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This Issue in the Journal

New Zealand evidence for the impact of primary healthcare investment in Capital and Coast District Health Board

Lee Tan, Julia Carr, Johanna Reidy

In New Zealand, active partnership with iwi and communities, a multidisciplinary primary health profession, with local government, other government agencies and non-governmental organisations is fundamental to effective primary health care. This article demonstrates the link between investment in primary health care, increased access to primary care for high need populations, workforce redistribution, and improved health outcomes. Over the study period, preventable hospitalisations and emergency department use reduced for enrolled populations and the District's immunisation coverage improved markedly. Funding and contracting which enhanced both 'mainstream' and 'niche' providers combined with community-based health initiatives resulted in a measurable impact on a range of health indicators and inequalities. Maori primary care providers improved access for Maori but also for their enrolled populations of Pacific and Other ethnicity. Growth and redistribution of primary care workforce was observed, improving the availability of general practitioners, nurses, and community workers in poorer communities.

Investigating factors that influence success of Pacific students in first-year health sciences at university in New Zealand

Faafetai Sopoaga, Jacques van der Meer

Pacific students studying health sciences first year reported favourably their transition experiences at University. The factors however influencing the success of Pacific students in higher education are complex. A very small proportion of Pacific students are successful in entering health professional courses. Understanding and addressing barriers to success in higher education in health sciences for Pacific students is needed to increase the Pacific health workforce in New Zealand.

Final-year medical students' perceptions of maternity care in general practice

Hanna Preston, Dawn Miller

This research investigated the perceptions of final year medical students (Trainee Interns or TIs) at the University of Otago about maternity care in general practice, their possible future roles in providing maternity care in general practice, and factors influencing this. Data was collected through an electronic survey with a response rate of 50.7%. Most final year medical students believe GPs should provide maternity care and women should be able to access maternity care from their GP. Students show an interest in providing a range of maternity care services, including shared care with midwives and providing full maternity care, if practicing as a GP in the future. Those students who reported having seen a GP practicing full maternity care were most

likely to consider providing full maternity care if they were to become a GP. The main factors that could influence future GPs becoming involved in providing maternity care in general practice are: personal experience of GPs providing maternity care, adequate postgraduate training in obstetrics, professional and peer support, adequate funding for maternity care, and a model of maternity care that is compatible with general practice and lifestyle options.

A survey of personal digital assistant use in a sample of New Zealand doctors

Oliver H Menzies, John Thwaites

This email based survey of New Zealand hospital-based doctors found about half of respondents used a Personal Digital Assistant (PDA), also known as a smartphone. One of the major factors affecting usage was what District Health Board (DHB) a doctor was working at. Users felt that PDAs helped considerably with time saving, but had only a moderate effect on clinical decision-making. There were a range of barriers to usage, cost being a large factor.

Binge drinking and alcohol-related behaviours amongst Pacific youth: a national survey of secondary school students

Tasileta Teevale, Elizabeth Robinson, Shavonne Duffy, Jennifer Utter, Vili Nosa, Terryann Clark, Janie Sheridan, Shanthi Ameratunga

This study looked at a particular type of alcohol use called binge drinking (5 or more alcoholic drinks in one session within 4 hours) in young Pacific New Zealanders. Despite being underaged for drinking alcohol, youth have access to alcohol and approximately a third (31.6%) of Pacific high school students reported drinking alcohol hazardously (binge drink). The study compared characteristics that were different between Pacific youth who binge drink and Pacific youth who do not binge drink. Non-binge drinking was more likely in younger students (ages 13), and those students who had strong religious affiliations, had a Pacific Island language speaking parent at home, and whose parents monitored their after-school and night-time activities. Binge drinking was more likely in older students (ages 17), Pacific New Zealanders from middle-high income families and those participating in sports teams/clubs outside of schools.

Options for postgraduate anatomy education in Australia and New Zealand ((review article))

Ian S Campbell, Carly M Fox

This paper analyses the options available in Australia and New Zealand for junior doctors wanting to learn human anatomy with a focus on surgical and radiology anatomy. It covers the costs, content and contact details of all courses available in universities and surgical training colleges in Australia and New Zealand. It raises questions that must be considered with the development of these programs, will it mean a new requirement for entry into training, who should pay for these programs, who should organise these programs (i.e. universities or colleges).

Investment in primary care—is it worthwhile?

Jim Reid

The importance of primary care in New Zealand is emphasised in a number of Ministry documents—“A strong primary health care system is central to improving the health of New Zealanders and, in particular, tackling inequalities in health”,¹ and “Better, Sooner, More Convenient Primary Health Care is the Government's initiative to deliver a more personalised primary health care system that provides services closer to home and makes Kiwis healthier.”²

In this issue of the *Journal*, Tan, Carr, and Reidy report on the implementation of the Primary Care Strategy¹ through a Framework developed to guide funding decisions made by the Capital and Coast District Health Board.³ The article demonstrates the strong association between funding levels and improved outcomes, measured by specific outcome markers.

Internationally there is growing recognition of the importance of strengthening primary health care as it is seen as probably the only way to in some way contain burgeoning health care costs.⁴⁻⁶ In addition to downstream costs (or upstream costs—depending on which way it is addressed) in New Zealand, there is evidence of inequality of primary health care provision, and as a consequence, of health care uptake.^{7,8} This has association with geographic location, race, age, and socioeconomic status.

It is now 34 years since the WHO's Declaration of Alma-Ata,⁹ and while this has reference to third world and developing countries, there are underpinning principles which have application to all countries. The goal of primary health care is “health for all” and the WHO-inspired document has identified five key elements to achieving this goal. These are the reduction of exclusion and social disparities, the organisation of health services around peoples needs, integration of health care into all sectors of the population, pursuit of collaborate forms of health delivery, and increasing the stakeholder participation. The latter includes of course the patient who is the principal stakeholder for health care receipt. In the provision of health care an inverse rule applies—those who need the care the most, receive the least.

In New Zealand, primary care must strive for optimal health of the populace at a cost which is affordable, and this must be recognised by Government. The capitation payment for general practice was calculated at just over three services a year for the adult population, with increases in attendance allowance for the young and the elderly. As a consequence of a number of factors, including fee reduction, the consultation numbers have climbed with a consequent decline in the value of the per service capitation.

Accident Compensation Corporation (ACC) levies to General Practice have remained constant for approximately 5 years in spite of sometimes dramatic rises in practice costs, and again as a consequence, ACC part-payments to patients have risen. There are arguments on each side of the fence as to whether primary health care should be

free to all, or at least to some, or whether there should be some cost to the patient. But what is abundantly clear to providers is that the cost should not be a disincentive to attending a doctor. In many cases this is happening at present.

With the introduction of the Primary Health Care Strategy and the formation of PHOs in 2003 the funding for primary care increased significantly. But the important point is that it received the smallest portion—it had an increase of 6 million dollars annually from 2002 till 2007, whereas secondary care increased by 21 million dollars annually. Equally important is that in spite of increased primary care workload and output, there has been overall no shift in resource provision.

If there is an available, affordable, and acceptable primary health care service then as the paper by Tan, Carr and Reidy demonstrate,³ there can be an expected reduction in unnecessary or avoidable hospital use, including admissions, and emergency department utilisation, increased utilisation for disadvantaged patients, and increased patient directed initiatives involving the whole primary health care team. However this outcome was only obtained in the Capital and District Health Board region with sustained investments over and above PHO funding along with a collaborative approach with provider and community input. This will only continue to happen in this country if the sector is adequately resourced.

Competing interests: None declared.

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New Zealand evidence for the impact of primary healthcare investment in Capital and Coast District Health Board

Lee Tan, Julia Carr, Johanna Reidy

Abstract

Aims This paper provides New Zealand evidence on the effectiveness of primary care investment, measured through the Capital and Coast District Health Board's (DHB) Primary Health Care Framework. The Framework was developed in 2002/2003 to guide funding decisions at a DHB level, and to provide a transparent basis for evaluation of the implementation of the Primary Health Care Strategy in this district.

Methods The Framework used a mixed method approach; analysis was based on quantitative and qualitative data.

Results and conclusions This article demonstrates the link between investment in primary health care, increased access to primary care for high-need populations, workforce redistribution, and improved health outcomes. Over the study period, ambulatory sensitive hospitalisations and emergency department use reduced for enrolled populations and the District's immunisation coverage improved markedly. Funding and contracting which enhanced both 'mainstream' and 'niche' providers combined with community-based health initiatives resulted in a measurable impact on a range of health indicators and inequalities.

Māori primary care providers improved access for Māori but also for their enrolled populations of Pacific and Other ethnicity. Growth and redistribution of primary care workforce was observed, improving the availability of general practitioners, nurses, and community workers in poorer communities.

While the importance of primary health care's contribution to the health system is acknowledged,¹ it is not always easy to show how we track outcomes and show how primary care contributes to health system effectiveness.^{2,3} Following the 2001 launch of New Zealand's first Primary Health Care Strategy, considerable new funding was channelled into the primary health care sector with the aim of reducing health inequalities between populations, reducing acute hospital demand, and improving health outcomes.^{4,5}

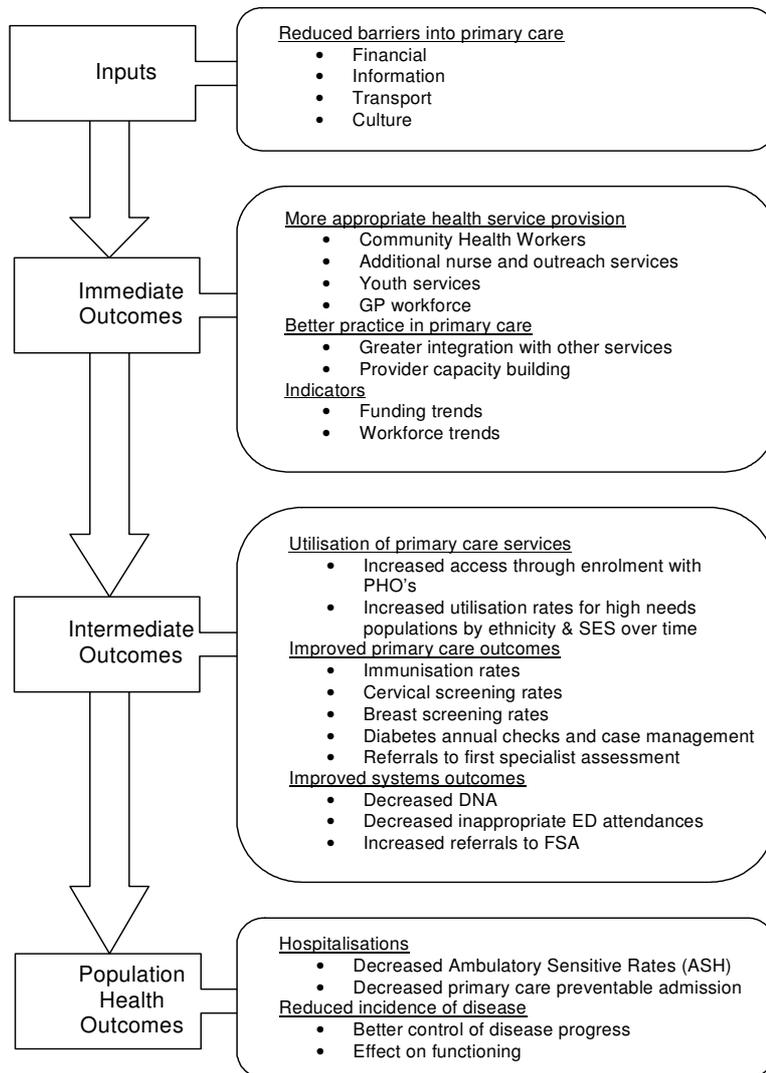
The Capital and Coast DHB Primary Care Framework

In 2002/2003, Capital and Coast District Health Board (C&C DHB) developed a Primary Health Care Framework (the Framework) to guide funding decisions, and identified a set of indicators to measure the impact of increased primary health care investment (see the full report for a fuller discussion of the development of the methodology).⁶

In addition to funding aimed at reducing fees in general practice, C&C DHB targeted investment to improve equity of access and invested in a broad range of service developments and action to influence the social determinants of health.

