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Finnish physicians show little support for consumer advertising of prescription drugs
H. Toiviainen, L. Vuorenkoski, E. Hemminki

All Finnish physicians (16,698; 85% answered) were asked for their opinions of direct-to-consumer advertising (DTCA) and other drug information sources for patients. Almost all were against full DTCA, but half would allow advertising indirectly via patient organisations or healthcare units; 18% were against all types of DTCA. Thirty-six percent considered (in general) that drug advertisements to patients and consumers were 'harmful' or 'useless'. Further discussion of DTCA and other means of disseminating drug information is needed.

Interest and participation in selected sports among New Zealand adolescents
R Richards, A Reeder, H Darling

Participation in physical activity commonly declines during adolescence, making this an important time to target promotion efforts. Participation and interest in 18 sports was examined among 3434 New Zealand adolescents as part of the Youth Lifestyle Study. Several sports were identified where substantial proportions of respondents were interested but not participating. For these sports, in particular, it may be possible to capitalise on the interest expressed and (through appropriate provision of opportunities and support) turn this interest into actual participation.

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S Butler, M Williams, C Tukuitonga, J Paterson

It is recommended that most infants be exclusively breastfed for the first 6 months. Factors associated with not breastfeeding exclusively were investigated among mothers of a cohort of over 1000 Pacific infants in New Zealand. Aside from smoking, different factors were associated with initiation and maintenance of exclusive breastfeeding. Identification of risk factors can assist in targeting women for breastfeeding education and support. Lastly, greater attention is needed to address modifiable risk factors such as smoking.

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babies. However, when comparing mothers by ethnicity, Maori mothers had significantly lower haemoglobin values then non-Maori. Furthermore, Maori newborns had significantly lower cord ferritin levels then non-Maori.

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Dialysis in the elderly

Justin Roake

Krishan Madhan's paper *The epidemic of elderly patients with dialysis-requiring end-stage renal disease in New Zealand*, published in this edition of the New Zealand Medical Journal,[1] raises important issues pertaining to planning and provision of renal replacement therapy (RRT) in New Zealand. (RRT includes home-delivered and institutional haemodialysis, peritoneal dialysis, and renal transplantation.)

In common with all countries that provide comprehensive RRT programmes, New Zealand is experiencing substantial and sustained growth in demand for RRT, and a disproportionate increase in new patients accepted for RRT in the age group =65 years. It appears that there is no realistic prospect that this trend will reverse, and further expansion of this group is predicted.

The complex interplay of pressures within our health system, generating expansion in RRT in the population aged =65 years, includes:

- Ageing of the population in general, and ageing of the population sustained by dialysis specifically.
- Explicit removal of age as a criterion for restriction of access to medical services.
- Greater expectations from life and quality of life into 'retirement years'.
- Perceived greater ability of dialysis systems to provide acceptable quality of life in the population aged over 65 years.
- Improved outcomes of transplantation (in general and in the elderly patient group), and willingness of health professionals to transplant without an upper-age threshold.

Elderly patients receiving RRT are characterised as likely to have significant co-morbid conditions, most notably peripheral vascular disease and/or diabetes. They also have a high chance of being dependent upon maintenance of chronic ambulatory peritoneal dialysis (CAPD) for their survival—but have a low chance of either being accepted onto the deceased donor transplant waiting list or of receiving a transplant from a living donor.

Issues that arise include the practicalities of delivering dialysis to an elderly population, the costs of delivering the care and social/ethical issues related to access to high cost (ie, dialysis) or resource-limited (ie, transplantation) therapies, and the clinical outcomes of RRT in the elderly.

Successful chronic dialysis has always been dependent upon provision of adequate access to the peripheral circulation for haemodialysis (preferably and most commonly in the form of a radio-cephalic arteriovenous fistula) or to the peritoneum for peritoneal dialysis through insertion of a permanent peritoneal dialysis catheter. In either case, technical problems and complications are more frequent in elderly patients.

In comparison to a younger cohort, elderly patients are more likely to have poor quality (or absent) forearm or leg veins through exposure to prior medical interventions, and are more likely to have atheroma or medial calcification affecting their radial or brachial arteries. Provision of circulatory access for haemodialysis is therefore more difficult and may require the use of 'permanent' central venous catheters with their associated complications. Even if adequate circulatory access is provided, poor manual dexterity, impaired quality of eyesight, and limited social supports may impact upon successful delivery of haemodialysis, especially in a home setting. The result is greater dependence on institutional care and resources.

Although CAPD appears to be preferred in elderly patients, technical problems are not infrequent. Previous abdominal surgery resulting in adhesions, presence of abdominal wall herniae, poor quality of tissue, and impaired healing all mitigate against CAPD that is free of technical complications. Diabetes, immunodeficiency associated with renal failure, and increased likelihood of intra-abdominal pathology (diverticulitis for example) contribute to relatively high procedure failure rates (through development of peritonitis) and greater demands on hospital medical and surgical services.[2]

The extent to which these problems occur in the elderly patients is not well documented and the extra demands placed upon already stretched resources requires research—but, to meet current and future demands, there is no doubt that greater attention will need to be given to provision of vascular and peritoneal access surgery.

Dialysis in all its forms is a high-cost therapy, and additional cost is associated with age.[3] In general, CAPD may be marginally less costly than haemodialysis but this remains to be established for the elderly dialysis population in the New Zealand setting. Beyond the first year, renal transplantation is substantially less expensive than dialysis and, as graft and patient survival rates have improved, the cost differential has increased.[4].

Transplantation is also associated with better survival and better quality of life than dialysis, especially in elderly patients. Indeed, most transplanting centres have abandoned any upper age limit on transplantation, and a significant proportion of patients aged =65 years meet the criteria of life expectancy and general fitness required for inclusion on the deceased donor transplant waiting list. It is expected, therefore, that greater demands for transplantation will occur within this elderly age group in the future.

In 2002, only 7 of 117 (6%) renal transplant operations performed in New Zealand were for patients aged =65, and only 22% of the 590 patients aged =65 years receiving RRT had a functioning transplant—this compares to 47% of 2110 patients <65 years. Furthermore, whereas 20% of patients <65 years undergoing dialysis were on the national transplant waiting list for a deceased donor transplant, the corresponding figure for patients =65 years was only 4%.[5] The National Kidney Allocation System for transplantation,[6] as updated in 2003, does not discriminate on the basis of old age, and (for the time being) the transplant waiting list has not been increased substantially by elderly dialysis patients.

As yet, there appears to be little requirement for public debate on age-specific allocation of scarce transplant organs in New Zealand, but if current trends continue

and organ donation rates do not increase substantially, as seems likely, that issue will need to be resolved.[7]

Living kidney donation is also considered for elderly patients requiring RRT, but usually there are no suitable donors as living donors are predominantly parents, siblings or spouses—all of whom are likely to fall into the elderly category. Moreover, potential elderly donors are often ruled out because there is normally significant decline in renal function with age, and many will have their own health problems acquired over a lifetime. This is reflected in figures from Australia where (in 2002) more than 50% of transplants in patients aged 15–34 years were from living donors—but this figure in patients aged 65–74 years was only 30%.[5] This fact, combined with low deceased-donor transplant rates, means that the vast majority of elderly patients who require RRT will see out their days on dialysis without experiencing the benefits of transplantation. It also means that our health system will be responsible for the high associated costs.

The challenge now is to provide life-sustaining RRT to all patients who need it—in such a way as to achieve good quality of life at a cost that our society can afford. While it is tempting to resort to restrictions in access to either dialysis or transplantation based upon age, as a means of containing costs, there is little evidence that age *per se* is an independent risk factor for poor outcome. For example, age alone is not an adequate predictor of who will die within the first year of becoming established on haemodialysis,[8] and the presence of co-morbid conditions (especially diabetes and vascular disease) are likely to be better determinants of outcome.[9,10]

Greater research into predictors of outcome (in terms of survival and quality of life) is needed[8]—transparent guidelines for acceptance onto a RRT programme (based upon expected outcome) must then be developed and implemented nationally.

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Physicians' negative views of direct-to-consumer advertising (DTCA): the international evidence grows

Les Toop, Dee Richards

If further evidence were needed of the negative perceptions of prescribers around the world to the practice of direct-to-consumer advertising (DTCA), it is provided by the report from the Finnish annual physician survey reported in this issue of the Journal.1 All 16,000 Finnish physicians were asked about their attitudes to the possible introduction of DTCA to Europe, as part of an official annual survey. Eighty percent of the 14,000 respondents were against the introduction of DTCA (as we currently have in New Zealand); only 4% were in favour.

Even this high figure (80%) is beaten in the recently reported survey of Colorado Physicians. Only 1 in 10 respondents (remembering they have had DTCA for years) to this mailed survey considered DTCA a positive trend in healthcare—for the usual reasons.[2] Perhaps even more telling, and in contrast to the claims of the proponents of DTCA, less than 30% of the public surveyed at the same time thought DTCA was a positive trend in healthcare (500 replies from 624—an 80% response rate). This in a country (United States) where the public have had more than ample opportunity to see DTCA for what it is.[2]

Unsurprisingly, both of these recent surveys are in line with the views of the 1600 New Zealand GPs who answered a request for support to call for a ban on DTCA. Once more, four out of five of the 1600 respondents, felt DTCA was (on balance) negative.[3]

Thankfully, the overwhelming support from health professional organisations and from consumer groups in New Zealand to a call from academic general practice to ban DTCA, has encouraged the Government to signal its intention to ban DTCA in New Zealand soon.[4] This will be achieved through harmonisation with Australia.

Of ongoing concern is the stated intention to continue to allow company-sponsored 'disease-awareness' advertising. This form of 'back-door' DTCA is on the rise around the world—and the lack of regulation or monitoring is causing great concern in many countries, notably in Canada, Australia, and in Europe. A strong message to the New Zealand Government is required that emphasises that even this form of industry-sponsored advertising will bring with it more problems than it will solve. If allowed to continue, a much more stringent system of central monitoring and regulation of disease awareness advertising will be required.

At present, the Ministry of Health has no proactive remit to monitor DTCA, and the self-regulatory system run by the Advertising Standards Authority (ASA) has shown itself to be (and in the view of many will remain) an inadequate and inappropriate mechanism for protecting the public from partial, unbalanced, and frankly misleading information on advertised medicines.

There are obvious commercial imperatives facing the pharmaceutical industry, which together with its undoubted effectiveness at influencing prescribing behaviour, make DTCA (overt or covert) irresistible as a marketing tool.

Until the pharmaceutical industry shows a more responsible attitude to marketing and to the provision of balanced information, advocacy by the medical profession in protecting the public health will remain of the utmost importance. Around the world, pharmaceutical companies are trying to get alongside, sponsor/influence, and (at times) covertly set up patient advocacy groups as a means to promote sales of their products. This ploy will eventually backfire on pharmaceutical companies as awareness by consumer advocates (some of the strongest opponents of DTCA) grows.

In New Zealand, fortunately we will soon see the end of brand advertising. Therefore, we need (more than ever before) better and more accessible independent health information for consumers.

At a recent meeting in Christchurch, many of those interested in facilitating this came together to discuss ways in which these aims can be achieved.[5] Encouragingly, momentum is building for a stronger and more coordinated national consumer voice to advocate for more balanced and honest information about medicines and health in general.

Let's hope that New Zealand can very soon put another 'unfortunate experiment' behind it, and again lead the world in encouraging informed consumers.

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Finnish physicians show little support for consumer advertising of prescription drugs

Hanna Toiviainen, Lauri Vuorenkoski, Elina Hemminki

Abstract

Aim To study Finnish physicians' opinions of direct-to-consumer advertising of prescription drugs (DTCA) and other drug information sources for patients.

Method A survey was sent to all working-aged physicians (n=16,698; response rate 85%).

Results Almost all physicians were against full DTCA, but half would allow advertising indirectly via patients organisations or healthcare units; 18% were against all types of DTCA. Thirty-six percent generally considered drug advertisements to patients and consumers to be harmful or useless.

Conclusion Further discussion of DTCA and other means of disseminating drug information are needed.

Direct-to-consumer advertising of prescription drugs (DTCA) is currently allowed in two developed countries—New Zealand and the United States (US). In New Zealand, the banning of DTCA has been discussed.[1] Canada currently prohibits DTCA, but consumers receive DTCA across the border from the US. The European Commission (EC) proposed in July 2001 to allow DTCA, initially in selective diseases; however, the proposal was rejected in June 2003.

DTCA has been defended by its supporters who claim that it increases patients' participation in their healthcare, and they also give the difficulty in preventing and controlling 'hidden' DTCA as a reason.

Meanwhile, critics have said that DTCA is uninformative, creates demand via consumers, increases medicalisation, deteriorates the doctor-patient relationship, and increases (irrational) prescribing and drug costs.[2–4]

The Standing Committee of European Doctors holds a negative position towards the EC proposal for DTCA, but no representative data are available on what practising physicians in Europe think of DTCA.

We carried out a survey on Finnish physicians' opinions of DTCA and other drug information sources for patients.

Method

The data were gathered as part of the annual physician survey (sent to all working-aged physicians in Finland [n=16,698] by the Finnish Medical Association in March 2002). The response rate was 85%.

The covering letter briefly described the EC proposal for DTCA, and physicians were asked their opinions of the advertising of prescription drugs for consumers, and they were also asked for their opinions on the usefulness of different drug information sources for patients and consumers.

Results

The average age of respondents was 43 years, 53% were women, 42% worked in hospitals, 60% were specialists, and 87 % did clinical work (n=12,255). Age was strongly correlated to other characteristics.

Almost all physicians were against full DTCA (Table 1), but half would allow advertising indirectly via patient organisations or healthcare units; 18 % were against all types of DTCA, and 19 % choose the 'cannot say' option or did not answer the question.

Table 1. Physicians' attitudes towards DTCA of prescription drugs (n=14,157)*

	Yes (%)	No (%)	Cannot say (%)	Missing information (%)	All (%)
Full DTCA, including product names and health claims	4	80	7	9	100
Reminder advertising (brand name, images, but no health claims)	8	67	15	10	100
Comparative price advertising (name, quantity, and price; no images or advertising text)	22	50	17	11	100
Disease-oriented advertisements with no product name	25	49	16	10	100
Drug information leaflets through patient organisations or healthcare units	54	26	10	10	100

*Question asked: *In your opinion, should the EU (European Union) allow the following types of direct-to-consumer advertising (DTCA) of prescription drugs?* Note: The order of alternatives was different in the questionnaire.

When asked how useful various drug information sources (in general) were, 20% of physicians considered drug advertisements 'harmful', and 16 % considered them 'useless'. Pharmacies were considered to be the most useful drug information sources (84% thought pharmacies were 'very' or 'somewhat' useful). Patient organisations were also considered useful (82%). Scientific journals, media, and even the Internet received more support than drug advertisements.

Discussion

Finnish physicians are critical towards 'product-claim' full DTCA, but half of them would allow advertising by 'mediators' such as patient organisations or healthcare units.

The majority of general practitioners in New Zealand (in 2002),[5] and family physicians in the US (in 1997),[6] generally had clear negative opinions of DTCA. In a US Food and Drug Administration study in 2002, GPs and specific specialists were divided in their attitudes.[7] In that study, physicians were asked to base their responses on a recent specific encounter with a patient.

Physicians' dislike of DTCA may result from their desire to retain traditional professional roles or from their concern over quality of patient care. Salaried physicians may feel that DTCA can prompt patients to seek care unnecessarily and

increase physicians' workloads. Indeed, DTCA may lead patients to pressure physicians into selecting certain treatment options, which are not optimal.[3,8] Furthermore, physicians may think that DTCA misinforms patients, therefore making them anxious that they are not receiving the correct treatment.

DTCA experience from the US shows that it does not provide good quality information to the patients. Indeed, only a few prescription drug advertisements in magazines describe other treatment alternatives, the duration of the treatment, or even which patients benefit from the treatment.[9–10]

In summary, further discussion of DTCA and other means of disseminating drug information are needed.

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Interest and participation in selected sports among New Zealand adolescents

Rosalina Richards, Anthony Reeder, Helen Darling

Abstract

Aim The current study aims to describe participation and interest in 18 selected popular sports among a large sample of New Zealand adolescents with the goal of identifying opportunities for increasing youth participation in physical activity.

Methods Multi-stage cluster sampling was used to select 82 secondary schools and classes of Year 10 and 12 students within schools from six geographical regions throughout New Zealand. Students completed self-administered written questionnaires.

Results The school response rate was 58%, with physical activity data available for 1730 females and 1704 males, including 637 students who self-identified as Maori. The greatest gaps between expressed interest and actual participation were reported for rugby union, rugby league, basketball, soccer and surfing (among both sexes); dance and volleyball (among females); and skateboarding (among males). When diversity of participation was modelled, increased diversity was associated with being male, having an income from part-time work, and having greater diversity of interest in the selected sports.

