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EDITORIAL

The case for doubling investment in biomedical research

This issue of the Journal contains a viewpoint article by Mark Richards that highlights the critical situation for biomedical research in this country and the desperate need for the Government to double its investment. Professor Richards presents evidence that New Zealand invests far less in health research compared with other OECD countries, and that recent substantial increases in the research budgets of countries such as the US, Canada and Australia have widened the gap even further.

Biomedical research encompasses both clinical research and the fundamental experimental research that underpins the understanding of diseases and the basis for prevention and treatment. It represents just over half the research currently supported by the Health Research Council (HRC). Funding of the HRC has increased only modestly since its inception about ten years ago, and few of these extra dollars have become available for biomedical research. Allowing for inflation, a declining exchange rate, as well as increasing compliance costs associated with health, safety, biosecurity legislation etc, the actual research that can be supported has undoubtedly declined.

The effect of cumulative underfunding of biomedical research is starting to bite. The impact has already been felt by the biomedical research workforce, who depend on research grants for their salaries. Loss of grant support has forced some to move out of biomedical science. The high risk of sustaining salary support through grants is making others review their career options. Young scientists have little incentive to return after overseas postdoctoral experience and it is becoming increasingly difficult for those in New Zealand to develop their careers here. With other countries boosting their research spending, more of our bright young scientists are taking advantage of the opportunities on offer overseas. Knowledge economy and bright futures may be the government buzz words, but for New Zealand biomedical scientists the light is shining elsewhere.

The low level of biomedical research funding not only restricts the amount of research carried out in New Zealand. It also affects our ability to attract and retain the academic staff responsible for teaching medical students and other health professionals. In a recent editorial, we discussed the problem of losing clinical teachers from our medical schools.[1] Research is one of the attractions that might keep them, but only if funding is available. The vitality of the preclinical teaching programme is also reliant on good academic staff who are attracted by research opportunities. On another front, biomedical research is well recognised as the key discipline underpinning developments in biotechnology, and New Zealand stands to gain economically in the medium and long-term by fostering expertise and training opportunities in this discipline.

As Mark Richards cogently argues, a doubling of Government funding for biomedical research would go a long way towards solving the current problems, and would be a low risk investment for the future. Much of this funding should be directed at fundamental research, not just projects that focus on short term health gains. There is no doubt that basic research is absolutely critical for the advancement of medical knowledge and its practical applications.

The Editors

1. Editorial. Medical training in crisis. NZ Med J 2000; 113: 155.

We do consider that the model of a tax-based NHS is the most equitable and efficient. We believe that a hypothecated health component of taxation is an acceptable way of improving the resources for health services, and would be acceptable to the population. If resources for the NHS are expanded, the need for contracting services out to the private sector becomes unnecessary. We believe in a nationally funded system with central guidance and local democratic autonomy. We believe in the purchaser-provider split, as at present, but there is a great need to strengthen the input from public-health professionals into both activities. However, rigid centralised direction and managerial control is completely counter-productive to the delivery of health services related to the needs of a population. There must be a local democratic authority, and not an appointed one; regional government can only help this trend. We believe in providing incentives to those who deliver health services built on the desire to provide an excellent service with appropriate rewards, and not on a competitive service based only on monetary incentives. We believe that health services should be taken out of party politics and waiting lists should not be a political football. The population, and the medial must be educated in the limits, as well as the possibilities, of health care - and the assignation of blame, compensation, and intervention of legal procedures should be abolished. Mistakes are always made in every field. Other countries have been able to develop 'no-blame' compensation schemes. This does, however, imply that the health professionals have to establish a reliable, effective method for the promotion and maintenance of high standards.

Walter Holland, Alexander Macara, London School of Economics and Political Science. The Lancet 2000; 356: 80.

ORIGINAL ARTICLES

Enhanced surveillance of HIV infections in New Zealand, 1996-1998

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Abstract

Aim. To improve understanding of the HIV epidemic in New Zealand through use of an enhanced voluntary reporting system for new diagnoses of HIV.

Methods. Routine reporting of new HIV diagnoses by the two laboratories that perform confirmatory HIV antibody testing, to the Department of Health and later to the AIDS Epidemiology Group, has been in place since 1985. From January 1996, this was supplemented by a questionnaire about demographic characteristics and circumstances of HIV exposure sent to clinicians requesting the HIV test.

Results. From January 1996 to December 1998, 260 new diagnoses of HIV were reported (205 males, 55 females) and extra information was obtained from clinicians for 253 (97.3%) people. HIV diagnosis rate was highest for 'other' ethnicity and similar for European, Maori and Pacific Island ethnic groups. Sexual intercourse between men was the commonest mode of infection (43.5%), followed by heterosexual intercourse (40.0%) and injecting drug use (2.7%). Places of infection were New Zealand (38.5%), Australia (7.7%), 'other' overseas (45.4%) and unknown (8.5%). Heterosexual infections were acquired through contact with a person in or from a high prevalence area (mainly in Africa or Asia) for 86.7% of males and 68.2% of females. Second generation heterosexual transmission was rare.

Conclusions. Introduction of an enhanced surveillance system has been successful. Results confirm continuing spread of HIV in New Zealand amongst men who have sex with men, and suggest low levels of heterosexual and injecting drug use transmission in New Zealand. Of major importance in the occurrence of heterosexual infection is the role of imported HIV.

NZ Med J 2000; 113: 390-4

Understanding patterns of spread of HIV in New Zealand has until recently been based mainly on AIDS notifications[1] and HIV prevalence testing, in sentinel populations.[2,3] Before 1996, limited information was available on newly diagnosed HIV infections through the laboratories that perform confirmatory HIV antibody testing, but there was a considerable amount of missing information.

As the epidemic evolves, finding out more about people with newly diagnosed HIV infections assumes greater importance. In New Zealand, male homosexual contact has been the predominant mode of transmission for diagnoses of HIV and AIDS.[1] AIDS diagnoses have declined among this group.[4] More recently, there have been increasing numbers of reports of people being infected heterosexually.[5] It is helpful for control purposes to distinguish between first generation transmission[6] (from sexual partners who were themselves at high risk of infection, such as bisexual men, injecting drug users, or people from countries where heterosexual spread is common) and second generation transmission (through sexual contact with people who were themselves heterosexually infected in New Zealand), as the latter suggests broadening of the epidemic in New Zealand. Determining the characteristics of those with newly diagnosed HIV infections has also been crucial in identifying unusual modes of spread, such as transmission in a health care setting.[7]

A further factor which increases the importance of HIV reporting data now, is the advent of highly effective antiretroviral therapies which delay AIDS onset. The long incubation period from HIV infection to AIDS has always limited the usefulness of AIDS notification data, and this situation is exacerbated by the new drug therapies.[8] The prevalence of diagnosed HIV in New Zealand is increasing. In December 1998, 770 people were estimated to be living with HIV.[9] The burden of illness for individuals with HIV and for the community is changing, in terms of health and social care and drug costs, and needs to be measured.

In New Zealand, it is mandatory to report AIDS but not HIV cases. Some countries, for example Australia[10] and most European countries,[11] have compulsory surveillance systems for both HIV and AIDS, whereas others, for example the United Kingdom, operate systems based on voluntary reporting.[11]

Monitoring HIV case reports should improve our understanding of the epidemic, and give a better indication of more recent patterns of HIV transmission than AIDS surveillance. To improve surveillance, the AIDS Epidemiology Group developed an enhanced voluntary reporting system for HIV in New Zealand using unique identifiers. The results for the first three years of operation are reported here.

Methods

Since 1989, the AIDS Epidemiology Group in Dunedin has been contracted to collect information about people diagnosed with AIDS through a compulsory notification system. Information has also been collected about people infected with HIV through a laboratory-based surveillance system through the two laboratories that perform confirmatory HIV antibody testing using the Western blot method (Communicable Disease Centre, Institute of Environmental Science and Research and the Virus Laboratory, Auckland Hospital). From 1985 to 1991, information on new HIV diagnoses was collated by the Department of Health; this included age, sex, probable mode of transmission (when available) and place of testing. Since 1992, this information has been provided directly to the AIDS Epidemiology Group. HIV cases, as with AIDS cases, are reported using a code constructed from the person's initials, sex and date of birth. This code ensures that the identity of the patient is known only to the reporting doctor, but is sufficiently specific to allow detection of duplicate reports.

The 'enhanced surveillance system', introduced on 1 January 1996, is essentially a laboratory based surveillance system complemented by a questionnaire sent to the clinicians requesting the confirmatory HIV test. For each confirmed diagnosis, either the laboratory or the AIDS Epidemiology Group sent a letter to the doctor who requested the test seeking information on testing site, reasons for HIV testing, date of first diagnosis of HIV, previous negative HIV tests, ethnic group, district of usual residence, likely country of infection, and likely mode of infection. For those infections thought to be acquired through sexual intercourse, information about the partner was also sought. Doctors were also asked whether they thought the information given accurately described the patient's exposure. If necessary, a reminder letter was sent. This process was approved by the relevant ethics committee.

When categorizing the likely mode of infection, a hierarchical system was used. If the person came from an area where heterosexual transmission was common, and reported heterosexual intercourse, this was recorded as the likely mode of infection, even when other possible exposures were reported. Similarly, for men who had sex with men and who also injected drugs, the probable mode of infection was classified as sex between men. While this could misclassify the actual mode of transmission, it applies to very few cases. To ensure consistency with the census, we requested that ethnicity be self-reported by the patient, and that more than one ethnic group could be specified. Denominator data for rates were taken from the 1996 census of the usually resident population. Those people who had a previous diagnosis in another country, but had a further HIV test in New Zealand, were included.

For comparison of proportions the chi squared test was used and for comparison of means a t-test was used. Indirectly age-standardised rates were used to compare rates of diagnosis by ethnic group using the rates in the European population as the standard.

Results

From 1985 (when HIV antibody testing first became available in New Zealand) to the end of 1998, 1337 people were diagnosed with HIV infection. The annual number peaked in 1986, and generally decreased from 1986 to 1997 before increasing in 1998 (Figure 1). This pattern mainly reflects that of HIV in males and masks a small but statistically significant increase in the number of women diagnosed with HIV since 1990 (p<0.001). The sex was not stated for nineteen cases of HIV.