A negotiated process between the DHB and service providers allowed the DHB to collect NHI level utilisation data for all general practice consultations for PHO enrolees and similar utilisation data for many other primary care contracts. This data provided age, gender, ethnicity, and socio economic status (NZDep 2006) for every recorded encounter. Additionally, service providers submitted periodic narrative reports on the developments, trends, successes, and challenges of health service delivery and community initiatives. This rich data allowed a depth of analysis not possible in other District Health Boards.

Figure 1. Input/outcome model for Capital and Coast DHB primary care framework



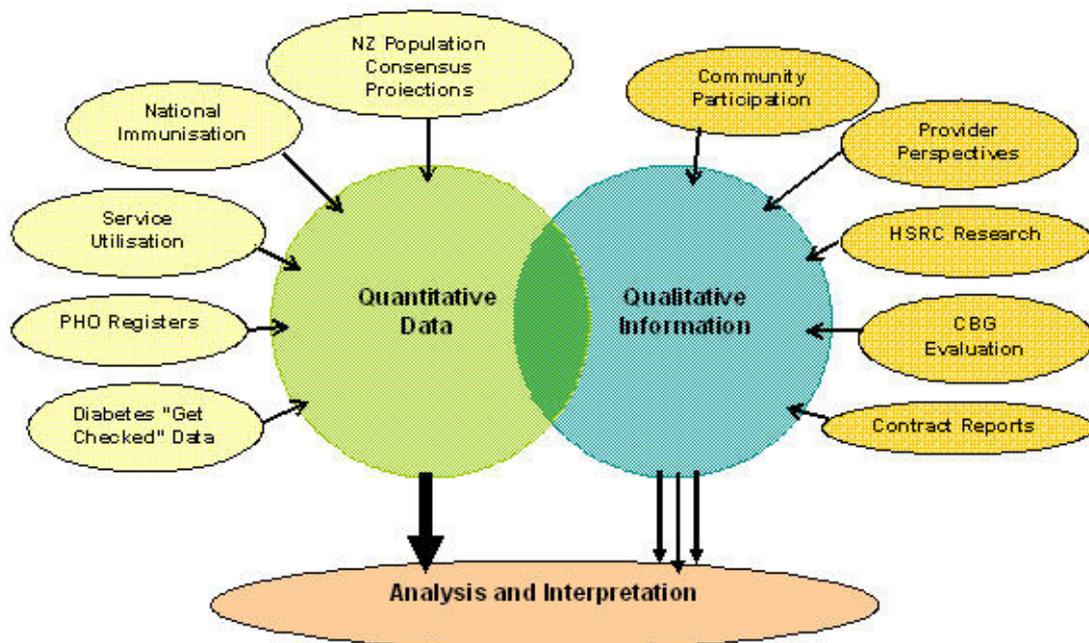
The Framework set out the intervention logic for investment, documenting assumptions about expected outcomes from investment, along with the underpinning

values and approach to contracting that C&C DHB hoped to model. It described the anticipated outcomes in terms of primary health care access, impact on health inequalities, and short term population health gain. This is summarised in a simplified input/outcome model based on a model developed for a similar evaluation.⁷ We note that a diagram cannot capture the true complexity of interaction of well established services, provider relationships with communities, and the multiple levels of influence on population health patterns.

The Framework assumed that improved access to primary health care would improve health outcomes and reduce health inequalities and timely access was expected to reduce ambulatory sensitive hospitalisations (ASH), acute hospital demand, and inappropriate use of the Emergency Department (ED).

The Framework guided investment, and prioritised the enhancement of services in high deprivation areas, for Māori, for Pacific communities, for refugee communities, and for young people. Investment also focussed on building broader primary health care teams, and improving workforce stability in areas of high deprivation. Considerable investment (sourced from DHB marginal funding) was made to bring all service providers up to similar capacity to meet the needs of their enrolled populations, investing differentially in areas with clusters of high health and social need.

Figure 2. Mixed Methods data collection and analysis



This analysis used mixed methodology.⁸ By 2006, C&C DHB had 96% of its population enrolled in PHOs, so was able to analyse the whole population without the usual statistical sampling problems. We assumed that cost influences utilisation, therefore analysis was undertaken by aggregating primary care practices into four

clusters: Very Low Fees (analogous to VLCAF practices which met the 2006 Ministry of Health eligibility criteria of zero fees for children under 6 years and a maximum of \$15 for adults over 18 years), Low Fees, Medium and High Fees practices. We used fees clusters to look at the relationship between cost (patient co-payment) and access. The ranges of GP fees in these clusters are as follows:

Table 1. Fee ranges

Fee range	Fee level (normal consultation)
Very low fees (VL)	Free to maximum of \$15 for all age groups
Low fees (L)	\$16–\$30
Medium fees (M)	\$31–\$39
High fees (H)	\$40 or above

Qualitative analysis of reports from the service providers was used to put the numbers in context. Drafts of a report, used as the basis for this article, were shared with the primary care sector and the PHO Advisory Group (footnote – this included up to 3 representatives from each PHO – clinical, management or community), who provided feedback and input.

Results

Immediate outcomes of primary health care investment

Increased funding—Primary care funding increased significantly in 2003 with the advent of PHOs, yet primary care still received the smallest tranche of DHB funding overall, averaging an increase of \$6M annually 2002–2007 while hospital funding increased \$21M annually, on average (see Figure 3). Thus, absolute investment in health services increased with no substitution from one area to another.

Figure 4 illustrates the funding increases associated with the phased rollout of additional subsidies. It shows the “access” formula funding that initially applied to PHOs with greater than 50% Māori, Pacific and low-income enrolled population, was progressively applied to different age groups in the remaining (“interim”) PHO practices. Most new funding went to Medium Fees PHOs.

Very Low fee practices did not receive as much funding over the same period. Consequently, differential investment was required to maintain very low cost access in areas of high health need.

Figure 3. C&C DHB annual expenditure trends

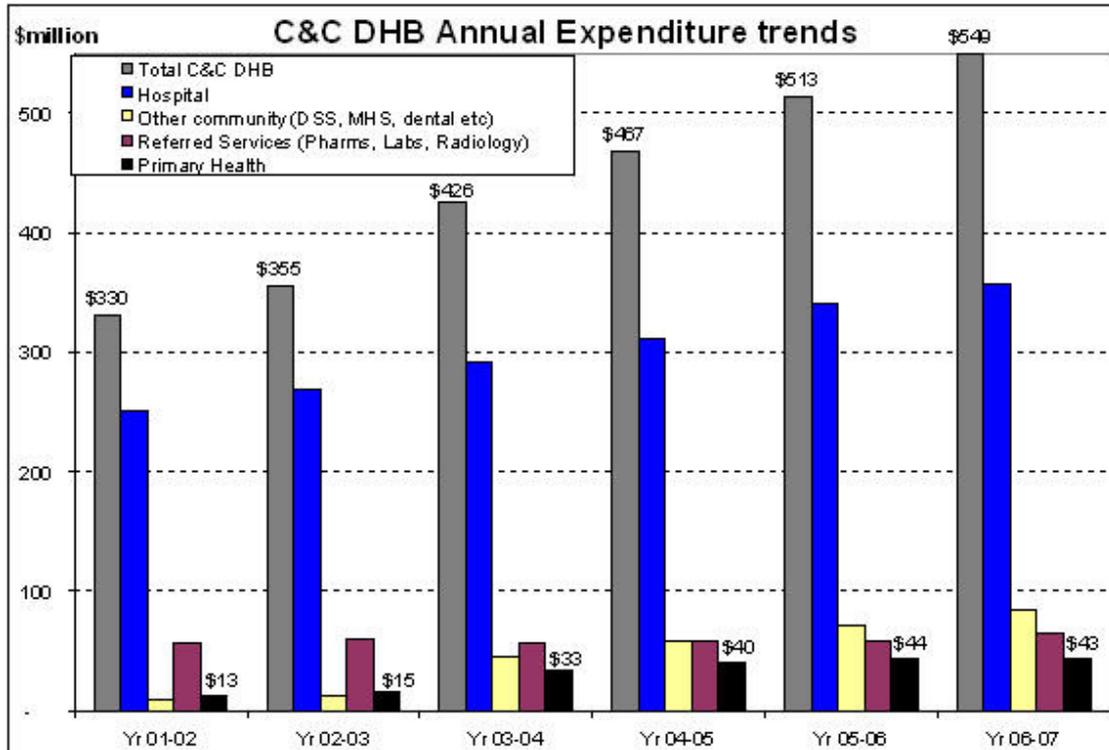
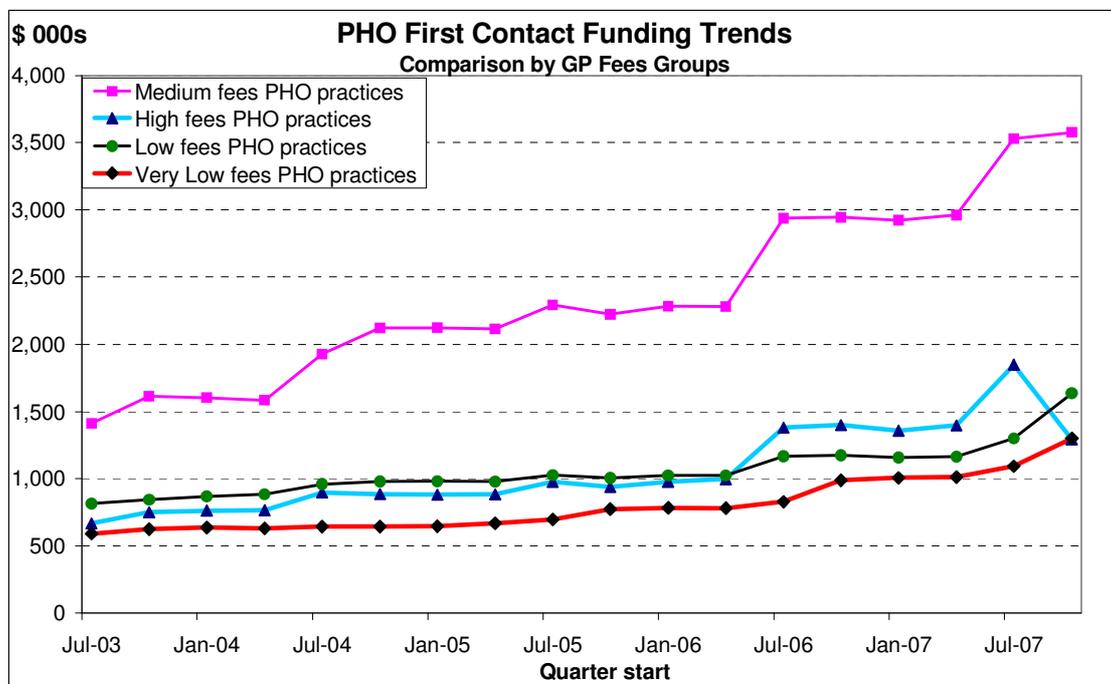


Figure 4. PHO first contact funding trends-comparison by GP fees groups



Enrolment in PHOs—Two methods were used to track PHO coverage. Using DHB data only in terms of enrolment and projected Census population as the denominator, PHO enrolment increased from 80% in 2004 to 85% in 2007.