Conclusions For several sports there are substantial groups of young people who express interest but do not participate. The challenge for public health is to turn this interest into increased participation in health-promoting physical activity—by providing appropriate opportunities and support for participation.

Sedentary lifestyles are associated with poor physical and mental health,[1] and place a significant burden on health services.[2] In New Zealand, more than 2000 premature deaths each year are attributed to physical inactivity.[3] Adolescents have been identified as an important population to target, due to declines in participation in physical activity during this life period.[4-6] A recent study of New Zealand secondary school students found 30% of males and 43% of females did not participate in regular (more than 3 days per week) moderate-vigorous physical activity.[7]

This study focuses on one component (sport participation) of the overall opportunities for physical activity participation. Information about participation in specific sports in New Zealand is available from Sport and Recreation New Zealand (SPARC),[8] and some historical data are available from the Dunedin Multidisciplinary Health and Development Study.[4] These sources indicate that among New Zealand adolescents the most popular sports include rugby union, soccer, netball, basketball, touch rugby, swimming, and athletics.

Research by SPARC has found that between half and two-thirds of adolescents are interested in participating in a new sport or active leisure.[8] This is a positive finding for public health as it suggests that, with the opportunity and support to be more

active, many adolescents would like to increase their participation. In addition to this general expression of interest in participation, it would be useful to have information at a sport specific level, which may indicate paths for encouraging sport participation among this age group. Given current patterns of sport participation it is also likely that interests differ between males and females.

Therefore, the aim of the current study was to examine participation and interest in selected sports among a sample of New Zealand adolescents, and to identify sports where there may be opportunities for increasing participation.

Methods

Sample—Sampling methods have been described in greater detail elsewhere.[9] In summary, in 2002, multi-stage cluster sampling was used to randomly select 82 secondary schools and classes of Year 10 and 12 students from within six geographical regions throughout New Zealand.

Measures—Participants completed a questionnaire while being supervised by trained interviewers within a school classroom setting. The questionnaire asked participants to indicate their sex, ethnicity, and whether they received money from working at a part-time job.

Participants were also asked to indicate (on a list of 18 forms of sport and active recreation [Tables 1 and 2]) which activities they were interested in (including watching them on TV, and reading about them in newspapers/magazines), and secondly, the activities in which they participated. These sports were chosen based on their reported popularity in previous New Zealand research,[8] and their likelihood of being associated with cigarette smoking (the area focused-on by the survey).

School details, including socioeconomic decile rating, were obtained from the Ministry of Education. Schools provided class data, which included the Year (ie, either 10 or 12) in which students were enrolled.

Data analysis—To adjust for the cluster sampling procedure, probability weights were assigned at the individual student level. Diversity of sport participation and interest was indicated (in each case) by counts of the number of selected sports where participation or interest was expressed (out of a possible 18 in each case). Poisson regression was used to examine associations between these diversity measures and other variables.

Results

The school response rate was 58%, with physical activity data available for 1730 females and 1704 males, including 637 students who self-identified as Maori (a weighted proportion of 15.4%). Higher decile schools were slightly over-represented.

The percentages of students reporting participation and interest in each of the 18 selected activities are presented (separately for females and males) in Tables 1 and 2, respectively.

Among females, there was moderate overlap between participation and the activities in which ‘interest’ was most frequently expressed—with netball, dance, basketball, volleyball, soccer, touch rugby, tennis, surfing and rugby union being of interest to at least one-third. The activities with the greatest interest-participation differential for female adolescents (ie, where the levels of interest outweigh participation by 20% or more) were surfing, rugby union, rugby league, dance, basketball, volleyball, and soccer.

Among males, as for females, there was overlap between the activities in which participation and interest were most frequently reported, such as rugby union, basketball, soccer, cricket, touch rugby and skateboarding. Activities for which the reported levels of interest outweighed participation by 20% or more were rugby league, rugby union, basketball, and soccer.

Table 1. Participation and interest in selected activities among 1730 females aged 12–17 years*

Activity	Participation (P)		Interest (I)		Difference (I-P)	
	%	Rank†	%	Rank†	%	Rank†
Netball	41	1	58	1	17	10
Dance	23	2=	47	2	24	4
Basketball	23	2=	46	3	23	5
Touch rugby	20	4	35	6=	15	–
Soccer	18	5=	37	5	20	7
Tennis	18	5=	35	6=	18	9
Volleyball	17	7	38	4	21	6
Hockey	14	8	28	–	14	–
Surfing	8	9=	35	6=	26	1=
Cricket	8	9=	21	–	13	–
Rugby union	7	–	33	9	26	1=
Baseball/Softball	7	–	19	–	12	–
Mountain biking	6	–	14	–	8	–
Road cycling	5	–	9	–	4	–
Rugby league	5	–	30	10	25	3
Skateboarding	5	–	24	–	19	8
Golf	4	–	10	–	6	–
Outrigger/Waka Ama	3	–	6	–	3	–

*Percentages weighted to be nationally representative. †Top ten ranked sports.

Table 2. Participation and interest in selected activities among 1704 males aged 12–17 years*

Activity	Participation (P)		Interest (I)		Difference(I-P)	
	%	Rank†	%	Rank†	%	Rank†
Rugby union	33	1	55	1	22	2=
Basketball	27	2	49	2	22	2=
Soccer	26	3	46	3=	20	4
Touch rugby	24	4=	36	7	12	9
Cricket	24	4=	42	5	18	7
Skateboarding	20	6=	38	6	19	5
Golf	20	6=	29	10	10	–
Mountain biking	17	8	31	9	14	–
Surfing	15	9	33	8	19	5
Tennis	14	10=	25	–	12	9
Rugby league	14	10=	46	3=	32	1
Dance	12	–	27	–	15	8
Hockey	11	–	22	–	11	–
Volleyball	10	–	22	–	12	9
Baseball/Softball	7	–	19	–	12	9
Road cycling	5	–	12	–	7	–
Netball	3	–	9	–	6	–
Outrigger/Waka Ama	2	–	5	–	3	–

*Percentages weighted to be nationally representative. †Top ten ranked sports.

The diversity (ie, the number of activities selected out of the possible 18 choices) of participation and interest in the 18 selected activities was also examined. As these were summary measures of participation/interest in all selected activities, the groups were large enough to allow differences in diversity to be described between Maori and non-Maori, as well as between males and females.

There was a greater diversity of interest than participation in the selected activities and a greater diversity of participation among males compared to females and among Maori compared to non-Maori (Table 3).

Table 3. Overall participation and diversity of participation and interest among the total sample (n=3434), and among Maori and non-Maori

	Participation			Interest		
	%	mean*	95% CI	%	mean*	95% CI
Overall						
Male	86	3.3	3.1-3.4	95	5.7	5.4-6.1
Female	80	2.9	2.7-3.1	96	5.4	5.2-5.7
Maori						
Male	88	4.1	3.7-4.5	97	6.5	6.0-7.0
Female	85	3.6	3.3 – 4.0	99	5.6	5.2-6.0
Non-Maori						
Male	86	3.1	3.0-3.3	95	5.6	5.2-6.0
Female	79	2.7	2.5-2.9	96	5.2	5.0-5.5

*Mean number of activities among those who reported at least some participation.

Poisson regression models were created to predict (a) diversity of participation and (b) diversity of interest in selected sports. The univariate and adjusted associations for each model are presented in Table 4.

Table 4. Factors associated with diversity of participation and interest in selected sports

	Participation				Interest			
	Univariate		Adjusted		Univariate		Adjusted	
	ratio	95% CI	ratio	95% CI	ratio	95% CI	ratio	95% CI
Sex								
Female	1.00	–	1.00	–	1.00	–	1.00	–
Male	1.22	1.14-1.32	1.15	1.08-1.22	1.04	0.96-1.13	1.04	0.97-1.12
School decile								
High (7-10)	1.00	–	1.00	–	1.00	–	1.00	–
Mid (4-6)	0.96	0.85-1.08	0.95	0.87-1.05	0.99	0.92-1.07	1.00	0.93-1.07
Low (1-3)	1.11	0.98-1.25	0.98	0.88-1.08	1.14	1.02-1.27	1.15	1.03-1.27
School year								
Year 10	1.00	–	1.00	–	1.00	–	1.00	–
Year 12	0.97	0.93-1.02	0.98	0.93-1.02	0.99	0.95-1.02	0.98	0.96-1.01
Employment								
No income	1.00	–	1.00	–	1.00	–	1.00	–
Part-time work	1.13	1.03-1.23	1.11	1.03-1.19	1.04	0.97-1.12	1.06	0.99-1.15
Diversity of interest*	1.14	1.13-1.16	1.14	1.13-1.15	–	–	–	–

* Higher scores on this scale indicate greater diversity of interest

Statistically significant, but weak, associations were found between diversity of participation in selected sports—and sex, part-time work, and diversity of interest. Participation diversity was higher among males than females, with males participating in 15% more sports after adjustment for all of the other factors included in the model.

Students who received an income (from part-time work) reported greater diversity of participation compared to those not in paid work and, finally, there was a positive association between diversity of participation and diversity of interest in selected sports. For the latter association, there was a small but significant interaction effect, with diversity of interest being more strongly related to participation among males (ratio: 1.17; CI 1.16–1.19) than females (ratio: 1.12; CI: 1.11–1.14).

When compared to students from high decile schools, those attending low decile schools reported greater diversity of interest in the 18 sports. No other independent variable was significantly associated with diversity of interest in selected sports.

Discussion

Strategies that aim to promote and increase physical activity among adolescents require up-to-date information about the nature of current participation and the identification of promising opportunities for promotion among this population. To identify some of these opportunities, this study examined ‘interest’ as well as participation (in 18 popular activities/sports) among a large sample of New Zealand adolescents.

The sports where there were the greatest gaps between expressed interest and actual participation included rugby union, rugby league, basketball, soccer, and surfing (among both sexes); dance and volleyball (among females); and skateboarding (among males). For these sports, in particular, there may be opportunities to capitalise on the level of interest expressed and, through provision of opportunities and support, turn this interest into actual participation.

When the extent of participation and interest in sports among adolescents was examined, perhaps unsurprisingly, diversity of interest was greater than that of participation. Diversity of participation was greater among males than females, and greater among Maori than non-Maori. When predictors of participation diversity were examined, positive effects were found for being male, having an income from part-time work, and having greater diversity of interest in the selected sports.

Greater participation in sport among males than among females is a consistent finding in studies of physical activity. Interestingly, when diversity of interest was examined, males and females did not differ significantly; although the association between interest and participation was stronger among males than females. This finding is potentially useful for informing health promotion efforts, as it suggests that, despite similar levels of interest among males and females, factors exist that make it less likely for interest among females to be translated into participation.

The positive impact of part-time work on diversity of participation may relate to having additional income to help pay for increased equipment, fees, and travel costs associated with participation in multiple sports.

Future research in this area would benefit from the addition of standard measures that estimate the actual frequency, duration, and intensity of participation in each type of activity. This would allow an examination of the factors associated with attaining 'recommended' levels of physical activity—in addition to 'overall' participation, as reported here.

Understanding which sports are of interest to 'inactive' adolescents would be particularly valuable. Another important limitation of this study is that the list of sports is not comprehensive, and does not include some popular sports such as athletics and swimming; additionally, sport participation is only one component of overall participation in physical activity.

Further research should, therefore, also focus on finding these opportunities for non-sport physical activities such as walking and cycling, undertaken for recreation or transport, and unstructured activities such as gardening.

Levels of interest are, in part, likely to reflect the media attention and level of resources held by particular sporting codes. In the case of several popular New Zealand sports examined here, there are large groups of young people who express interest in them, but who are not participants. While this finding suggests potential opportunities for increasing participation, there is also a risk that this interest may find expression solely through 'sedentary' involvement in sports, such as viewing elite sports events on television or playing sport-themed video and computer games.

Overall, a challenge for public health is to provide opportunities and support for adolescent sport and recreation—to turn their interest into increased participation in (sport and non-sport) physical activity.

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Factors associated with not breastfeeding exclusively among mothers of a cohort of Pacific infants in New Zealand

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Abstract

Aims This study investigated the association between not breastfeeding exclusively (among mothers of a cohort of Pacific infants in New Zealand) and several maternal, sociodemographic, and infant care factors.

Methods The data were gathered as part of the Pacific Islands Families (PIF) Study. Infant feeding information was obtained through interviews with mothers (6 weeks post-birth) and from hospital records for 1247 of the 1365 biological mothers.

Results Factors significantly associated with not exclusively breastfeeding at hospital discharge included smoking, unemployment prior to pregnancy, years in New Zealand, not seeing a midwife during pregnancy, caesarean delivery, and twin birth status.

Factors significantly associated with cessation (before 6 weeks post-birth) of exclusive breastfeeding (for mothers who initially breastfed exclusively) included smoking, employment prior to pregnancy, being in current employment, high parity, dummy use, not receiving a visit from Plunket, infant not discharged at the same time as the mother, infant not sharing the same room as the parent(s) at night, regular childcare, and having a home visit for the infant from a traditional healer.

Conclusions Aside from smoking, different factors were associated with initiation and maintenance of exclusive breastfeeding. Identification of risk factors should assist targeting women who are at heightened risk of not breastfeeding exclusively.

The benefits of breastfeeding (for both infant and mother) are numerous and well documented.[1–3] A threshold level may exist for protection against infectious diseases for infants, with greatest protection observed with exclusive breastfeeding.[2] For these protective and other observed benefits, it has been recommended that the introduction of complementary foods should be delayed (in most circumstances) until the infant is approximately 6 months old.[4] Thus, it is important to encourage mothers to breastfeed exclusively over the first few months of the infant's life.

Although breastfeeding rates in New Zealand tend to be high compared to other countries,[5,6] exclusive breastfeeding rates appear to reduce substantially—well before the recommended 6 months.[7] To provide opportunities for targeted intervention, and to better inform breastfeeding programmes, it is important to identify factors that may hinder the initiation or maintenance of exclusive breastfeeding for different ethnic groups in New Zealand.

An earlier study identified Pacific ethnicity as being associated with not exclusively breastfeeding at discharge from hospital.[7] Furthermore, we have previously shown that breastfeeding rates observed in our cohort (at 6 weeks post-birth) fall below recommended national targets.[8] The present study investigates the association

between not breastfeeding exclusively (among mothers of a cohort of Pacific infants in New Zealand) and several maternal, sociodemographic, and infant care factors.

Methods

Data were collected as part of the Pacific Islands Families (PIF) Study; a longitudinal investigation of a cohort of 1398 infants (11 pairs of twins) born at Middlemore Hospital, South Auckland, New Zealand during the year 2000. Middlemore Hospital was chosen as the site for recruitment of the cohort as it has the largest number of Pacific births in New Zealand and is representative of the major Pacific ethnicities. It was estimated that a cohort of 1000 would provide sufficient statistical power to detect moderate-to-large differences (after stratification for major Pacific ethnic groups and other key variables).

Eligibility criteria included having at least one parent who self-identified as being of Pacific ethnicity and at least one parent who was a New Zealand permanent resident. Thus, non-Pacific mothers were eligible for the study in cases where the infant's father was of Pacific descent. Detailed information about the cohort and procedures is described elsewhere.[9]

Approximately 6 weeks after the birth of their child, Pacific interviewers (fluent in English and a Pacific language) visited the mothers in their homes. Of the 1376 mothers, 1365 were biological and 11 were foster or adoptive mothers. Eligibility criteria were confirmed, and informed consent was gained for their participation in an interview and for our access to their Middlemore Hospital discharge record.

Each mother participated in a 1-hour interview (in their preferred language) about the health and development of their child, and family functioning. Questions regarding how the infant had been fed for the first 6 weeks of their life were included in this assessment.

Consistent with other studies,[10,11] breastfeeding was considered exclusive if no other milk, formula, or solids were given apart from liquids such as water. Combination breast-and-formula feeding and formula-only feeding were therefore considered as ‘not breastfeeding exclusively’. Several variables were examined for associations with ‘not breastfeeding exclusively’ via univariate and multivariate logistic regression analyses.

First, factors associated with ‘not breastfeeding exclusively’ (at the time of discharge from hospital) were examined. Subsequently, factors associated with not breastfeeding exclusively (at 6 weeks post-birth) were examined for mothers who initially exclusively breastfed in hospital. Of the 1365 biological mothers in the PIF study, infant feeding data from hospital records were available for 1247 of the mothers (91.4% of the mothers of the cohort). Data from these 1247 mothers and the responses based on the first-born twin for twin pairs were used in all analyses.

Results

Ninety-six percent (n=1590) of potentially eligible mothers of Pacific infants (who had been born between 15 March 2000 and 17 December 2000) gave consent to be visited in their homes when their infant was 6 weeks old.

