracic Society severity prediction rule,[1] 40% of patients admitted to Waikato Hospital compared to 30% to Christchurch Hospital were identified as having severe pneumonia at presentation (p=0.02). There was a significant difference in duration of hospital stay between Christchurch and Waikato (7.3 and 4.4 days respectively, p<0.001), but no difference in rate of ICU admission, complications of pneumonia, mortality or morbidity at six weeks between the two centres.

Discussion

In this twelve month prospective study involving two centres we enrolled 474 individuals with community-acquired pneumonia requiring hospitalisation. Using traditional diagnostic techniques, *S pneumoniae* was the most commonly identified organism, in keeping with previous local and international studies.[1,2,10] Overall we made a definite diagnosis in a smaller proportion (42%) of cases compared to our previous study (71%). The reasons are uncertain but probably reflect a smaller proportion of cases in which an adequate sputum sample was obtained early in the admission and fewer number of atypical organisms being identified by serology such as Legionella spp, *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*,[1,2] An 'atypical' organism was identified in 8% of cases compared to 30% and 23% in the previous Christchurch and Waikato studies respectively. This is partly accounted for by the fact that the two previous study periods coincided with an epidemic of *M pneumoniae*, which was clearly not the case for the current study. The high prevalence of legionella pneumonia (11%) in Christchurch in

1992/93 had fallen to 4% in the present study. This difference cannot be accounted for by an outbreak of Legionella spp infection during the previous study period[9] and provides evidence of variation in the prevalence of Legionella spp infection over time. *C pneumoniae* was once again found to be a rare cause of community-acquired pneumonia in New Zealand. This differs from most series elsewhere in the world which have reported a prevalence of 5-20% for this organism.[22]

Variation in the prevalence of the organisms causing community-acquired pneumonia within one region over time is an important observation. It adds weight to the Infectious Diseases Society of America's recommendation that diagnostic testing be performed in patients with pneumonia.[5] This testing guides the treatment of individual patients, and helps update local epidemiological data which can then be used to guide empiric antibiotic selection within a community. Improved clinical outcomes have been demonstrated for individuals with Legionella spp and *M pneumoniae* pneumonia who receive appropriate antibiotic therapy.[9,23]

Compared to the previous New Zealand studies, a greater effort was made to diagnose viral infections in this study, which may account for a viral diagnosis being made in 15% of cases compared to 7% and 11% in the previous Christchurch and Waikato series respectively. It remains difficult to determine what proportion of such isolates are the principal pathogen causing pneumonia or are part of a co-infection with a bacterial pathogen. Identifying viral isolates has little influence upon the current management of community-acquired pneumonia, since viruses are not actively treated. However, if new anti-viral agents such as the neuraminidase inhibitors, with their activity against influenza virus, are shown to be beneficial, a diagnosis of viral infection may be important in the future management of community-acquired pneumonia.

A reduced susceptibility to penicillin was identified in 14 (21%) of the 67 *S pneumoniae* culture positive cases, all with a MIC of ≤ 2µg/mL. In clinical practice, as in this study, isolates with a penicillin MIC of ≤ 2µg/mL do not appear to be associated with worse outcomes and patients usually respond well to high dose parenteral penicillin.[15] The levels of antibiotic resistance in this New Zealand community-acquired pneumonia population are low compared to some overseas populations.[14] However, over the past decade there has been a progressive increase in the prevalence of *S pneumoniae* isolates with reduced susceptibility to penicillin, with an increase in their average MIC and their association with multidrug resistance.[24] If these trends persist, given that *S pneumoniae* is consistently the most frequently identified pathogen causing community-acquired pneumonia, antibiotic selection may need to change in the future.

Although there was a significantly shorter duration of hospital stay in Waikato than Christchurch there was no significant difference in clinical outcomes. We believe that the difference in hospital stay is due largely to variations in management practices between the centres, rather than to different characteristics of the two populations.

The higher proportion of Maori admitted to Waikato than Christchurch Hospitals largely reflects the different proportion of Maori living in each centre. However, Maori made up 24% of the Waikato study population which is greater than the 18% of the general population for the Waikato Hospital catchment area identified as Maori in the 1996 New Zealand census. This suggests there may be a higher incidence of community-acquired pneumonia among Maori than non-Maori. The reasons for this difference are likely to be multiple. The high rate of smoking amongst Maori (35%) is likely to be relevant, as smoking is implicated as a risk factor for community-acquired pneumonia.[25-27] Other possible factors (not addressed in this study) are socioeconomic differences and genetic variation in susceptibility to pathogens causing community-acquired pneumonia that may exist between ethnic groups.

There were two major differences between the study populations in this report and those from the previous community-acquired pneumonia surveys undertaken in Christchurch and Waikato, which were consistent for both centres.[1,2] Firstly, the population was older in the present study (mean age 64 compared to 58 and 56 years respectively). This was due to our deliberate decision not to exclude elderly patients. Secondly, far fewer participants had received antibiotics prior to admission, 27% versus 40% and 51% respectively. This difference may be explained by a well funded campaign launched by a local general practitioner group to educate the general public about the unnecessary prescription of antibiotics for viral respiratory infections. Difficulties in patient access to primary care services may also have contributed.

Half the study population had received influenza vaccination in the twelve months prior to hospitalisation. The use was highest for those over 65 years of age, in whom 73% had been vaccinated and likewise those with co-morbidity were significantly more likely to have received influenza vaccination. For the Christchurch population there was a large increase in the proportion of patients admitted with pneumonia who had been vaccinated between the current and previous studies (54% versus 15%), reflecting an active campaign by local health care providers.[28] We are not able to assess what impact, if any, the increased influenza vaccination use has had on the incidence and epidemiology of community-acquired pneumonia. Despite similar recommendations for influenza and pneumococcal vaccination in the New Zealand Ministry of Health Immunisation Handbook, the pneumococcal vaccine had been given to only 4% of the study population in the previous five years. Uncertainty persists regarding the efficacy of pneumococcal vaccine in the prevention of pneumonia.

The significant morbidity and mortality associated with community-acquired pneumonia has been highlighted by this study. As with previous epidemiological surveys *S pneumoniae* was the most common pathogen, however, the prevalence of Legionella spp and *Mycoplasma pneumoniae* infections appears to vary considerably. This variation in prevalence of different causative organisms and the emergence of antibiotic resistance necessitates ongoing surveillance of the microbial epidemiology. However, currently available diagnostic techniques have a low diagnostic yield and are under-utilized in routine clinical practice, which undoubtedly leads to an underestimation of the true prevalence of organisms and their levels of antibiotic resistance. This problem can be countered through the development of improved diagnostic techniques. Such advances will not only improve the surveillance process, but will also offer advances in acute management – for example with the use of targeted antimicrobial therapy. The development of such techniques is the major focus of our ongoing research program.

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New Zealand Rural General Practitioners 1999 Survey - Part 1: an overview of the rural doctor workforce and their concerns

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Abstract

Aims. To obtain current information about New Zealand rural general practitioners (GPs) and their localitites.

Methods. An anonymous postal questionnaire was mailed out to 559 rural and semi-rural GPs in November 1999, and non-responders were sent three reminders.