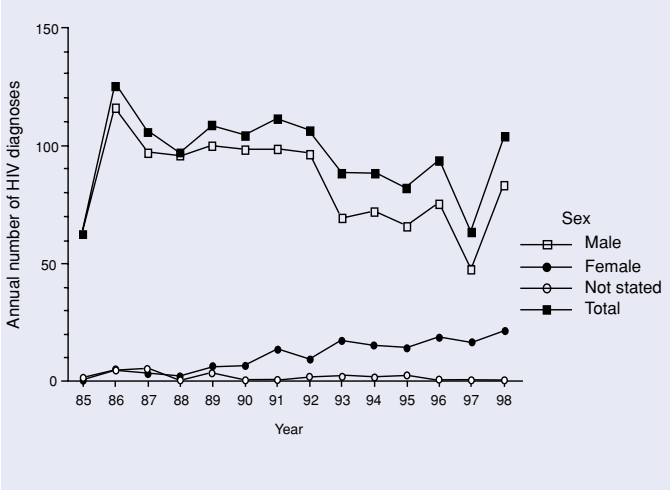

Figure 1. HIV diagnoses by calendar year and sex in New Zealand.

During 1996 to 1998, there were 260 new HIV diagnoses reported (and 27 duplicate reports). Completed forms were obtained for 253 (97.3%) people. No extra information was obtained for seven people, including one patient who refused to allow his doctor to divulge any information about him. A notification of AIDS was also made for 42 of these people by 31 March 1999, 35 (83.3%) of whom were diagnosed with AIDS at the same time or within three months of the diagnosis of HIV. These patients represent 30.4% of the 115 diagnoses of AIDS in the same three year period. A comparison of the characteristics of adult men who had their infections diagnosed late in the course of their disease (i.e. had a diagnosis of AIDS within three months), and all other new HIV diagnoses in men, showed that those with a late diagnosis tended to be older (mean age 42.3 versus 35.1 years, p<0.001). Patients who were reported to be infected in New Zealand were more likely to have a late diagnosis than those infected overseas: 20.0% versus 10.1% (p = 0.03).

Reports were received from 71 general practitioners and 50 specialists or other doctors. In most cases, the reporting doctor considered that the information given accurately described the patient's exposure. In no case did the doctor indicate that transmission might have occurred through an unusual mode, requiring special investigation.

Selected demographic characteristics of people with newly diagnosed HIV infections are shown in Table 1. There were 205 males and 55 females. One transsexual was diagnosed, and has been grouped with the males. Three children, all under five, were diagnosed. The mean age for people aged fifteen years or older was 36.3 years for males and 30.1 years for females, p<0.001. The rate of diagnosis was highest for men aged 30-39 years, and for women aged 20-29 years.

Table 1. Selected demographic characteristics of people with newly diagnosed HIV infections, 1996-1998.

Characteristics	Male No.	Male %	Female No.	Female %	Average annual rates (per 100 000) Male	Average annual rates (per 100 000) Female
Age (years)						
0-4	1	0.5	2	3.6	0.2	0.5
5-14	0	0.0	0	0.0	0.0	0.0
15-19	2	1.0	1	1.8	0.5	0.3
20-29	54	26.3	31	56.4	6.7	3.7
30-39	85	41.5	13	23.6	10.1	1.5
40-49	38	18.5	6	10.9	5.2	0.8
50-59	19	9.3	1	1.8	3.7	0.2
60+	5	2.4	1	1.8	0.7	0.1
Unknown	1	0.5	0	0.0		
15-59	198	96.6	52	94.5	6.0	1.5
Ethnic Group*						
European/Pakeha	114	55.6	12	21.8	4.5	0.5
Maori	16	7.8	2	3.6	3.7	0.4
Pacific Island	3	1.5	3	5.5	2.0	1.9
African	43)		26)			
Asian	20)	31.2	11)	67.3	36.7†	18.3†
Other	1)		0)			
Unknown	8	3.9	1	1.8		
Area of usual residence*						
Northland	3	1.5	0	0.0	2.6	0.0
Auckland	111	54.1	32	58.2	10.8	0.0
Waikato	7	3.4	3	5.5	2.2	0.9
Bay of Plenty	9	4.4	1	1.8	4.7	0.5
Hawkes Bay/Tairawhiti	6	2.9	2	3.6	2.5	1.2
Taranaki	0	0.0	0	0.0	0.0	0.0
Wanganui/Manawatu	1	0.5	2	3.6	0.5	1.0
Wellington	24	11.7	8	14.5	6.2	1.7
Nelson/Marlborourgh	0	0.0	0	0.0	0.0	0.0
Canterbury/West Coast	22	10.7	0	0.0	4.5	0.0
Otago/Southland	0	0.0	0	0.0	0.0	0.0
Total New Zealand	183	89.3	48	87.3		
Overseas	8	3.9	6	10.9		
Unknown	14	6.8	1	1.8		
Total	205	100.0	55	100.0		

*Rate per 100 000 aged 15-59 years. †Denominator is all other ethnicities apart from European, Maori and Pacific Island.

The majority (55.6%) of newly diagnosed men, but only 21.8% of women, were European. 'Other' (mainly African and Asian) ethnic groups were overrepresented among both men (31.2%) and women (67.3%). The age-standardised diagnosis ratio for such men and women combined was 11.1 (95% CI 9.0-13.5) compared to European. The crude rates were similar for European, Maori and Pacific Island adults, and the age-standardised diagnosis ratios still showed no significant differences. The ratios were 0.84 (95% CI 0.50-1.3), and 0.80 (0.29-1.7) for Maori and Pacific Island respectively (compared to Europeans).

Of those people newly diagnosed with HIV, 231 (88.8%) were usually resident in New Zealand at the time. The majority (143) lived in Auckland. Refugees and asylum seekers were mainly tested in Auckland, but may not permanently reside there, so the rates of people with diagnosed HIV now living in Auckland may be overestimated.

Table 2 shows the probable modes of infection for people with newly diagnosed HIV according to place of infection. The commonest mode was sexual intercourse between men, 113 of 260 (43.5%) (which includes two men who also reported

Table 2. Probable mode of infection for all people diagnosed with HIV and those infected in New Zealand, 1996-1998.

Mode of infection	Infected in New Zealand				All diagnoses					
	Male		Female		Male		Female		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sexual intercourse between males*	76	86.4	-	-	113	55.1	-	-	113	43.5
Sexual intercourse between men and women	5	5.7	11	91.7	60	29.3	44	80.0	104	40.0
Injecting drug use	2	2.3	0	0.0	6	2.9	1	1.8	7	2.7
Blood factor treatment	0	0.0	0	0.0	1	0.5	0	0.0	1	0.4
Blood transfusion	0	0.0	0	0.0	2	1.0	0	0.0	2	0.8
Mother to infant	1	1.1	1	8.3	1	0.5	2	3.6	3	1.2
Other†	0	0.0	0	0.0	2	1.0	2	3.6	4	1.5
Undetermined	4	4.5	0	0.0	20	9.8	6	10.9	26	10.0
Total	88	100.0	12	100.0	205	100.0	55	100.0	260	100.0

*Includes two men who also reported injecting drug use. †Reported to be related to medical treatment in Africa.

injecting drug use), followed by sexual intercourse between men and women, 104 of 260 (40.0%), and injecting drug use, 7 of 260 (2.7%). All three children (1.2%) were perinatally infected. Of the 260 HIV infections, 100 were reported to have occurred in New Zealand, 20 in Australia, 118 in other overseas countries, and for 22, the place of infection was unknown. 76 (76.0%) of the infections occurring in New Zealand were through sexual contact between men. All seven infections from exposure to contaminated blood factor treatments, blood transfusions, or other medical treatments occurred outside New Zealand. Two of the perinatal infections occurred in New Zealand. The increase in diagnoses in 1998 (Figure 1) can be accounted for by an increase in infections occurring outside New Zealand. The proportion infected overseas for 1996, 1997 and 1998 respectively were: 44.1%, 44.4% and 66.3%.

Table 3 shows that general practice was the most frequent site of testing (36.2% overall), though for people heterosexually infected, the refugee resettlement centre was the most common site of testing (45 of 104, 43.3%). A negative HIV test before their HIV diagnosis was reported for 73 (28.1%) people. In total, 40 people were known to have acquired their HIV infection over the period 1995 to 1998, and 27 of these were men who had sex with men. Of the people diagnosed in 1996, six infections were known to have been acquired within the previous year. The same was true for sixteen people diagnosed in 1997 and eight people diagnosed in 1998.

Table 3. Selected characteristics of HIV testing of people diagnosed, 1996-1998.

Characteristic	Male		Female		Total	
	No.	%	No.	%	No.	%
Site of testing						
General practice	76	37.1	18	32.7	94	36.2
AIDS centre	16	7.8	2	3.6	18	6.9
Hospital specialist services	37	18.0	8	14.5	45	17.3
Hospital other	0	0.0	1	1.8	1	0.4
STD clinic	20	9.8	7	12.7	27	10.4
Refugees resettlement/ immigration centre	39	19.0	17	30.9	56	21.5
Other*	7	3.4	0	0.0	7	2.7
Undetermined	10	4.9	2	3.6	12	4.6
Previous negative HIV test						
Yes	63	30.7	10	18.2	73	28.1
No	116	56.6	36	65.5	152	58.5
Unknown/not stated	26	12.7	9	16.4	35	13.5
Total	205	100.0	55	100.0	260	100.0

*Includes blood transfusion service, private specialists, accident and medical centre, youth centre and in the workplace.

Table 4 shows information about HIV infections acquired through homosexual contact. Of the 113 men who had sex with men, 87 (77.0%) were European, fifteen (13.3%) were Maori, two (1.8%) were Pacific Island men; most, 76 (67.3%) were infected in New Zealand. The remainder were infected in Australia (13), the USA (6), the Asia Pacific region (6), Europe (5), South America (1), or an unknown location (6). The majority were identified as being homosexual (78.8%), rather than bisexual (14.2%). A history of a previous HIV test varied with the country of infection, with a greater proportion of men who had sex with men infected in Australia having had an HIV test before, ten of thirteen (76.9%), than those men infected in New Zealand, 30 of 76 (39.5%), p=0.03. Of the thirteen infected in Australia, six (46.2%) were known to be newly acquired during 1995-1998, compared with 19 of 76 (25.0%) newly acquired in New Zealand (p=0.18). For men with newly acquired infections, the mean age at diagnosis was 33.4 years, compared to 37.5 years for all other men who had sex with men (p=0.08). For men having sex with men who were infected in New Zealand, 47 (61.8%) were infected by a New Zealander, but for 25 (32.9%), the details of the partner were unknown to the reporting doctor.