Of the 1477 mothers contacted and who met the eligibility criteria, 1376 (93.2%) agreed to participate in the study. A more conservative recruitment rate of 87.1% would include mothers who consented to contact and were (a) confirmed eligible, or (b) of indeterminable eligibility due to inability to trace. Of the 1247 biological mothers in the present study (1.7% gave birth to twins; n = 21), 47.5% self-identified their major ethnic group as Samoan, 16.6% as Cook Island Maori, 4.3% as Niuean, 20.8% as Tongan, 3.5% as Other Pacific (includes mothers either identifying equally with two or more Pacific groups, equally with Pacific and Non-Pacific groups, or with Pacific groups apart from Tongan, Samoan, Cook Island or Niuean), and 7.4% as Non-Pacific. The mean age (SD) of mothers was 27.9 (6.1) years; 80.7% were living together in married or de facto partnerships, 32.8% of mothers were New Zealand born, and 27.7% had post-school qualifications.

At the time of discharge from hospital, 1017 mothers (81.6%) were exclusively breastfeeding. Of 23 variables examined for potential association with not breastfeeding exclusively at discharge from hospital, 9 reached statistical significance ($p<0.05$); findings for these variables are shown in Table 1.

Table 1. Numbers (row percentages) and odds ratios of 'not breastfeeding exclusively' at discharge from hospital by variables attaining significance in univariate logistic regression analyses (n=1247)

Variable	Category	Not breastfeeding exclusively			
		n	(%)	Univariate odds ratio	(95% CI)
Maternal variables					
Employed prior to pregnancy?	Yes	112	(16.5)	1.00	
	No	118	(20.8)	1.33	(1.00– 1.76)*
Years in New Zealand	0-5	34	(13.5)	1.00	
	6-10	22	(16.5)	1.27	(0.71–2.28)
	>10	174	(20.2)	1.62	(1.09–2.41)*
Other variables					
Pregnancy planned	Yes	69	(15.2)	1.00	
	No	160	(20.2)	1.41	(1.04–1.92)*
Smoked during pregnancy?	No	153	(16.3)	1.00	
	Yes	77	(25.2)	1.73	(1.27–2.36)†
Saw midwife during pregnancy?	Yes	163	(16.6)	1.00	
	No	66	(25.0)	1.68	(1.21–2.32)†
Birth weight	=2500 g	214	(17.9)	1.00	
	<2500 g	16	(32.7)	2.23	(1.21–4.12)*
Delivery method	Vaginal	180	(16.9)	1.00	
	Caesarean	50	(27.0)	1.82	(1.26–2.61)†
Multiple birth status	Single	215	(17.5)	1.00	
	Twin	15	(71.4)	11.76	(4.51–30.64)‡
Infant discharged same time as mother	Yes	219	(18.0)	1.00	
	No	11	(40.7)	3.14	(1.44–6.87)†

*$p<0.05$; †$p<0.01$; ‡$p<0.001$.

For the categories within each variable, the numbers and percentages of mothers who reported not breastfeeding exclusively are given along with their respective univariate odds ratios (95% CI) indicating likelihood of not breastfeeding exclusively.

Variables examined, but not significantly associated with not breastfeeding exclusively, included maternal age, ethnicity, whether born in New Zealand, social marital status, education, English fluency, cultural alignment, parity, whether pregnancy was planned, whether they attended antenatal classes, alcohol consumed during pregnancy, whether general practitioners or traditional healers were seen during pregnancy, birth weight, whether the infant was discharged at the same time as mother, household size (persons), and annual household income.

Many variables examined for individual associations with not breastfeeding exclusively at discharge from hospital are likely to be interrelated. A multiple logistic regression analysis was undertaken to control for confounding effects and enable identification of important variables able to provide a parsimonious explanation of the data.

Five demographic variables (age, education, ethnicity, marital status, and household income) were initially forced into the model as control variables, and then all remaining variables were submitted to a forward stepwise procedure (p to enter = 0.15, and p to remove = 0.20).

Table 2 demonstrates that (when adjusting for all other variables in the final model) factors significantly associated with not breastfeeding exclusively ($p<0.05$) at discharge from hospital were caesarean delivery, not being employed prior to pregnancy, living in New Zealand for more than 10 years, twin birth status, not seeing a midwife during pregnancy, and smoking during pregnancy. Variables included in the model but failing to reach significance were the five demographic control variables, and cultural alignment.

Table 2. Adjusted odds of not breastfeeding exclusively at discharge from hospital for variables attaining significance in a multiple logistic regression (n=1235)[§]

Variable	Category	Adjusted odds ratio	(95% CI)
Delivery method	Vaginal	1.00	
	Caesarean	1.75	(1.18–2.60)[†]
Employed prior to pregnancy?	Yes	1.00	
	No	1.41	(1.02–1.94)[*]
Years in New Zealand	0–5	1.00	
	6–10	1.40	(0.75–2.62)
	>10	1.80	(1.13–2.86)[*]
Multiple birth status	Single	1.00	
	Twin	11.37	(4.02–32.20)[‡]
Saw midwife during pregnancy?	Yes	1.00	
	No	1.53	(1.07–2.19)[*]
Smoking during pregnancy?	No	1.00	
	Yes	1.81	(1.27–2.58)[†]

[*] $p<0.05$; [†] $p<0.01$; [‡] $p<0.001$; [§] Variables included in the model but failing to reach significance were ethnicity, marital status, age, education, household income, and acculturation.

To examine factors associated with a change from exclusive breastfeeding in hospital to not exclusively breastfeeding by 6 weeks post birth, data from the 1017 mothers (who were initially exclusively breastfeeding) were also assessed via univariate and multiple logistic regression analyses.

Of the 1017 mothers who initially breastfed exclusively, 631 (62%) continued to do so at 6 weeks. In addition to the variables examined at the time of hospital discharge, 10 variables (based on events post-discharge and gathered at the 6-week interview) were included to identify any potential association with not breastfeeding exclusively at 6 weeks post-birth. The 10 variables were current employment status; current smoking status; alcohol consumed since birth; whether they had a home visit for the infant from a midwife, traditional healer, or a Plunket nurse; use of a dummy; infant's feeding pattern (on demand or to a schedule); whether the infant sleeps in the parental room at night; and use of regular childcare.

Fourteen variables reached statistical significance ($p<0.05$) and findings for these variables are shown in Table 3.

Table 3. Numbers (row percentages) and odds ratios of not breastfeeding exclusively (at 6 weeks post-birth) by variables attaining significance in univariate logistic regression analyses (n=1017)

Variable	Category	Not breastfeeding exclusively			
		n	%	UOR[?]	(95% CI)
Maternal variables					
Ethnicity	Samoan	144	(30.3)	1.00	(1.15–2.39)†
	Cook Island	69	(41.8)	1.66	(0.67–2.42)
	Niuean	16	(35.6)	1.27	(1.60–3.09)‡
	Tongan	106	(49.1)	2.22	(0.95–3.45)
	Other Pacific[§]	18	(43.9)	1.80	(1.13–3.05)*
	Non Pacific	33	(44.6)	1.86	
Employed prior to pregnancy?	Yes	237	(41.7)	1.00	
	No	149	(33.2)	0.69	(0.54–0.90)†
Currently employed (full or part time)?	Yes	40	(74.1)	1.00	
	No	346	(35.9)	0.20	(0.11–0.37)‡
Cultural alignment	Low NZ, high Pacific	111	(33.2)	1.00	
	High NZ, low Pacific	137	(42.3)	1.47	(1.07–2.02)*
	High NZ, high Pacific	67	(37.0)	1.18	(0.81–1.72)
	Low NZ, low Pacific	65	(38.2)	1.24	(0.85–1.83)
Years in New Zealand	0–5	61	(28.0)	1.00	
	6–10	44	(39.6)	1.69	(1.04–2.74)*
	>10	281	(40.8)	1.78	(1.27–2.48)†
Parity (number of children)	1	109	(38.0)	1.00	
	2–4	203	(35.3)	0.89	(0.67–1.20)
	5+	74	(47.7)	1.49	(1.01–2.22)*
Other variables					
Smoked during pregnancy?	No	273	(34.6)	1.00	(1.36–2.48)‡
	Yes	113	(49.3)	1.84	
Smoked yesterday?	No	264	(33.4)	1.00	
	Yes	122	(53.7)	2.32	(1.72–3.12)‡
Traditional healer home visit post-birth?	Yes	51	(57.3)	1.00	
	No	335	(36.1)	0.42	(0.27–0.65)‡
Birth weight	=2500 grams	368	(37.4)	1.00	
	<2500 grams	18	(54.5)	2.01	(1.00–4.03)*
Household income (annual)	$0–$20,000	111	(33.5)	1.00	
	$20,001–$40,000	203	(38.4)	1.23	(0.93–1.65)
	>$40,000	58	(48.3)	1.84	(1.21–2.84)†
	Unknown	14	(37.8)	1.21	(0.60–2.44)
Dummy used?	No	252	(32.5)	1.00	
	Yes	134	(55.4)	2.58	(1.92–3.46)‡
Infant sleeps in parental room at night?	Yes	362	(37.2)	1.00	
	No	24	(55.8)	2.14	(1.15–3.95)*
Use regular childcare?	No	286	(34.6)	1.00	
	Yes	100	(53.2)	2.15	(1.56–2.96)‡

*p<0.05; †p<0.01; ‡p<0.001; §Includes mothers identifying equally with two or more Pacific Island groups, equally with Pacific Island and non Pacific Island groups, or with Pacific Island groups other than Tongan, Samoan, Cook Island Maori or Niuean; ?Univariate odds ratio.

The multiple logistic regression analysis followed that described previously, except the additional 10 variables gathered during the 6-week interview were added for potential inclusion during the stepwise procedure.

Table 4 demonstrates that, when adjusting for all other variables in the final model, factors significantly associated with not breastfeeding exclusively ($p < 0.05$) at 6 weeks post-birth were employment prior to pregnancy, being currently employed, parity of five or more children, current smoking (smoked yesterday), having a home visit from a traditional healer, not receiving a home visit from a Plunket nurse, dummy use, the infant not sharing the same room as the parents at night, regular childcare arrangements, and the infant not discharged home from hospital at the same time as the mother.

Table 4. Adjusted odds of not breastfeeding exclusively (at 6 weeks post-birth) for variables attaining significance in a multiple logistic regression (n=1004)[§]

Variable	Category	Adjusted odds ratio	(95% CI)
Employed prior to pregnancy (full or part-time)?	Yes	1.00	(0.53–0.99)[*]
	No	0.72	
Currently employed (full or part-time)?	Yes	1.00	
	No	0.30	(0.15–0.60)[†]
Parity (number of children)	1	1.00	
	2–4	1.06	(0.74–1.54)
	5+	1.94	(1.12–3.35)[*]
Smoked yesterday?	No	1.00	
	Yes	2.26	(1.60–3.18)[‡]
Traditional healer home visit post-birth?	Yes	1.00	
	No	0.45	(0.26–0.77)[†]
Plunket home visit post-birth?	Yes	1.00	
	No	1.54	(1.05–2.27)[*]
Dummy used?	No	1.00	
	Yes	2.48	(1.79–3.44)[‡]
Infant sleeps in parental room at night	Yes	1.00	
	No	2.11	(1.00–4.47)[*]
Use regular childcare?	No	1.00	
	Yes	1.60	(1.10–2.35)[*]
Infant home from hospital same time as mother?	Yes	1.00	
	No	3.22	(1.07–9.75)[*]

[*] $p<0.05$; [†] $p<0.01$; [‡] $p<0.001$; [§] Variables included in the model but failing to reach significance were ethnicity, marital status, age, education, and household income.

Discussion

On the assumption that the more important associations between the variables examined and not breastfeeding exclusively are those identified by the multiple regression analyses, the discussion will focus on these findings.

With the exception of maternal smoking, it appears that different factors are associated with the initiation and maintenance of exclusive breastfeeding among mothers of Pacific infants. Mothers who smoked during pregnancy were almost twice as likely not to begin exclusive breastfeeding compared to non-smokers. Similarly, mothers who reported that they were current smokers were over twice as likely to have abandoned exclusive breastfeeding by 6 weeks post-birth.

The negative association between maternal smoking and breastfeeding has been reported elsewhere.[12,13] Both physiological and psychosocial factors have been postulated to explain lower rates of initiation and duration of breastfeeding among smokers compared to non-smokers.[7,14] It has also been suggested that some smoking women may decide against breastfeeding in order to reduce risk to their infants, unaware that not to breastfeed at all is less optimal than smoking while breastfeeding.[15]

Employment status was associated with not breastfeeding exclusively, but the effects differed regarding initiation and maintenance of breastfeeding. Employment prior to pregnancy reduced risk of not breastfeeding exclusively at discharge from hospital, whereas (by six weeks) both prior and current employment increased risk of not breastfeeding exclusively. Other unmeasured factors associated with being previously employed may explain the initial reduced risk, whereas the practicalities of a return to employment (or plan to return) may explain the change from initial exclusive breastfeeding to alternative feeding methods by 6 weeks post-birth.

Research suggests that the relationship between employment and breastfeeding is complex, and findings can differ depending on how and when employment status is measured. Most studies find negative associations between employment and breastfeeding, particularly the relationship between return to employment and shortened duration of breastfeeding,[16,17] although timing and intensity of return to employment are facets that complicate this negative association.[17]

Factors associated with an increased risk of not breastfeeding exclusively at discharge from hospital (but not associated with continuation to 6 weeks) included longer residency in New Zealand, twin birth status, not seeing a midwife during pregnancy, and caesarean delivery. Mothers who have resided in New Zealand for over 10 years were more likely not to breastfeed exclusively at discharge from hospital compared to those who have lived here less than 5 years.

Other studies report similar findings, with shorter length of residence following immigration being associated with a greater likelihood of breastfeeding.[18] Longer-term exposure to the availability of infant formulas in New Zealand may explain these differences. In concordance with other authors,[7,19] given the obvious demands placed by multiple births, it was not surprising to find that twin birth status increased risk of not breastfeeding exclusively.

Mothers who did not see a midwife during pregnancy may have missed the opportunity to gain breastfeeding advice prior to delivery, possibly influencing feeding decisions. Other studies have also found caesarean delivery to negatively influence initiation of breastfeeding, but this is often overcome following discharge from hospital or once feeding is established.[20,21] Hospital practices, level of postoperative recovery, effects of postoperative drugs, and child illness are possible factors that may impede initiation of breastfeeding following a caesarean delivery.[20–22]

Factors associated with an increased risk of cessation of exclusive breastfeeding (between hospital discharge and 6 weeks post-birth) included higher parity, infant not discharged home at the same time as the mother, having a home visit from a traditional healer, not receiving a home visit from a Plunket nurse, regular childcare

arrangements, dummy use, and the infant not sharing the same room as the parent(s) at night.

Inconsistent findings have been found in the literature between parity and initiation and maintenance of breastfeeding.[23] In contrast to a large, nationally representative American Study,[13] women in our study were less likely to continue to breastfeed exclusively if they had five or more children. Additional pressures within the household posed by caring for a larger family may dissuade mothers from exclusive breastfeeding.

Mothers were over three times more likely to not continue exclusively breastfeeding if their infant was not discharged from hospital at the same time as them. Such a finding is not unexpected as this variable implies need for specialist neonatal care. Maintenance of exclusive breastfeeding in these cases is likely to be compromised and has been observed previously.[7] The use of regular childcare has similar constraints for breastfeeding due to absence from the infant.

Although it appears that newer migrants to New Zealand might be more traditional in terms of infant feeding practices, the finding that postnatal home visits by a traditional healer increased the risk of not breastfeeding exclusively was somewhat unexpected and warrants further study. Examination of other data for these participants indicated that, in most cases, traditional massage and/or herbal treatment was sought to assist the closure of the infant's fontanelle. It is not known whether breastfeeding was hampered by this traditional treatment or whether the healer variable acted as a proxy for other influential factors inherent in the mother or the child.

The opposite effect was observed in relation to Plunket nurses, which is encouraging news as the majority of mothers are seen by Plunket nurses. However, approximately 16% of mothers not seen by Plunket nurses, appear to have fallen through the gaps. Concern has been expressed previously about timing of the commencement of well child services—including late referrals and difficulty in locating mothers upon discharge from hospital.[24]

Infant care practices were also associated with a greater likelihood of not breastfeeding exclusively by 6 weeks post-birth. In concordance with other studies,[5,7,25] if the infant did not sleep in the same room as the parent(s) at night, mothers were more than twice as likely not to exclusively breastfeed. It should be noted that approximately half of those sharing the room shared the same bed (analyses not shown here).