Results. Of the 417 completed questionnaires returned (response rate 75%), 338 were from rural GPs (Rural Ranking Scale score ≥35 points) and these formed the study group. The mean age was 44 years, 72% were male, and 93% were of New Zealand European ethnicity. Less than 50%had graduated from a New Zealand medical school with Britain (30%) and South Africa (11%) providing most of the foreign- trained rural GPs. Only 59% had received vocational training in general practice. The majority worked fulltime (79%) and owned their practice (78%), while 133 (39%) worked part time as rural hospital doctors and 72 (21%) provided intra-partum obstetric care. Over two thirds rated lack of locum relief, onerous oncall, and rural GP shortages as 'important' or 'very important' problems, with one third stating that more rural GPs were needed in their locality.

Conclusions. This, only the second national survey of rural GPs, provides a comprehensive overview of New Zealand rural general practice in November 1999. It confirms that the major current problem is an under supply of rural GPs, causing overwork and stress in those remaining.

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Prior to November 1999, GPs in historically identified 'rural' areas were paid a 'rural bonus' of an additional 10% of the general medical services they billed Health Benefits. In November 1999 the Health Funding Authority adopted the Rural GP Network's Rural Ranking Scale (RRS) for defining 'rural' GPs entitled to claim a rural bonus payment.[1] Only GPs scoring 35 points or greater (maximum 100 points) were considered 'rural' and entitled to apply for a 'rural bonus' payment. The higher the GP's RRS score the greater the rural bonus payment.

Rural general practice in New Zealand is facing increasing difficulties with recruitment and retention[2] and those in the current workforce are stressed.[3,4] The key issue identified by rural GPs themselves is a significant workforce shortage, which leads to heavy workloads, frequent oncall commitments, and lack of locums to enable time off for professional development and holidays.[5,6] Despite clear identification of this issue, there has been no recent representative survey of the rural GP workforce and its concerns since 1986.[7]

With a clear definition of a 'rural GP' and the availability of a database of New Zealand rural GPs compiled by one of the authors (RJ; unpublished data), the opportunity existed to directly survey the entire rural GP workforce. The purpose of the survey was to obtain accurate, current information about the demographics, work characteristics, future plans and current concerns of rural GPs.

Methods

Questionnaire. An anonymous postal questionnaire was used to collect information about rural GPs and their localities (oncall regions). Data collected included age, gender, ethnicity, RRS, year and country of medical school graduation, vocational training, work scope and length of experience in general practice, membership of medical organisations , level of computerisation, future plans and current concerns. Data collected about localities included number of GPs locally, perceived need for more GPs, and presence of a rural hospital or maternity unit.

Experienced rural GP opinion leaders assisted with questionnaire design and advised on key data to collect. A penultimate draft was tested by ten rural GP volunteers to assess clarity of questions and ease of completion. The mean time for questionnaire completion was ten (range 4.5-20) minutes. Questionnaires were numbered with only one author (DC) having access to the list of names. This was to ensure anonymity and that only non-responders were sent reminders.

Distribution. A database of rural GPs compiled by one of the authors (RJ) was used to mail out the questionnaires. This was compiled from telephone books, the New Zealand Rural GP Network, The Royal New Zealand College of GPs (RNZCGP) and personal networking, and was part of a separate study.[8] At the time of the initial mail out in November 1999, the database still contained 90 semi-rural GPs who subsequently were found to score less than 35 points on the RRS. Numbered postal questionnaires, which included a self-addressed stamped return envelope, were used in the survey. Non-responders were posted a reminder card in December, a reminder questionnaire in January 2000, and then a further reminder, by telephone or facsimile, a month later. Completed questionnaires were entered into a Microsoft Access database, and descriptive statistics were generated using Epi Info software.

Results

Response rate. Questionnaires were sent to 559 rural and semi-rural GPs, of which 417 were returned completed (response rate 75%). An additional 51 were returned uncompleted (44 declined to participate; seven marked 'return to sender'). Of the 417 completed questionnaires, 74 had RRS scores of <35 points, and five had not completed the RRS. This provided 338 completed questionnaires for analysis.

Demographic data (Table 1). The mean age of rural GPs was 44 years, the majority being male (72%) and of New Zealand European/Caucasian ethnicity (93%). Over half were in practice either by themselves (25%) or with only one other doctor (28%). 9% were the only GP in their locality, while a further 10% shared the locality oncall with only one other GP.

Most GPs had RRS scores of 35-55 (71%), while the remaining 29% were more isolated (60-100 points). Only 47% had graduated from a medical school in New Zealand, with Great Britain (30%) and South Africa (11%) providing most of the foreign-trained doctors (Sri Lanka-3%; Australia-3%; Canada-2%; other-4%). Only 59% have received vocational training in general practice.

Work characteristics. Of the 338 respondents, the majority worked 8/10ths or more (79%). Most owned their own practice (78%), while 14% were employed by one practice, 2% were doing locums and 7% had other arrangements. Of the 184 GPs with a rural hospital in their locality, 133 (72%) worked part time as rural hospital doctors, providing inpatient or oncall services. Of the 204 GPs with local birthing facilities, 72 (35%) provided intra-partum obstetric care. One third (34%) felt that more rural GPs were needed in their locality, while less than 1% thought their locality had too many. When asked about future plans, 87% replied that they intended to stay in their current practice for at least the next year. However, only 48% anticipated being in their current practice in five years time, with 27% stating they intended leaving within five years, and 25% were unsure.

General practice experience (Table 2). While 67% had been working as a GP for ten years or more, for only 52% was this as a 'New Zealand' GP, and for only 48% was it as a 'New Zealand rural' GP. More than a quarter of those surveyed (27%) had worked less than five years in rural New Zealand.

Computer usage. E-mail access was available to 72% of respondents at home and 47% at their surgery. Only 13 (4%) did not use computers at all in their surgery. About two thirds used their computers for appointments, accounts, word processing, age/sex/disease registers, and recalls. Full electronic patient records were used by 42% of GPs.

Memberships. 57% of rural GPs were vocationally registered with the New Zealand Medical Council. The remaining 43% will require supervision or oversight after July 2001. The majority of respondents were members of key medical organisations: RNZCGP (80%), IPAs or similar organisation (75%), New Zealand Medical Association (58%), and Rural GP Network (50%). Of the 267 who were members of the RNZCGP, 150 were doing reaccreditation (MOPS), 87 were doing accreditation and 30 doing neither.

Table 1. Demographic profile of rural GPs who completed the questionnaire.

	Number* (n=338)	%
Male	242	72.2
Female	93	27.8
Age in years (mean=44.1)		
26-34	48	14.3
35-44	154	46.0
45-54	95	28.4
55-64	27	8.1
65-78	11	3.3
Ethnicity (may choose multiple)		
NZ European/Caucasian	305	93.0
Maori	8	2.4
Pacific Islander	2	0.6
Asian	15	4.6
Other	4	1.2
Year of Graduation from Medical School		
1990+	47	13.9
1980-89	152	45.1
1970-79	99	29.4
1960-69	28	8.3
pre-1960	11	3.3
Number of GPs in your practice		
1	81	24.8
2	91	27.9
3	68	20.9
4	42	12.9
5	16	4.9
6	13	4.0
7	8	2.5
8	2	0.6
9	1	0.3
10	4	1.2
Number of GPs in your locality		
1	28	8.8
2	32	10.0
3	51	16.0
4	32	10.0
5	35	11.0
6	69	21.6
7	26	8.2
8	16	5.0
9	5	1.6
≥10	25	7.8

* Number of respondents vary due to non-response to some questions.