However, the most accurate estimate was made in 2006, when detailed analysis of PHO enrolment by DHB was compared to Census data, and the DHB had access to information about enrolment in any PHO, including those in neighbouring DHBs. This showed that 96% of the C&C DHB population was enrolled with a PHO (89% Māori, 93% Pacific, and 93% of people living in NZDep 9 and 10 areas).

Access and service utilisation trends—Service utilisation, measured by the number of visits to first contact services (GP and/or nurse attendances), provides a good indication of overall access to primary care, which populations are using services and trends in access as cost and other barriers are modified.

Figure 5. First contact service utilisation—comparison by cost of access

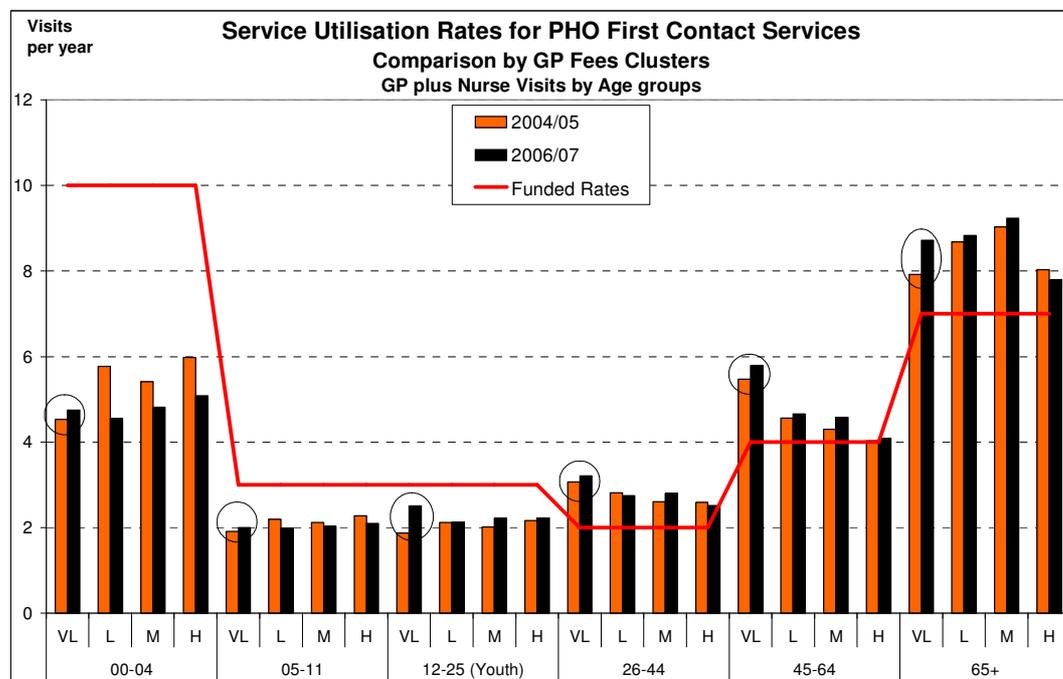


Figure 5 compares the number of consultations by age groups for those accessing Very Low (VL), Low (L), Medium (M) and High (H) fees PHO practices. “Funded rate” refers to the number of visits per year for each age band that is used in the PHO funding formula. These rates were based on the General Medical Subsidy (GMS) claims data prior to the start of PHOs. The circles are inserted to highlight where an increase in service uptake was observed.

Trend analysis shows:

- that, nearly a year after the introduction of an additional subsidy to maintain Very Low Cost Access, in 2006-07, the Very Low fees PHO practices have provided more consultations across all the age groups than in 2004-05;
- although the consultation rates for very young children apparently declined in most practices following the introduction of PHOs, the Very Low fees PHO practices show a positive trend in providing increased consultations by 2006-07; and
- there was increased utilisation by people over 45 years of age in Low and Medium fee practices. This may reflect the effect of Care Plus and other strategies, using Services to Improve Access (SIA) funding, introduced in these practices to reduce the cost barriers for high need people.

There was evidence of increased utilisation by Māori and Pacific populations at VL fees practices over this period. This is illustrated in Figures 6 and 7.

Figure 6. First contact service utilisation - comparison by cost of access by Māori

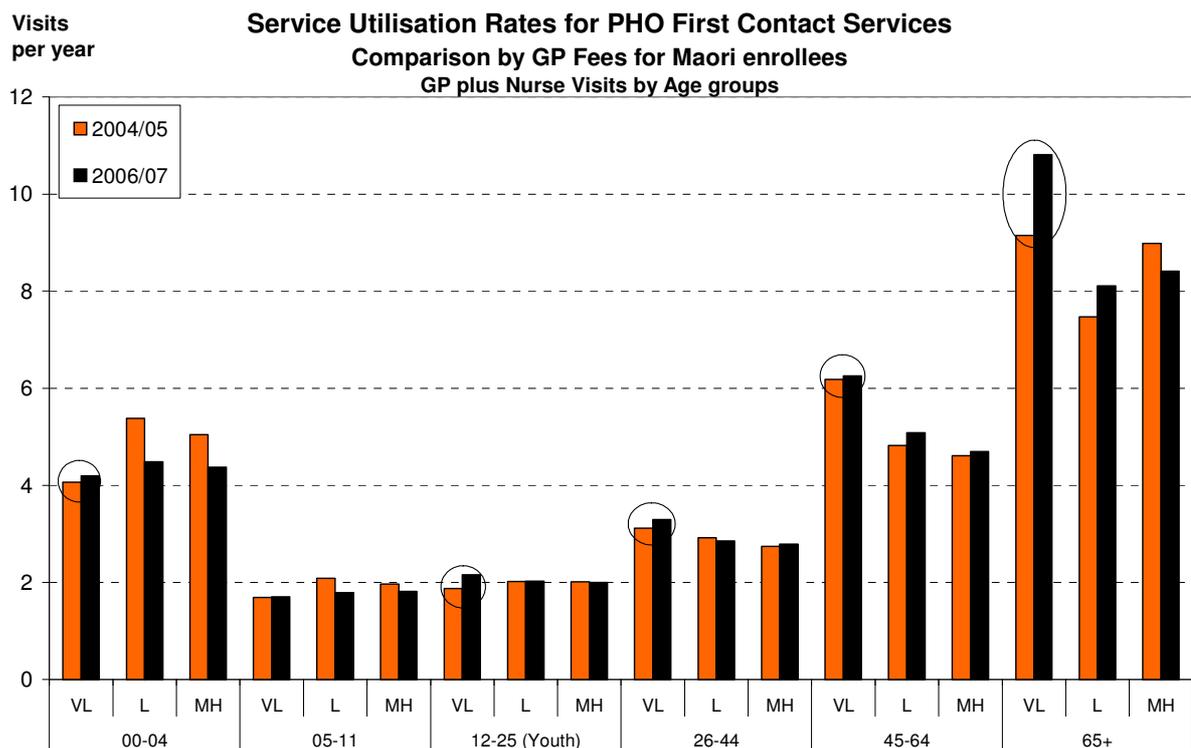
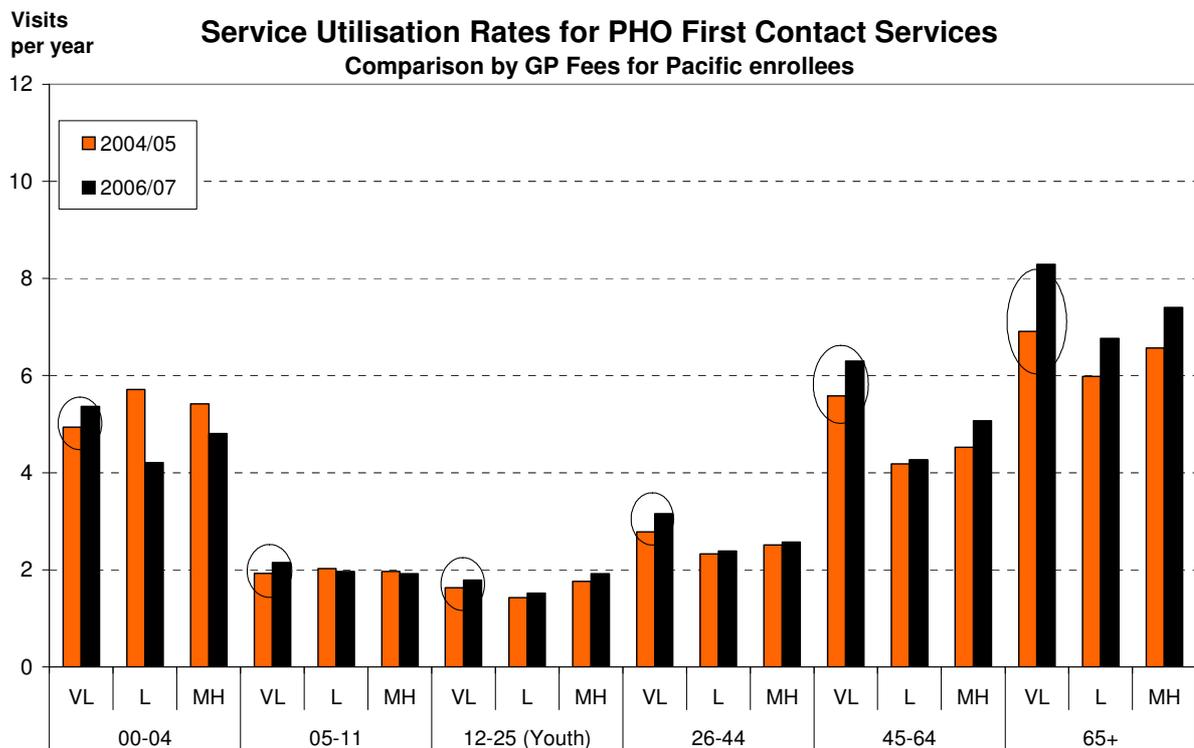


Figure 7. First contact service utilisation - comparison by cost of access by Pacific people

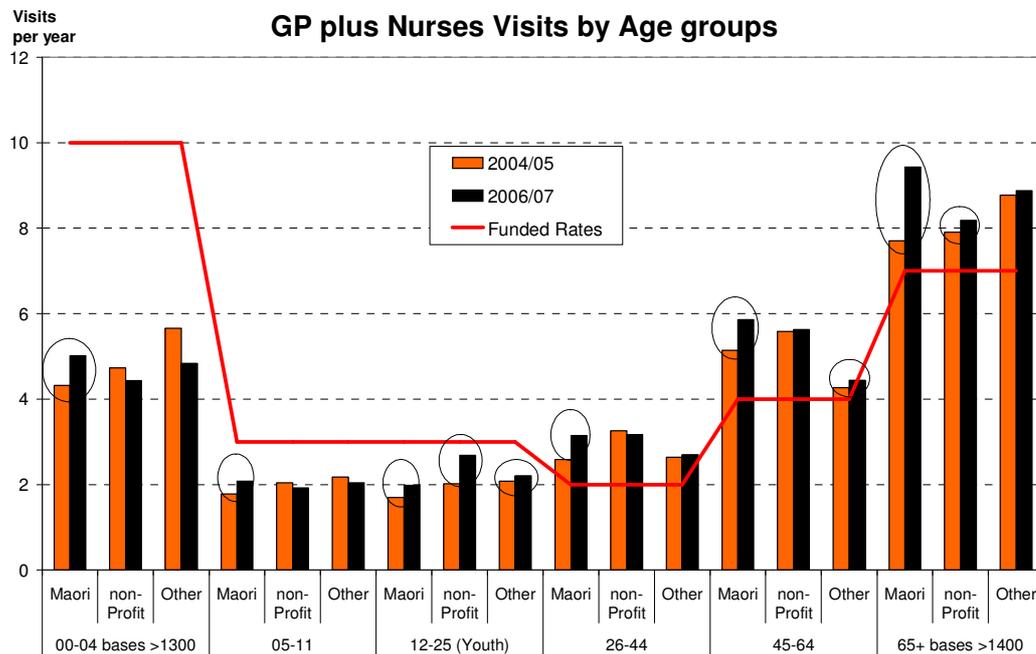


Increased utilisation was observed for Māori over the age of 45 years in Low fee practices. For Pacific enrollees, there was increased utilisation in Low Fee and Medium/High Fee practices in some age groups, possibly reflecting the targeted use of Care Plus and SIA funding to reduce cost barriers.