Table 4. Information about people infected through homosexual contact, 1996-1998.

Characteristic	Infected in New Zealand		Infected in Australia		Total	
	No.	%	No.	%	No.	%
Ethnicity						
European	59	77.6	10	76.9	87	77.0
Maori	12	15.8	2	15.4	15	13.3
Pacific Island	1	1.3	0	0.0	2	1.8
Other	4	5.3	1	7.7	9	8.0
Sexual identity						
Homosexual	61	80.3	12	92.3	89	78.8
Bisexual	12	15.8	0	0.0	16	14.2
Other*	0	0.0	0	0.0	1	0.9
Unknown	3	3.9	1	7.7	7	6.2
Previous negative HIV test						
Yes	30	39.5	10	76.9	46	40.7
No	41	53.9	1	7.7	56	49.6
Unknown/not stated	5	6.6	2	15.4	11	9.7
Total	76	100.0	13	100.0	113	100.0

*Sexual intercourse between men which was not consensual.

Table 5 shows that only 25 (24.0%) of the 104 people who were heterosexually infected were European, two (1.9%) were Maori and three (2.9%) were Pacific Island people. The majority of the heterosexual infections were due to sexual contact with a person in or from an area with a high prevalence of HIV among the heterosexual population (86.7% and 68.2% for males and females, respectively). Of the sixteen people

Table 5. Information on people infected through heterosexual contact, 1996-1998.

Characteristic	Infected in New Zealand				All diagnoses					
	Male		Female		Male		Female		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Ethnicity										
European	3	60.0	7	63.6	14	23.3	11	25.0	25	24.0
Maori	0	0.0	2	18.2	0	0.0	2	4.5	2	1.9
Pacific Island	0	0.0	1	9.1	0	0.0	3	6.8	3	2.9
Other	2	40.0	1	9.1	46	76.6	28	63.6	74	71.2
Likely mode in infection										
Exposure to a person from a high prevalence area	2	40.0	3	27.3	52	86.7	30	68.2	82	78.8
Exposure to other high risk partner*	0	0.0	3	27.3	0	0.0	5	11.4	5	4.8
Other exposure†	1	20.0	1	9.1	1	1.7	2	4.5	3	2.9
Undetermined	2	40.0	4	36.4	7	11.7	7	15.9	14	13.5
Previous negative HIV test										
Yes	1	20.0	6	54.5	12	20.0	10	22.7	22	21.2
No	4	80.0	5	45.5	41	68.3	29	65.9	70	67.3
Unknown/not stated	0	0.0	0	0.0	7	11.7	5	11.4	12	11.5
Total	5	100.0	11	100.0	60	100.0	44	100.0	104	100.0

*High risk partners were considered to be bisexual men, people from areas of high prevalence, injecting drug users, and recipients of blood products. †Second generation transmission (no evidence of high risk partner or exposure to a person from a high prevalence area).

reported to have been heterosexually infected in New Zealand, information on the partner's risk was known for seven women and three men. Of these, one man and one woman are believed to have been infected through second generation transmission. Only 22 (21.2%) of the people who were heterosexually infected had a history of a previous negative test.

Discussion

The introduction of enhanced surveillance of HIV infections over the last three years has been successful, with extra information available on 97.3% of all new HIV diagnoses. The results confirm the continuing spread of HIV in New Zealand amongst men who have sex with men, and suggest low levels of heterosexual and injecting drug use transmission within New Zealand. Of major importance in the occurrence of heterosexual infection is the role of imported HIV. The results also highlight uncertainties around the coverage of HIV testing in New Zealand.

Homosexual men have been most affected by the epidemic. In 1996-98, about two-thirds of newly diagnosed infections among homosexual men were known to have occurred in New Zealand, and about one-quarter were known to have been newly acquired in that time period. Men with infections known to be newly acquired were younger and more likely to have become infected in Australia rather than New Zealand, although these differences were not statistically significant. Recognition of newly acquired infection depends on previous negative tests, and the prevalence of testing among men who have sex with men may be lower in New Zealand (in a 1996 survey, 70.3% had ever been tested),[12] compared to Australia (in 1996, 77.7% had ever been tested),[13] but higher than in the United Kingdom (in 1997, 57.9% had ever been tested).[14]

Three-quarters of the people with heterosexually acquired HIV infections had sexual contact in an area where heterosexual transmission is common, and most of these people were from relevant parts of either Africa or Asia themselves. The most frequent site for testing for heterosexuals was the refugee resettlement centre. The group of people with HIV who have settled in New Zealand from elsewhere, mainly Africa, have special needs for health and social services.[15] There is also a need for education and support to prevent transmission of HIV within the family and community, including from mother to infant.

The number of HIV infections acquired heterosexually in New Zealand is still very small, and most of these are from people who have engaged in other risk activities - bisexual men and injecting drug users - or involve people from high prevalence areas. Only two people had apparently acquired their infection from people not themselves at high risk through so-called second generation transmission (although details of the partners' risk were unknown for six people). Such transmission has also remained relatively rare in the United Kingdom: following a rise in the early 1990s, it remained stable to 1996.[16]

There were no appreciable differences in rates of HIV diagnosis among Maori, Pacific Island and European populations. These data need to be seen in the context of HIV testing practices. There is limited evidence, from sexual health clinics, of lower rates of HIV testing in Maori and Pacific Island people, compared to Europeans in 1991-1992,[17] and this persisted for Pacific people in 1996-1997 (unpublished data). Nevertheless, unlinked anonymous monitoring for HIV at sexual health clinics (a method which does not depend on voluntary HIV testing patterns) shows low and comparable HIV prevalence among heterosexuals in Maori, Pacific Island and European populations (unpublished data).

Injecting drug users formed only 7/260 (2.7%) of all new diagnoses. Again, there is some uncertainty about HIV testing patterns in this group, but the results are compatible with a prevalence of under 1% in injecting drug users detected by anonymous monitoring in 1997.[18]

The proportion of AIDS diagnoses for which the first diagnosis of HIV was made within three months of AIDS was high at 30%. The proportion of late diagnoses of HIV infection is increasing in the United Kingdom.[19] This is likely to reflect a deficit of AIDS diagnoses in those with early diagnosed HIV infection because of improved treatment. The same may be occurring in New Zealand. When we compared late presenters and earlier presenters amongst those with a new diagnosis of HIV, we found that the men in the former group were older and were more likely to have a mode of transmission other than homosexual contact. Late presenters were also more likely to have been infected in New Zealand than overseas. These late presenters may not have been tested earlier in the course of their illness, either because they did not recognise they were at risk or because there were real or perceived barriers to testing. Such delays may also occur because health workers fail to recognise clinical features of HIV infection.

Recommendations for the surveillance of HIV/AIDS in Europe[20] have stressed that AIDS case reporting alone is no longer sufficient for monitoring the epidemic. Monitoring should be expanded, as part of a strategy to control the epidemic, to include HIV case reporting, periodic HIV prevalence surveys, and behavioural surveillance. We have shown the potential value of HIV case reporting. This needs to be seen in the context of a control strategy which puts appropriate emphasis on the encouragement of HIV testing, the early recognition of HIV disease, and the longer term treatment and support of those with HIV infection.

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The prevalence of viral hepatitis (HAV, HBV and HCV) in the Christchurch community

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Abstract

Aim. To determine the prevalence of hepatitis A (HAV), hepatitis B (HBV) and hepatitis C (HCV) in adults randomly selected from the Christchurch community.

Methods. A list of names was randomly generated from the Christchurch electoral roll and subjects were sequentially contacted and invited to participate. A blood sample was taken and tested for hepatitis A (IgG anti-HAV antibody), hepatitis B (HBsAg and anti-HBc) and HCV (anti-HCV antibody) using Abbott Elisa kits. Subjects positive for HBsAg were also tested for HBeAg/HBV DNA. Those positive for anti-HBc were tested for anti-HBs. HCV antibody positive samples were tested for HCV RNA using PCR.

Results. 1064 subjects (30.3% of those invited) participated in the study. The prevalence of HAV antibodies was 27.9%, and increased with age. The overall prevalence of HBV markers was 42/1064 (4.2%), and of these 0.3% were HBsAg positive and 3.9% were considered immune. No gender or ethnic differences in these proportions were observed. The seroprevalence of HVC antibody was 3/1064 (0.3%), two of whom were also PCR positive for HCV RNA.

Conclusion. In the Christchurch community there was a high prevalence of antibodies to HAV, which increased with age. The prevalence of HBsAg and antibody to HCV were both low at 0.3%

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Viral hepatitis, particularly hepatitis B (HBV) and hepatitis C (HCV), is responsible for increasing numbers of patients developing chronic liver disease, some of whom progress to liver cirrhosis and hepatocellular cancer.[1-3] Hepatitis C is now the most common indication for people requiring liver transplantation in the USA and Australia,[4] while HBV, followed by HCV, is the most common indication in New Zealand (E Gaine, Hepatologist, Liver Transplant Unit, Auckland: personal communication).

The prevalence of hepatitis B is high in many Maori communities in the North Island.[5] Since the introduction of the national HBV vaccination programme in the 1980s, notifications for HBV have been falling.[6] Regional differences in HBV carrier rates have been observed in pregnant woman; 2.8% for the northern NZ region, 3.9% for the central NZ region and 0% for the southern NZ region.[7] Ethnic differences in HBV carrier rate were also observed in a large study of the New Zealand police and custom services; Maori 5.43%, Pacific Island 4.44% and for European, 0.42%.[8] No gender or regional differences, however were observed.[8] Similarily, in the 1985 regional immunisation survey, the carrier rate for Maori of 7.5% was high compared to the European rate of 0.6%.[9] A national hepatitis B screening program based in the North Island for

high risk groups has commenced. If screening for hepatitis B is to be considered for the South Island, then decisions must be based on data that takes into account regional differences in prevalence.