Problems. Table 3 summarises the relative personal importance of a range of current problems facing rural GPs. The key issues, rated as 'important' or 'very important' by over two thirds of the respondents were: lack of locum relief for holidays (83%) and CME (77%), oncall workload (72%), shortage of rural GPs (71%), need for upskilling in trauma/emergency work (72%), and lack of quality rural CME (70%).

Discussion

This survey provides a snapshot of New Zealand rural general practice in November 1999. The results are probably representative of New Zealand rural general practice since 72% of the 469 rural GPs working in the country in November 1999[8] responded and the demographic data (age, sex, and ethnicity) are comparable to that from the New Zealand

Medical Council's 1999 medical workforce survey.[9] The 28% practitioners who did not return completed questionnaires could well include those with the greatest difficulties in terms of overwork and stress. Therefore this study, while identifying the most important concerns, may have significantly underestimated their extent in rural general practice.

Table 2. General practice experience of rural GPs who completed the questionnaire.

	Number* (n=338)	%
Years in General Practice		
< 5 years	37	11.3
5-9 years	77	23.5
10-19 years	140	42.7
20-29 years	57	17.4
≥30 years	21	6.4
Years in New Zealand General Practice		
< 5 years	69	20.8
5-9 years	89	26.8
10-19 years	110	33.1
20-29 years	50	15.1
≥30 years	14	4.2
Years in Rural NZ General Practice		
< 5 years	89	27.0
5-9 years	83	25.2
10-19 years	103	31.2
20-29 years	42	12.7
≥30 years	13	3.9

*Number of respondents vary due to non-response to some questions.

The only previous national survey of rural GPs was in 1986.[7] In that survey, questionnaires were sent to 363 rural GPs and responses were received from 276 (76%). The researchers were uncertain whether all practitioners had been identified, and it seems unlikely that the rural workforce has increased by 106 (29%) in just thirteen years. While the mean age of rural GPs was 44 years in both surveys, a number of other workforce characteristics have changed since 1986. Women now make up a greater percentage of the rural workforce, up from 17% in 1986 to 28% in 1999, and membership in the RNZCGP had increased from 54% to 80%. Rural GPs have combined into practices of larger size. Practices with four or more GPs have increased from 10% to 26%, while solo GPs have reduced from 49% to 25%. Whereas a shortage of rural GPs was not specifically assessed in the 1986 study, the difficulty of securing locums for study and holiday leave was common to both surveys. The trend to larger practices may represent an attempt to reduce overhead costs, to improve chances of attracting locums and, in the absence of locums, to provide 'time-off' cover for each other.

There are similarities between this study and the 1996 'National Rural General Practice Study' in Australia.[10] In both countries females were in the minority, and the highest percentages were in the 35-44 year age group (Australian mean age 47 compared to 44 years New Zealand). Australian rural GPs had spent an average of eleven years in their current practice and anticipated staying an additional eight years on average.[10] In our study, 48% of GPs surveyed had been in rural New Zealand practice for over ten years. While 87% anticipated being in their current practice in one year, less than 50% were planning to still be there in five years. If these GPs do leave rural practice as they indicate, the current under supply will dramatically worsen. As of July 1 2001, those GPs without vocational registration (43% of responents) will be required to practice under the general oversight of a vocationally trained GP, adding yet more difficulties for rural GPs.

This survey confirms that the greatest problem facing our rural GPs is an under supply of skilled doctors for both fulltime and locum work. Advertisements for doctor vacancies, calculations of GP to population ratios or, as in this study asking rural GPs directly if more doctors are needed in their area (one third said 'yes'), are only crude methods of assessing the magnitude of this obvious problem. Notwithstanding this under supply, additional primary care doctors are needed because of the ageing rural population, increasing demands for medical services, earlier hospital discharges, greater emphasis on primary and preventive healthcare, advances in medical technology, and changes in practitioners' work styles and expectations. These factors, combined with the current inability to recruit and retain adequate numbers of rural GPs in many areas, further exacerbate the problems of work hours and stress levels for those remaining.

New Zealand has historically relied on overseas-trained doctors to provide care in rural areas.[11] This study confirms that less than 50% of rural GPs graduated from New Zealand medical schools, compared to the national average of 66% for all doctors.[9] With stricter licensing and supervision requirements, it is becoming even more difficult to recruit foreign doctors to rural areas. Most Western countries now have an under supply of rural GPs, so New Zealand is competing internationally[12] with countries that are offering substantially better financial incentives.

Effective strategies for increasing recruitment to rural practice include medical schools actively selecting rural origin students who express a desire to be rural GPs,[13] teaching specialised rural knowledge, skills, and attitudes throughout training,[14] and providing rural work experience.[13-15] A review[15] of ten years of graduates from a Canadian rural GP training programme showed that 51% were still working in rural areas, 26% in their training practice. There is currently no rural GP training programme

Table 3. Relative personal importance of current problems facing rural GPs.

	Not Important %	Important %	Very Important %	No Response %
Difficulties with accreditation	37.6	29.3	23.4	9.8
Difficulties with MOPS* (reaccreditation)	37.6	33.1	13.6	15.7
Lack of locum relief for CME†	19.6	37.9	39.3	3.3
Lack of locum relief for holidays	14.8	24.0	58.9	2.4
Shortage of rural doctors	26.3	33.7	37.3	2.7
Lack of quality rural CME†	26.9	44.7	25.1	3.3
On-call workload is too great	24.6	37.0	35.2	3.3
Daytime workload is too great	49.1	34.6	12.7	3.6
Difficulties with being supervised	78.1	10.1	4.7	7.1
Increased workload from supervising others	76.9	13.0	2.1	8.0
Need for upskilling in trauma/emergency care	25.4	53.3	18.3	3.0
Need for upskilling in rural hospital work	55.6	29.3	10.4	4.7

*Maintenance of Professional Standards (RNZCGP programme); †Continuing Medical Education.

in New Zealand, despite the under supply and rural general practice being recognised as a distinct discipline internationally.[16] Only 59% of the rural GPs in this survey had even basic general practice vocational training.

Additional recommendations for increasing recruitment include improving rural GP vocational training, ensuring remuneration is internationally competitive, providing acceptable working conditions and support (locums, CME), enabling practitioners to leave rural general practice easily when they so decide, and establishing academic centres in rural areas.[5,6,17-22]

Despite Government acknowledgement of the under supply,[23] New Zealand is only now beginning to discuss and implement some of these solutions. Undergraduate medical programmes are starting to provide medical students with rural teaching and rural experiences, a locum support programme for rural GPs will begin in 2001, and second year house surgeons may soon be able to undertake rotations in rural general practices. It will take time to assess whether these changes have a positive impact on the rural workforce.