Despite indications that mothers may bed-share for the purpose of breastfeeding,[5] it is unclear whether bed or room sharing is causally related to, or a consequence of, not breastfeeding exclusively. Avoidance of mixed health messages is, however, of critical importance for bed sharing given that it is a common practice among Pacific families in New Zealand,[26] and that infants may be at increased risk for SIDS, particularly when sharing a bed with mothers who smoke.[27] Instead, sharing the same room rather than the same bed is recommended.[25]

Mothers who reported their infant used a dummy were 2.5 times more likely to have changed to not breastfeeding exclusively by 6 weeks. Although dummy-use has been linked to a shorter duration of breastfeeding[5,7,25] it remains controversial due to

inconsistent findings.[28] As with bed or room sharing, it is not known whether dummy-use is a cause, or consequence, of reduced breastfeeding.

In conclusion, several factors were identified to be independently negatively associated with exclusive breastfeeding at the time of discharge from hospital and at 6 weeks post-birth. Many of these factors (eg, maternal smoking) support previous research, while others (such as the use of traditional healers) are more specific to the Pacific Island population and require further investigation within the New Zealand context.

Health professionals should be alerted to circumstances that may lead to unsuccessful establishment or maintenance of exclusive breastfeeding. As not all risk factors are modifiable, it is important to emphasise those that are, such as smoking. Furthermore, mothers should be encouraged to lead healthier lifestyles and be educated on ways to reduce possible harm to their infants[15]—not only for greater success with breastfeeding, but as a preventative risk factor for SIDS and other negative health consequences.[29]

The message to continue breastfeeding exclusively for the first 6 months (despite smoking) should be reiterated—as it may provide additional protection for the infant against respiratory illness.[30]

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Comparison of Maori and non-Maori maternal and fetal iron parameters

Diane Emery, David Barry

Abstract

Aims To investigate the effect of maternal iron stores on the fetus in Maori and non-Maori neonates.

Methods Paired samples of maternal venous and fetal cord blood were compared for haemoglobin, iron, and ferritin. Women were included who had no medical complications and were delivering by elective caesarian section at Hastings Memorial Hospital.

Results The study involved 124 participants, of whom 31 were Maori. The mothers in our study had normal iron status or were mildly-to-moderately anaemic. Maori mothers had significantly lower haemoglobin levels compared to non-Maori; however there was no significant difference in maternal levels of iron or ferritin. Cord blood parameters for Maori neonates were not different for haemoglobin or iron, however ferritin was significantly lower. When Maori and non-Maori were analysed together, no statistical relationship was found between maternal and fetal cord blood for haemoglobin, iron, and ferritin levels.

Conclusions Our study suggested that, when analysing our study population of mothers with normal iron status or mild-to-moderate anaemia, iron stores in the fetus were not adversely affected by maternal haemoglobin, ferritin, or iron levels. However, separating for ethnicity, Maori mothers had significantly lower serum haemoglobin values than non-Maori. Furthermore, Maori neonates had significantly lower cord ferritin levels than non-Maori. It is possible that the lower ferritin values seen in Maori neonates compared to non Maori may ultimately contribute to higher rates of anaemia in these infants.

Iron deficiency is a preventable heath problem that affects a large number of New Zealand infants.[1,2] Little progress has been made in the last 42 years since the first paper (identifying iron deficiency as a problem) was published.[3] Iron deficiency is common amongst children living in underprivileged circumstances; children of Maori and Pacific ethnicity are highly represented in this group.[1,2]

Iron requirements are high during infancy, and it is during this time that major deleterious effects of tissue iron deficiency are seen. These include impaired brain development, altered mood, reduced weight gain, fatigue, and impaired immunity.[4] Neurological affects (such as altered behaviour and development in infants, and decreased learning in children) have been shown to occur in the presence of iron deficiency, even in the absence of anaemia.[5,6] Some studies have shown that cognitive function may not improve in iron-deficient anaemic infants following iron therapy.[7] This suggests that prevention of iron deficiency in young New Zealanders is extremely important as it may stop them from achieving their full potential.

To prevent the development of iron deficiency in infancy, it is necessary to understand whether it occurs during the pre-, peri- or postnatal period. Peri-natal acquisition of iron stores has been shown to be affected by time of cord clamping in Indian infants.[8] Postnatal iron stores have been reported to be greatly affected by diet, especially from 6 months of age.[9] There are conflicting reports regarding pre-natal acquisition of iron in the fetus, the question being whether maternal iron status affects, or is independent of, the fetal iron status.[10–19] This study was undertaken in the Hawke's Bay region where iron deficiency, especially in Maori infants, is a problem. This study investigated the associations between maternal and fetal iron stores.

Methods

The study was performed at Hastings Memorial Hospital in Hawke's Bay, New Zealand. The study period was between December 1997 and August 1999. A total of 3145 women delivered babies during this period, this included all elective and emergency caesarian sections and vaginal deliveries. 179 women, of whom 38 were Maori, had elective caesarian sections performed. 146 women were eligible, of whom 85% were consented and 15% were missed due to the consenting doctor being unavailable. 124 women participated in the study. A sample size of 27 per ethnic group would have 80% power at the 0.05 level of significance to show that a correlation of 0.5 was different from a correlation of 0.

Women who delivered by elective caesarian section were included in the study. Women were excluded if they suffered medical conditions, had complications of pregnancy, or delivered prior to 36 weeks' gestation. The decision to only include women delivering by elective caesarian section allowed a standard interval of time (less than 48 hours) between maternal and cord blood samples to be taken. This also allowed maternal blood to be taken when the mother was not in established labour. However, the results from this study must be interpreted with the consideration that only women delivering by elective caesarian section were included.

On the day prior to delivery, venous blood samples were taken from women for measurement of serum haemoglobin, ferritin, and iron. Cord blood samples were taken at caesarian section for measurement of haemoglobin, ferritin, and iron. Caesarian section and blood-taking techniques were not influenced by cultural preferences, these being the same for Maori and non-Maori. The hospital's laboratory analysed the blood samples. During 1998, the analysers were upgraded.

Haemoglobin was analysed using a Technicon H1 machine, which was replaced by a Coulter STKs. Cyanmethaemoglobin reagent was used. Ferritin was analysed using an Abbott IMX which was replaced by an Abbott Axsym. Dedicated Abbott reagents were used. Iron was analysed using a Hitachi 911 followed by a Hitachi 917. Roche reagents were used.

SAS version 6.12 was used for statistical analysis. Separate regression models for each of the parameters (haemoglobin, iron, and ferritin) were used to investigate whether maternal levels predicted cord blood levels. Ethnicity was included in the models.

Consent was obtained from all participants involved in the study. The Hawke's Bay Ethics Committee approved the study.

Results

Maori and non-Maori maternal serum and cord blood haemoglobin, ferritin, and iron were compared using T tests. Twenty-five percent of the study population was Maori, which was comparable to the percentage of Maori (22%) in the Hawke's Bay Region.[20] Maori mothers were found to have a significantly lower serum haemoglobin level compared to non-Maori ($p=0.002$). However, other blood parameters indicating maternal iron levels (ferritin [$p=0.2$] and iron [$p=0.8$]) were not significantly different between the two groups.

Thus, although Maori mothers had lower haemoglobin values, they were not more iron-deficient then their non-Maori counterparts in our study. The cord haemoglobin

(p=0.9) and cord iron (p=0.8) levels of Maori and non-Maori neonates were not significantly different, however cord ferritin (p=0.01) was significantly lower (Table 1).

Table 1. Comparison of blood parameters for Maori and non-Maori

	Maori Mean (Confidence Intervals)	Non-Maori Mean (Confidence Intervals)	P value
Maternal Hb*	107.9 (102.6–113.1) n=29	117.3 (114.5–120.2) n=90	0.002
Maternal Iron	13.8 (10.7–16.8) n=25	14.3 (11.8–16.8) n=83	0.8
Maternal Ferritin	21.7 (12.3–31.08) n=25	15.8 (11.9–19.7) n=83	0.2
Cord Hb	143.6 (137.0–150.1) n=20	144.1 (140.7–147.6) n=73	0.9
Cord Iron	26.7 (23.4–30.1) n=23	26.4 (24.9–27.8) n=77	0.8
Cord Ferritin	83.6 (61.8–105.4) n=23	119.8 (101.5–138.2) n=76	0.01

*Haemoglobin.

Table 2. Regression results from models with one maternal blood predictor and ethnicity

Maternal predictor	Cord blood outcome	Predictor			Ethnicity*		
		Slope	Standard error	p	Slope	Standard error	p
Haemoglobin	Haemoglobin	- 0.01	0.1	0.95	1.98	3.96	0.6
	Iron	0.01	0.05	0.9	-0.98	1.8	0.6
	Ferritin	-0.2	0.6	0.7	35.9	19.5	0.07
Iron	Haemoglobin	0.001	0.14	0.99	3.3	3.9	0.4
	Iron	0.07	0.07	0.3	-0.3	1.7	0.9
	Ferritin	1.0	0.8	0.2	35.3	19.7	0.08
Ferritin	Haemoglobin	0.09	0.1	0.4	3.5	3.8	0.4
	Iron	0.01	0.04	0.8	-0.1	1.7	0.9
	Ferritin	0.2	0.4	0.7	37.6	20.2	0.07

A positive slope indicates an increased cord blood outcome for Maori. A negative slope indicates a decreased cord blood outcome for Maori.

The relationship between maternal and cord blood was analysed using separate regression models for each of the parameters (haemoglobin, iron, and ferritin). Ethnicity was included in the models. The interactions of ethnicity on maternal blood were not found to be significant (p>0.5) so Maori and non-Maori data were analysed together. No relationship was found for any of the parameters investigated. Maternal haemoglobin did not predict cord haemoglobin (p=0.95), iron (p=0.9), or ferritin (p=0.7); maternal iron did not predict cord haemoglobin (0.99), iron (p=0.3), or ferritin (p=0.2); and maternal ferritin did not predict cord haemoglobin (p=0.4), iron (0.8), or ferritin (p=0.7), respectively (Table 2).

Prior to the analysis, the sample size was reduced by loss of blood samples secondary to blood clotting, and insufficient specimens taken (Table 1).

Discussion

The mothers in our study had normal iron status or were mildly-to-moderately anaemic. Analysis of the study group showed no statistical relationship between maternal venous and fetal cord blood haemoglobin, iron, and ferritin levels. This result suggested that iron stores in the fetus were not adversely affected by mild-to-moderate anaemia in the mother—thus supporting the theory that (for women with mild-to-moderate anaemia) the placenta and fetus have a special affinity for iron in the mother's circulation, and iron is transported through the placenta irrespective of the concentration gradient.[12]

Some studies have shown similar results, with the fetus gaining iron stores independently of maternal iron status. Sturgeon demonstrated that fetal-cord-blood haemoglobin levels were similar in anaemic and non-anaemic mothers.[10] Furthermore, Cantwell et al showed that mothers who were given adequate and less-than-adequate iron therapy during pregnancy had babies with similar cord-blood haemoglobin levels.[11] Turkay et al found no correlation between maternal haemoglobin and ferritin at 16 and 34 weeks' gestation and newborn haemoglobin parameters.[12] Bhargava et al found maternal iron depletion did not adversely affect newborn haemoglobin levels.[14]

However, it appears that the relationship between the mother and fetus regarding the acquisition of iron is more complex, with other studies documenting a correlation between maternal iron status and that of the fetus or newborn infant. Sisson and Lund[15] and Nhonoli et al[16] found that the newborn of iron deficient mothers had significantly lower levels of haemoglobin and iron in the cord blood. Singla et al found that maternal haemoglobin had a linear correlation with haemoglobin and iron levels in the cord blood and placental tissue.[17] Fenton et al[18] and Milman et al[13] found that maternal ferritin correlated with cord and newborn ferritin levels, respectively. Rusia et al found that maternal haemoglobin did not correlate with cord blood haemoglobin, but maternal ferritin and haemoglobin were found to correlate positively with cord ferritin.[19]

This present study suggests that, in our population of Maori and non- Maori mothers, iron parameters taken at the end of the third trimester of pregnancy did not significantly affect fetal iron parameters. However, when separating for ethnicity, Maori mothers had significantly lower haemoglobin values and Maori infants had significantly lower cord ferritin values compared to non-Maori. It is possible that these parameters may be linked and related to higher rates of anaemia in Maori infants. This possibility would require clarification with further research.

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The epidemic of elderly patients with dialysis-requiring end-stage renal disease in New Zealand

Krishan Madhan

There has been continuous growth in dialysis-requiring end-stage renal disease (ESRD) since dialysis became available for treatment more than 39 years ago. In New Zealand, the number of new dialysis patients has grown from less than 50 in 1970 to over 450 at the end of 2001.[1]

Similar trends have been seen in various other parts of the world. The incidence of patients on renal replacement therapy in a several-country analysis in Europe, increased from 79.4 per million population (pmp) in 1990–1991 to 117.1 pmp in 1998–1999, with no flattening of the increase being evident by the end of the decade—thus suggesting that growth continues.[2] A similar trend is evident in the United States.[3] Indeed, prevalent patient numbers continue to grow worldwide (as is also seen in New Zealand).

While much of this growth is attributable to diabetes-related renal disease, the proportion of incident patients with diabetes-related ESRD have not increased tremendously over the past decade. In fact, diabetic renal disease as a cause of ESRD in New Zealand was recorded as 40%, 45%, 39%, 36%, and 37%, respectively over the 5 years between 1997 and 2001.[4]

There is, however, a continuous and large rise in elderly incident patients in New Zealand as recorded elsewhere. In this paper, I will review data from ANZDATA (Australia and New Zealand Dialysis and Transplant Registry) to show that there is an emerging epidemic of dialysis requiring ESRD in the elderly population, and review some characteristics of this cohort.

Incidence and prevalence of elderly end-stage renal disease patients

In the decade prior to the end of 2001, the incidence of patients accepted onto dialysis programmes in New Zealand has increased across all age groups (Table 1).

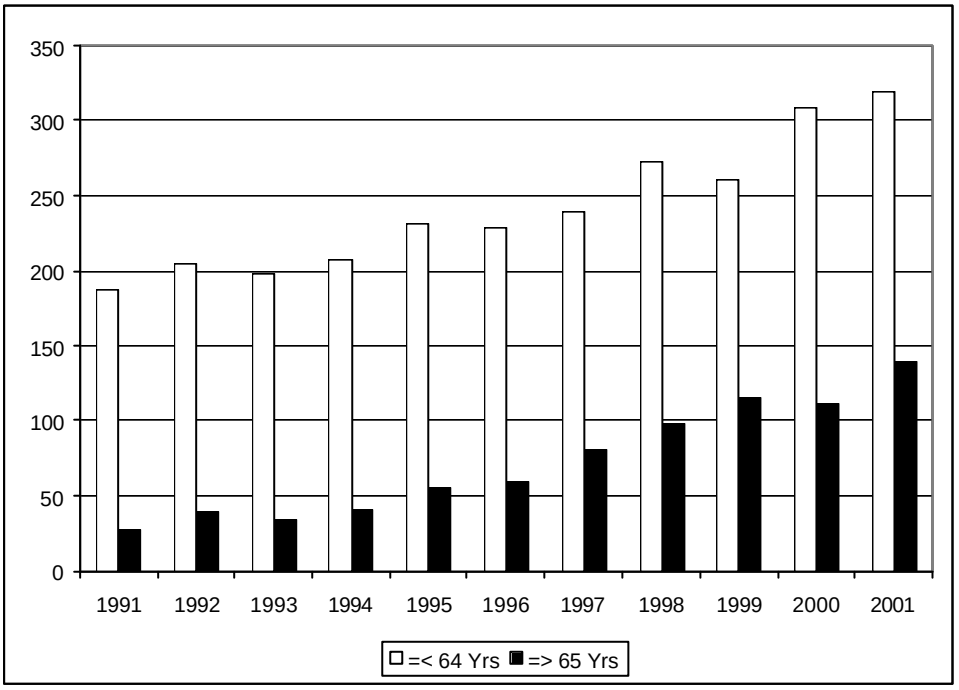
Table 1. Age distribution of incident dialysis patients 1991–2001 (Adapted from ANZDATA)[1]

Year/Age	00–24	25–44	45–54	55–64	65–74	75+	Totals
1991	19	50	50	68	22	6	215
1992	22	63	52	68	37	3	245
1993	21	70	44	63	32	2	232
1994	15	64	58	70	39	2	248
1995	18	58	82	73	46	10	287
1996	27	63	67	72	54	6	289
1997	20	71	68	80	69	12	320
1998	20	69	68	116	79	19	371
1999	16	64	83	97	78	37	375

2000	21	76	81	131	74	37	420
2001	24	81	94	120	104	35	458

The total number of patients went up from 215 in 1991 to 458 in 2001, thus representing an increase of 113%. For patients aged 65 years or above, the number went up from 28 patients in 1991 to 139 patients in 2001 (Figure 1). This is an increase of 396% compared to a growth of 170% for those aged less than 65 years. The growth in those aged above 75 years is even more impressive at 483% with much of it having taken place in the previous five years. Incident rate for those aged between 65 and 74 years at the end of 2001 was well over 400 per million compared to 119 per million for dialysis patient from all age groups.[4] Overall prevalence of dialysis patients at the end of 2001 was 379 pmp. Elderly patients, aged above 65 years, made up 38.3% of all dialysis patients at an astounding 897 pmp.