Intermediate outcomes of primary healthcare investment: model of service delivery and impact on access for vulnerable populations—Reducing cost barriers to improve access to primary health care is important to reduce inequalities between populations. However, other factors influence accessibility and acceptability of services. The ownership, service model and service culture can also be influential.⁵

Over the period of the study, Māori providers and Not for Profit providers (who tend to serve more ethnically diverse communities and more deprived populations) demonstrated more change in service uptake across the adult population enrolled than mainstream services.

Figure 8. First contact service utilisation - comparison of models of care by age group



There was increased utilisation by Māori enrolled with Māori providers, in every age group. Interestingly, this increase in utilisation was also observed for Pacific populations and those of Other ethnicity enrolled with Māori providers. Māori providers achieved this increase in utilisation, despite relatively high baseline utilisation rates. This is illustrated in Figures 9, 10, and 11 that show utilisation rates for Māori, Pacific and Other populations, analysed by model of service delivery.

Figure 9. First contact service utilisation - comparison by models of care for Māori uptake

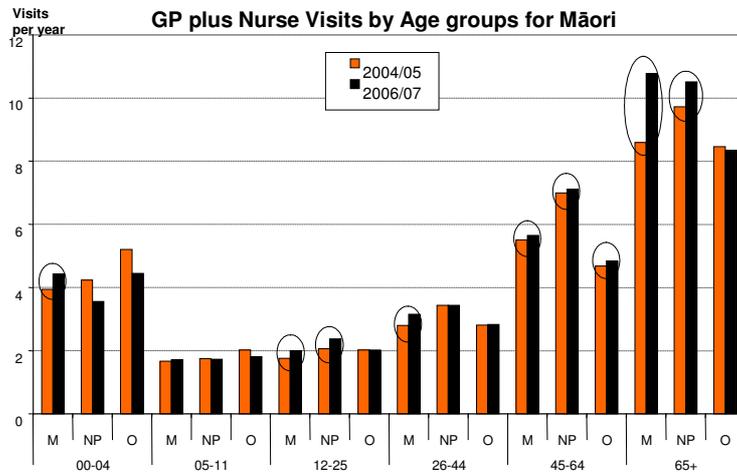


Figure 10. First contact service utilisation - comparison by models of care for Pacific uptake

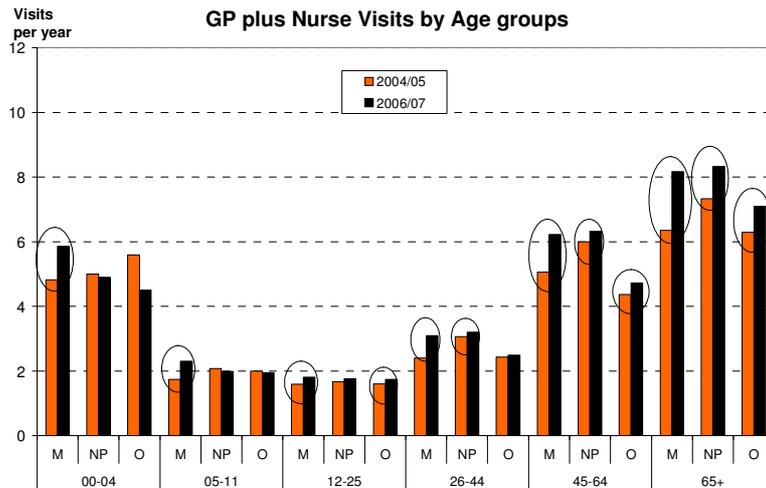
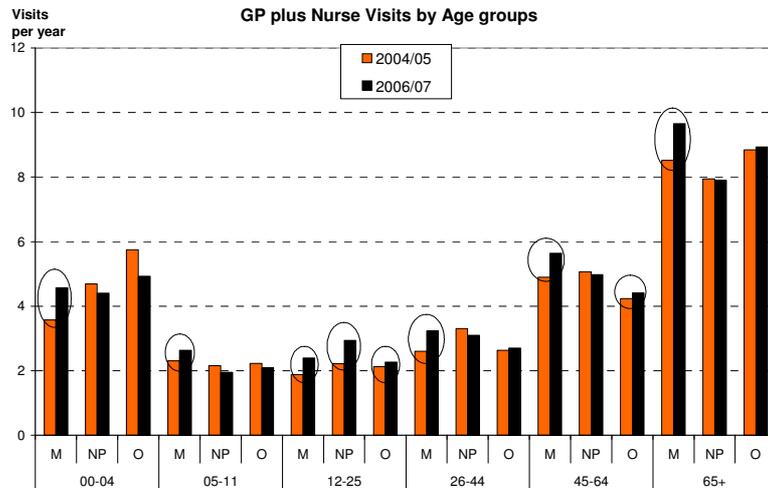
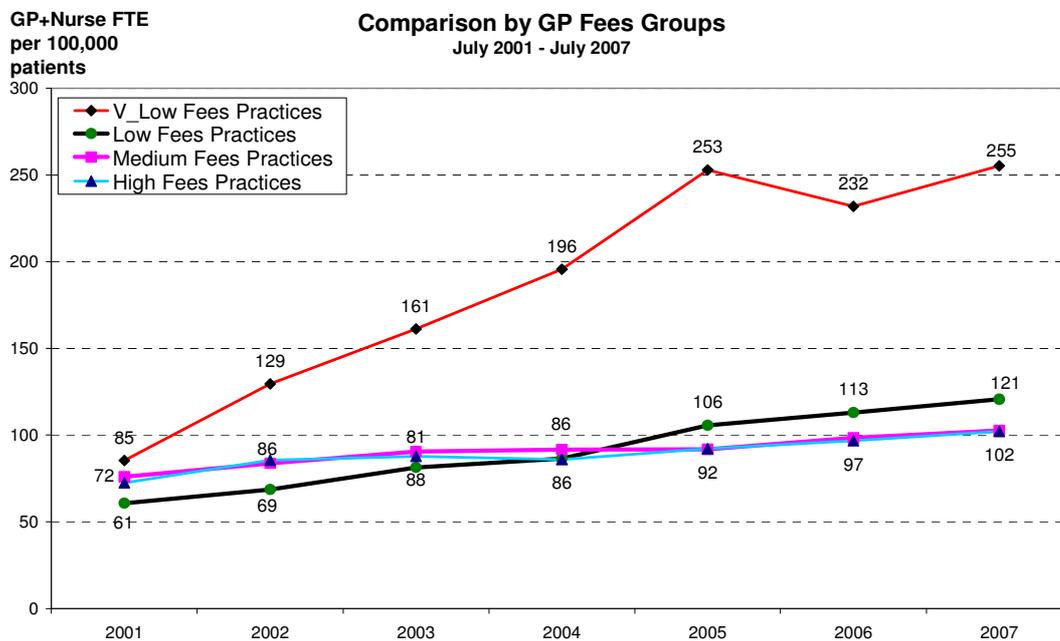


Figure 11. First contact service utilisation - comparison by models of care for non-Māori, non-Pacific people



Primary care workforce—There was a steady increase in the GP and practice nurse workforce over this period and additional funding for Very Low Fees practices resulted in a marked increase in workforce capacity in these services.

Figure 12. Comparison of GP workforce growth by fees groups



The workforce growth was particularly marked for practice nurses. Overall, practice nurse numbers increased by 86% between 2003 and 2007; (78% in High Fees

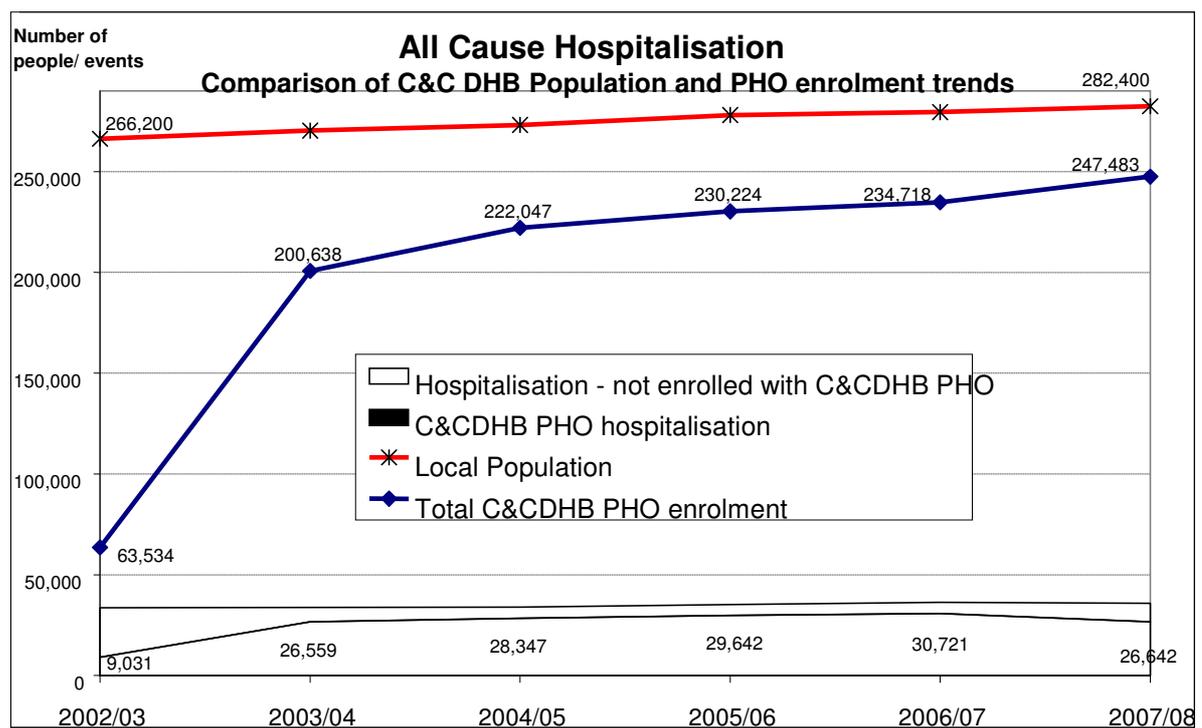
practices, 54% in Medium Fees practices, 132% in Low, and 122% in Very Low Fees practices). This demonstrates that differential investment in areas of high deprivation will result in a redistribution of workforce into these areas.

Very Low Fees practices employed a broader range of primary health workforce including community outreach workers to increase access to services. From 2001-2007, there was substantial growth in community based nurses, outreach workers and health promotion workers across all the PHOs. These workers facilitated more responsive services to the 'hard to reach' populations, extending services beyond the clinic settings, for example into homes, schools, marae, churches, kōhanga reo, schools, sports clubs and some council flat complexes.