Women comprised only 28% of rural GPs in this survey, compared with 36% of all GPs in New Zealand.[9] This under-representation is also seen in the rural areas of other Western countries, such as Australia[10] and Canada.[24] Rural general practice needs to change significantly if it is to address some of the issues unique to female rural GPs,[25] and thereby attract more of the increasing number of new female medical school graduates. However, there exists a 'Catch-22' situation: the current under supply means rural GPs are overworked and stressed, conditions which make rural general practice unattractive to the new female (and male) graduates, the very individuals who must be recruited to correct the problem. Difficulties in attracting both female and male doctors may relate to changing work expectations of this generation, in addition to the current lack of adequate rural GP training. Without the knowledge and skills to feel comfortable practising in a rural area, most new graduates are opting to work in urban areas or go overseas for more lucrative jobs to enable them to pay off their student debts.

Rural GPs leave rural areas for many reasons. These include personal and family reasons, a desire for a less professionally isolated and/or stressful job, or they may simply be ready for a change in career. A number of key issues were identified by rural GPs in this study as being personally 'important' or 'very important'. Of the six most important, four related to overwork (lack of locum relief for holidays and CME, too much oncall, shortage of rural doctors) and two to education (need for upskilling in trauma/emergency work, lack of quality rural CME). Similar issues have been identified for rural general practice in Australia[10] and Canada,[17] and the solutions have been discussed above.

This is the first national survey of rural GPs in thirteen years. It confirms that the major current problem is an under supply of practitioners, causing overwork and high stress in those remaining. New Zealand is no longer able to attract sufficient overseas doctors to fill its rural shortages, and neither is it training rural GPs to meet its needs. This under supply will continue, and most likely worsen, until significant steps are taken to train sufficient rural GPs, including locums.

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Exercise for intermittent claudication

Intermittent claudication is a common condition leading to significant functional impairment and enhanced risk of cardiovascular morbidity and mortality. However, despite the functional impairment caused by intermittent claudication, the natural history in the affected limb is fairly benign. Only about 25% of patients show symptomatic deterioration and only 2% eventually lose the affected limb. This epidemiological evidence has led most clinicians in both primary and hospital care to manage intermittent claudication conservatively, addressing cardiovascular risk factors and giving advice on exercise. This may well be appropriate but merely giving advice about exercise is unlikely to be the most effective treatment.

Exercise as a treatment for intermittent claudication is not new, with improvements in walking described from as early as 1898. A recent Cochrane review of 10 randomised trials of exercise therapy estimated an overall improvement in walking distance of about 150%. The exercise component in all but one of these trials were supervised. Even in the one study where the exercise was not formally supervised, patients were given pedometers and exercise logbooks to monitor their daily exercise. Few randomised trials exist that directly compare supervised and unsupervised exercise training.

AHR Stewart, PM Lamont. BMJ 2001; 323: 703-4.

Levels of physical activity of a sample of 10-13 year old New Zealand children

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Abstract

Aims. To determine what proportion of a sample of 10 to 13 year old New Zealand children attained the Ministry of Health's physical activity guidelines. These guidelines recommend that children accumulate a minimum of 30 minutes of moderate intensity physical activity on most, preferably all, days of the week.

Methods. The heart rates of sixty 10-13 year olds were monitored at one minute intervals, for twelve hours on three week days and one weekend day. For each day, the number of minutes when the subject's heart rate exceeded 139 beats per minutes (bpm) was determined. The proportion of subjects who accumulated at least 30 minutes of heart rates > 139 bpm on three of the four recording days was determined. These subjects were deemed to have met the physical activity guidelines.

Results. 53% of subjects met the minimum physical acivity guidelines. Boys spent significantly more of their time with their heart rates elevated above 139 bpm than girls. There was no significant difference between the number of children achieving the recommended guidelines and their school's decile ranking.

Conclusion. There are indications that children's lives are becoming more sedentary due in part to the popularity of passive forms of leisure and the reduced incidence of active forms of transportation like walking or cycling to school. The low proportion of New Zealand children meeting the minimum physical activity guidelines is a cause for great concern.

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The Surgeon General's (1996) report on Physical Activity and Health recommended that in order to gain health benefits, people of all ages should accumulate at least thirty minutes of moderate intensity physical activity on most days of the week.[1]

This recommendation was endorsed by the New Zealand Physical Activity Taskforce[2] and was embodied in the Physical Activity Policy Statement by the Ministers of Sport Fitness and Leisure, and Health.[3] For children, the New Zealand recommendation[4] is for them to accumulate 30-60 minutes of moderate intensity physical activity per day. This compares with English guidelines for all children to accumulate one hour of moderate intensity physical activity per day.[5] Physical activity for children includes active recreation (eg informal play, dance, sport and games), active transportation (eg walking and cycling to school), and activity during paid or domestic work (eg paper rounds and lawn mowing).[6]

There is strong epidemiological evidence from longitudinal cohort studies of a positive relationship between regular physical activity and health in adulthood.[7] Sedentary lifestyles increase the risk of coronary heart disease, non-insulin dependent diabetes, stroke and cancer of the colon; whereas active lifestyles ameliorate the risk of high blood pressure, obesity and osteoporosis.[1,7] The relationship between the health of children and adolescents and their physical activity levels is less well understood.[8] Appropriate physical activity appears to reduce blood pressure in hypertensive adolescents[9] and help reduce percent body fat in obese individuals.[10] In this regard it is of interest to note that the proportion of overweight and obese New Zealand children appears to be rising.[11] Psychological[12] and social[13] benefits appear to be associated with an active lifestyle, with researchers reporting increased self esteem and reduced levels of stress, anxiety and depression with increased involvement in active leisure. Physical activity in adolescence involving weight bearing, has positive influences on bone mineral density into adulthood.[14] A study of 138 fifteen to seventeen year old New Zealand females has revealed a positive correlation between physical activity levels and bone mineral density in the femur.[15]

The aim of the present study was to determine what proportion of a sample of 10-13 year old New Zealand children comply with the physical activity guidelines.

Methods

Three schools from the region encompassing Christchurch and its district were chosen to represent high, middle and low socio-economic areas, decile 10, 5 and 2 respectively based on the Ministry of Education's school ratings.

Following ethical approval from the Lincoln University Human Ethics Committee, permission to undertake the study was obtained from the principal and the Board of Trustees of each of the three schools.

60 children, twenty from each of the three schools (10 boys and 10 girls), were randomly selected from those who had given informed consent. Consent was also obtained from the children's parents or guardians. Two children withdrew from the study and replacements were randomly selected from the pool of volunteers. The methodology to assess physical activity mimicked that established by Armstrong[16] and involved continuous monitoring of heart rates for twelve hours on three week days and one weekend day (usually Saturday). It is recognised that heart rate is not a direct measure of physical activity, though it reflects the stress placed on the cardiovascular system by physical activity.[16] Given that heart rate can be also be influenced by other factors like temperature and emotional state, heart rate monitoring is considered only to be a valid tool for assessing moderate to vigorous levels of physical activity.[17]

Heart rates were monitored using Polar 2000 heart rate monitors (Polar, Kemple, Finland). The monitors were set to record continuously and store minute-by-minute heart rates. The children were asked to undertake their normal activity though they were required to remove the watch when swimming (this was a relatively uncommon activity at the time of year the study was undertaken which was Autumn and Winter). The monitors were attached to the children between 8.00 am and 8.45 am and were removed by the children's guardians twelve hours later. The monitors were retrieved and the stored data were downloaded onto a MacIntosh Powerbook via a Polar computer interface.