Hepatitis C is a common infection among intravenous drug users (IVDU), with high seroprevalence reported in this group in Christchurch (84.2%)[10] and Wellington (64%-82%).[11,12] Ethnicity was recorded in two of these studies, and 90.6% in Christchurch and 89% Wellington were European.[10,12] By comparison, the prevalence of hepatitis C among blood donors is low. Gibbons et al in 1990 reported a national figure of 0.47% in blood donors in New Zealand,[13] and more recently a study from the Waikato blood transfusion service found an HCV seroprevalence in new donors of 0.87%.[14] Hepatitis A is often an asymptomatic infection and, unlike HBV and HCV, does not progress to chronic liver disease. Higher seroprevalence has been observed in Maori compared to European.[15]

The aim of this study was to investigate the prevalence of viral hepatitis (HAV, HBV and HCV) in a randomly selected sample of the adult population in Christchurch.

Methods

The study was designed to obtain a random sample of 1000 subjects representative of the adult population of Christchurch. A list of 4 000 names was randomly generated from the 1996 electoral rolls and was used for sequential recruitments. Subjects were recruited from the Maori electoral role in proportion to their representation in the general community. Subjects were contacted by telephone and invited to participate by a trained interviewer. In the case of those who declined to participate, limited demographic data were requested and recorded if given. An information sheet was sent to those not contactable by telephone, requesting them to contact an interviewer. Those who volunteered, completed a questionnaire and provided a fasting blood specimen. Subjects unable to come to Christchurch hospital were visited at home. Informed consent was obtained in every case. The study protocol was approved by the Southern Regional Health Authority's Ethics Committee.

In total, 3510 adults were invited to participate, 2032 (57.9%) by telephone and 1478 (42.1%) by letter. Final enrolment was 1064 (30.3% of the 3510 subjects approached), and included 52 individuals who were visited at home. A greater proportion of subjects initially contacted by telephone (42.3%) participated in the study, compared to those contacted by letter (13.8%). The reasons for non-participation (n = 2446) were: not contactable (errors in the electoral roll or change of address) 112 (4.6%); refusal 744 (30.4%); initial agreement but failure to attend 357 (14.6%); and no response to a letter of invitation 1233 (50.4%). When available, information on gender and employment status was extracted from the electoral roles and an analysis indicated that the study sample contained a higher proportion of females and retirees, and proportionately fewer students and unemployed subjects compared with those who did not participate in the study. Age and racial background are not available from the electoral rolls, but was supplied by more than 90% of the 735 subjects who were contacted by telephone but declined to participate, and was not significantly different from the study population

All 1064 samples were screened for contact with hepatitis A by testing for IgG anti-HAV antibodies with a commercially available enzyme linked immunoabsorbant assay (Elisa) supplied by Abbott Diagnostics. Samples were tested for contact with hepatitis B using assays for both HBsAg and anti HBcAg antibodies. Those positive for anti-HBc were also tested for anti-HBs antibodies (Abbott Elisa). Samples positive for HBsAg were tested for HBeAg and anti-HBeAg antibodies (Abbott Elisa), and if HBeAg was negative, testing for HBV DNA (Immunoblot, ESR Kenepuru) was performed to detect infection with precore mutant virus. All samples were screened for infection with hepatitis C, using an assay for anti-HCV antibodies (Abbott Elisa). Samples that tested positive for anti-HCV antibodies were then tested for HCV RNA using the Roche Amplicor method to detect viral replication. Equivocal antibody results were investigated further by retesting with a second antibody assay (Murex EIA) or Immuno blot (3rd generation) at the ESR laboratory Kenepuru.

Results

The overall prevalence of HAV antibodies in the 1064 subjects was 27.9%, and increased with age (Figure 1). The HAV antibody positive subjects were significantly older than those who were negative (62.2 years vs 45.5 years, p< 0.001, Chi-squared test). No significant gender difference was observed. There was a significant difference in prevalence of HAV between the different ethnic groups (p<0.001 Chi-squared test, Table 1).

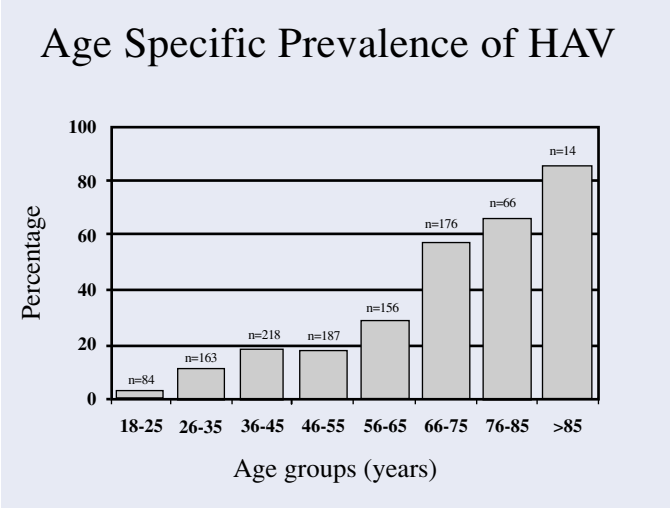

Figure 1. Prevalence of hepatits A serpositivity by decade for all subjects. n=total number of subjects in each age group.

Table 1. Prevalence of HAV and HBV makers in difference ethnic groups

	NZ European	Maori	P.I	European	Asian	Other
HAV	252 (25.5%)	10 (43.5%)	21 (63.6%)	4 (50%)	3 (60%)	7 (100%)
HBV	29 (2.9%)	4 (17.4%)	2 (6.0%)	3 (37.5%)	1 (20%)	3 (43%)
Total	988	23	33	8	5	7

NZ European (born in New Zealand). P.I = Pacific Islander.

The overall prevalence of HBV markers (anti-HBc or HBsAg) indicating infection, current or past, was 4.2%. Of the 42 with HBV markers, 39 were considered to have past contact (immune); 11/39 had anti-HBc alone and 28/39 had both anti-HBc and anti-HBs. Only 3/1064 (0.3%) were HBsAg positive. Two of the three HBsAg positive subjects were HBeAg positive, indicating continuing viral replication and infectivity; the other patient had anti-HBe antibodies and was HBV DNA negative, implying that viral replication had either ceased or was below detection. Two of the three HBsAg carriers were New Zealand European and the third was Somalian. There was no difference in age between those who had positive HBV markers and those who were negative. There was a slightly higher prevalence of HBV markers in males (5.1%) compared to females (3.1%), but this difference did not reach statistical significance (p= 0.08, Chi-squared test). Significant differences in the prevalence of HBV markers was seen in the different ethnic groups (p<0.001 Chi-squared test). The prevalence was lowest in the New Zealand European group (table 1).

Nine subjects had positive HCV antibody results. Two of these were strongly positive, and both had HCV RNA detected by PCR. The other seven had equivocal antibody results and were negative on PCR for HCV RNA. Six of these seven had negative antibody results on repeat testing using the Murex assay and thus the original equivocal results were considered false positives. One subject was Murex positive, NS3 positive on the immunoblot test but PCR negative. This subject had normal liver function tests and was considered to have had past contact. Thus the HCV antibody prevalence

was 3/1064 (0.3%), with two active infections and one probable past infection. These three HCV antibody positive subjects were all New Zealand European.

Discussion

The prevalence of antibodies to hepatitis A was high, and increased significantly with age. The design of the study did not allow us to distinguish between increasing acquisition with age or a cohort effect. The prevalence is lower than a study in Port Chalmers in Dunedin, where the HAV antibody prevalence was 40%[17], and lower than in a large study in Melbourne that reported a similar seroprevalence of 46%.[18]

Compared with studies in the North Island, the prevalence of HBsAg was low, perhaps reflecting the lower Maori and Polynesian population residing in the South Island.[5-7] Based on these results, extending the national screening program to the South Island would not be justified, although a more targetted approach may be appropriate.

The prevalence of HCV was lower than that described in blood donors national (0.47%) and in the Waikato (0.87%).[13,14] This may reflect the study design. High hepatitis C prevalence groups, such as IVDU and prisoners, are probably less likely to be enrolled voters, more difficult to contact and less likely to participate; all factors that could affect the observed prevalence. Similarly, blood donor programs would screen out such individuals and underestimate the community prevalence. Now that blood products are being tested for HCV, transmission from this route will become insignificant. Clearly the high prevalence found in the injecting drug users (64% - 84.2%) in Christchurch and Wellington means these are the communities where resource should be invested to prevent further spread of HCV infection.[10-12]

In conclusion, antibody to HAV (27.9%) is common in the Christchurch community, whereas HBsAg and HCV antibody (both 0.3%) have a low prevalence. These results confirm national differences and provide important information which may prove useful in planning public health programmes in both primary and secondary health care.

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Users of unconventional practitioners: a profile of 26 year old New Zealanders

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Abstract

Aims. To profile 26 year old New Zealand users of unconventional practitioners.

Methods. 977 members of the Dunedin Multidisciplinary Health and Development Study participating in the age-26 assessment (1998-1999) answered questions about twelve-month service use, education, income, recent medical history, current health status and avoidance of medical situations.

Results. 10% had used an unconventional practitioner in the previous twelve months. The majority (88%) had also used a conventional practitioner. Those using both types of practitioner were heavy users of health services (twelve visits/year). Compared to those who used conventional practitioners exclusively, they had significantly higher incomes and were more likely to report a serious injury, a current disability, a history of back problems, role limitations due to physical health problems, and more bodily pain (all $p < 0.01$).

Conclusions. 26 year old New Zealand users of unconventional practitioners have a similar profile to their counterparts in other developed countries. It appears that their health needs are not fully met by conventional services, emphasising the need for more research into the aetiology and treatment of ailments (eg back pain) for which unconventional practitioners are commonly sought. The Medical Council of New Zealand guidelines on unconventional medicine are discussed in light of these findings.

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As governments and mainstream medicine embrace "evidence-based treatments,"[1] the use of unconventional therapy (which, by definition, lacks sufficient evidence for its efficacy or safety[2]) continues to increase.[3] Unconventional therapy use can have significant health, economic and legal implications. For example, some treatments, particularly those involving herbal preparations, may be unsafe,[4,5] out-of-pocket expenses for unconventional treatments tend to be large,[3,4] and as practitioners of most unconventional therapies do not need a licence to practice,[6] there is no legal guarantee of competence. Understanding the profile of those who seek unconventional treatment is therefore of interest.