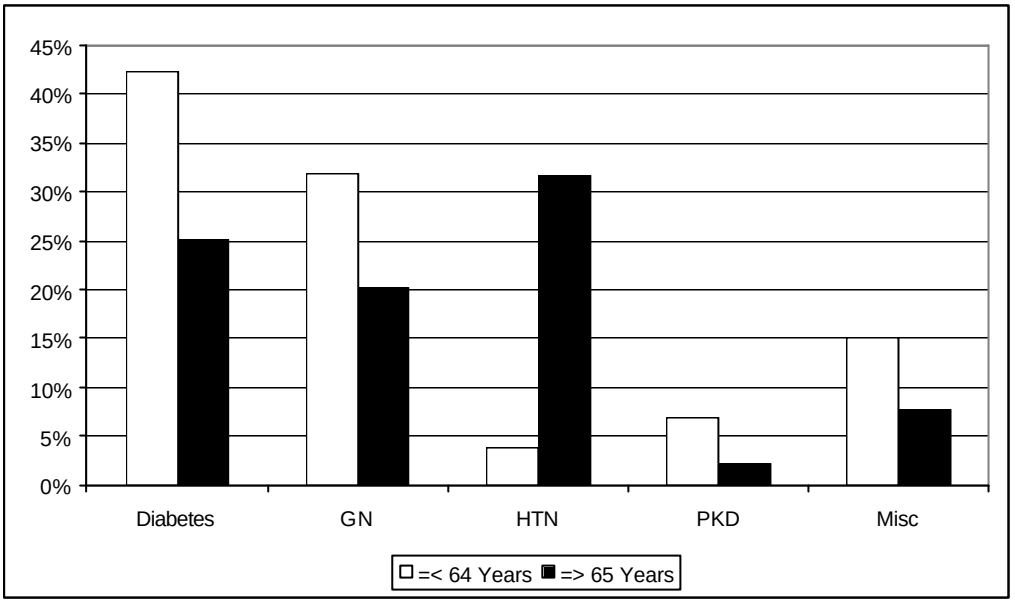
Figure 1. Numbers of dialysis patients during the years 1991–2001. Note the increasing proportion of older (above 65 years of age) patients.



Disease pattern

The major causes of end stage renal disease are diabetic renal disease, various glomerulopathies, and vascular disease (manifested mainly by hypertension). In patients aged 64 years or less, diabetic nephropathy remains the most common cause of ESRD at 42% of new patients in 2001 while glomerulonephritis comprised 32% and hypertension a mere 4%. In the cohort aged 65 and above, however, vascular disease (mainly hypertension at 32%) replaces diabetic nephropathy as the predominant cause of renal failure. (Figure 2).

Figure 2. Comparison of causes of renal failure in patients aged above 65 years versus patients aged less than 64 years



GN=glomerulonephritis; HTN=hypertension; PKD=polycystic kidney disease; Misc=miscellaneous.

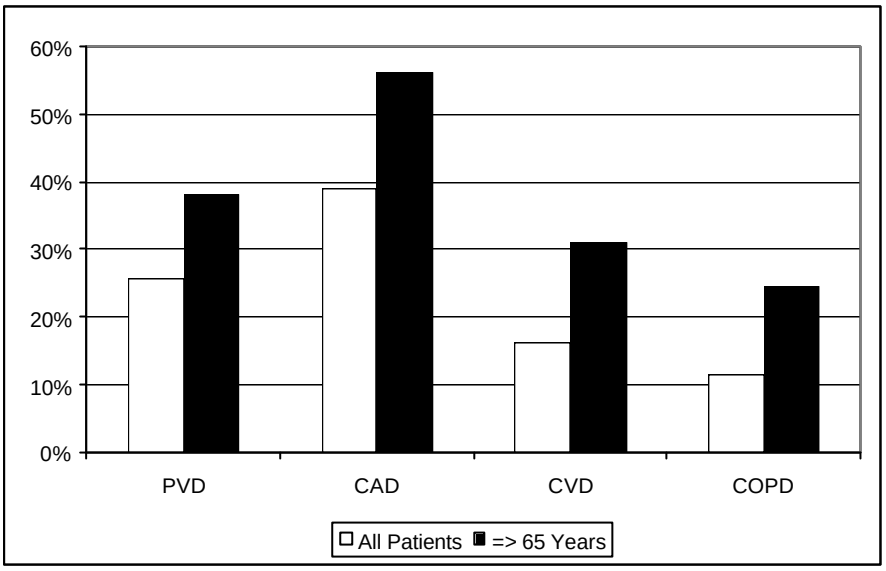
Racial distribution

There were distinct racial differences in the cohort of elderly incident patients in NZ in 2001. Caucasians made up the predominant group in this age group at 66%, Maori were the second largest at 19%, Pacific Islander origin at 9%, and others comprised 6%. In comparison, the figures for all dialysis patients are Caucasians: 46%, Maori: 32%, Pacific Islanders: 15%, and others: 7%.

Co-morbidity

Survival in elderly patients decreases as the number of co-morbid conditions increases.[5] Peripheral vascular disease is a strong risk factor for increased mortality in this group.[5,6] Among new patients in 2001, peripheral vascular disease was present or suspected in 26%, coronary artery disease in 39%, and cerebrovascular disease in 16%, respectively. In the age group aged 65 years or above, the corresponding figures were peripheral vascular disease: 38%, coronary artery disease: 56%, and cerebrovascular disease: 31%, respectively (Figure 3).

Figure 3. Comparison of co-morbid conditions in patients aged above 65 years versus all dialysis patients



PVD=peripheral vascular disease; CAD=coronary artery disease; CVD=cerebrovascular disease; COPD=chronic obstructive pulmonary disease.

Mortality

Mortality is higher in the elderly with ESRD compared to the younger cohort. In 2001, death rate (per 100 patient years) was 17.3 in the 45–64 year age group. The death rate for the 65–84 years age group was almost double at 30.8. For patients on haemodialysis, the death rate was much higher than for those on peritoneal dialysis (36.7 vs 26.3)—in contrast to the younger age group where the death rate for those on peritoneal dialysis was higher (19.6 vs 15.1).[4]

Dialysis modality

A high percentage of dialysis patients in New Zealand are treated by some form of a home dialysis modality. Seventy-eight percent of this is continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis (APD). For 61% (278 of 458), peritoneal dialysis was the initial treatment modality and 49% of prevalent dialysis patients receive a form of peritoneal dialysis.[7]

In the elderly age group, peritoneal dialysis was the initial modality in 70% (97 of 139) of new patients aged above 65 years starting dialysis in 2001. This proportion was even greater in the 75+ age group, with 26 of 35 new patients (74.2%) starting with peritoneal dialysis as the initial modality.

Among prevalent dialysis patients, peritoneal dialysis remains the predominant modality of dialysis, with 60% on this modality. This is much greater than the 49% overall prevalence of peritoneal dialysis modality across all age groups.

Discussion

It is sufficiently apparent from the above data that there is a large and continued growth in elderly patients with end-stage renal disease entering dialysis programmes in New Zealand. Furthermore, it is likely that this growth will continue well in to the future as has also been shown in data from other registries. Data from United States Renal Data System (USRDS)[3] shows, for example, that incidence of ESRD increased with advancing age, and there is high prevalence of elderly patients in US dialysis programmes.

The 2001 Population Census of New Zealand showed that the number of elderly people in New Zealand more than doubled over the previous 50 years (the number of people aged 65 years and above rose from 177,459 to 450,426). It is also projected that these numbers will more than double again in the next 50 years (reaching 1,181,000 by 2051); with an annualised growth of over 3%.[8] Furthermore, two studies reported from United Kingdom (UK) indicate a high prevalence of risk factors and presence of significant renal impairment in this elderly population.

The first is a study of prevalence of renal impairment in patients aged 50–75 years in the database of two general practices in South London.[9] This showed that overall prevalence of renal impairment (serum creatinine =0.12 mmol/L was 8.4%; 6.1% in hypertensive patients, 12.6% in diabetics, and 16.9% in those with both disorders. The second is an audit of primary care records from 12 general practices in inner and greater London of patients (also aged 50–75 years) with either hypertension or diabetes.[10] Of the 16,855 records studied, hypertension or diabetes (or both) were found in 15.5% of patients, and 53.1% of these patients had creatinine measured within the past 24 months. Of these, 11% had a value greater than 0.125 mmol/L equating to a prevalence of renal insufficiency of >110,000 patients per million in the group with these two disorders. The situation in New Zealand is likely to be similar—with hypertension, diabetes, or both together accounting for 57% of incident dialysis patients in 2001.

Acceptance of older patients into dialysis programmes is increasing—in spite of a low referral bias in NZ[11] and elsewhere.[12] It is likely that several factors are responsible for this increase. While increased availability of dialysis facilities; combined with increased expectation of medical treatments by a healthier, older population is likely; the realisation by nephrologists that dialysis is a viable option in the elderly with end-stage renal disease is probably a significant contributing factor.

Several reports in published literature illustrate favourable outcomes with dialysis in the elderly patient. In the North Thames Dialysis Study,[5] survival rate at 12 months was 71% for patients aged 70 years and above. Although mortality increased with increasing number of co-morbid conditions, age above 80 years (RR 2.79), and presence of peripheral vascular disease (RR 2.83), there was no effect from diabetes, ischaemic heart disease, cerebrovascular disease, sex, or treatment modality. Quality of life, assessed by the UK version of Short Form 36 (SF-36) and adapted for use with older people, showed that mental component scores were equivalent to elderly populations in UK and the US. Mean physical component score was lower than that of the general population. Hospital admissions represented a low proportion of costs and the average annual cost per patient was within the range of other life-extending treatments. Joly et al[6] compared outcomes in a cohort of 107 octogenarians treated by

dialysis with another 37 who reached end stage renal disease but were treated conservatively. Median survival on dialysis was 28.9 months compared to 8.9 months with conservative treatment. One- and two-year survival on dialysis was 73.6 and 60 percent, respectively. While mortality increased with increasing number of co-morbid conditions, there was no difference with respect to presence of congestive heart failure, coronary artery disease, late referral, or gender.

The increasing number of elderly and very elderly patients on renal replacement therapy is bound to give rise to several socioeconomic considerations, which will have to be taken into account when planning the future management of dialysis burden in New Zealand. Although a large percentage of elderly in New Zealand undergo dialysis by 'home therapy' (mainly peritoneal dialysis), it is not known how many of these elderly receive substantial assistance from family members or health services, or are nursing home residents. It is also not known if the disease burden in terms of hospitalisation or surgical procedures is acceptable. Lastly, there is no data on quality of life issues in the New Zealand context, and neither is any information available on rehabilitation of elderly dialysis patients. Such information will need to be obtained for health planners and nephrologists to be able to optimally plan future dialysis services for the elderly.

I believe we are at the beginning of an epidemic of dialysis-requiring renal failure in the elderly, which is second (if not equal) to the epidemic of diabetic renal disease. This is likely to challenge both clinicians and health planners alike.

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Ethnicity and body fatness in New Zealanders

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Abstract

In light of alarming rises in the prevalence of obesity worldwide, tackling the obesity 'epidemic' is now a national health priority in many countries. Increasingly, population measures that provide accurate estimates of body fatness are required to assist public health organisations in identifying at-risk groups and developing appropriate preventative strategies. Body mass index (BMI) remains the most cost-effective and practical tool in this regard.

The World Health Organization (WHO) has issued universal BMI standards for defining 'overweight' and 'obesity' in adults (BMI =25 $kg.m^{-2}$, and =30 $kg.m^{-2}$, respectively) based on the risk of obesity-related disease in Europeans. Although widely used, there is mounting evidence suggesting that these standards are not appropriate for all populations. Research indicates that the associations between BMI, percent body fat (%BF), and health risks can vary across different ethnicities. Accordingly, ethnic-specific and country-specific BMI cut-offs for overweight and obesity may be necessary to attain valid prevalence estimates. In New Zealand, this area is largely unexplored in both young people and Asian populations. There is a need for large-scale longitudinal studies investigating the relationships between excessive body fatness and related health outcomes across all major ethnic groups in New Zealand.

The obesity epidemic

The prevalence of obesity has rapidly reached epidemic proportions in both developed and developing countries around the world. The World Health Organization (WHO) estimates that there are now more than 300 million obese people worldwide—an increase of 100 million since 1995.[1]

This rising level of obesity has increased the incidence of obesity-related morbidities, such as cardiovascular disease, Type 2 diabetes, and hypertension, thus imposing a major burden on healthcare systems and lowering the quality of life for those affected. Furthermore, it is predicted that rates of obesity in the next 20 years could be as high as 45–50% in the USA, and 30–40% in Australia and England.[2]

New Zealand is no exception to these trends. National survey results show an 88% increase in the number of obese adults since 1989,[3] to a stage where more than half of all adults are overweight and obesity-related illnesses cost the health care system an estimated $303 million each year.[4]

Maori and Pacific Island (PI) adults appear particularly susceptible, with obesity rates 1.9 and 2.5 times (respectively) higher than that of New Zealand Europeans.[5] Similar patterns have been observed in younger New Zealanders. Results from the 2002 National Children's Nutrition Survey indicated that Maori and PI children were 3.0 and 5.3 times (respectively) more likely to be obese than children from other

ethnicities.[7] Overall, 21.3% of New Zealand children aged 5-14 years were classified as overweight, with a further 9.8% obese.

Body Mass Index as a measure of obesity

Obesity is defined as a condition of excessive fat accumulation to the extent that health and wellbeing may be impaired.[8] In population research, body fatness (BF) is most commonly estimated using body mass index (BMI), a simple anthropometric measurement of weight (kg) divided by squared height (m^2), which tends to correlate well with both percent body fatness (%BF) and health-risk.[9–13] Although more accurate techniques are available; such as four compartment models that measure bone mineral content, body water, and body density independently; BMI remains the most cost-effective and practical tool in studies of this type.

In 1998, the WHO provided international BMI standards for classifying overweight and obesity in adults based on the risk of obesity-related disease for Europeans at each BMI category.[8] Overweight was defined as BMI =25 $kg.m^{-2}$ and obesity as BMI =30$kg.m^{-2}$, with the latter corresponding to approximately 25% and 35% BF in young European men and women, respectively.[14] An obvious limitation of this measure is its inability to distinguish between fat and fat-free mass. As such, standard BMI cut-offs for overweight and obesity may not represent the same levels of BF in populations that differ significantly from the typical European phenotype.

For young people, different BMI standards are required. The US Centers for Disease Control and Prevention issued age- and sex-specific BMI charts for defining overweight and obesity in those aged 2 to 20 years based on the 85th and 95th percentile of an American reference population.[15] Alternative thresholds have been provided by the International Obesity Task Force (IOTF) using the mean of the BMI-age curves from six major countries.[16] At a given age, individuals are classified as overweight or obese if they have a BMI greater than the mean BMI-age curve that passes through 25 $kg.m^{-2}$ or 30 $kg.m^{-2}$ (respectively) at age 18 years. The intention of these IOTF cut-offs was to establish a higher degree of international applicability, although the averaging of the six diverse datasets could be considered arbitrary.

Obesity and ethnicity

The WHO BMI thresholds for overweight and obesity are widely used in field research; however, their relevance to all populations is questionable. It is generally accepted that associations between BMI and BF are dependent on age and gender. More recently, these associations have been shown to vary with ethnicity. For example, Pacific Islanders tend to have lower levels of BF than Europeans at a given BMI.[17–19] Conversely, many Asian ethnic groups have higher levels of BF than Europeans at specific BMI, thus putting them at greater risk of obesity-related disease at relatively low BMI scores.[20–22]

Even at the same level of BF, risk profiles may differ between ethnic groups.[23] This may be explained by ethnic-specific variation in the patterns of fat distribution. Indeed, central fat accumulation (ie, an android fat pattern) appears to be a greater predictor of obesity-related health risks than overall fatness.[24,25]

Research indicates that, in general, Asian adults are more prone to visceral and central obesity than Europeans.[26,27] In particular, Hughes et al[28] found that Asian Indians had

a greater predisposition for central obesity than Malay and Chinese Asians. Likewise, there is evidence that Asian children[29] and adolescents[30] have a greater central fat mass when compared with Europeans and other ethnic groups. In accordance with a higher %BF at a given body size, and a more centralised pattern of fat distribution, elevated disease risks have been observed in Asian populations at BMI scores well below the WHO thresholds defining overweight and obesity.