For each subject, and each day, the number of minutes where their heart rate exceeded 139 bpm was determined. Heart rates in excess of 139 bpm were deemed to represent the subjects undertaking moderate intensity physical activity. This threshold follows Armstrong's methodology[16] for monitoring physical activity in children and also allows for international comparisons to be made. Armstrong and his colleagues determined that brisk walking at 6 $km.h^{-1}$ elicits a steady state heart rate of 140 bpm in 5-16 year olds. 27 of the 60 subjects in the present study also averaged a steady state heart rate of 139.6± 14.3 (mean ± SD) bpm when walking on a treadmill at 6 $km.h^{-1}$, supporting Armstrong's finding.[16]

Children who accumulated 30 minutes per day with their heart rates >139 bpm on three of the four collection days were deemed to have met the Ministry of Health's physical activity guidelines.[4,5] Unpaired t-tests were used to analyse the differences in the accumulated minutes above a heart rate of 139 bpm between schools, weekday versus weekend day, and gender. A Type I error of 5% was chosen for the declaration of statistical significance; precision of estimates are represented by the 95% confidence interval (CI, the likely range of the true estimate). In order to make a comparison between the New Zealand children and English children of the same age, the percentage of complying children were estimated from Armstrong's data.[16]

Results

53% of the 60 children tested (63% of males, 43% of females) accumulated a minimum of 30 minutes of moderate intensity physical activity on at least three of the four days monitored (Table 1). 48% of children had one day or more when they did not accumulate at least ten minutes of moderate intensity physical activity. Overall boys spent on average fifteen minutes (95% confidence interval 3-27, $p<0.05$) more time per day than girls at a heart rate above 139 bpm.

Table 1. The proportion of children achieving the physical activity guidelines and their average daily minutes at a heart rate above 139 beats per minute.

	School 1		School 2		School 3		Totals		
Decile	10		5		2				
	male	female	male	female	male	female	male	female	overall
% achieving guidelines	40	40	100	20	50	70	63	43	53
Accumulated mins>139 bpm/day	47.5 ± 21.0	53.4 ± 24.5	67.6 ± 20.3	25.3 ± 6.0	56.4 ± 32.6	46.7 ± 17.2	57.2* ± 25.8	41.8* ± 20.9	49.5 ± 25.5

Heart rate data are the mean ± SD, * $p < 0.05$ for gender comparison. Decile 10, 5 and 2 are high, medium and low socio-economic school ratings respectively.

There was no significant difference between the accumulated heart rates >139 bpm on the weekend (43 minutes) compared to the weekdays (51 minutes). There was no significant difference between the number of children achieving the recommended guidelines from the schools of different decile ranking (socio-economic status). Neither was there any significant difference in the mean number of accumulated minutes >139 bpm per day between subjects from the different schools.

The percentage of English 10-13 years old meeting the physical activity guidelines was estimated to be 55%[16] which is comparable to the 53% complying in the present study.

Discussion

The present study using physiological techniques, found that 53% of 10-13 year olds met the Ministry of Health's guidelines for participation in physical activity in order to gain health benefits. Although subject numbers were relatively low and confined to a selected region of New Zealand, the results indicate worrying levels of inactivity in Christchurch children, which may reflect a national problem. All other New Zealand studies to date have used questionnaire methodologies using either self or proxy reporting.[18-20] A recent proxy report survey conducted by the Hillary Commission found that 73% of 9-12 year olds meet the minimum guideline that subjects be active for 2.5 hours per week.[18] The Hillary Commission's findings are consistent with international studies using questionnaires, which report 60-70% of children undertake appropriate amounts of physical activity.[17] It is generally understood that despite questionnaires being able to sample large numbers of subjects, they tend to overestimate the actual amount of time participants are active.[9] This may explain the differences between the present study's finding and previous studies.

Literature reviews of physical activity epidemiology report an almost consistent finding of greater physical activity participation by males compared to females.[9,17] In addition, it appears that males are approximately 15-25% more active than females.[21] The present study reports that ten to thirteen year old boys spend significantly more of their time with their heart rates elevated above 139 bpm than girls. The 1998 Physical Activity Survey[18] found significantly more boys (74%) achieved the physical activity guidelines compared to girls (64%). The Dunedin Multidisciplinary Study[19] and the Life in New Zealand survey[20] observed higher levels of male participation in leisure-time physical activity and vigorous activity respectively, than females, as did a recent Australian survey[22,23] of participation in sport and physical activity by five to fourteen year olds. The gender differences in physical activity participation may, in part, be attributed to differences in the independent mobility between girls and boys. A study of English children reported that a greater proportion of boys were allowed to cross roads, cycle on roads, take buses and to go to leisure places on their own.[24] This lack of independence may affect girls' ability to participate in sport and active leisure pursuits, and to walk or cycle to school.

There are indications that children's lives are becoming more sedentary; it appears that activity levels in British children have fallen since the 1930's.[25] Electronic entertainment (eg watching television and playing computer games) takes a significant proportion of children's total leisure time[26] and the incidence of active transportation to school by walking or cycling is declining.[27] Additionally, the amount of timetabled physical education taught in schools is decreasing.[28] Given these trends, there is cause for public health concern. It is therefore heartening that the recently released New Zealand Health Strategy[29] is placing a priority on the objective to increase the level of physical activity of the population. It is hoped that this strategy will help improve the currently low proportion, indicated by the present study, of children attaining the New Zealand physical activity guidelines.

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CASE REPORT

Stroke after neck manipulation in the post partum period

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NZ Med J 2001; 114: 498

A 34 year old woman presented with recent onset memory loss, ataxia and poor coordination of the right arm associated with right sided neck pain. She was five weeks post partum having delivered a healthy baby following normal pregnancy and vaginal delivery. She noticed right sided neck pain following delivery, aggravated by neck movements during breast-feeding. A day prior to presentation, she consulted her chiropractor who performed cervical manipulation. Half an hour later, she developed memory loss with no recollection of her recent visit to the chiropractor or the recent birth of her child. This resolved after 90 minutes. The following day, she noted poor coordination of her right hand, difficulty with articulation and unsteadiness of gait. There had been no antecedent neurological history or prior thrombotic event. Past history included infrequent tension headaches and one prior, uncomplicated pregnancy. There was no family history of thromboembolic disease. She had stopped smoking four years previously and was on no regular medication.