Previous research has found unconventional therapy use to be more common among those with higher incomes,[7,8] more education[8,9] poorer perceived health,[10] and those with musculoskeletal (particularly back, neck and shoulder) problems.[2,9,11] There are some reports suggesting women are more likely than men to use unconventional therapies,[7,9] although findings are not consistent.[2,11] Only a small proportion of unconventional therapy users abandon conventional therapy entirely,[2,3,8,10,12] and those who do so may be particularly dissatisfied.[10] However, there continues to be disagreement about whether those who use unconventional therapy as an adjunct are dissatisfied with conventional therapy.[9,10,13-18]

Currently, no data exist on the profile of New Zealanders who use unconventional therapy. Additionally, data from overseas studies have typically been derived from either clinic samples[11,13-16,18] or specific population subsets,[6,8,9] and studies of population-based samples have had low-moderate (60-80%) response rates.[2-4,7,10,12] We had the opportunity to examine the profile of unconventional practitioner users (ie those who had visited a provider of unconventional therapy) derived from a largely intact representative population-based birth cohort aged 26 years. It is important to understand the factors influencing unconventional practitioner use among this age group, as they are in the early stages of developing views about the health system and the services on offer.

We examined the demographic characteristics, service use patterns, self-reported medical history, current health status and avoidance of medical situations among Study members who did not use any health services in the twelve months prior to assessment, users of conventional practitioners only, users of unconventional practitioners only, and users of both types of practitioner. We hypothesised that users of both types of practitioner would report more pain and more musculoskeletal problems than those using one type of practitioner, and that those solely using unconventional practitioners would report greater dissatisfaction with conventional treatment.

Methods

Participants. The sample were 498 male and 479 female (mean age 26.0 years) members of the Dunedin Multidisciplinary Health and Development Study, a longitudinal investigation of the health, development and behaviour of 1037 children born in Dunedin during 1972-73.[19] 96% of the living sample (980/1019) participated at the 'age-26' assessment, of whom 41% (404) were still resident in Dunedin at the time of interview, 21% (202) were resident in other parts of the South Island, 17% (168) were resident in the North Island, 11% (108) were resident in Australia, and 10% (98) were resident 'elsewhere'. Information was obtained about academic or trade qualifications and gross income during the previous financial year.

Service Use. Service use information was obtained from 977 study members by asking if and how often during the previous twelve months they had received treatment from a general practitioner (GP), medical specialist (eg orthopaedic surgeon, obstetrician/gynaecologist), an allied health professional (eg physiotherapist, family planner), a chiropractor and an alternative therapist. Conventional practitioner users were those who had used a GP, medical specialist or allied health professional. As in previous research,[2-4,6-13,18] unconventional practitioner users were those who had sought treatment from an alternative therapist or a chiropractor. Those who had consulted an unconventional practitioner were asked what practitioner(s) they had used (Table 1).

Medical history. Self reported information was obtained about the Study members general health included self-reported general health problems (eg asthma, diabetes) and chronic health conditions and disabilities since the age of 21 years.

Health status. Self-reported health status during the previous twelve months was measured by the Australian/New Zealand adaptation of the SF-36 Health survey[20] - a 36-item questionnaire measuring eight aspects of health. These included: physical functioning, role physical (the impact of physical health on performance of everyday roles), bodily pain, general health, vitality, social functioning, role emotional (the impact of emotional health on role performance) and mental health. This instrument has been shown to be a reliable and valid measure of the health status of New Zealanders.[20-22]

Avoidance of medical situations. Study members were asked if and why they had avoided medical treatment or going to the doctor (17 reasons for avoidance were rated on a four point scale where 0=never, 1=sometimes, 2=often and 3=always). Principal components factor analysis revealed five factors with eigen values > 1: (1) fear of negative outcomes (eg fear of medical mishap), (2) fear of medical procedures (eg fear of having blood drawn), (3) barriers to treatment (eg difficulty of getting an appointment), (4) cost and (5) embarrassment (about medical questions or treatment).

Statistical Methods. Comparisons were made between four groups: (1) service non-users, (2) users of conventional practitioners only, (3) users of unconventional practitioners only, and (4) users of both types of practitioner. Arithmetic means were reported. Probability (p) values were calculated as follows: chi squared tests were used for categorical measures (eg location, attained degree), analysis of variance tests with gender entered as a factor were used for continuous measures (eg frequency of service use, income), and pairwise comparisons were conducted with Bonferroni adjustment to the alpha level (ie 0.05/number of comparisons). As the 'frequency of service use' variable was non-normally distributed, we used the log 10 transformed scores for analysis with this variable. The statistical package SPSS 9.0 for Windows was used for all data analyses. Effects were considered statistically significant if $p<0.05$.

Results

Patterns of service use. 10% of the sample (n = 99, 95% CI 8-12%) reported using an unconventional practitioner in the twelve months prior to interview, the most common being massage therapists, chiropractors and osteopaths (Table 1). In total, 168 (17%) Study members had not consulted a practitioner in the previous year, 710 (73%) used a conventional practitioner only, 12 (1%) used an unconventional practitioner only, and 87 (9%) used both types of practitioner.

Table 1. Unconventional practitioners used by 26 year olds in a longitudinal birth cohort study.

Practitioner	Number*
Massage therapist	31
Chiropractor	26
Osteopath	16
Homeopath	13
Acupuncturist	8
Naturopath	5
Other (kinesiologist [3 users], iridologist [2], herbalist [2], reiki practitioner [2], reflexologist [2], touch for health therapist [1], craniosacral therapist [1], crystal healer [1], blood letter [1], and rebirther [1])	16
Total	115†

*These numbers can also be considered percentages as there were 99 unconventional practitioner users.
†This number exceeds the 99 who reported using unconventional practitioners as 16 Study members reported using more than one practitioner. Seven Study members failed to state which practitoner(s) they had used.

Users of both types of practitioner made significantly more visits to a conventional practitioner (median = 5, interquartile range 2-13), than those who used conventional practitioners only (median = 4, interquartile range 2-9, $p<0.05$). Users of both types of practitioner also used unconventional practitioners more often than those who used unconventional practitioners only (median visits = 3, interquartile range 2-8 versus 2, 1-4; $p<0.05$). In total, users of both types of practitioner sought treatment a median of twelve times (interquartile range 6-23).

Gender, location, education and income characteristics. More females (95%) than males (71 %) had used health services in the previous twelve months and more females (84%) had used conventional practitioners alone compared to males (62%; both $p<0.001$). There was no gender difference in the number of study members who used both types of practitioner ($p=0.15$) or used unconventional practitioners alone ($p=0.09$).

Service use varied according to place of residence only insofar as those living 'elsewhere' (ie outside Australasia) consulted an unconventional practitioner alone more often (4%) and a conventional practitioner alone less often (65%) than Dunedin residents only (1% and 77%, respectively, both p<0.05).

There were no differences among groups in the numbers who had obtained university degrees (p=0.62), but there was a difference in incomes with those who used a conventional practitioner only (mean income = $28 000) having lower incomes than all other service use groups (mean incomes, no services: = $32 000, p<0.05; both types of practitioner: $36 000, p<0.01; unconventional practitioner only: $46 000, p<0.01).

Medical history. Users of both types of practitioner were more likely than those who used only conventional practitioners to report a serious injury that had restricted their activities for more than six months during the previous five years (p<0.01), and to be currently disabled because of an injury or long term health problem (p<0.001). Considering the sample as a whole, males (13%) reported serious injuries more often than females (7%) (p<0.01), yet among those who did not have a serious injury, more women (10%) than men (5%) used both types of practitioner (p<0.01).

Analyses of the types of injuries and reasons for disablement revealed that 21% of users of both types of practitioner reported a back, neck or shoulder injury or disablement, compared to 7% of those who used one type of practitioner or the other (p<0.001). If those with back, neck or shoulder injuries or disablements were excluded from the analysis, the differences between users of both therapies and users of one practitioner alone no longer reached significance (injury; p=0.10; disablement; p=0.09). This suggests that users of both types of practitioner were no more likely to report having a serious injury or disablement unrelated to the back, neck or shoulder than were users of one practitioner exclusively.

Health status. SF-36 health status means are presented in Table 2. Not surprisingly, those who did not use health services in the past year reported fewer role limitations due to physical health problems, less bodily pain, greater vitality, and better social functioning than those who had used a conventional practitioner, either alone or in conjunction with an unconventional practitioner (all p<0.01). Those who had used a conventional practitioner alone reported fewer role limitations due to physical health and less bodily pain compared to those who had used both types of practitioner (both p<0.01). It is noteworthy that no group differences emerged on the scale measuring emotional health.

Avoidance of medical situations. Health service use groups did not differ on any of the avoidance of medical situations factors (all p>0.19, Table 3). That is, service use patterns were unrelated to fear of, or dissatisfaction with, doctors or medical services.

Discussion

One in ten 26 year old New Zealanders in this study had used unconventional practitioners in the previous year. This is similar to the twelve-month prevalence rates of unconventional practitioner use found in other countries,[2,4,7,9,12] and suggests there may be few age differences in the prevalence of unconventional practitioner use in adulthood. Consistent with previous findings,[3,10,12] only a small proportion of unconventional practitioner users (12%; 12/99) did not also use conventional practitioner.[3,10,12] The small numbers in this group prevent us from drawing definite conclusions, although our results suggest they are relatively affluent, healthy and are more likely to be living outside Australasia.

It appears that a sizeable minority (9%) of 26-year-olds supplement conventional practitioner use with services from unconventional practitioners. They are characterised by relative affluence, frequent medical service use (a median of twelve visits in the last year), poorer perceived health and greater likelihood of having a back, neck or shoulder problem. As such, it appears their health needs may not be fully met by conventional treatments. Hence, and despite findings suggesting this group were no more likely to report greater fear of, or dissatisfaction with, some aspects of conventional medical services (eg waiting lists, cost), they were clearly not satisfied with conventional treatments. This could be because for some ailments (eg back pain) there is often no cure[23] and conventional treatments (eg non-steroidal anti-inflammatory drugs[24]) may produce unwanted side effects.[23,25] More research should be devoted to investigating the efficacy of unconventional treatments of these complaints, especially in light of the dearth of high quality research into the efficacy of unconventional therapy in general.[26,27]

That women were no more likely to use an unconventional practitioner than men is surprising insofar as women were more likely to use health services overall. However, this finding might be explained by the greater number of males reporting a serious injury, which was related to the supplementary use of an unconventional practitioner. That is, among those who did not have a serious injury, significantly more women than men used both types of practitioner.