Impact of primary care investment on population health outcomes

Hospital admission trends—By 2004/5, most of the population was enrolled with a PHO, six PHOs were established and a range of new service developments were in place.

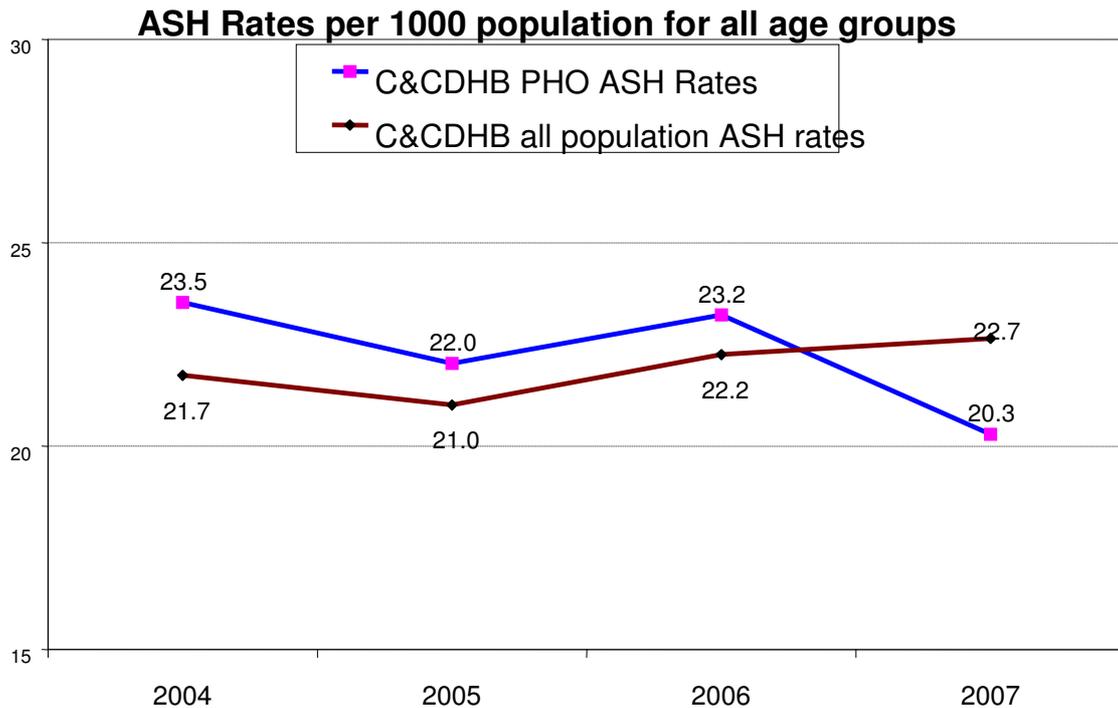
Figure 13. All cause hospitalisation



Despite steady population growth, all cause hospitalisation for those enrolled in a PHO was relatively stable and by 2007/08, there was a 4% decrease compared to 2003/04.

Ambulatory Sensitive Hospitalisation Trends (ASH)—Ambulatory Sensitive Hospitalisations (ASH) are admissions that can potentially be avoided through interventions delivered in primary care or through other ambulatory services. ASH rates fell over this period for the PHO enrolled population.

Figure 14. Comparison of ASH rates between local and PHO enrolled populations



ASH and inequalities

Across the country, ASH rates varied despite the same funding inputs. The long term trends in ASH for C&C DHB in the graph below indicates a narrowing of inequalities between Māori and Pacific and Other, in the 0-4 age range. This is a positive result compared to other urban DHBs where there are mixed results.

Figure 15. ASH trends for 0–4 year old children, 2001-07 by urban DHBs

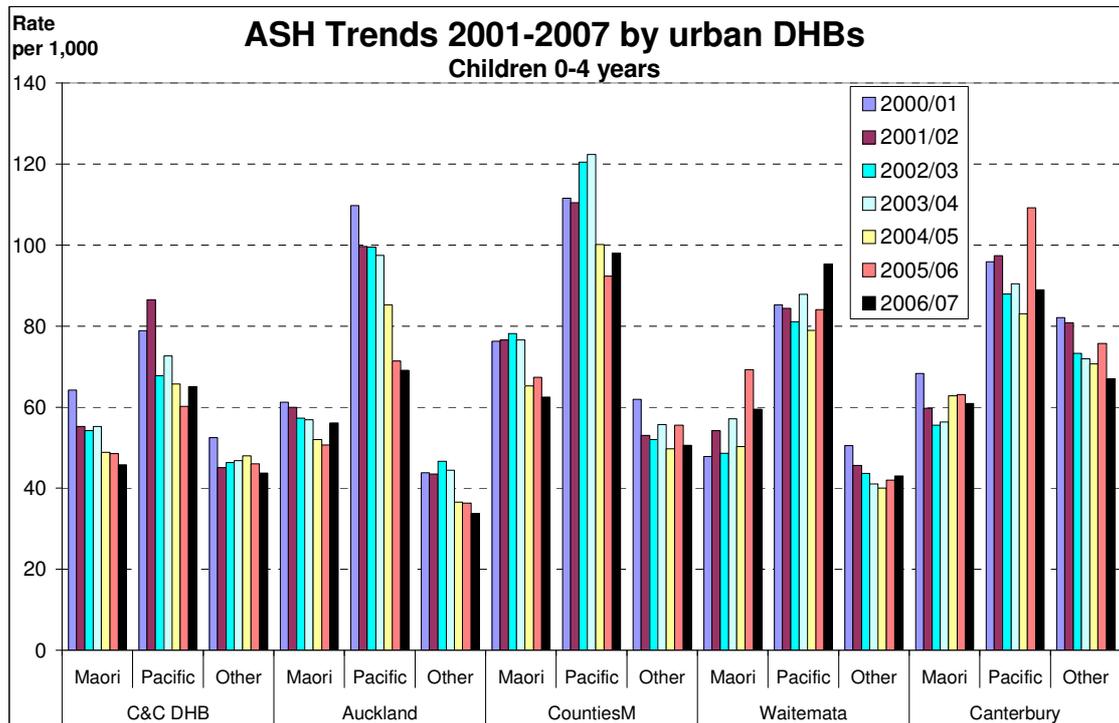
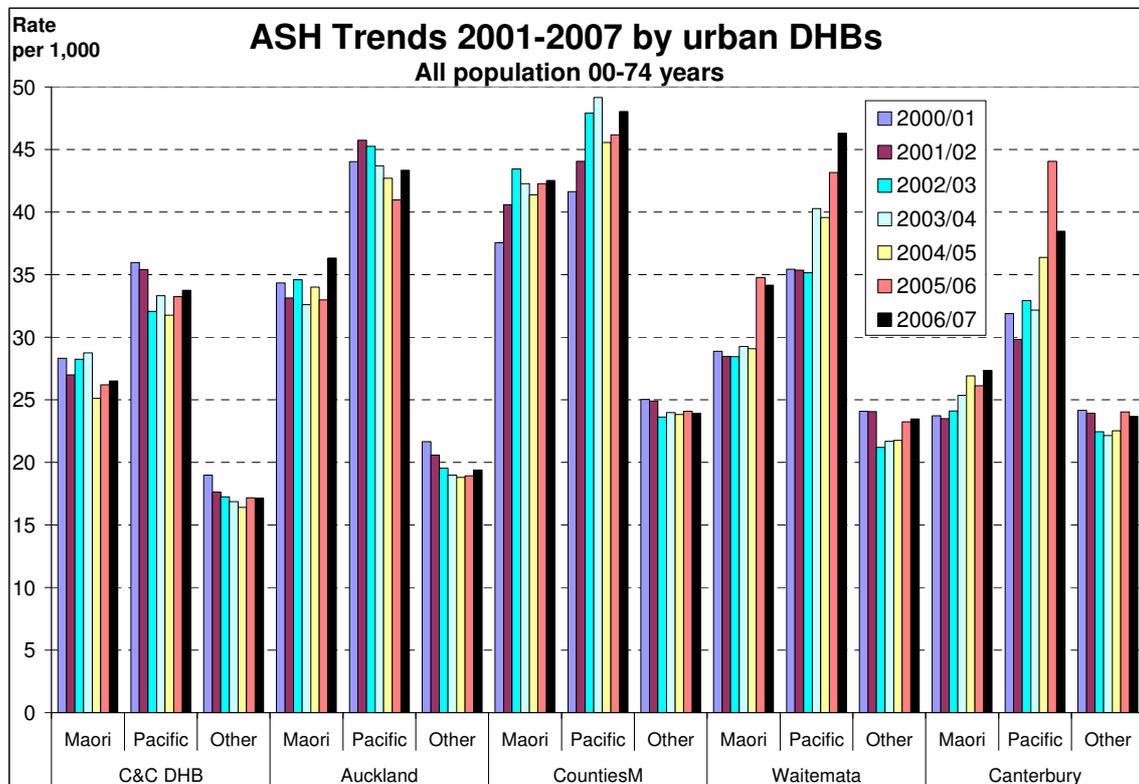
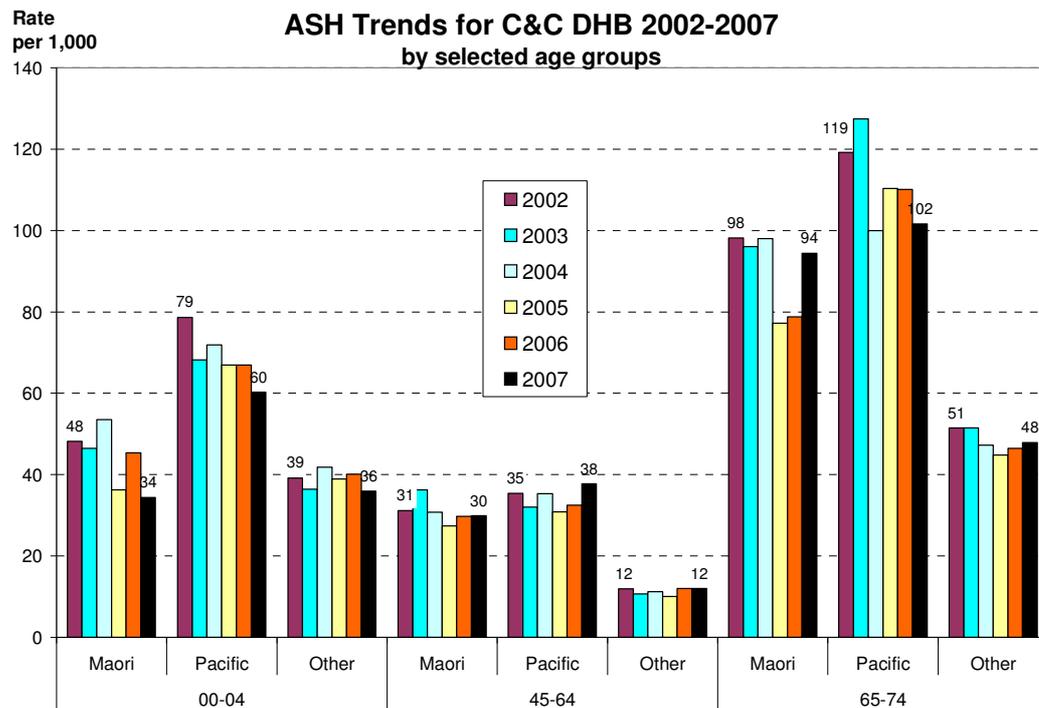


Figure 16. ASH trends 2001-2007 by urban DHBs



The ASH trends for 0-74 year olds in the District was consistently less than national average and decreased over this period. However, significant disparities remained between Māori, Pacific and Other adult populations over the period of the study.