Examination revealed normal orientation and speech, and she was afebrile. The BP was 155/125 mmHg, falling to 140/90 mmHg two days after admission. Cardiorespiratory examination was normal. There was no calf tenderness, peripheral pulses were present and no carotid bruits were heard. There was unsteadiness of gait and positive Romberg's sign but no focal neurologic findings. Complete blood count, biochemistry and coagulation studies were normal. ESR was 7 mm/hr and an ECG showed sinus rhythm. An MRI scan of the head confirmed a right cerebellar infarct, with a wedge shaped area of increased T2 signal in the right antero-superior cerebellar cortex. There was no associated mass effect or oedema. MRA revealed a normal vertebrobasilar system and normal flow in the superior cerebellar artery with no evidence of dissection. Echocardiography was not performed. Prothrombotic screen analysis revealed low protein S levels of 18%, consistent with the post partum state. A repeat level three months later showed normalisation of levels to 64%. She made a full neurological recovery within one month.

Discussion

Manipulation of the cervical spine has increased in popularity for the treatment of tension headaches and neck pain. It is not without risk, the most serious being traumatic arterial dissection or spasm causing brain stem ischaemia.[1] The incidence of serious neurovascular compromise is difficult to estimate due to the unknown number of manipulations practiced and under-reporting of cases in the literature. Estimates of complications range from one in 200 000[2] to one in 3 million[3] manipulations. Previous reports have suggested that certain factors are a contraindication to manipulation of the cervical spine. Women immediately post partum are thought to have hormone-mediated ligament laxity that might reduce the protective stability in intervertebral articulations.[4]

Our patient most likely had a small tear or spasm of the vertebral artery followed by thrombosis resulting in stroke. The vascular lesion may have been too subtle to be detected radiologically or healed at the time of imaging. To our knowledge, there is no literature evidence of the post partum state being associated with a higher incidence of stroke after neck manipulation. We did find one case report identifying a patient in the post partum period.[5] We suggest that the risk of neurological injury from manipulation of the neck may be increased in patients with additional risk factors such as prothrombotic states and that extra care is needed before considering manipulation in these patients. Those who practice cervical spine manipulation should carefully consider prothrombotic risk factors when deciding whether to undertake such therapy in order to minimise the risks of potentially dangerous neurological complications.

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VIEWPOINTS

Should the law require doctors to make records available for audit of cervical screening?

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NZ Med J 2001; 114: 499-500

Background

The Ministerial Inquiry into the under reporting of cervical smear abnormalities in the Gisborne region concluded that an audit of cases of cervical cancer is the best way of measuring the effectiveness of a cervical screening programme.[1] The Report described the problems with two audits of cases of cervical cancer which were not carried out because of refusal and delays by ethics committees to approve the protocols, which included seeking access to identifiable patient information without explicit consent. In the case of the audit confined to the Gisborne area proposed for the Ministerial Inquiry, access was needed to medical records held by general practitioners and hospitals over a long period, and patients were not to be approached. In the case of the national audit, to be conducted on behalf of the Ministry of Health by a research group at the Otago Medical School, access to names on the Cancer Register was sought, in order that individual women could be invited for interview, once their medical advisers had agreed. The protocol in that audit was to seek the consent of the women to access general practitioner and hospital records.

The Ministerial Inquiry report noted that they "had seen at first hand how the intervention of ethics committees in audit and evaluation activities can result in those activities not being carried out." And they continued: "For too long the evaluation of the National Cervical Screening Programme has lain dormant. A major contributing factor to this is the decisions of ethics committees." They referred not only to the problems described above, but also earlier difficulties such as the first statistical report not including Wellington data because the local ethics committee would not agree to its release. They could see no reason for any longer involving ethics committees in this process, and suggested instead that audit should be seen as an integral part of a patient's treatment.

In the light of this, three recommendations were made. One (Recommendation 11.18) was that guidelines for ethics committees need to change so that the audit, monitoring and evaluation of past and current medical treatment does not require the approval of ethics committees. The others were that the law should be amended to permit ready access to both the National Cervical Screening (NCS) Register (Recommendation 11.14) and medical files (Recommendation 11.17) for appropriately qualified persons carrying out audits of cervical cancer.

The Minister of Health confirmed, after the Ministerial Inquiry report was released, that all recommendations would be implemented. The Ministry of Health has subsequently released a discussion paper on the proposed law changes to support the audit of the programme.[2] These changes would allow information held on the NCS Register and pathology slides to be provided for external audit, without consent. It also proposes to change the law to require doctors, nurses, specialists or hospitals to make relevant records available where they are essential for audit.

The arguments in favour of these proposed legislative changes

The proposed law changes should not be dismissed lightly. They were the recommendations of a very well qualified group of women who had examined the evidence carefully. The Inquiry report highlighted the choice between privacy and safety:

> "The choice is stark. Effective evaluation cannot be guaranteed if women's consent is required; if the right of an individual to consent to access to her now protected information is to predominate the Programme cannot effectively evaluate its effectiveness and therefore the safety of all women participants is potentially at risk."

A choice must be made. If safety for participants is to be guarded, then absolute privacy must go. In New Zealand, the Health Information Privacy Code already allows for health information to be disclosed for research or audit without consent, in certain circumstances, and with ethics committee approval. Yet the Committee of Inquiry clearly formed the view that ethics committees were not seeing all the ethically relevant matters in deciding whether to approve the audit proposals. Ethics Committees were putting too much weight on privacy and also making an untenable ethical distinction between internal and external audit. The problem was compounded by the lack of clear expression in the national standard for ethics committees[3] about whether external audit required ethical review. Hence the Report dismissed the possibility of continuing to rely on the judgement of ethics committees and recommended removing the discretion - from both the holders of health information and ethics committees - to withhold disclosure of such information.

If Parliament approves mandatory access to health information for audit, then this is a powerful statement about the public interest in audit of the health service. It is a societal recognition that the common good of health care cannot be provided without the co-operation of those who stand to benefit.[4] This can be stated as a moral obligation to contribute to the processes by which effective treatments and care are determined - that is, to audit.

The arguments for more limited legislative changes

Some of the proposed changes in the law are essential to allow access to health information, but the changes requiring health professionals to disclose information for audit may not be necessary, and may have perverse effects if they are enacted.

Which changes are essential? The amendment of the Health Act (Section 74A) is required to allow access to data on the NCS Register. The current law includes the provision for regulations to be made allowing access to persons studying cancer. These regulations need to be made. An

amendment may also be required to the Code of Health and Disability Services Consumers' Rights, Right 7(10) to allow pathology slides to be reviewed. At present that Right restricts use of any body parts or substances without consent, even if unidentified. Nevertheless, the current Health and Disability Commissioner has indicated that he could signal that in cases where it is not reasonably practicable to obtain consent, and for which approval has been given by an ethics committee, the provider will be found to have taken reasonable actions to give effect to Right 7(10).[5] Hence an amendment might not be essential, but would remove any doubt about the interpretation of the Code.

The proposal to require health professionals to make their records available without consent for audit of the cervical screening programme has some disadvantages. First, it appears heavy handed, and may make both patients and health professionals anxious. Providing audit is done with strict safeguards for confidentiality by health professionals who already have a duty of care, there is nothing for patients to fear. For health professionals, so long as the identification of mistakes is handled carefully, there should also be little to fear. Nevertheless, there may be less draconian ways of reaching the same end (as described below). Secondly, the effect may be perverse. If legislation has to be introduced requiring that health professionals and hospitals make records available for audit of cervical screening, will audit of all other aspects of the health system require similar legislation? If legislation is solely for cervical cancer, will discretionary disclosure no longer be permitted without consent, in certain circumstances, for audit and research? If that happened, audit of all other parts of the health service would grind to a halt.