We were unable to ascertain the proportion of unconventional practitioner users who had kept their conventional practitioner informed about other treatments received, although estimates from previous research range from 20%-75%.[3,12,13] Ideally, patients should keep their doctor informed about all their health service use and doctors should seek this information from patients. Currently, the Medical Council of New Zealand (MCNZ) guidelines on unconventional medicine allow for doctors to refer their

Table 2. SF-36 *health status subscale means (standard deviations) by service use group for a longitudinal birth cohort of 26 year olds.

SF-36 subscales	Service non-users	Conventional practitioner users	Unconventional practitioner users	Users of both practitioner users	p values
Physical functioning	95.3 (8.3)	92.2 (13.3)	95.4 (5.0)	92.7 (10.9)	0.582
Role-physical	97.5 (11.8)	88.8 (27.6)†	87.5 (29.2)	78.7 (36.9)‡§	0.000
Bodily pain	86.3 (15.3)	78.4 (21.1)‡	74.7 (14.4)	69.7 (22.8)‡§	0.000
General health	79.9 (14.0)	76.6 (16.9)	76.6 (12.9)	78.1 (17.2)	0.127
Vitality	71.0 (14.0)	64.6 (16.9)‡	70.8 (8.7)	61.6 (17.4)‡	0.003
Social functioning	93.5 (13.3)	88.8 (17.0)†	89.6 (11.7)	85.3 (19.6)†	0.002
Role-emotional	94.0 (18.7)	91.0 (24.4)	100.0 (0.0)	87.0 (26.6)	0.230
Mental health	81.4 (11.8	78.3 (14.4)	78.3 (8.6)	77.1 (12.9)	0.173

*higher scores represent better self-reported health
†less than service non-users, p<0.01
‡less than service non-users, p<0.001
§less than conventional practitioner users, p<0.01

Table 3. Avoidance of medical situations factor means (standard deviations) by service use group for a longitudinal birth cohort of 26 year olds.

Factors	Service non-users	Conventional practitioner users	Unconventional practitioner users	Users of both practitioner users	p values
Fear of negative outcomes	0.17 (0.36)	0.20 (0.41)	0.06 (0.11)	0.13 (0.25)	0.292
Fear of medical procedures	0.23 (0.44)	0.30 (0.57)	0.21 (0.46)	0.35 (0.60)	0.727
Barriers to treatment	0.26 (0.53)	0.30 (0.54)	0.18 (0.35)	0.31 (0.53)	0.750
Cost	0.90 (0.99)	0.87 (0.87)	0.59 (0.58)	0.92 (0.83)	0.198
Embarrassment	0.25 (0.51)	0.23 (0.50)	0.41 (0.49)	0.27 (0.53)	0.243

patients to an unconventional practitioner, but do not emphasise the need for records of unconventional treatment to be kept or made available to doctors.[28] To ensure patient safety and optimal treatment, it is important that doctors have a complete knowledge of all treatments they are undergoing. The MCNZ guidelines should reflect this.

Further, if a sizeable number of patients of conventional practitioners are also receiving treatment from unconventional sources, there is a need for conventional practitioners to be educated about unconventional therapy. A New Zealand survey from 1988 found that GP knowledge of unconventional therapies was moderate and varied according to the particular therapy.[29] Updated information of this kind is needed.

Overall, this study found that young New Zealand users of unconventional practitioners were very similar to those in other population samples. By age 26 years, young people were displaying patterns of health service utilisation that reflect low expectations from some types of conventional treatments. An important limitation of the present study is that Study members were not directly asked why they chose the practitioners they did, or about their perceptions of conventional and unconventional medicine. Understanding these aspects of decision making remain vital for understanding who and why people choose to go outside mainstream medicine to meet their health care needs.

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Tony Delamothe and Richard Smith. BMJ 2000; 321: 192.

VIEWPOINT

Funding of Biomedical Research in New Zealand

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The funding of biomedical research in New Zealand is discussed in the context of our need to develop as a 'knowledge society', the current level of support for research, science and technology in general, and for health research in particular. Comparisons with other nations are given and a way forward is suggested.

The 'knowledge society'

New Zealand, like other western industrialised nations, is evolving to become a 'knowledge society'.[1] The 1998 document "Building Tomorrow's Success" set the scene for the 'Foresight Project' which was intended to guide the setting of priorities for government investment in research, science and technology. The defining characteristic of the 'knowledge society' is that know-how, as much as raw materials or capital, determines value produced. "Building Tomorrow's Success" reported that knowledge activities including education, communications and information technology had made an increasing contribution to gross national product (GNP) over recent times, with studies in the United States indicating an increase from 29% of GNP in 1958 to 34% in 1980. Full development as a 'knowledge society' is agreed as necessary to improve our standard of living and for New Zealand to retain a place as a full competitor and participant in the developed world. This realisation has occurred also in other OECD nations including Australia, Ireland, Finland, Canada, Germany and the United States with concomitant recent increased investment in research, science and technology.

The 'Science Envelope'

How is New Zealand placed to further develop its research, science and technological capacity and productivity? The national public 'science envelope' includes parts of Vote Research, Science and Technology and Vote Education, together with scientific and technological spending through other government departmental budgets. In 1999/2000 their combined value was $616 million, or about 0.6% of New Zealand's gross domestic product (GDP), compared with the OECD average of 0.68%. These funds included approximately $330 million of 'targeted' investment, nearly 90% of which was allocated via the Public Good Science Fund, with the remainder distributed to Technology New Zealand and the Health Research Council (HRC). Science and technology spending in other government departments accounted for another $90 million. The 'untargeted' investment included the Marsden Fund with a value of $22 million, and that part of Vote Education EFTS funds ($96 million) filtering into research in our universities.

Business (private) funding of research and development is 0.3% of GDP in New Zealand, compared with the OECD average of 1.06%. This reflects, in part, the structure of the New Zealand economy, with about 240 000 enterprises, most of which employ fewer than five full time equivalent staff.[1] The large organisations active in New Zealand generally have their headquarters and their major markets elsewhere, which influences the disposition of their research and development budgets.

Health research funding

Despite the obvious importance of health research, it receives only a small proportion of the approximate $616 million New Zealand dollars invested in publicly funded 'science envelope'. According to both the HRC[2] and the Ministry for Research, Science and Technology (MRST), the HRC funds "about 65% of the national health research effort". Extrapolating from the HRC's 1998/1999 funding of $44.7 million, this suggests that only about $70 million per annum is spent on health research. This is 1% of Vote Health and 0.07% of GDP. It should be noted that the $44.7 million included entry fees ($9.12 million) from tertiary institutions with initiation of full cost recovery HRC funding. The actual quantum from Vote Research, Science and Technology available to support health research was actually only $29.82 million (GST exclusive).

As already mentioned, the HRC is the single largest contributor to health research funding in New Zealand. The Marsden Fund, which aims at curiosity-driven ('blue skies') research in science had $23 million available for the 1999/2000 funding round, with approximately $10 million going to health-related (i.e. biomedical) projects. Lotteries Health Research provided $3 million in its July 1998 and June 1999 funding rounds. Other trusts, and charitable agencies making smaller contributions include the Cancer Society ($3 million), the National Heart Foundation ($1.2 million) the Neurological Foundation, Kidney Foundation, the Asthma and Respiratory Foundation of New Zealand, Bone Marrow Trust, Multiple Sclerosis Society, National Child Health Foundation, Leukaemia and Blood Foundation, Arthritis Foundation and locally based foundations such as the Canterbury Medical Research Foundation (which provides approximately $400,000 of funding for health-related research each year).

Biomedical Research Funding

For current discussion, the term biomedical research indicates laboratory-based and clinical research, as distinguished from population-based and health services research.

Biomedical research is an important element of a developed nation's research capability. National expenditure on health, which varies from less than 7% of GDP in countries such as New Zealand (approximately $7,000 million per year), to 14% in the United States, constitutes a huge public cost. This requires increasing application of 'smart', affordable solutions, thus providing a major incentive to invest in biomedical research. In New Zealand universities, health research constitutes a major component of externally funded research. In 1999, the HRC funds contributed just over one-third of the University of Otago's total research expenditure,[3] being the largest single research funder in that institution and in the University of Auckland. A majority of internationally cited New Zealand research is biomedical (personal communication, Dr Bruce Scoggins, Director, HRC).

New Zealand investment in biomedical research has directly or indirectly led to the recent establishment of four biotechnology companies including Genesis R & D, NeuronZ, EPPTO and Physiane.

About 60% of project funding in the last HRC grant round went to biomedical research, the remainder to public health, Maori and Pacific Island health. The funding awarded supports only eighteen basic science biomedical projects and seven clinical studies (plus six limited budget applications) throughout New Zealand.

Extrapolating the 60% proportion to the national pool of about $70 million health research dollars, this suggests about $43 million per annum is spent in New Zealand on biomedical research. For a national population of 3.8 million, this equates to $11 per head per annum, ie approximately $US5.50 or $A9 per head per annum. This figure is in line with the value of per capita public spending on health and medical research and development given for New Zealand in the "Wills Report",[4] a strategic review from 1999 which triggered increased investment in biomedical research in Australia (Figure). This comparison of twelve OECD nations ranks New Zealand by far the lowest at less than one-fifth the weighted average expenditure for 1995 in a peer group of nations. In view of subsequent increases in research budgets elsewhere, this understates the true severity of our situation. For example, since 1995 the United States has markedly increased its health and medical research investment. Further, the figure applies purely to public expenditure, leading to further under-estimation of the poverty of New Zealand's position in that, as stated above, private sector contributions to biomedical research in New Zealand are less than one-third of the OECD average. In contrast, the United Kingdom's private Wellcome Trust alone contributes more to health and medical research than that government's Medical Research Council.