Figure 17. ASH trends by selected age groups, 2002–07

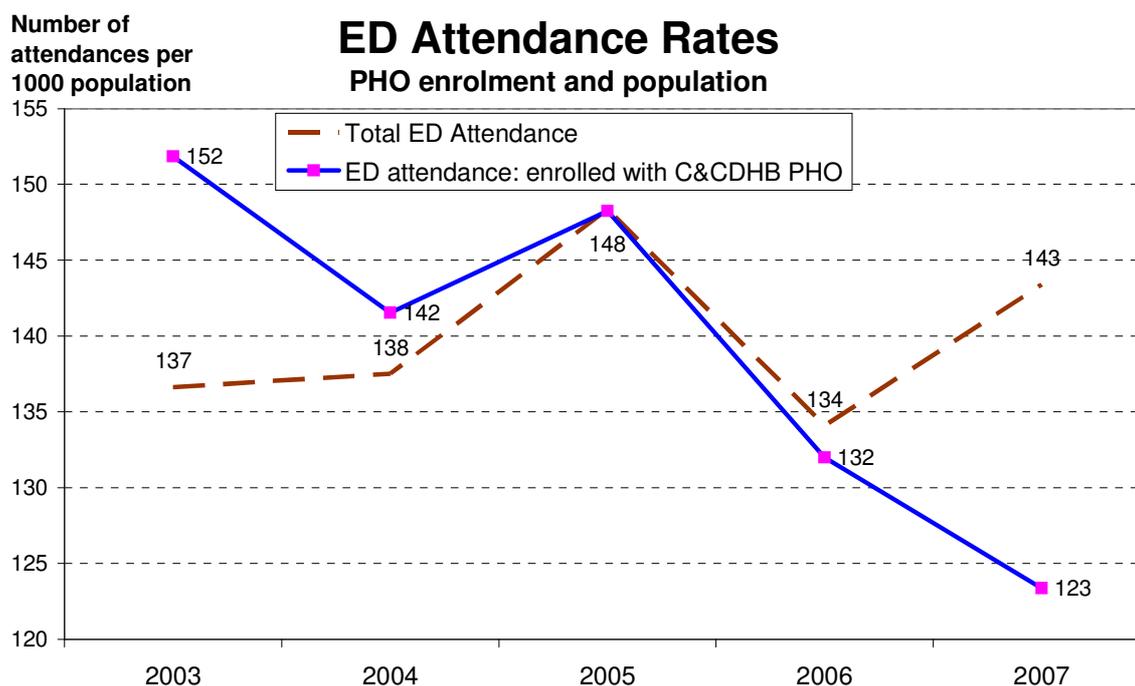


Inequalities in C&C DHB slowly reduced both in absolute and relative terms. Both the rate and the trend were favourable compared to the results in other large urban DHBs over this period.

ED attendances

Total ED volume at Wellington Hospital was nearly 46,000 in 2007, with 14% of those attendances by people from outside of C&C DHB. ED attendances grew steadily at 2% per year over the period. The PHO enrolled population contributed to 0.2 % of the growth in total ED attendances, while those not enrolled, or outside of C&C DHB PHOs contributed 1.7% of the 2% increase. This suggests a link between primary care access and ED attendance.

Figure 18: ED rates of local C&C DHB population by PHO enrolment status



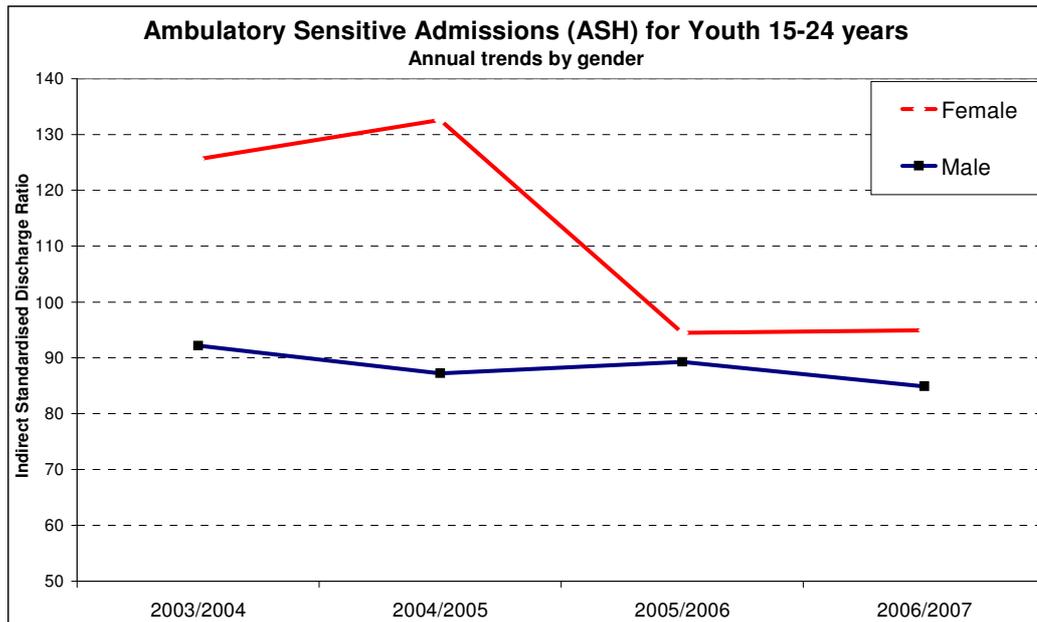
Immunisation coverage as a marker of access and outcomes

From November 2007, C&C DHB had reliable data, based on the National Immunisation Register (NIR). By January 2008, the NIR data indicated that 85% of C&C DHB children were fully immunised at two years (national average 77%); 81% of Māori two year olds (national average 69%) and 82 % of Pacific children (national average 75%). Since this study was completed, the coverage has risen further and was 91% (national average 87%) in 2010.

Service mix and health outcomes for vulnerable populations

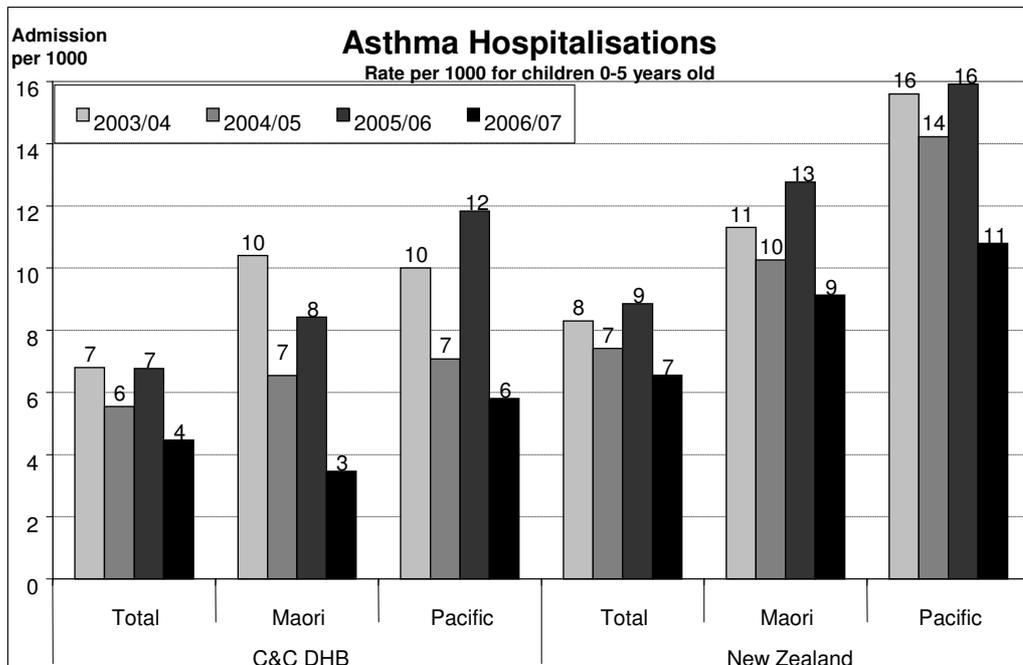
The mix of services operating at different levels of the DHB influences health outcomes for vulnerable populations. Young people attend general practice less than other populations, particularly youth living in high deprivation areas. Investment in a range of youth-specific services resulted in an increase in primary care service uptake by young people over the study period, but ethnic disparities in access were not reduced. (4% increase for Māori, 9% for Pacific, 12% Other and 9% high needs). ASH rates dropped steadily for young males, and dramatically for females from 2003-2007.

Figure 19. Ambulatory sensitive hospital admissions for youth



Asthma in children is a sensitive indicator of primary care access and quality. Note that the Māori rate in 2006/07 is less than Other which demonstrates the value of improved primary care access and Māori niche services.

Figure 20. Asthma admission rates for children—C&C DHB and NZ



Discussion

This paper, based on the C&C DHB Framework report,⁶ illustrates that sustained and targeted investment in primary care impacts positively on health outcomes, reduces avoidable hospital use and can reduce health inequalities. The results confirm international research findings and support the value of investment in comprehensive primary health care to drive effectiveness, efficiency, and equity in health systems.^{1-2, 9-13}

High levels of enrolment, increased utilisation and affordability of primary care services, combined with active community engagement and a range of community-led initiatives led to reduced ASH and reduced ED attendances for the enrolled population, and improved immunisation rates across the District. Importantly, improvements were particularly striking for Māori, Pacific, high deprivation, and youth populations.

In short, increased investment in primary health care improved population health outcomes overall and, within two or three years of the increased primary care focus, was demonstrating promising impact on inequalities. Sustained investments over and above PHO funding and a collaborative planning approach with ongoing provider and community input were required to achieve these results. This is a case study of a comprehensive approach to primary health care and a participatory model that was implemented in one District. It is therefore not reflective of the whole New Zealand experience.

A striking finding of this study is that Māori providers improved utilisation for all ethnicities. Clearly, there are elements of the approach to service delivery in Māori providers that work to improve utilisation for the enrolled population, not just Māori.

A range of youth-friendly service developments, including school clinics in Porirua, youth health services in Wellington and Kapiti, subsidised sexual health services, youth-led health promotion initiatives and rangatahi engagement activities improved primary care utilisation by young people. The results, including a decrease in avoidable admissions was encouraging.

Further initiatives, being introduced at the end of the study period, included a 'boyz clinic' with male peer support workers, a male GP and periodic activities to draw in more young men to the youth health services. In the early stages of this development, the service reported that young men, particularly young Māori who were not registered elsewhere, were participating. This may reduce inequalities in utilisation and health outcomes for this age group.

It was expected that ED use would reduce with increased primary care funding to reduce cost barriers and increase primary care capacity. However, the impact on ED use was complicated by unintended or unanticipated factors such as workforce shortages, "closed books" or limited enrolment policies in primary care practices, intermittent increased pressure on GP capacity due to national programmes such as the MeNZB campaign, influenza vaccine shortage, and changed after hours arrangements. In many practices significant cost barriers remained for most patients.

Despite these factors, it was clear that ED use by the population enrolled in a PHO fell substantially.