The less draconian solution to disclosure of information held by general practitioners and hospitals for audit would be to go back to relying on ethics committees to weigh up the pros and cons in particular cases, as to whether consent should be sought or not, and to leave some discretion for health professionals. The Health Research Council has drawn up guidelines on privacy and the use of health information, including the scientific, practical and ethical matters to be weighed up.[6] If this path were to be followed, it would be essential that the recommendations of the Inquiry in relation to ethics committees be implemented, including a review of their operation. The Inquiry has shown us starkly what the choice is, and that ethics committees must consider the moral obligations of audit if they are to serve the public interest. If health professionals did retain discretion about the disclosure of their records, it might also serve their sense of contributing to this public interest.

Conclusions

On balance, I support the more limited legislative amendments essential to allow the audit of cervical cancer cases to proceed, but not the law change forcing health professionals to make their records available. The review of the operation of ethics committees should proceed. It may be that this review will conclude, with the Ministerial Inquiry, that internal or external audit, when conducted by health professionals with a duty of care, and with appropriate safeguards, should not require detailed review by ethics committees. But I hope that ethics committee oversight will remain. If all the legislation recommended by the Ministerial Inquiry is not enacted, the effects of this different course of action should be monitored closely.

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Audit or research?

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We wish to bring the vexed question of differentiating 'audit' and 'research' to the attention of colleagues, and to stimulate debate within our profession regarding the need for ethical appraisal of any study of clinical data. This issue arose in the context of a study we conducted where the decision as to whether this was 'audit' or 'research' is not clear-cut.

The study in question was a retrospective consecutive case review of clinical records at an abortion clinic in 1999. Anonymous data were collected from patient records by a nurse counsellor who had access to these records in her normal work situation. Data included demographic details (age, ethnicity, parity, number of previous terminations); pre-conception contraception and why this failed; risk factors for venous thromboembolism (VTE) (family or past history of VTE, varicose veins, obesity, clotting disorder) or arterial disease (hypertension, smoking); and post-termination contraception. Where a patient had been taking combined oral contraceptives (COCs) prior to conception, it was recorded whether she had stopped these in response to fears raised by the publicity regarding VTE.

Because we considered this to be a clinical audit, not an experimental study, ethics committee approval was not sought prior to carrying out the review. One of us (FGS) worked at the clinic as a certifying consultant. The role of the other (BA) was primarily statistical analysis. Both worked from an aggregated data set containing no identifiable details of individual patients. It was our understanding from the 1996 National Standard[1] that audit, and publication of resulting data, did not require ethics committee appraisal.

We analysed the data with a particular focus on demographics, possible risk factors for VTE and the 'panic stopping' of COCs. We considered that the findings were in

the public interest. Accordingly we wrote two papers aimed at publication in peer-reviewed journals. The first addressed the debate about the increased risk of VTE associated with third generation COCs and contained one item of data from our study. It was published in the NZ Family Physician.[2] The second paper presented our findings in detail. It was peer reviewed and accepted for publication in the 26 January 2001 issue of the NZ Med J.

In December 2000 a complaint was made to us and to our local ethics committee that we were publishing work which had not received prior ethical approval and which had had no external evaluation for scientific validity. We felt that the NZ Med J peer review process adequately addressed the latter criticism. Inherent in the former criticism was the premise that our study was research, not audit. We immediately embargoed publication of our NZ Med J paper and sought clarification from the Auckland Ethics Committee. The committee members were divided in their view as to whether our study was audit or research, and they declined to conduct a retrospective ethics review.

We therefore sought the opinion of the Ethics Committee of the Health Research Council (HRC). This committee endorsed the decision that it is not appropriate for ethics committees to give retrospective ethics approval. After some deliberation, they determined that there are three criteria which define audit that is exempt from ethics committee review:

1 "The audit is undertaken by or under the supervision of senior members of the health care or disability team directly responsible for the care of that group of health and disability support service consumers;
2 "There is no access to confidential medical information by persons who do not owe a professional duty of confidentiality to those consumers;
3 "Audit can be defined as examining practice and outcomes in a particular time and place to see whether they conform with expectations, with a view to informing and improving management rather than adding to general knowledge."

The Committee determined that our study met the first two criteria but not the third. The study 'was not examining procedures or outcomes of the abortion service' but was contributing to new knowledge and hence was research, conducted on the basis of information given by patients for treatment purposes, without consent for research use.

Some journals do not enquire whether ethical approval was obtained for research they publish. Many journals require prospective ethics approval for research but not for clinical audit data. A few journals are moving towards requiring ethics approval for audit as well. This requirement was introduced by the journal Anaesthesia in 1997[3] but they have since removed this barrier in response to professional correspondence on the issue.[4] The HRC Ethics Committee ruling effectively determines that there can be no such thing as published audit, because once audit information is seen to be contributing to general knowledge and is hence worthy of publication, it becomes research. In a subsequent letter they have written to us stating that it is 'at the discretion of the editor of any publication to which the paper is submitted to proceed with publication in spite of the absence of prior ethics review'.

The lack of consensus on the definitions of audit and research has been the subject of recent debate in the BMJ. Considerable confusion by ethics committees, health authorities, service providers and researchers is apparent.[4] Wilson et al described the wide discrepancy among various British ethics committee rulings as to whether a postal survey they conducted was audit not requiring appraisal, or was research needing ethics approval.[5]

One distinction offered is that audit is 'whether you are doing what you ought to be doing', whereas research is 'finding out what you ought to be doing'.[5] The objective of an audit may be to improve service against a standard. Research may include the objective of defining best practice. BMJ editor Richard Smith writes that audit might be defined as 'collecting data on routine clinical practice with the intention of improving that practice', whereas research is 'testing a new hypothesis'.[6]

The decision to disseminate audit findings externally by conference presentation or publication signifies that they are considered of interest to a broader audience than just 'in-house' service providers, and therefore 'are adding to general knowledge' rather than merely 'informing and improving management' of the service provider. This means that whenever audit findings are considered of significant public interest to warrant publication or presentation to an external audience, they will be deemed research. Lack of prior ethics approval may therefore impede this dissemination.

This restriction may preclude the publication of important messages pertaining to public health. With respect to our own study, our service provider data has potential value in the wider context of lessening the impact of the future occurrence of phenomena such as media-induced 'pill scares'. For example, the Ministry of Health could consider additional ways to inform women about any potential health risk due to oral contraceptives. One solution would be for family planning clinics and general practitioners (GPs) to have a free funded recall visit to discuss the issues. This could stop some women at low risk of VTE from unnecessarily subjecting themselves to the risks of unwanted pregnancies. The Ministry of Health would need to embargo this information with the media to give women the chance to discuss the issue with their health care provider.