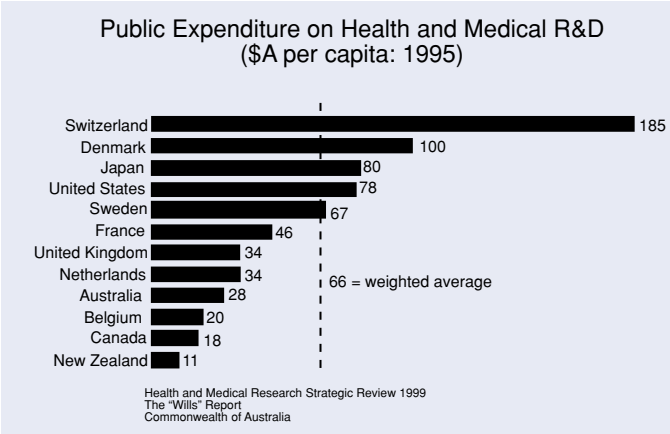

Figure 1. Public expenditure on health and medical research and development (A$ per capita: 1995). From the "Wills" report.[4]

New Zealand biomedical researchers face extreme competition for limited contestable funding. Applications for new biomedical projects submitted to the HRC, for example, typically have a one in four funding rate. As a consequence, choices must be made between excellent proposals, and at least half of projects considered worthy of funding on peer review do not receive support. Set against the background of a sustained drive over recent years for 'efficiencies' in both the health services and our universities, the effect is one of austerity and demoralisation of the biomedical research community. This is now reflected in problems with retention and recruitment, which threaten the quality of our academic and scientific staff and therefore biomedical teaching and research.

Medical Research Institutes

The Malaghan Institute of Medical Research in Wellington claims to be the only independent biomedical research facility in New Zealand. It is quartered with the Wellington School of Medicine and maintains close relationships with the University of Otago. A recent annual report detailed income of $2.48 million for 1999.[5] The Institute has a capital endowment fund of $2.27 million. In contrast, Australia, with only five times our population and less than twice our per capita income, has over 30 independent medical research institutes. These include both private and publicly funded organisations with substantial staff complements and large budgets. Recent annual reports from the Baker Medical Research Institute of Melbourne and The Heart Institute of Sydney show total annual expenditures of $A12.0 million[6] and $A5.2 million[7] respectively. Australian institutes often have large capital funds. For example, the Walter and Eliza Hall Institute of Medical Research declares permanent funds of $A46.0 million.

Private Industry

As already stated, private industry makes a small contribution to biomedical research and development in New Zealand. Because public spending is so low, however, these scant private sector funds assume great importance. The major component of this limited contribution has hitherto come from the pharmaceutical industry. Despite scepticism in some quarters, company-sponsored controlled trials make an undeniably essential contribution to the evidence-base, much emphasised by PHARMAC. Revenue generated by participation in industry-funded trials allows flexibility for biomedical groups to pursue basic science projects for which there is inadequate contestable public funding available. This contribution has recently come under threat. Explicit statements have been made by large pharmaceutical companies indicating a lack of willingness to invest in research and development in our country. Bristol Myers Squibb[8] and the recently merged Smith Kline Beecham/Glaxo[9] have stated specifically that drug pricing procedures in New Zealand are so restrictive that there is little incentive to support local research. As a consequence, and in contrast with other OECD nations where the pharmaceutical industry plays a major role in collaborative support of biomedical research, there is currently a major 'disinvestment' by this industry in New Zealand. We are losing access to any share of the global US$55 billion per year spent on pharmaceutical research and development. This has been cited by Professor Stephen MacMahon (a worldranking initiator and co-ordinator of landmark international cardiovascular trials) as contributing to his departure from Auckland to Sydney. Professor MacMahon attracted over $40 million worth of investment by the pharmaceutical industry, among other sources, for independent investigator-initiated research, through the Auckland Clinical Trials Research Unit over a period of seven years, but at the time of his departure felt this was unlikely to be sustained due to the estrangement of the pharmaceutical industry (personal communication).

International Response

What is happening elsewhere? Across the Tasman, the Wills Report[4] has triggered increased funding for scientific and medical research, with a doubling of the budget for the National Health and Medical Research Council of Australia over the coming six years.[10] In addition, Australia conducts a collaborative interaction with large private contributors

including the pharmaceutical industry, and provides incentives for them to invest locally.

Finland is currently spending approximately 2.9% of GDP on science research funding from both public and private sources.[12] This increase (from approximately 1.3% in 1983) places that nation of five million among the largest spenders on research, and offers a stark contrast to the 0.5% of GDP in New Zealand. In the field of molecular biology, Finland has established a new Institute for Genomics and Bioinformatics in Helsinki which co-ordinates input from three other new university genomics centres and a similarly organised Institute for Structural Biology. The Finnish Academy of Sciences which allocates much of the nation's basic research funding, has set up new programmes in microbiology, cell biology and transgenics. The improved support has resulted in double the number of papers per capita published in refereed journals over the past decade.

In Canada, the potentially disastrous effect of the southward drift of scientific talent has been recognised and a programme instituted to retain and attract academic researchers to Canadian universities.[13] 2000 research chairs will be established. The "21st century chairs plan" commits $Can 180m to 1,200 chairs over three years, with a further 800 to be created as soon as possible thereafter, bringing the annual federal bill to $Can 300m. 40% of these funds are slated for chairs in biomedical research. As part of the programme, promising emerging researchers will receive annual support of $Can 100 000 for five to seven years, and for established scientists $Can 200 000 per annum may be available for salaries and teaching replacement.

Canada also has a constructive relationship with the pharmaceutical industry.[14] The Canadian Medical Research Council (MRC) and Canada's Research-Based Pharmaceutical Companies (Rx & D) recently announced the continuation of a partnership begun in 1993. Phase 1 of that programme provided $Can 240 million of new basic and clinical research in Canada. Phase 2 currently underway, will promote a wide variety of peer reviewed research projects jointly funded by Rx & D companies and the MRC. These will include training awards, such as fellowships and studentships funded on a 1:1 basis between industry and the MRC, and operating grants and clinical trials funded on a 1:2 and 1:4 basis distributed between MRC and industry respectively.

As previously mentioned, the United States has increased its already massive National Institutes of Health (NIH) budget from US$11.3 billion in 1995 to US$17.8 billion per year with a further billion dollar increment likely this year.[15] This equates to US$65 (approx. NZ$130) per capita of health research money from this source alone.

A New Zealand solution

Health costs are huge and increasing. Current health research spending is minuscule despite its disproportionate contribution to our universities externally funded research effort. The fact that much of New Zealand's internationally cited research relates to health, indicates that we have the scientific talent available. This must be retained to spearhead new biomedical and biotechnical enterprises in New Zealand. Rather than solely importing expensive and ill-fitting solutions to our unique health problems from overseas, we need to take the dual opportunity of solving these problems ourselves and becoming exporters of knowledge to reap the benefits of an upskilled work force, new employment opportunities, increased export earning and decreased import costs. Improvement in the nation's health will follow.

To reverse the effects of years of 'malign neglect' we must avoid the trap of 'too little, too late'. To rescue our future economy, New Zealand science in general and biomedical research in particular, requires government, private industry and the research sector to raise their game. Success will be driven by excellent research, which must first be seeded by adequate capital from government - which also has a role in ensuring that private biomedical and biotechnical industry flourish. This country should improve on the example set by Australia and immediately double public investment in both fundamental and priority-driven biomedical research. We should commit to further staged expansion of funding over time. This increment in funding will impose little upon the national annual budget, but will have a disproportionately positive influence upon the biomedical community, both in terms of morale and productivity, and is essential for New Zealand to claim and retain a place in the international biomedical and biotechnical community.

The Australian 'Wills Report' provides a template for the following recommendations:

1. The research sector must retain curiosity-driven, investigator-initiated peer reviewed fundamental research as the foundation for success in the research sector.
2. Priority-driven research must also be developed.
3. The number, scope, scale and duration of competitively acquired grants must be increased. The government needs to foster expansion and retention of a critical mass of well trained scientists with a sufficient career structure and security to retain our 'best and brightest'.
4. The creation of one or more new biomedical institutes within New Zealand (independent or linked to existing university-based research staff and infrastructure) should proceed urgently.
5. The conditions for technology transfer from research to the commercial sector must be improved. Private sector investment in the form of venture capital must be encouraged through tax regimes recognising that start-up support for new ventures is critical to the establishment of biotechnology industries.
6. Investment by pharmaceutical and other established knowledge-based industries must be constructively encouraged - as successfully demonstrated in Ireland and Finland. The Canadian example suggests that with appropriate safeguards, this can be achieved together with both 'value for money' in terms of the public pharmaceutical bill and sustained integrity of biomedical academic endeavour.

New Zealand has a proud history of significant original discovery by scientists who have attained international acclaim despite minimal resources. To realise their full potential requires urgent investment, the initial cost of which will be repaid many-fold in terms of international competitiveness, employment and improvements in the nation's health.

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Christchurch Medical Research Society Meeting, April 12, 2000

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VEGF-B expression in human breast cancers correlates with lymph node status. SP Gunningham, MJ Currie, PAE Scott, BA Robinson, SB Dox, Angiogenesis Research Group, Christchurch School of Medicine, Christchurch.

Tumour angiogenesis is essential for growth and metastasis. It is regulated by numerous angiogenic factors, one of the most important being vascular endothelial growth factor (VEGF). Recently VEGF-B, a new VEGF family member, has been identified. It binds to the eyrosine kinase receptor flt-1. Although the importance of VEGF has been shown in many human tumour types, the contribution of VEGF-B to tumour neovascularization is unknown. We therefore measured the level of VEGF-B and flt-1 mRNA by ribonuclease protection assay and the pattern of VEGF-B expression by immunohistochemistry in eleven normal and 62 invasive breast cancers. Flt-1 expression was significantly higher in normal breast than in tumours (p=0.02), but no significant difference in VEGF-B between normal and neoplastic breast was seen (p=0.03). There was a significant association between VEGF-B and lymph node status (p=0.02) and the number of involved nodes (p=0.01) but not with age (p=0.07), size (p=0.06), ER (p=0.2), grade (p=0.05) or vascular invasion (p=0.3). No significant relationship between VEGF-B and flt-1 p=0.2 or tumour vascularity (p=0.4) was present. VEGF-B was expressed mostly in the cytoplasm of tumour cells, although occasional stromal components including fibroblasts and endothelial cells were also positive. No difference in VEGF-B expression was observed adjacent to regions of necrosis, in keeping with this VEGF family member not being hypoxia regulated. These findings suggest that VEGF-B may contribute to tumour progression by enhancing angiogenesis and metastasis possibly by increasing plasminogen activators, as has been described in vitro. Measurement of VEGF-B together with other angiogenic factors may identify a poor prognostic patient group that may benefit from additional chemotherapy.