The World Health Report 2008 outlined two strategies to address inequity: moving towards universal access to health services and working with communities to change social and environmental factors affecting community health.¹⁴⁻¹⁵

The workforce growth and redistribution observed in C&C DHB demonstrates the value of differential investment to improve services in areas of high need and traditionally poorer levels of primary care access and utilisation. Despite this, capacity issues affecting appointment availability, the ability to register with a general practice and continuity of care remained an issue in some parts of the district. These capacity issues were partly due attributable to the success of the primary health care strategy, with increased utilisation by existing enrollees, longer consultations to support chronic disease management, increased expectations of expanded primary care services and increased income allowing some general practitioners to reduce hours of work.

While improvements in utilisation were achieved for Māori, Pacific and low income populations, the developments fell far short of universal free access for any high need population or age group. Substantial co-payments remained for the majority of service users, reducing the accessibility of services for many in the district. However, there is evidence in this report that, even within two or three years of increased investment in primary health care and with a strong focus on inequalities, tangible results are possible.

Space does not allow description of the many tailored service initiatives nor the range of community-led action and intersectoral projects that were integral to C&C DHB's primary health care development over this time. Some initiatives were particularly designed to enhance participation by marginalised or 'hard to reach' communities and improve health outcomes in these groups. Others to improve housing, income and employment, urban planning, social inclusion and youth development involved a broad range of health professionals and community groups. During this period of primary care development, fostering community participation, engaging in intersectoral projects and supporting community action to address such issues came to be regarded as core business by PHOs and primary care providers.

The summary provided in this paper gives some indication of the scale of new investment in primary health care in C&C DHB as the national primary health care strategy was implemented. Across the set of results reported in this paper, there is evidence of improved access to primary care, reduced avoidable hospitalisations, better health outcomes and some promising progress in addressing inequalities.

This paper reinforces the value of the comprehensive primary health care approach taken in C&C DHB. It demonstrates the strength of the mix of services and strategies that were built around general practice-based first contact primary care. The tailoring of primary health care services to meet different needs in different communities, mechanisms for community participation,¹⁴ and intersectoral action with communities and providers improved outcomes for all,¹³ and most markedly for Māori, Pacific, youth and refugee populations, the most marginalised and those with the poorest health status.

The combination of these ingredients in C&C DHB's approach illustrates the potential to reduce avoidable admissions and acute demand through the correct mix of primary care services. It also shows a successful outcome of a more primary care oriented system anticipated in the Primary Care Strategy 2001.¹⁶

For a fuller description of the developments and outcomes, refer to the Report "Primary Health Care in C&C DHB".¹⁷

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A full copy of Report is available on the C&C DHB website:

http://www.ccdhb.org.nz/planning/Primary_Care/docs/PCF_Report_2009_Final.pdf

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Investigating factors that influence success of Pacific students in first-year health sciences at university in New Zealand

Faafetai Sopoaga, Jacques van der Meer

Abstract

Aims Pacific peoples in New Zealand are a migrant population and suffer disproportionately from poor education outcomes compared to the total population. The purpose of this study was to understand factors that influence academic achievement of Pacific students studying health sciences at the University of Otago.

Methods Pacific students enrolled in health sciences first year (HSFY) in 2010 were invited to complete a questionnaire on their experiences and adjustment to university. It sought information on university preparedness and “engagement factors”. Academic results were obtained.

Results 90% of eligible Pacific students completed the questionnaire. Most students scored their experiences at university highly. Following first semester exams, 60% passed all papers and 40% failed one or more papers. Of those who failed a paper, 50% felt they had developed good study skills. One-third would memorise facts without fully understanding them. Fourteen (23%) HSFY students were successful in getting into a health professional course after end-of-year exams.

Conclusions Factors influencing academic outcomes of Pacific students at first year of study at University are complex. Further research focussing on effective roles universities can play in the provision of support, and the influence of preparedness prior to entering university is required.

Pacific peoples living in New Zealand, a migrant ethnic group make up approximately 7% of the total population.¹ Since the 1960s, increasing numbers migrated to New Zealand from different islands in the Pacific for better employment and educational opportunities.²⁻⁴

The Pacific population however is over-represented in poor health statistics and socioeconomic determinants of health when compared to the total population.^{1,5} Pacific peoples share many concerning socioeconomic factors which influence health with Māori, the indigenous people of New Zealand.⁶

Education is an important determinant of health.⁷ In recent times there has been some improvement in education outcomes for Māori students; however, concerning trends remain unchanged for Pacific students.⁸ For example, completion rates for Pacific students in tertiary education was lower than all other ethnic groups, including Māori.⁸

The issues involved are complex and influenced by student development and preparation prior to university,⁹ transition and experiences at university¹⁰ and socioeconomic and cultural factors.⁷ In response to these concerns, the New Zealand

Government outlined Pacific plans to improve health and education outcomes for Pacific peoples.^{11,12} Increasing the number of Pacific peoples successfully completing health education training will contribute to improving outcomes, and provide a diverse workforce for a multi-ethnic society in New Zealand.

Pacific health professionals make up 1% of doctors, 2.8% nurses, 0.7% physiotherapists, 0.5% dentists, and 0.2% pharmacists in the New Zealand health workforce.¹³ A government strategy to addressing disparities included improving educational achievements, and Tertiary Education Institutions are expected to be part of the solution.¹⁴

The University of Otago has four academic Divisions with 21,780 enrolled students in 2010. The Division of Health Sciences is the largest provider of health education and professional training in New Zealand. It has the first established medical school in New Zealand, the sole training site for dentists, provides training in physiotherapy, pharmacy, oral health, medical laboratory science, bio-medical science and radiation therapy. In 2010, there were 4702 students enrolled in the Division. Of these, 163 (3.5%) self-identified as Pacific students.

Students who wish to enter a health professional course at the University of Otago are required to enrol in the competitive HSFY course.¹⁵ The academic requirements for entry into a health professional course varies across different programmes within the Division.¹⁶ Some health professional courses have Affirmative Action Programmes for minority groups, which seek to increase the entry of students from under-represented minorities. Similar programmes are offered in the USA and UK universities.^{17,18}

The number of Pacific students successful in entering health professional courses following the HSFY course however is low, and numbers have not increased over the past decade.¹⁹

Previous studies have outlined the importance of the “first-year experience” for students in Universities.^{20,21} Many tertiary institutions in the USA, UK and more recently in Australasia have used national student surveys focussing on “student engagement” to identify areas associated with successful academic outcomes.²²⁻²⁴ “Engagement” is the extent to which students devote to educationally purposeful activities and the policies and practices that institutions use to encourage students to take part in these activities.^{21, 24, 25}

These surveys found a supportive campus environment, good staff-student and student-student interactions, high level of academic challenge, collaborative learning environment and enriching educational experiences were linked to successful academic outcomes for students.

Research in the USA however have often grouped students from the Pacific Islands and those from Asian countries together,²⁰ and a recent Australasian study provided very limited information on Pacific students and “engagement” in New Zealand.²⁴ There has been some research and work in New Zealand on tertiary education for Pacific peoples in New Zealand,²⁶⁻²⁹ however none of these has focussed specifically on first year health sciences at tertiary level.

We conducted this research with the aim to understand “engagement”, transition and adjustment to university for Pacific health sciences students in their first year of study, and investigate the relationship between these and academic outcomes.

Methods

Students who identified with a Pacific Island ethnicity at registration and enrolled in the HSFY programme at the University of Otago in 2010 were eligible to participate. Pacific students were identified from the Division of Health Sciences database and recruited mid-way through the first semester over six weeks. Recruitment started on 24 April 2010. A message was sent from the Associate Dean (Pacific) by e-mail to all eligible students, explaining the purpose of the survey and inviting everyone to participate.

Students were recruited by Pacific research assistants during a Pacific HSFY student forum. Those who participated went into a draw for a raffle to win prizes (valued at \$150, \$100, and \$50). A small gift was offered to students who completed the questionnaire at later events during lunch hours, and after tutorials offered by the Pacific Islands Centre. In the final week of the survey, remaining students were contacted through mobile phone and offered the opportunity to participate.

All students who agreed to participate were given information sheets outlining the aims of the research and contact details if they had further questions. Ethical approval was obtained from the University of Otago Human Ethics Committee at the departmental level.

The questionnaire obtained information about students’ socio-demographic background, career choice, transition and adjustment to the University environment, study skills, perception of learning, engagement with peers, and use of existing support networks. Responses consisted of a five-point Likert rating scale (ranging from 1=Strongly disagree to 5=Strongly agree). Other response scales included: “Not very well” to “Very well” and “Not very close” to “Very close”.

Data from the questionnaires were entered into an excel sheet. Results from first semester exams and successful entries into health professional programmes at the end of the year for all students were obtained. Data were analysed using SPSS statistical software.

Results

Sixty-six students were identified as Pacific from the Division of Health Sciences database. Eleven students enrolled online at the beginning of the year, but did not attend university and were excluded. Six Pacific Island students completed the questionnaire, but were not on our original database. Of the 61 students who were eligible to participate, 55 completed the survey, one declined, and five could not be contacted, giving a response rate of 90%.

Of the 55 participants, 60% passed all papers and 40% failed one or more papers from the first semester exams. Of the 61 Pacific students who enrolled in the HSFY course in 2010, 14 (20%) were successful in getting into a health professional course in 2011. Five in physiotherapy, four in medicine, three in pharmacy and two in dentistry.

Baseline demographic details are presented in Table 1. The majority of students (96%) had parents who lived outside the university city area. Most students (63.5%) lived in a residential college/hall, 21.8% flatting situation, 9.1% with parents/relatives, and 5.5% in other living arrangements. Ninety one per cent of students entered university directly from high school. Most students (73%) indicated a preference for studying medicine if they were successful in their HSFY course. Fifteen per cent indicated a preference for dentistry, 6% physiotherapy and 6% a range of other health courses.

Most (85%) preferred to stay within the health sector as a career pathway, even if they did not succeed the following year in getting into their preferred health course. Of

these, some preferred to complete a degree and apply again to their preferred course through the graduate entry pathway, others indicated they would train in a different health area.

Table 1. Demographic characteristics of Pacific students enrolled in Health Sciences First Year (HSFY)

Demography of study participants		n (%)
Age group (years)	16–19	45 (81.8)
	20–24	7 (12.7)
	25–29	2 (3.6)
	30–49	1 (1.8)
Gender	Female	35 (63.6)
	Male	20 (36.4)
Ethnicity	Samoan	12 (25.5)
	Cook Islands (Māori)	4 (7.3)
	Tongan	9 (16.4)
	Niuean	0 (0.0)
	Fijian Indigenous	4 (7.3)
	Fijian Indian	22 (40.0)
	Tokelauan	1 (1.8)
	Other Pacific ethnicity	1 (1.8)
Did not respond	2 (0.0)	
Languages spoken	English only	20 (37.0)
	English plus Indigenous language	17 (31.5)
	English plus Indian language	15 (27.8)
	English and non-PI language	2 (3.7)
	Did not respond	1 (0.0)

Table 2 shows five areas which describe the “first year experience” of Pacific students at the University of Otago. Most students reported satisfaction with their transition into university life, felt the campus environment was supportive and positive, integrated well with their peers and developed friendships, received good academic support, and sought or felt able to seek assistance for their studies. One-quarter struggled with the course, 22% were not coping with the academic workload, and 18% felt the workload was not what they expected it to be.

Table 3 shows study skills of participants and academic performance in the first semester exams. Most students felt they were able to get help for their academic courses when needed, work independently, and had developed good study skills. Half of those who failed a paper “agree/strongly agree” they had developed good study skills. Students who passed all papers were more likely to “agree/strongly agree” they “feel confident to approach lecturers for advice and assistance” than those who failed a paper. This result was statistically significant.