In the broader context, the HRC Ethics Committee decision has significant implications with respect to the general dissemination of important public health information by others in the future. Thousands of clinical audits are conducted annually in New Zealand by GPs, collectively by IPAs and by numerous other health care providers. Only very rarely is ethics approval sought for these studies. Commonly such audit findings are used internally to improve service delivery. Most audits reveal no major surprises and hence are not of public interest. However, at times audit does reveal important public health care outcomes with broader significance and of value to other relevant service providers. In other words there are occasions when information obtained from an audit 'may contribute knowledge on the effectiveness of services and permit new standards to be set'.[5] In such instances, it is of public benefit that these audit results are published, preferably in peer-reviewed journals, and presentations made at conferences to disseminate the findings.

Generally it is not possible to predict in advance the small percentage of audit findings worthy of publication. Clearly we would not have sought publication of our audit had our findings not been of general public importance.

One solution to this problem would be for everyone conducting clinical audit to seek prior ethics approval. One role of the ethics committee is the scrutiny of research proposals to ensure that they are scientifically valid with rigorous methodology.[6] Poorly designed projects do not justify the commitment made to them by participating subjects hence can be considered unethical.[1] Smith suggests that similarly, perhaps audit should be evaluated independently to ensure that time and resources are not wasted on collecting data in a way that cannot be scientifically used or interpreted. Ironically audit results that undergo peer review prior to publication (and hence would

also require prior ethical appraisal according to the HRC Ethics Committee ruling) are submitted to an independent scientific scrutiny not afforded internal audit data, which are exempt from appraisal.

We believe that under current circumstances, a requirement that all audit obtains prior ethical approval is untenable. It would pose a serious burden on ethics committees, would be unsustainable and would significantly reduce the amount of audit being conducted.

There is a common set of four moral principles which ethics committees are expected to apply to evaluate the ethics of medical research proposals.[7] These principles are respect for autonomy, nonmaleficence, beneficence and justice. Autonomy (from the Greek *autos* 'self' and *nomos* 'rule') relates to the right of competent people to make decisions independent from controlling influences. Nonmaleficence is the obligation to avoid harm whereas beneficence relates to helping others and promoting good. Justice is the disinterested, equitable and appropriate treatment of all, the fair distribution of benefits, risks and costs.

These principles are not necessarily complementary and may be conflicting or at times even mutually exclusive. This may require balancing one principle against another. There is a *prima facie* obligation to fulfil a principle unless a stronger obligation overrides this in a particular instance. The safety and benefit to the individual is usually considered to take precedence. For example, should an individual research participant be at risk of harm then the potential good to society or future individuals with relevant needs must heavily outweigh the potential risk.[1] For the case in question, the retrospective collection and dissemination of aggregated anonymous data poses no risk of harm to individuals, hence the principle of nonmaleficience is met.

While it was initially intended that the four moral principles would have equal moral weight and would be applied differently according to specific situations,[7] in practice autonomy has become the main principle guiding decision-making by ethics committees.[8] This dominance of autonomy has occurred in a climate of increasing consideration of patient rights and issues of individual choice, informed consent, privacy and confidentiality. Autonomy therefore has tended to over-ride and devalue the other principles, particularly justice and the needs of the community.[9]

In line with this trend, the HRC Ethics Committee appears to focus on autonomy as their primary guiding principle. Patients had not given consent for information to be used for research purposes, hence prior ethics appraisal was necessary. The principle of beneficence, of acting in the public good, does not appear to be considered in this decision. Where there are health findings in the public interest, surely there is an 'ethical duty' for these to be published. We feel that an ethics committee should facilitate this process.[10]

In 1996 the Royal College of Physicians of London ruled that neither ethical approval nor individual patient consent was required for studies based on accessing existing medical records.[11] However, the need for informed consent and the principle of autonomy has gained ascendancy in recent years. Warlow and Al-Shahi contend that the undue protection of patient confidentiality, especially with respect to anonymised data, may jeopardise not only epidemiological audit, but also research and hence clinical governance.[12] They argue that "the cost to society of hampering timely research and audit must surely outweigh the risk of bona fide researchers and auditors endangering patient confidentiality".

Where audit findings pose no harm to individual subjects, we consider that the public good should take precedence over the argument that patients have not given explicit consent for their anonymised clinical information to contribute to new health knowledge.

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MUSINGS

White-coated survivor

NZ Med J 2001; 114: 502-3

In Twelfth Night[1] the conceited Malvolio in attempting to impress a younger woman is cruelly duped into wearing the outlandish "yellow stockings, cross-gartered". Clothes not only hide or display our bodies, but give out all kinds of strong messages. Many past and present groups have used a uniform to foster a sense of solidarity. The modern corporate organisation understands this well. Everyone in the system, especially a hierarchical system, is subject to its dress code, whether formal or informal and transgressions attract powerful sanctions. Like Malvolio, the higher they come the further they fall.

We all conform to dress code all the time and may be reminded of this with amusement or embarrassment if we happen to come across an article of personal clothing from the 1970s, or worse still, the 1960s. The organisation which employs me used to have a defined dress code for male medical students and may still have a dress code tucked away in a policy manual. The male medical student on the ward had to wear shirt and tie, dress trousers (not jeans) and formal shoes (not trainers). Ingenuity gave rise to mildly defiant gestures such as wearing a shoe-string tie or the unimpeachable jade pendant. Strangely, the female medical

students were not subject to formal dress code and neither length of skirt nor visibility of earrings was defined.

The nursing uniform at my hospital has recently undergone a radical change. The previous white overall with red epaulettes was considered too 'militaristic' perhaps evocative of Florence Nightingale fighting dysentery in the Crimea.[2] The new uniform offers variety. The most popular option is a loose granny smock in muted colours and covered with a small abstract design worn with dark skirt or trousers. The new uniform is undoubtedly practical and comfortable to wear but it makes the nurses look like bank clerks or librarians. Bank clerks and librarians are very worthy people and look just the part in their uniforms in their banks and libraries. A nursing uniform should be comfortable and practical but it should mean something more. Overnight, the professional nursing uniform has been replaced by a corporate nursing uniform.

For more than a century the dress code of the hospital doctor has included the white coat. In recent times, the white coat has been scorned as an authority symbol and a barrier to communication but apparently not by the patients. In a recent survey in Sydney,[3] most cancer patients wanted senior and junior doctors to wear white coats in order to "look more professional" and "for identification purposes" to distinguish doctors from other staff wearing anonymous corporate uniforms. As a junior doctor, my white coat was a very useful garment – stethoscope in right hand pocket, British National Formulary in left hand pocket, torch and ophthalmoscope in pen pocket, red pen for visual fields in lapel, and tendon hammer through the top button hole. On a ward round, any instrument of medical examination could be produced instantly from the capacious recesses of the white coat.

My white coat is lighter nowadays – stethoscope, diary, pen and security tag. So why do I still wear this largely abandoned and faintly old-fashioned garment? Perhaps it is a reminder of all those white-coated teachers who introduced me to a very long humanistic tradition of medicine, and to signal in a very small way the fundamental medical professionalism that survives social and economic change, stretches back beyond those Greek temples thousands of years ago, and is just as relevant to me today as it was 30 years ago when I first donned my white coat.

Scrutator

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