In response, the WHO released provisional recommendations that overweight and obese BMI cut-off points for Asian populations in the Asia-Pacific region be reduced to =23, and =25 $kg.m^{-2}$, respectively.[31] Although a good starting point, these guidelines do not take into consideration variance among different Asian populations.

More recently, a WHO expert consultation on BMI in Asian populations concluded that there is no single cut-off point appropriate for defining overweight or obesity in all Asian groups.[22] Recommendations from the consultation include: (1) retaining current WHO BMI cut-off points for international classification; (2) adding 'action points' of =23 and =27.5 $kg.m^{-2}$ (representing 'increased' and 'high' risk) as a trigger for public health action; (3) developing ethnic- and country-specific BMI action points; and (4) refining BMI action points with waist circumference in populations predisposed to central obesity.

Obesity in young people

Compared with adults, less is known about the body composition of children and adolescents. There is, however, evidence that BMI is not an equivalent measure of BF among young people from different ethnic groups. At a given BMI, Chinese[32] and Hispanic[33,34] youth have a higher level of BF than Europeans, who in turn have more BF than African-Americans,[35] and Maori and Pacific Islanders.[36] These disparities may evolve, or at least increase, during puberty. For example, Ellis et al[37] observed that ethnic differences in body composition between Hispanics, African-Americans, and Europeans were much less pronounced in children younger than 8 years of age (pre-puberty).

Sexual maturation processes (that occur during puberty) affect body composition, and can alter the associations between BMI and fat mass.[35,38–40] Thus, differences in body composition observed during childhood and adolescence may, in part, reflect ethnic-specific growth and development patterns.[41] In a 6-year follow-up study of Chinese children, Wang et al[42] noted that overweight prevalence (defined according to IOTF age- and sex-specific BMI cut-off points) decreased as children became adolescents. This apparent reduction in overweight may be due to different BMI-age relationships between the study and the IOTF reference populations.

Although the authors did not determine pubertal stage, they suggested that Chinese adolescents tend to mature later than the IOTF reference populations, thereby causing them to be misclassified. Consequently, the IOTF cut-offs may not be appropriate for these populations. For future studies, consideration of sexual maturation may be beneficial.

Explaining ethnic-specific relations between Body Mass Index and percentage of body fatness

Several factors have been proposed to help explain the dependency of the BMI/%BF relation on ethnicity. First, body build/frame size (as measured by wrist and knee girths) tends to vary among different ethnic groups. A number of studies have noted that ethnic populations with relatively high levels of BF at a given BMI also have a more slender build.[43,44] Furthermore, Deurenberg et al[45] found that correcting for body build eliminated most of the ethnic-specific differences associated with %BF prediction equations for bioelectrical impedance analysis (BIA) in Chinese, Malay, and Indian Singaporeans.

In contrast, earlier research concluded that the prediction of %BF from BMI was only slightly improved by the inclusion of body build parameters.[46,47] It is possible that the effects of body build were not observed in these studies due to low inter-group and/or high intra-group variability.[44]

A second factor that may contribute to ethnic-specific relationships between BMI and %BF is variation in sitting height relative to total height. Individuals with long legs (low sitting height) generally have a lower BMI and, as such, %BF may be underestimated from BMI.[48] Relative sitting height tends to be higher in Asian ethnic groups, although the effects on BMI are inconclusive—most likely due to the large intra-group variation in this parameter.[43,44]

Given that differences in body build may explain a large proportion of the ethnic variation in relationships between BMI and %BF, frame size represents an alternative criterion to ethnicity on which to base BMI cut-offs. As ethnicity is self-identified, individuals may affiliate with an ethnic group with which they have no genetic relation. As such, classification according to body build (rather than ethnic group) may help control for inaccuracies when defining ethnicity. However, it is unlikely that collecting data on frame size will be practical in population studies.

Finally, there may be differences in physical activity level among ethnic groups. More active individuals are likely to have a higher proportion of muscle mass, and therefore the potential for overestimation of %BF from BMI.[44] Such a tendency may only be observable in athletes performing high levels of activity. Nevertheless, future studies should include anthropometric measures of body build and physical activity levels in order to increase our understanding of differences in the BMI/%BF relationship among ethnic groups.

New Zealand's issues regarding body fatness and ethnicity

New Zealand has an ethnically diverse population comprising mainly New Zealand Europeans (80.0%), Maori (14.7%), Asians (6.6%), and Pacific Islanders (6.5%).[49] Despite this diversity, ethnic variation in BF and other body composition variables has yet to be investigated in all major ethnic groups.

However, researchers have compared ethnic differences in BMI and %BF among Maori, PI, and European populations. Several studies have found that Maori and PI adults tend to be leaner (ie, have a lower %BF, and higher fat-free mass) than New Zealand Europeans of the same body size.[17-19]

Similar results have been observed in children. Rush et al[36] noted that Maori and PI girls have (on average) 3.7% less BF than New Zealand European girls of the same body size. Furthermore, a related study by Tyrell et al[6] found a small, but statistically significant, difference in the relationship between BMI and %BF in New Zealand European, Maori, and PI schoolchildren aged 5–10 years; although they suggested that the effects of ethnicity were not clinically relevant.

Even though Maori and Pacific Islanders tend to have a higher proportion of lean mass to fat mass than New Zealand Europeans at a given BMI, as a population they maintain a greater absolute fat mass. Indeed, when higher BMI thresholds are applied to Maori and PI peoples to counteract the high lean-to-fat mass ratio (26 $kg.m^{-2}$ and 32 $kg.m^{-2}$ for 'overweight' and 'obesity', respectively), these two groups remain twice as likely to be obese than the 'European and Other' group.[5] Not surprisingly, Maori and PI populations also have a much higher prevalence of type 2 diabetes when compared to Europeans.[50] However, it is noteworthy that the prevalence of type 2 diabetes among New Zealand Indians exceeds that seen in Maori and Pacific Islanders.

The high prevalence of diabetes among Indians is in line with the elevated levels of BF at a given body size seen among Asian populations overseas. This is an issue of increasing importance to New Zealand given that Asian people make up the fastest growing ethnic group, more than doubling in number between 1991 and 2001.[49] Furthermore, Asians are projected to account for 13% of New Zealand's population by 2021.

In spite of their population growth, Asian ethnic groups have been largely neglected by New Zealand health and research policies. For example, only Maori and PI children were over-sampled in the 2002 National Children's Nutrition Survey. In addition, Maori and PI children were analysed separately, whereas children of Asian decent were grouped with New Zealand Europeans. This is a common theme in national surveys by government organisations; such as the Ministry of Health, and Sport and Recreation New Zealand. In order to understand the public health needs of Asian populations in New Zealand, and to tailor preventative health strategies, it is vital that future surveys distinguish between these ethnic groups.

At present, standard BMI thresholds for 'overweight' and 'obesity' are applied to Asian populations as there are no robust New Zealand data available on the relationship between BMI and body composition variables in this ethnic group. Consequently, Asian groups at risk for health complications (accompanying their overweight and obesity conditions) may not be targeted in interventions to prevent/treat obesity. The only evidence available is from a study by Tyrell et al[6] that included two small groups of Asian children in their investigation of the relationship between BMI and body composition in Maori, Pacific Islanders, and New Zealand Europeans. Although results were not presented, the authors commented that Asian Indian children tended to have a higher %BF at a given BMI compared with New Zealand Europeans. However, caution must be taken when interpreting this statement given the small sample size and the fact that %BF was estimated from bioelectrical impedance analysis using a prediction equation that was not specifically developed for Asian Indian children.

The recommendations put forward by the recent WHO expert consultation[22] offer promise for the classification of overweight and obesity in New Zealand's multiethnic society. For clinicians assessing the health status of individuals, BMI thresholds should be refined by consideration of ethnicity and other risk factors such as waist circumference. At a population level, implementation of additional BMI action points will better reflect the continuum of BF and associated health risk. However, valid comparisons with overseas statistics will only be possible if the criteria used to define overweight and obesity are consistent. In these instances, the retention of the standard WHO cut-offs (25 and 30 $kg.m^{-2}$) is advisable. Ultimately, national BMI action points should be developed for all major ethnic groups in New Zealand based on large-scale population studies of BMI, BF, and health risk.

Conclusions

Accurate assessment of overweight and obesity is vital to assist public health organisations in identifying at-risk groups and to facilitate development of appropriate preventative strategies. At a population level, BF is most commonly assessed using BMI. Although WHO established universal BMI standards for defining overweight and obesity, studies have shown that these BMI thresholds do not provide an equivalent measure of BF and associated health risk across different ethnic groups. Consequently, WHO recently recommended the use of additional BMI cut-offs as public health action points, such as ethnic- and country-specific BMI cut-offs for overweight and obesity.

In New Zealand, knowledge of the ethnic variation in BF and other body composition variables is restricted to New Zealand European, Maori, and PI ethnic groups. New Zealand Asians are of particular interest because of their rapid population growth, and the lack of published data on their BMI/%BF relationships. Furthermore, compared with Europeans, Asians from other countries show elevated levels of BF and greater morbidity and mortality at a given BMI.

In conclusion, large-scale studies are needed to determine the relations between BMI, %BF, BF distribution, and health risk across all major ethnic groups in New Zealand. For young people, these studies should also consider maturational stage. Resulting data will enable development of ethnic-specific BMI thresholds for overweight and obesity—however this is only a starting point.

There is also a clear lack of knowledge concerning ethnic variation in other areas, such as physical activity and diet. An understanding of these issues is imperative for tailoring preventative interventions that will counteract the burgeoning epidemic of obesity in New Zealand.

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Some remarks on the epiphyses of the long bones, and their bearings on the operation of resection

This extract was taken from an article by Dr John Knott, published in the New Zealand Medical Journal Vol 3 (12), p408–17

The idea of a mysterious power of resistance and survival possessed by some specimens of the tissues of the human skeleton is illustrated in the classical tradition regarding the incombustibility of the great toe of Pyrrhus, which is treated with respect by authors of such attainments and intellectual powers of Plutarch and the elder Pliny. Of far deeper and wider interest is the notion which survived down to modern times, and which may be traced backwards to Jewish, if not to Egyptian, sources of thought, of the indescructibility of the terminal segment of the skeleton of the human spine. This was the *resurrection bone*, whose presence was necessary to the future reclothing of the skeleton with a fleshly body, and the realisation of the vision of the prophet Ezekiel, before entrance into a future life. The belief is embalmed in human and, indeed, in all vertebrate anatomy by the familiar name of *os sacrum*.

Its influence at a period of less than three centuries ago is shown by the biographic fact that Riolan, the famous professor of anatomy in Paris—the contemporary of William Harvey, and the most ardent and skilled of the opponents to his teaching regarding the circulation—felt so much exercised by his unsatisfied curiosity on this head that he was driven to pay a formal visit to the public executioner for the purpose of asking this very important functionary whether he had observed, in his extensive experience of the combustion of (live) human bodies, that the ultimate osseous item of the spinal column was really fireproof!

Quite as convincing, if not actually so startling, a proof as the above is furnished by the way in which the human pelvis was placed in the artificial skeletons of former times. And even the anatomists of the past generation in Dublin—when Dublin possessed the foremost school of anatomy in the world, and before the wave of Caledonian mud had extinguished the light of its teaching—who enriched anatomical science with the rarest and most exquisite specimens of anatomical work that the world has yet seen, were for the most part rather careless about the minutiae of osteology.

The process of embryology—a science of entirely recent origin—demonstrated the importance of the epiphyses in the economy of the skeleton. And the introduction of the practice of resection of joints into the surgery of recent times was the means of impressing all operators with their influence, especially in the growth of the limbs. This was, however, but a gradual process. Before the introduction of general anaesthesia into surgical practice the operation of resection, as already observed, was far too prolonged a process of torture to become very widely diffused.

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The assessment and management of primary antibody deficiency

Marianne Empson, Jan Sinclair, John O'Donnell, Rohan Ameratunga, Penny Fitzharris, Richard Steele

Primary immune deficiency (PID) diseases are relatively rare. The number of patients affected by PID in New Zealand is unknown. Based on other national registries, it is likely that significant PID affects at least 1:25,000 New Zealanders.[1–4]

Overall antibody defects are the most common, and the development (in the mid 1980s) of intravenous immunoglobulin (IVIG), for replacement of IgG, revolutionised the management of these patients.[1,5–8]

Decisions about the use of IVIG replacement in the management of patients with PID are critical. IVIG therapy is important to reduce mortality from life-threatening invasive infection. Timely institution of IVIG replacement prevents the development of end-organ damage such as bronchiectasis, which causes significant morbidity and increased mortality for these patients.[1–3,7,8]

IVIG is a blood product and therefore has the potential for transmission of infective agents (eg, hepatitis viruses and prions).[6] In addition, it is expensive, with the IVIG required for replacement therapy for an adult costing about $25,000 per annum. Furthermore, supplies of IVIG are not limitless, and there have been problems with shortage of IVIG in the USA and Australia.

The New Zealand Clinical Immunology Group has developed this consensus document based on established international recommendations.[1,3,10] It details our agreement as to the investigation of patients with possible antibody deficiency as well as the appropriate use of IVIG for patients with PID.

Wherever possible, a patient with a definite or suspected antibody defect should be referred to a clinical immunologist for further evaluation.[1] Further investigation of low immunoglobulin results may be required (eg, of lymphocyte populations, T cell function, or specific antibody production). Consideration also needs to be given to possible underlying genetic causes.[2,3] Interpretation of poor or sub-optimal specific antibody responses requires the expertise of a clinical immunologist, as there may be variability in normal immune responses.

Assessment

Clinical assessment

This is the most important screen for a possible underlying antibody deficiency. Common presentations include:

- Recurrent sinopulmonary infection (of chest, ears, and/or sinuses, or bronchiectasis)
- Unusual or severe infections, even if otherwise well

- Failure of infections to respond to treatment
- Chronic diarrhoea
- Failure to thrive in childhood
- There are many other less common presentations (eg. arthritis, inflammatory bowel disease).

Investigation

Initial investigation for possible underlying antibody deficiency should include:

- Quantitative assessment of serum immunoglobulin concentrations.
- Specific antibody response to protein and polysaccharide vaccines – this should be undertaken in all patients who clinically may have an antibody deficiency but who have significant or normal amounts of circulating antibody (see below).[1-3, 9, 10]

An imbalance of IgG subclasses (excluding IgG_4), or absence of a particular subclass, may be seen in patients with antibody defects. A subclass deficiency (IgG_1, IgG_2, or IgG_3) thought to be clinically significant should always be further investigated with evaluation of specific antibody production.

If clinical suspicion of immunodeficiency remains high, it is strongly recommended that the patient be seen or at least discussed with a clinical immunologist—as disorders of other arms of the immune system can mimic the clinical presentation of antibody deficiency.

If antibody deficiency is confirmed, then evaluation for possible end organ damage is recommended, as follows:

- CXR (chest X-ray) ± HRCT (high-resolution computed tomography) chest.
- Sinus CT (computed tomography).
- Pulmonary function testing.

In addition, baseline investigations for HIV, hepatitis B, and hepatitis C are recommended (using non-serological methods).

Indications for IVIG replacement in antibody deficiency

Very low IgG

IVIG is indicated for patients with agammaglobulinaemia or severe hypogammaglobulinaemia:

- Most adults with severe hypogammaglobulinaemia (eg, total IgG<3 g/L) will require IVIG replacement. If the patient is clinically well, then documentation of impaired antibody response will support a decision to treat; however, a decision ‘not to treat’ should be made only by a clinical immunologist, with careful follow up arranged.
- The normal range for IgG in children varies considerably with age, and is influenced by factors such as gestational age or infection. To determine if an IgG

result indicates severe hypogammaglobulinaemia, age-related normal ranges must be used (and other factors taken into account) before a decision is made.

Moderately low or normal IgG

- The clinical significance of low or normal IgG levels (in patients with a clinical history suspicious for an antibody deficiency) can be clarified by measuring specific antibody responses. Antibody responses to protein and polysaccharide antigens (eg, tetanus, diphtheria, hepatitis B, pneumococcus, and *Haemophilus* B) should be assessed, and results discussed with a clinical immunologist.
- Serum for baseline antibody levels should be drawn, the vaccines administered, and a further serum sample drawn 3 weeks later in order to measure the specific antibody response. A fourfold increase in antibody is regarded as an adequate response. High baseline antibody levels may result in a smaller increase from baseline.
- Patients with low or low normal IgG levels and normal antibody responses are not usually considered to be candidates for IVIG replacement therapy, however consideration needs to be given to the clinical history and the degree of IgG reduction.

Subclass deficiency

- Abnormal levels of IgG subclasses are expected in patients with agammaglobulinaemia or severe hypogammaglobulinaemia.
- IgG subclass deficiency without significant impairment of specific antibody response to vaccination is not an indication for IVIG replacement therapy.

Other immune deficiency

- There are a number of other rare primary immune deficiencies where immunoglobulin replacement therapy is indicated, including Severe Combined Immune Deficiency, Hyper IgM Syndrome, etc.