Relationship between sudden infant death syndrome, (SIDS) and climate in Canterbury - a 32 year profile. M Dalrymple, I Hudson, R Ford, Community Paediatric Unit and Department of Mathematics and Statistics, University of Canterbury, Christchurch.

This study examined the incidence of SIDS in Canterbury between 1968 and 1999, in relation to both current and lagged (moving-average, time series) climatic profiles.

An intervention analysis, based on an over-dispersed parametric survival model, found two significant points of change in the SIDS series at epochs 1972 and 1989 ($0.01 < p < 0.05$), with the later corresponding directly to publicity campaigns aimed at reducing prone sleeping. These two epochs effectively split the series into three periods: 1968-72, 1973-89, 1990-99. The epoch effect, and its interactions with the climatic variables, was found to be significantly related to SIDS ($p<0.001$) by Poisson and logistic regression modelling, indicating a differential effect of climatic factors across periods.

The average maximum daily air pressure over the previous 30 days, the average minimum daily temperature over the previous 21 days and a short-term deviance temperature variable (differential between temperature on the day of SIDS death and the average temperature over the previous fortnight), interacting with the epoch effect ($p<0.001$), best described the relationship between climate and SIDS. There was no significant relationship between SIDS and climatic variables in the third period, possibly due to the low SIDS rate (on average, 9.1 deaths per year for the third period, compared to 16.0 deaths for the first period and 28.6 deaths for the second period). A 10ºC increase in long-term temperature decreased the risk of SIDS by 40% (odds: 0.58; 95% CI: 0.32-1.06) in the first period and 60% (odds: 0.38; 95% CI: 0.29-0.29) in the second period. Comparatively, a 200 HPa increase in long-term pressure increased the risk of SIDS by 80% in the first period (odd: 1.82; 95% CI: 0.58-5.76) and doubled the risk in the second period (odds: 2.01; 95% CI: 1.26-3.22). A 10ºC increase in deviance temperature more than doubled the risk of SIDS (odds: 2.58; 95% CI: 1.17-5.66) in the first period and increased the risk by 30% (odds: 1.30; 95% CI: 0.96-1.78) in the second period, which is possibly indicative of a hyperthermia effect.

Attitudes of Pacific Island parents and boys to cultural circumcision. M Afsari[1], SW Beasley[1], K Maoate[1], K Heckert[2], [1]Department of Paediatric Surgery, Christchurch Hospital; [2]Department of Public Health and General Practice, Christchurch School of Medicine, Christchurch.

Circumcision for cultural reasons is routine in Pacific Island countries. In New Zealand, routine circumcision for which there is no medical indication is uncommon and is no longer publicly funded within the public hospital system. This has caused difficulties for Pacific Island people in New Zealand. This study documents differences in the attitudes of Pacific Island parents and their male children to cultural circumcision, and assesses the strength of their beliefs.

Pacific Island boys aged eight to eighteen years and their parents resident in Christchurch were given a questionnaire, then were interviewed. The participants were obtained mainly through church organisations and after broadcasts on Pacifica radio.

116 of the 123 participants felt that they had strong ties to the Pacific Island community. The majority (89%) felt that circumcision should be performed mainly for reasons of culture and hygiene. Only a small number were aware of possible complications. The average age that most are circumcised and would want their children to be circumcised is six to ten years. Boys were less sure than their fathers that they would get their own sons circumcised.

This study has shown that circumcision is expected and surprisingly well accepted by the boys of Pacific Island families, despite the associated discomfort. There is a strong cultural demand from parents for circumcision. Guidance from church leaders or male sexuality lessons at schools or elsewhere may alter the perceptions of the community, although the degree to which the practice is entrenched into their cultural beliefs is such that any change is likely to be gradual.

Auditory and visual evoked saccadic latencies in multiple sclerosis. EM Young, TJ Anderson, GJ Carroll, MR MacAskill, RD Jones, Department of Medicine, Christchurch School of Medicine, and Christchurch Movement Disorders and Brain Research Group, Christchurch Hospital, Christchurch.

In order to determine whether increased visual saccadic latency in multiple sclerosis (MS) is due to delay in the afferent or later pathways, we recorded visual and auditory evoked reflexive saccades in patients with MS and correlated saccadic latency with the latencies of the visual evoked potential (VEP) and the middle latency auditory evoked potential (MLAEP). Fourteen patients with definite MS and fourteen age and sex matched controls were recruited. Eye movements were recorded with infrared scleral reflection oculography. Visual reflexive saccade latency was increased in the MS group compared to the control group (mean left eye 219.2 ms vs 199.4 ms, p=0.054; mean right eye 229.8 ms vs 201 ms, p=0.04), but there were no differences in auditory reflexive saccade latencies between MS and control subjects (left 211.3 ms vs 203.1 ms; right 220.4 ms vs 211.1 ms). VEP latencies were prolonged in the MS group compared to the control group (left 119.9 ms vs 105.5 ms, p=0.03; right 119.4 ms vs 104.1 ms, p=0.003), but there were no differences in MLAEP latencies between the MS and control groups (left 30.5 ms vs 29.1 ms; right 28.6 ms vs 29.5 ms). These results indicate that there was no delay in the afferent auditory or efferent oculomotor pathways in the patient group. We conclude that the prolonged latencies of visually evoked saccades in MS are principally due to demyelination within the afferent visual system.

Comparison of tramadol with diclofenac as a post-tonsillectomy analgesic. MJ Courtney[1], D Cabraal[2], [1]Department of ENT, Christchurch Hospital, Christchurch; [2]Department of Otolaryngology, Palmerston North Hospital, Palmerston North.

Pain is the most significant obstacle to the rehabilitation of a patient following tonsillectomy. Several factors influence the duration and intensity of pain. This study is concerned with one of these factors, post-tonsillectomy analgesia. Non-steroidal anti-inflammatory drugs are good post-tonsillectomy analgesics but have some unwanted effects. Therefore, research is ongoing to find the ideal post-tonsillectomy analgesic. The aim of this study was to compare the analgesic efficacy of oral tramadol hydrochloride with oral diclofenac sodium.

The study was a single blind (surgeon and research team members) prospective randomised controlled clinical trial. The subjects were 64 consenting patients (age greater than ten years) booked for tonsillectomy. Trial subjects presenting for bipolar electautery tonsillectomy were randomised to either the oral tramadol or the oral diclofenac postoperative pain group. Subjects used a visual analog scale (VAS) to measure pain level twice daily for fourteen days.

Results indicated that the age, sex and weight classification of each group was statistically comparable. The VAS pain scores over the fourteen days were not significantly different between the oral tramadol and the oral diclofenac group (p=0.66). The incidence of post-tonsillectomy haemorrhage (p=0.68), postoperative vomiting (p=0.16 and readmission for uncontrolled pain (p=0.74) were statistically similar between the two groups. The duration of use of the trial drug (tramadol mean=11.2 days sd=2.65, diclofenac mean=11.5 days sd=2.56, p=0.66) and paracetamol (p=0.32) was similar, but amoxycillin (p=0.06) and difflam (p=0.03) were used for a shorter duration by the tramadol gorup. The study revealed that when deciding on post-tonsillectomy pain relief, the use of oral tramadol could deliver the same analgesic efficacy as oral diclofenac.

The destruction of Giardia intestinalis cysts using high voltage. PT Johnstone[1], G Ionas[2], PS Bodger[1], [1]University of Canterbury, Christchurch; [2]Protozoa Research Unit, Massey University, Palmerston North.

Previous research into the effects of high magnitude electric fields on living cells suspended in water has led to the development of a practical water disinfection device. A continuous flow of water through a region of high electric field strength can cause lysis of bacterial cells suspended in the water. The mechanism of the cell lysis is the disruption of the membrane. Application of this high voltage device to *Giardia intestinalis*, a parasitic protozoan often found in natural water supplies, resulted in over 99.9% of the Giardia cysts being rendered non-viable as defined by fluorogenic vital dyes. Under differential interference contrast (DIC) microscopic examination it was observed that the outer wall of treated cysts had been disrupted, revealing the shape of the internal trophozoites.

A study of autonomic function, diurnal blood pressure variability and left ventricular hypertrophy in renal transplant recipients. C Olsson, DO McGregor, KL Lynn, Department of Nephrology, Christchurch Hospital, Christchurch.

Abnormal circadian blood pressure (BP) rhythm is common in end-stage renal disease (ESRD). The roles of abnormal autonomic dysfunction, left ventricular hypertrophy and the effect of renal transplantation (RT) are not know. Nineteen renal transplant recipients, aged 22-67 years, who received their transplants more than twelve months (1-29 years) previously, were studied with 24-hour ambulatory blood pressure monitoring (ABPM). Parasympathetic function was tested by automated analysis of heart rate variations at rest, during deep breathing, during the valsalva manoeuvre and while standing. Left ventricular mass index (LVMI) was estimated by echocardiography.

Thirteen patients (68%) had abnormal circadian BP rhythm and seven (37%) had significant parasympathetic damage, but there was no relationship between autonomic damage and circadian BP rhythm. Neither abnormality showed a tendency to diminish with time after transplantation. Systolic hypertension occurred in 5% during the awake period and in 52% during sleep, while diastolic hypertension occurred in 47% when awake and in 63% asleep. Awake systolic BP was the strongest predictor of LVMI ($r=0.7$, $p<0.001$), considerably better than clinic systolic BP ($r=0.48$, $p<0.05$).

Abnormal circadian BP rhythm is common after RT but it is not related to the degree of parasympathetic dysfunction, and neither abnormality trends to resolve more than twelve months after RT. These findings suggest that parasympathetic damage is not a major contributor to abnormalities of circadian BP in renal failure. In RT patients, ABPM is a more sensitive indicator of hypertension, and a stronger predictor of LVMI than clinic BP.