Immunoglobulin replacement

A replacement dose of ~400–600 mg/kg given by intravenous infusion every 3–4 weeks is usually sufficient to maintain the trough IgG level in the low normal range (eg, IgG >7g/L).[1–3,5,8] Doses of IVIG should be rounded to avoid wasting IVIG from an opened vial. Higher doses or more frequent doses may be required, particularly in the presence of ongoing suppurative infection. The dose should be individualised to maintain an adequate trough IgG.

A loading dose of IVIG (eg, 1 g/kg) should be considered if a patient with a newly diagnosed antibody deficiency is unwell.

Premedication with paracetamol and/or antihistamine may be considered prior to the initial infusion, but is not usually required long term.

The trough IgG is not a useful guide to adequate replacement in specific antibody deficiency where the total IgG may have been normal prior to the initiation of therapy. Standard replacement doses of 400–600 mg/kg given every 3-4 weeks are usually sufficient replacement.

Side effects of IVIG

Common side effects of IVIG infusion include headache, chills, aches, nausea, and chest or abdominal pain. These are more common at the initiation of IVIG therapy or in the presence of an acute infection, and occur most often early in an infusion. They usually resolve if the infusion rate is reduced. Premedication with paracetamol or antihistamine may prevent these side effects.

There are many less common side effects, including anaphylactoid reactions and aseptic meningitis. Resources must be available to recognise and treat anaphylactoid reactions wherever IVIG is being infused.

Subcutaneous immunoglobulin (SCIG) replacement

Immunoglobulin replacement can be given by subcutaneous infusion.[11] The preparation used for this is the 'normal' immunoglobulin, which is also used by intramuscular injection as prophylaxis against some infections, and not the preparation intended for intravenous use. Using it by subcutaneous infusion is 'off label' but is an effective alternative to intravenous therapy.

Intramuscular immunoglobulin replacement

Intramuscular immunoglobulin does not have a role in the management of immunoglobulin deficiency.

Monitoring of immunoglobulin replacement and underlying disease

The half-life of IgG is approximately 21 days (the half-life of Intragam P®, which is commonly used in New Zealand, is reported to be 39 days). After initiation of therapy, change in IVIG dose, or change in IVIG dose frequency it will take 3–5 half lives (2–3 months) to reach a new steady state IgG level.

The trough IgG should be measured regularly (eg, each 3–6 months) to ensure the dose is adequate, particularly in growing children who will need regular dose adjustment.

Patients on IVIG replacement need regular clinical review to assess:

- Efficacy of treatment.
- Complications of treatment (e.g. reactions to IVIG).
- Complications of disease.
- Overall health.

Follow-up should include regular monitoring of the patient's full blood count, trough IgG, and liver enzymes every 3–6 months. Clinical review (at least 6 monthly) is also recommended to look for evidence of disease complications, which include chronic lung disease, autoimmune phenomena, granulomatous disease, lymphoma, inflammatory bowel disease, malabsorption, hepatitis, malignancy and others.[12,13]

Protocol for administration

This should be read in conjunction with the product information.[11]

The IVIG preparation should reach room temperature before infusion. A controlled infusion device (IVAC) should be used. A blood filter is not needed.

Since reactions are often rate-related, the following regimen is suggested for adults:

On first infusion

- 30 ml/hour for 15 minutes.
- 60 ml/hour for 15 minutes.
- 90 ml/hour for 15 minutes.
- 120 ml/hour for 30 minutes.
- Continued increments up to 250 ml/hour.

Subsequent infusions can commence at 60 ml/hour. For adults with multiple previous uneventful infusions, infusions can be run at 250 ml/hr.

In children, the infusion rates depend on the weight of the child, and should be calculated accordingly.

Observation during infusion

The temperature should be recorded at commencement of the IVIG infusion and during it as required. For the initial dose, the pulse and blood pressure should be measured prior to increasing the infusion rate. Subsequent infusions should have baseline observations and hourly pulse and blood pressure recordings.

Ongoing side effects

If side effects occur, they can usually be controlled with pre- and post-medication using paracetamol and/or antihistamine. If problems occur during the infusion, reducing the rate is also usually helpful. If problems persist, then smaller, more frequent doses or subcutaneous administration are alternatives for consideration—but this should be discussed with a clinical immunologist, see Table 1.

Table 1. Clinical immunology contacts in New Zealand

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Auckland Public Hospital	Rohan Ameratunga	Level 2, Building 31, Private Bag 92024, Auckland	Tel) 09 3074949; ext 6113 Email) rohana@adhb.govt.nz
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Hyperlipidemia and the liver sieve. V Cogger[1], S Hilmer[1], R Fraser[2], D Le Couteur[1]. [1]Centre for Education and Research on Ageing and ANZAC Research Institute, University of Sydney, Sydney, Australia; [2]Department of Pathology, Christchurch School of Medicine and Health Sciences, University of Otago, Christchurch.

The hepatic sinusoidal endothelium (liver sieve) is perforated with numerous fenestrae each of about 100nm in diameter. The fenestrations allow passage of substrates such as chylomicron remnants but exclude larger particles such as chylomicrons. Alterations in the liver sieve are known to affect hepatic lipoprotein uptake.

A single intraperitoneal (i.p.) injection of Poloxamer 407 (P-407) (0.5-1.0mg/kg) induces dramatic hyperlipidemia within 24 hours in rodents. The precise mechanism for these changes is not understood. One possible explanation is that P-407 alters the structure of the liver sieve, impairing the transfer of lipoproteins across the liver sieve. We report the affects of a single i.p. dose of P-407 on the plasma lipids and on the liver sieve porosity.

Ten week old, male BL57 mice were injected with either P-407 (1mg/kg, i.p., n=5) or volume matched normal saline (i.p., n=5). After 24 hours the mice were anaesthetised, blood samples were taken for triglyceride and cholesterol analysis, and the livers were perfusion fixed via the portal vein (3% Glutaraldehyde/2.5% Paraformaldehyde). Livers were then prepared for scanning electron microscopy.

At 24 hrs total triglycerides and cholesterol were significantly elevated in the P-407 treated animals when compared with controls (triglycerides: 15.4 ± 4.7 v 2.1 ± 4.3, $P < 0.01$, and cholesterol: 6.9 ± 1.4 v 2.6 ± 0.1, $P < 0.01$). Scanning electron microscopy of the liver sieve showed dramatic loss of endothelial fenestrations in the P-407 treated animals when compared with the controls.

Administration of P-407 is associated with structural changes to the liver sieve that may impair hepatic uptake of lipoproteins with resulting hyperlipidemia.

3D Models of Blood Flow in the Cerebral-Vasculature. S Moore [1], J Chase[1], J Fink[2] and T David[1]. [1]Centre for Bioengineering, University of Canterbury, Christchurch; [2]Christchurch School of Medicine and Health Sciences, University of Otago, Christchurch.

The Circle of Willis (CoW) is a ring-like arterial structure located in the base of the brain, responsible for the distribution of oxygenated blood throughout the cerebral mass. Among the general population, approximately 50% have a complete CoW, where among a multitude of possible anatomical variations, vessels absent from the CoW are common. Certain conditions such as a build up of atherosclerotic plaque on

the arterial wall can result in ischaemic damage and stroke-like symptoms. A 3D computer model has been developed based on the results of a Magnetic Resonance Angiogram of a patient's cerebral vasculature and a numerical algorithm to simulate the body's autoregulation mechanism. The intention of the present study was to simulate different pathological states, including different vessels missing from the circle and varying degrees of stenosis in an afferent Internal Carotid Artery.

Results show that the CoW is remarkably resilient to a stenosis in one of the Internal Carotid arteries. Because of their small diameters the communicating arteries act almost as barriers between pieces of the circle and it is not until there is sufficient asymmetric afferent blood pressure that any significant amounts of blood will flow through them. The contralateral Posterior Communicating artery plays virtually no role in the re-distribution of blood to the starved ipsilateral side of the CoW. Peripheral resistances decrease to increase blood flow through the communicating arteries which also increases afferent flow, even when the Internal Carotid artery is subjected to a pressure drop. This indicates that 'pressure' is the more physiologically correct boundary condition as opposed to the specification of an inlet 'velocity profile'.

A new Ras inhibitor for advanced breast and prostate cancer. M Lynch[1], R Santen[1] and R McPherson[1,2]. [1]Division of Endocrinology and NCI Cancer Center, University of Virginia, Charlottesville, Virginia, USA; [2]Current address: Canesis Networks Ltd, Lincoln, North Canterbury.

Resistance to hormonal therapy of advanced breast and prostate cancer is a serious clinical problem. Altered regulation of signal transduction pathways are a hallmark of resistance to hormonal therapy in vivo and in vitro. The 21 kDa Ras GTP binding protein is a key mediator of these activated signal transduction pathways. Treatments targeting Ras have been extensively researched as cancer therapies but are yet to find clinical applications. The new Ras inhibitor farnesylthiosalicylate (FTS) has a very good therapeutic index in rodent models and is effective against other cancers in vitro that have upregulated Ras. We hypothesised that FTS would be an effective treatment for breast and prostate cancers that have developed resistance to hormonal therapy.

We confirmed that Ras was upregulated in cellular models of advanced breast and prostate cancer. Inhibition of signal transduction pathways downstream of Ras arrested growth of these cells. The anti-Ras compound FTS disrupted signal transduction in cellular models of advanced breast and prostate cancer significantly. Accompanying this disruption was massive cellular apoptosis and reduced proliferation. FTS also induced degradation of important cellular proteins, indicating it either increased turnover or reduced transcription/translation. A soluble complex of FTS, suitable for human dosage in vivo, was just as effective as FTS alone. FTS was also additive with Doxorubicin against a cellular model of advanced breast cancer.

FTS is effective against in vitro models of breast and prostate cancers that are resistant to hormonal therapy. FTS is entering preclinical trials for human cancer.

Role of glutathione in the resistance of Bcl-2 positive cells to Fas-mediated apoptosis. S Thomson, J Pullar, M Hampton. Free Radical Research Group,

Department of Pathology, Christchurch School of Medicine and Health Sciences, University of Otago, Christchurch.

Increased expression of the *bcl-2* oncogene has been linked to carcinogenesis and drug-resistance in a range of cancers. Bcl-2 functions by blocking apoptosis, but its exact mechanism of action is unclear. Overexpression of Bcl-2 is reported to elevate levels of the cysteine-containing tripeptide glutathione (GSH), and this has been proposed to interfere with apoptosis. Our aim was to test the link between Bcl-2 levels and intracellular GSH, and determine whether elevated GSH provides a survival advantage to cells. We generated a range of stable Jurkat lymphoma cells over expressing Bcl-2 at levels ranging from 2 to 50 times that of parent cells. Bcl-2 expressing clones exhibited a 60% average increase in GSH. We observed a strong negative correlation between Bcl-2 protein levels and caspase activation following Fas induced apoptosis (Pearson product moment correlation r = -0.625, p=0.01).

However, there was no correlation between Bcl-2 and GSH, or between GSH and resistance to apoptosis. Also, depletion of GSH with buthionine sulfoximine had no effect on the sensitivity of the cells to Fas-mediated apoptosis. However, phenethyl isothiocyanate (PEITC) was able to sensitize the Bcl-2 positive clones. PEITC lowers GSH and can directly modify cellular thiol proteins. While we conclude that Bcl-2 elevates GSH and promotes an intracellular reducing environment, GSH itself does not contribute to the anti-apoptotic properties of Bcl-2. We propose that PEITC bypasses the action of Bcl-2 by directly modifying specific thiol proteins. Identification of these proteins may provide novel targets in the search for novel treatments of drug-resistant cancers.

Comparison of Faecal Calprotectin and Clinical Disease Indices for Assessing Inflammation in Crohn's Disease.

R Gearry[1,3], M Barclay[1,2,3], M Burt,[1,3] B Chapman,[1] J Collett,[1] P George[4]. Departments of Gastroenterology[1] and Pharmacology[2], Christchurch Hospital, Department of Medicine, Christchurch School of Medicine and Health Sciences, University of Otago[3], and Canterbury Health Laboratories,[4] Christchurch.

Faecal calprotectin (FC) is a sensitive marker of intestinal inflammation that correlates well with invasive methods of inflammation assessment in Crohn's disease (CD) patients. We aimed to compare FC with conventional laboratory measurements of inflammation and clinical indices of disease activity - Crohn's Disease Activity Index (CDAI) and the short Inflammatory Bowel Disease Quality of Life score (sIBDQ).

This study had ethical approval and patients gave written informed consent. Patients with CD were recruited for the study from outpatient clinics or inpatient wards. Stool specimens for FC, blood for erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) and highly sensitive CRP (hs-CRP) was collected. The patients completed symptom cards (CDAI) and questionnaires (sIBDQ). Laboratory work was carried out by Canterbury Health Laboratories and clinical assessments by the principle investigator. The results were correlated using 2-tailed Pearson correlation coefficients.

Thirty-seven of 46 (80%) recruited patients with Crohn's completed the study (28 (76%) female, mean age 36y). The FC range was 2 to 12282 mg/L. Correlation

coefficients were as follows: CDAI v sIBDQoL r=0.869**, Log(FC) v CDAI r=0.328*, Log(FC) v sIBDQ r=0.235, Log(FC) v Log (ESR) r=0.608**, Log(FC) v Log(CRP) r=0.560**, Log(FC) v Log(hs-CRP) r=0.555**. (**p<0.001, *p<0.05).

The simpler sIBDQoL questionnaire correlates extremely well with CDAI. HsCRP was no better than CRP in determining CD activity. FC correlates modestly with conventional laboratory measures of inflammation. FC may be a better indicator of IBD inflammatory activity than symptom scores and standard laboratory measures, particularly at lower levels of inflammation.

Factors determining efficiency of Der f I and Fel d I removal from carpet. S Causer[1], C Shorter[1], and R Lewis[2]. [1]Canesis Networks Ltd, Lincoln, North Canterbury; [2]Saint Louis University School of Public Health, St. Louis, Missouri, USA.

Allergens derived from house-dust mites and pets, exposure to which is a risk factor for the development of sensitization and asthma, are known to accumulate in carpets. Regular vacuuming has been suggested as a useful technique for reducing exposure to such material, however, the efficiency of such processes is poorly understood. We sought to examine how wear and cleaning method affected house-dust mite (Der f I) and cat allergen (Fel d I) removal from carpet.

A selection of wool carpets (cut- and loop-pile of 7 mm or 9 mm pile height, 6 replicates each) were loaded with fine sieved house dust containing known amounts of Fel d I or Der f I, artificially worn, and subjected to either dry or wet vacuuming. The Der f I and Fel d I content of carpet cores was determined using double-monoclonal antibody ELISA before and after wear, and after cleaning.

Both dry and wet vacuuming procedures were effective at removing Der f I (>61%) and Fel d I (>74%) from unworn carpets, but this efficiency reduced to <30% for Der f I and to <39% for Fel d I once worn. Cleaning method and carpet style (cut vs loop) had no significant impact on ease of allergen removal (P>0.05), and pile height had only a minor influence.

We conclude that the degree of wear is one of the most important factors to consider when advising allergen sensitive patients of techniques to minimise allergen levels in carpet.

Effect of Hyperglycemia on Mortality in the Christchurch Intensive Care Unit. C Doran[1], M Bloomfield[2], D Lee[3], G Shaw[4], J Chase[1], J Lin[1], T Lotz[1]. [1]Biomedical Engineering Research Group, Department of Mechanical Engineering, University of Canterbury; [2]Christchurch School of Medicine and Health Science, University of Otago, Christchurch; [3]Department of Mathematics and Statistics, University of Canterbury, Christchurch; [4]Department of Intensive Care, Christchurch Hospital, Christchurch.

Critically ill patients often experience stress-induced hyperglycemia. Increased counter-regulatory hormone secretion leads to increase endogenously produced glucose and hepatic gluconeogenesis, and reduces insulin sensitivity. High dextrose nutritional support regimes compound the counter-regulatory response.

During 2003, 1164 patients were admitted to the Christchurch Hospital ICU. A retrospective data audit analysed relationships between plasma glucose values, insulin infusions, age, sex, APACHE II score, length of stay, ICU mortality and primary diagnosis for the 201 patients with a stay of greater than 72 hours.

The number of measurements per day, maximum, range and trapezoidal mean of blood glucose were higher in non-survivors ($P = 0.03$, $P = 0.001$, $P = 0.003$ and $P = 0.014$, respectively). Insulin infusion averages and proportion of stay were negatively correlated with mortality ($P = 0.01$ and $P = 0.02$, respectively). The general trend was that survival decreased with increasing maximum blood glucose, range of blood glucose and trapezoidal mean of blood glucose, suggesting that these three parameters have a negative effect on the survival of an ICU patient, independent of APACHE II scores.

Finally, the error in estimating the mean blood glucose for a patient over an interval of time increased with sampling time. Standard practice of four hourly measurements may not be appropriate for tightly controlling glucose levels, further reiterating the need for glucose sensing technology and automated insulin infusion in critical care environments.

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Low tar cigarettes—another con trick

During the past 50 years, changes in the design and manufacture of cigarettes have markedly reduced their machine measured "tar" yields, with the intention of lowering their carcinogenic potential. This intention/proposition has been tested in a prospective cohort study from the United States, Harris and colleagues followed up more than 940,000 people for six years; 25% of them were smokers. They found that the risk of dying from lung cancer was the same for smokers of very low tar (=7 mg tar/cigarette), low tar (8-14 mg), and medium tar (15-21 mg) filter cigarettes. People smoking high tar non-filter cigarettes were at an even greater risk, and only those who quit smoking or never smoked had a significantly lower risk of lung cancer.

BMJ 2004;328:72–6

Gout and alcohol; so it is true after all!

Gout is the most common inflammatory arthritis in men. The association between heavy alcohol consumption and increased risk of gout has long been suspected. Metabolic studies have shown that hyperuricaemia can be induced by alcohol loading, but until this study no prospective evidence has been available to prove the association.

In this report from Boston, 730 patients with gout were studied and the relative risk (RR) for gout was increased in the alcohol drinkers. The RR compared to non-drinkers ranged from 1.32–2.53 (increasing with increased consumption).

This risk varies substantially according to the type of alcoholic beverage: beer confers a larger risk than spirits, whereas moderate wine drinking does not increase the risk.

Lancet 2004;363:1277–81

Chicken-feed—or real bad news?

Many studies have shown that feeding antibiotics to livestock as growth promoters leads to antibiotic-resistance appearing in bacteria in the animals, and eventually in bacteria that cause diseases in people. It has always been assumed that this was because the drugs allowed naturally resistant strains to flourish, or evolve over time. Now it has been found that the crude antibiotics fed to farm animals for decades actually include resistance genes.

The feed-grade antibiotic avoparcin made by the Swiss firm Roche contains DNA from the bacteria used to produce it, including intact copies of a cluster of three genes that confer resistance, Karen Lu's team at the University of British Columbia in Canada report in the online journal *Emerging Infectious Diseases*.

The team notes that almost all feed-grade antibiotics consist of the same kind of crude preparation, and probably also carry resistance genes, creating "an enormous gene pool for antimicrobial resistance in the environment".

The avoparcin-resistance genes the team found closely resemble resistance genes for the related antibiotic vancomycin, the drug of last resort to which resistance is now emerging. These resistance genes may ultimately have derived from the crude avoparcin preparation fed to animals from 1976, the team suggests.

The finding could also add pressure in the US to ban antibiotic growth promoters. They will be banned in Europe from 2006.

New Scientist 10 April 2004 p4

Who owns our genes?

Does the patenting of genes stifle or stimulate medical research? On one hand, the commercial interests of the patent owner need to be protected, or the cost of developing a new drug would be too great a financial risk. But scientists should be able to freely use all worthwhile approaches—whether patented or not—in their research. In this month's *Nature Reviews Drug Discovery*, Mike Stott and Jill Valentine examine the effects of gene patenting on medical research *from the perspective of the pharmaceutical industry*. They conclude that the existing patent systems work well, both protecting the discovery of new genes and allowing the freedom to undertake new research based on patented genes.

Nature 15 April 2004 xvii

Medicine, a profession at risk?

United Kingdom academic Ellen Annandale, in *The sociology of health and medicine*, argues that "non-physician providers can sometimes deliver a comparable service at lower cost. This is fostered by specialization which permits knowledge to be broken down into smaller tasks which can be undertaken by less skilled workers." And these workers' time has come! Task substitution is now touted as a cure for current healthcare woes. We have advanced nurse practitioners, nurse colonoscopists and mental health practitioners, and the list is growing.

With task substitution on the health reform agenda, we need to ask: What do doctors do that others don't, or, indeed, can't? Diagnose, manage and care for patients, or just fade away?

MJA 2004;180:201

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Chlamydia in New Zealand

An editorial by Dr Nicky Perkins entitled *The Chlamydia problem in New Zealand* highlighted some of the challenges posed by the increasing prevalence of chlamydia in New Zealand (NZMJ 21st May 2004, Vol 117 No 1194).

In the paper, Dr Perkins references the *Sexually Transmitted Infections (STIs) in New Zealand, Annual Surveillance Report 2003* published by the Institute of Environmental Science and Research Limited (ESR) on behalf of the Ministry of Health.

We wish to bring to your readers attention some important issues and caveats regarding the data cited by Dr Perkins. For example in paragraph 2 she comments, 'over the past 5 years, the rates (of chlamydia) has risen 65.5%'.

This figure, taken from the above report, is the increase in the number of confirmed chlamydia diagnoses made only at sexual health clinics. It is not a rate. Applying this data to the whole of the New Zealand population is inappropriate as it does not include chlamydia infections diagnosed in other healthcare settings such as general practice, family planning, or antenatal clinics.

In paragraph 2, Dr Perkins also says 'the rate of chlamydia in Auckland, Waikato, and the Bay of Plenty (the regions with the most complete laboratory data) is six times higher than that reported in Australia'. It should be emphasised that these regions are currently the only ones in New Zealand where there is laboratory surveillance of STIs, and within these regions only 75% of laboratories participate in surveillance, which may significantly underestimate the true incidence of chlamydia infection.

In paragraph 17, Dr Perkins comments that 'laboratory surveillance needs to be extended to include full national participation'. The Ministry of Health and ESR are currently in discussion with laboratories and Public Health Units about extending STI laboratory surveillance; initial discussions being positive. However as long as STIs remain non-notifiable, surveillance will rely upon the voluntarily participation of laboratories.

ESR tries to ensure that all data quality issues are highlighted in the methods sections of the annual report, which is available to all those interested in the epidemiology of STIs in New Zealand at http://www.surv.esr.cri.nz

We would welcome ideas as to how to better illustrate the challenges within the constraints of the data.

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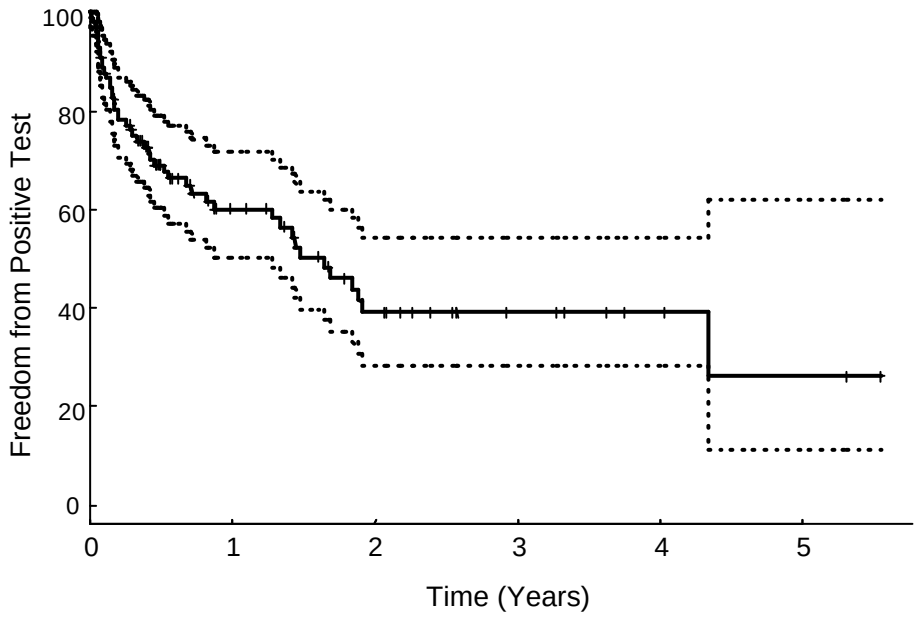
Duration of methicillin-resistant *Staphylococcus aureus* colonisation in hospitalised patients

With the increasing rates of methicillin-resistant *Staphylococcus aureus* (MRSA) reported in New Zealand each year, the management of patients with MRSA, or at risk of being colonised with MRSA, has become an increasing problem for infection control practitioners within our hospitals.[1]

The current New Zealand guidelines for the control of MRSA[2] recommends screening of patients at high risk of MRSA colonisation. Included in this group are patients known to be colonised or infected with MRSA previously. When admitted to hospital, these patients are screened for persistence of MRSA colonisation, and healthcare workers follow Contact Precautions when providing care. Long-term colonisation has been reported[3,4] but there is no local data on the length of colonisation of patients with MRSA. Colonisation with MRSA is associated with a higher risk of developing clinical infection with MRSA and it is important to identify this group of patients early.[5]

Figure 1. Kaplan-Meier curve (with 95% confidence intervals) for the likelihood of persistence of methicillin-resistant *Staphylococcus aureus* (MRSA) colonisation in a group of patients previously known to be colonised with MRSA; n=100



All patients found to be colonised with MRSA at or during their admission to Auckland District Health Board (ADHB) hospitals are entered onto a database by the Infection Control Service, and an electronic alert is attached to their national health index (NHI) number. This signals the need for MRSA screening at subsequent admissions. During 2003, we studied 100 patients known to previously be colonised with MRSA who were readmitted to ADHB hospitals.

When screened for MRSA, 46 patients were still colonised with MRSA. This allowed us to approximate the length of time these patients were colonised with MRSA. The length of colonisation was the difference between the date the alert was attached to the NHI number and the date that the positive screening swab was taken. We also looked for known risk factors associated with persistent colonisation of MRSA; chronic skin lesions, the presence of invasive devices such as intravascular catheters and indwelling urinary catheters, a tracheostomy, chronic suppurative lung disease, and residency in a residential care facility.

Prolonged colonisation with MRSA is not uncommon with more than 60% (95% CI 50–70) of patients still colonised at 1 year and 39% (95% CI 28–54) at 3 years (Figure 1). The presence of chronic skin lesions was significantly associated with persistence of colonisation (p=0.009).

Whilst acknowledging that this is a small study, and patients were not screened at regular intervals to determine more accurately when clearance occurred, it does show that colonisation with MRSA can be prolonged and that screening at readmission is warranted. This is especially true for patients with chronic skin lesions. Identifying high-risk patients and screening them for MRSA at admission remains an important step for controlling MRSA within our hospitals.

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Graham Rothwell Gordon

Graham, third son of Drs Bill and Doris Gordon, was born (1927) and bred in Stratford, Taranaki. He returned there to general practice with his father and brother Ross in 1957, following schooling at Nelson College, undergraduate years in Otago (Knox College; secretary OUMSA 1950; captain in Territorials, OU Medical Company), and FRS training in England. He also practiced as part-time visiting surgeon at Stratford Hospital from 1957 until the theatre closed in 1992.

Dr Graham (as he was fondly known to patients and colleagues) was a police surgeon (for over 30 years), officer in St Johns Ambulance, and honorary surgeon to the Stratford Volunteer Fire Brigade, with whom he set up New Zealand's first rural general practitioner first-response road trauma service. He was also involved in helicopter Search & Rescue work.

Throughout his career he worked tirelessly for the benefit of the profession as executive member and office holder (Secretary, President) in the Taranaki Division of NZMA (formerly BMA) for 19 years, then as NZMA Council Chairman (1977–1988) and NZMA President (1990–1991). He was elected Fellow of NZMA in 1981. He served on numerous local and national health-related committees and working parties, including advisory committees to the Taranaki AHB, Midland RHA, Taranaki Hospitals Library Trust, and Stratford Health Trust. His professional wisdom was also invaluable to several disciplinary committees.

Outside medicine, Graham was an Elder in the Presbyterian church (being granted the status of Elder Emeritus in 2003), enjoying philately, and was an accomplished tenor, with a particular flare for Gilbert and Sullivan. He sang (solo and chorus) and prepared commentaries for the Stratford Mountain Singers for many years.

Graham was a reliable, principled, and hardworking colleague, always good-natured and cooperative. A humble and private man with a strong faith, Graham'contribution to medicine, medical politics, and the community was outstanding. In 2000, he was awarding the Stratford District Citizen's award. Graham sold his practice in 1999, but never retired, continuing his input into local health issues and patient care until a few weeks before his death.

Graham's wife, Barbara, died in 1999; they are survived by their six children. To his last days, Graham was efficiently organised, down to detailed arrangements (including specific choir items) for his own well-attended and memorable funeral.

We are grateful to Keith Carey-Smith for this obituary.

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The Royal Australasian College of Physicians
Adult Medicine Division

Call for Applications for

Foundation Fellowship of the Australasian Chapter of Sexual Health Medicine

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

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

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

- participation in research in the field with appropriate supervision and collaboration
- development of professional or academic activity
- regular contributions to undergraduate/postgraduate education; and/or
- publications in scientific journals and/or contributions to scientific meetings.

For specific details concerning eligibility, please refer to the detailed criteria in the *Guidelines for Determining the Eligibility of Candidates for Foundation Fellowship* in the Application Package.

Applicants must demonstrate a satisfactory practice history (no professional misconduct, or disciplinary issues).

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

Application Process

Application Packages may be downloaded from the RACP Website at http://www.racp.edu.au/public/sexualhealth.htm

or obtained from:

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

Closing date for applications: Wednesday 28 July 2004

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Ethics and evidence-based medicine: fallibility and responsibility in clinical science

Kenneth Goodman. Published by Cambridge University Press. ISBN: 0521796539. Contains 180 pages. Price AUD$69.95

The evidence-based practice movement has swept the Western world over the last quarter century—polarising many health professionals as devotees or sceptics. The tension between efforts to make medical practice more scientific and the suspicions of some clinicians has caused a major challenge for health professions. *Ethics and evidence-based medicine* catalogues the history and conceptual origins of evidence-based practice. It also provides a very timely and important analysis of many key ethical issues that arise in decision-making related to clinical practice, public health, and public policy.

The book is fashioned as a series of essays, considering a number of crucial questions such as how should clinicians make important decisions in the face of scientific uncertainty and what kind of evidence is a meta-analysis or a systematic review? True to its evidence-based subject matter, the author has richly detailed each essay with topical quotes and references from leading scholars and protagonists in the field.

Without question, the author is well qualified to present this work. Kenneth Goodman's credentials include: founder and director of the University of Miami's Bioethics Programme; editor of *Ethics, Computing and Medicine*; and author of numerous key papers in bioinformatics journals.

The book is written skilfully in a lively and incisive style, and several complex issues are presented in a clear and succinct manner. One perhaps churlish criticism (considering the craftsmanship and detail of the text) is that the author does not further develop some of the arguments from philosophy and ethics that underpin the development of the evidence-based practice movement.

Although best suited to being an excellent textbook for postgraduate courses on evidence-based practice, *Ethics and evidence-based medicine* also provides stimulating and thought-provoking reading for all health professionals interested in the challenges presented by the contemporary emergence of evidence-based practice and health informatics.

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Care trusts: partnership working in action

Jon Glasby, Edward Peck (editors). Published by Radcliffe Medical Press (UK). ISBN 1857758218. Contains 160 pages. Price GBP27.50

In July 2000, the UK government's National Health Service Plan promised substantial extra investment and significant changes to healthcare delivery. Amongst the latter, care trusts offered a new level of primary care organisation that would deliver both health and social care. Prior to that point, UK health and social services had been organised separately—with the NHS responsible for healthcare, and local authorities responsible for social care.

The book's 11 chapters trace the recent evolution of seven emerging partnerships providing integrated services for people with mental health and learning disabilities, as well as older people. The partnership arrangements described include those between public, private, and voluntary providers—and those who use the services.

The book is divided into two sections. Part One focuses on the existing knowledge about partnership working, and there are explorations of the perspectives of different stakeholders including users and carers. Part Two draws together a series of personal observations about the way the care trust model has developed and works, and identifies some overall themes, questions, and tensions that require further exploration. Emphasising their pursuit of balance, amongst the chapters of apparent 'good news', the editors have included a detailed and robust critique of the care trust model written by a Senior Associate of the Health Services Management Centre at the University of Birmingham.

These perspectives are of some value from a New Zealand perspective. District Health Boards have recently undertaken to support the formation of broadly based Primary Healthcare Organisations (PHOs) as well as intersectoral working relationships with local government agencies. As Glasby and Peck correctly point out:

> 'Ultimately our own view is that care trusts (and partnership working more generally) are a means to an end rather than an end in themselves—if a local care trust can demonstrate that it has led to improved services and outcomes for users and their carers, then it will have succeeded. If not, then the government's new model will have failed. At the time of writing (mid-2003), the jury is still out'.

Bearing in mind that, for better or worse, New Zealand health initiatives generally rely heavily on UK experience, we should 'watch this space' as the vagaries of Population Based Funding stimulate as yet untested 'solutions'.

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