Table 2. The experiences of Pacific students in HSFY

Variables	Disagree/Strongly Disagree	Somewhat Agree	Agree/Strongly Agree
	1 to 2 n (%)	3 n (%)	4 to 5 n (%)
Transition to University			
I was well prepared for University by my previous education experience	6(11)	18(33)	31(56)
Study at University was what I expected it to be	10(18)	12(22)	33(60)
I am confident doing HSFY was the right decision	1(2)	10(18)	44(80)
I am enjoying my course very much	4(7)	12(22)	39(71)
I feel lonely most of the time since arriving at University	44(80)	8(15)	3(5)
I am seriously considering dropping out of University	54(98)	1(2)	
Overall I am happy with my experiences at the University of Otago	1(2)	6(11)	48(87)
Campus Environment			
I think the University of Otago as a whole takes an interest in student welfare	3(5)	11(20)	41(75)
I really enjoy organised Pacific student events*	4(8)	15(28)	34(64)
My academic experiences at University so far has been positive	1(2)	20(36)	34(62)
The University of Otago is not providing enough support for the social and cultural needs of Pacific students	39(71)	8(15)	8(15)
Peer Engagement			
I have made a lot of friends	2(4)	3(6)	50(91)
I usually 'hang out' mostly with Pacific students	33(60)	4(7)	13(33)
I am ok with 'hanging out' with students from different ethnic backgrounds	3(5)	1(2)	51(93)
I discuss my work with other students studying the same subject	2(4)	5(9)	48(87)
Staff-Student engagement			
The University of Otago provides good academic support for Pacific students	0	6(11)	49(89)
Academic staff make it clear what is expected of us	4(7)	14(26)	37(67)
I am able to get help for my academic course when I need it	1(2)	7(13)	47(75)
I feel confident to approach lecturers for advice and assistance	14(25)	11(20)	30(55)
Academic Challenge			
The workload is what I expected it to be	10(18)	15(27)	30(55%)
I am having difficulty with most of the material in the course	22(40)	19(35)	14(25)
I have regularly sought extra help for my studies†	7(13)	14(26)	33(61)
I am not coping with the workload	25(45)	18(33)	12(22)
I will probably change to another course in 2011	42(76)	7(13)	6(11)

*missing 2 responses, † missing 1 response.

Table 4 outlines students' perception of learning and academic performance in the first semester exams. Students who passed all papers were more likely than those who failed a paper to "agree/strongly agree" that "learning for me is building up knowledge by acquiring facts and information", and "learning for me is knowing how to acquire knowledge on my own". These results were statistically significant. More than half of all participants felt the need to pass exams and complete assignments were their main reasons for studying. Approximately one-third of all students would memorise facts they did not fully understand.

Table 3. Pacific students in HSFY, study skills and academic performance

	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree	Total	p-value
Able to get help for my academic course when I need it							
Pass All Papers	0.0%	0.0%	12.1%	33.3%	54.5%	100.0%	0.641
Fail 1 or More Papers	0.0%	4.5%	13.6%	27.3%	54.5%	100.0%	
Able to work independently without much direction from lecturers							
Pass All Papers	6.1%	3.0%	15.2%	48.5%	27.3%	100.0%	0.385
Fail 1 or More Papers	4.5%	0.0%	27.3%	59.1%	9.1%	100.0%	
Feel confident to approach lecturers for advice and assistance							
Pass All Papers	15.2%	3.0%	18.2%	33.3%	30.3%	100.0%	< 0.01
Fail 1 or More Papers	0.0%	36.4%	22.7%	27.3%	13.6%	100.0%	
I have developed good study skills							
Pass All Papers	6.1%	12.1%	21.2%	39.4%	21.2%	100.0%	0.612
Fail 1 or More Papers	9.1%	4.5%	36.4%	27.3%	22.7%	100.0%	

Table 4. Pacific students in HSFY, perceptions of learning and academic performance

	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree	Total	p-value
Learning for me is knowing how to acquire knowledge on my own							
Pass All Papers	0.0%	3.0%	3.0%	45.5%	48.5%	100.0%	< 0.05
Fail 1 or More Papers	0.0%	0.0%	31.8%	27.3%	40.9%	100.0%	
Learning for me is building up knowledge by acquiring facts and information							
Pass All Papers	0.0%	0.0%	6.3%	40.6%	53.1%	100.0%	<0.05
Fail 1 or More Papers	0.0%	0.0%	33.3%	38.1%	28.6%	100.0%	

When I learn, I try to memorise a lot of facts I don't fully understand						
Pass All Papers	24.2%	18.2%	27.3%	21.2%	9.1%	100.0%
Fail 1 or More Papers						
						0.531
Pass All Papers	13.6%	31.8%	22.7%	13.6%	18.2%	100.0%
Fail 1 or More Papers						
						0.850
The need to pass exams and to complete assignments are my main reasons for studying						
Pass All Papers	12.1%	6.1%	18.2%	30.3%	33.3%	100.0%
Fail 1 or More Papers						
						0.850
Pass All Papers	9.1%	13.6%	22.7%	22.7%	31.8%	100.0%
Fail 1 or More Papers						
						0.850

Table 5 shows preparedness for university and academic performance in the first semester exams. Students who passed all papers were more likely than those who failed a paper to “strongly agree” that taking HSFY was the right decision and that they “disagree/strongly disagree” about not coping with the workload. These results were statistically significant. Those who “strongly agree” the workload was what they expected it to be, were more likely to pass all papers. Of all students, most felt that they were prepared for University by their previous education experience.

Table 5: Pacific students in HSFY, preparedness for university and academic performance

	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree	Total	p-value
Prepared for University by previous educational experience							
Pass All Papers	6.1%	6.1%	24.2%	51.5%	12.1%	100.0%	
Fail 1 or More Papers	4.5%	4.5%	45.5%	31.8%	13.6%	100.0%	0.537
Workload what I expected it to be							
Pass All Papers	3.0%	9.1%	30.3%	24.2%	33.3%	100.0%	
Fail 1 or More Papers	4.5%	22.7%	22.7%	36.4%	13.6%	100.0%	0.316

Not coping with the workload							
Pass All Papers	18.2%	42.4%	21.2%	18.2%	0.0%	100.0%	
Fail 1 or More Papers	4.5%	18.2%	50.0%	18.2%	9.1%	100.0%	< 0.05
Confident HSFY was the right decision							
Pass All Papers	0.0%	0.0%	3.0%	27.3%	69.7%	100.0%	
Fail 1 or More Papers	0.0%	4.5%	40.9%	36.4%	18.2%	100.0%	<0.001

Discussion

The “first-year experience” of Pacific students studying Health Sciences at the University of Otago was positive for most students. Students scored favourably their experience of transition to university, the campus environment, and engagement with peers and staff. Previous research suggested these factors were associated with successful academic outcomes for students in the first year of study at university.^{21, 25, 30}

Following the first semester exams, 60% passed all papers, and 40% failed one or more papers. Nearly one quarter were successful in getting into a health professional course after end of year exams. Those who strongly felt they were doing the right course, confident to seek help, and coping with the workload were more likely to do well, as were those had a self directed approach to learning.

Of those who failed a paper, 50% felt they had developed good study skills, and 45% felt they were prepared for University by their previous educational experiences. At least half of all students felt the need to pass exams and complete assignments were the main reason for studying, and one-third would memorise facts without understanding them.

These results show factors associated with success or otherwise of Pacific students at University level are complex. Transition into university and “engagement” factors satisfaction were at a high level for most students, however, overall academic performance was low. Although many students felt they were prepared for university study, academic performance in the first year of study suggests otherwise. Pacific students’ preparedness for university, perception of their study skills, purpose for and methods of learning require further investigation.

Most students identified either medicine or dentistry as their preferred course. The aspirations of most HSFY students and their families are for these highly desirable careers. Universities need to consider how it can respond to students who do not gain entry into these programmes, and provide opportunities to students from underserved communities.³¹

The health sector in New Zealand requires Pacific health professionals in many areas. There is a need for health training institutions to effectively promote to the wider community all available health courses. For example, there are very good careers in

less well known areas such as radiation therapy, oral health and biomedical sciences where entry are less restrictive.

Our results suggest that there may be possible disparities between different Pacific ethnic groups and access to higher education. For example, nearly half of study participants were Fijian, 26% Samoan, 16% Tongan and 7% originate from the Cook Islands. However, for all Pacific peoples living in New Zealand, the majority (50%) are Samoan, 22% Cook Islands, 19% Tongan and 4% are Fijian. A national study comparing different Pacific ethnic groups access to, and academic performance in higher education may provide useful information for targeted initiatives.

The ability to communicate well with patients is an important aspect of health care.³² Approximately 60% of students were bilingual. This is a useful skill when working with Pacific patients in New Zealand where language can be a barrier. Previous research indicated students who stayed in residential halls had better academic outcomes compared to those who were not.³³ Most students in our study stayed in halls of residence. It may be useful to investigate this relationship further with Pacific students where sufficient numbers would allow comparisons.

The strengths of this study include the high response rate. This is partly due to the University's developed relationships with Pacific students through its student organisation Pacific Islands Health Professional Students Association (PIHPSA) and local Pacific support networks. Maintaining good relationships with Pacific students, their families and the wider community will assist future developments and research.

There were however, limitations in our study. The recording of ethnicity data was problematic. Some Pacific students who completed the questionnaire were not identified as Pacific on the University data system, and others were recorded as enrolled but never started the year. The data used for monitoring all Pacific students within the University system therefore, may not be complete or may have inaccuracies.

Conclusions

Factors influencing academic outcomes of Pacific students at first year of study at university are complex. There is an urgent need to better understand these factors and how to address them effectively for improved education outcomes. "The knowledge obtained from this research will guide future services and interventions for Pacific health sciences first year students at the University.

Since completing the research reported in this article, we have developed a targeted programme for Pacific health sciences student called the POPO (Pacific orientation programme at Otago). This is a specifically tailored transition programme for Pacific health sciences students into the University. A stage two pilot is planned for 2012".

It is important also to engage the Pacific community when developing solutions and pathways forward. Further research focussing on effective pathways for preparing Pacific students in health sciences from schools to higher education, including barriers and enablers for success, is needed.

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Final-year medical students' perceptions of maternity care in general practice

Hanna Preston, Dawn Miller

Abstract

Aims To investigate the perceptions of final year medical students' (known as trainee interns or TIs) at the University of Otago about maternity care in general practice, their possible future roles in general practice maternity care, and factors influencing this.

Methods An anonymous questionnaire using the online programme SurveyMonkey was emailed to the 227 Otago University TIs. Results were analysed using SurveyMonkey statistical analysis.

Results The response rate was 50.7%. About 90% of the TIs thought GPs should provide antenatal and postnatal care, 80.7% supported shared care and 55.7% thought GPs should provide full maternity care if interested and trained to do so. Almost 80% thought women should have access to full maternity care in general practice.

If practicing as a GP 90% or more of respondents would consider providing prenatal, early pregnancy, antenatal, postnatal care, or shared care and 64.0% full maternity care. Of the 29 TIs (25.2%) who had seen a GP practicing full maternity care 82.8% would consider offering this level of care if practicing as a GP. And 68.3% of the 65 TIs interested in a rural general practice career would consider providing full maternity care. Issues of training, professional support, funding and continuity of care for patients were important factors in contemplating providing full maternity care.

Conclusions TIs are interested in providing a wide range of maternity services if practicing as a GP. Many professional and lifestyle issues could influence our future doctors when deciding whether to practice maternity care in general practice.

Maternity care workforce shortages are a problem in New Zealand. There is a shortage of both midwives and specialist obstetricians in some regions¹ and a dramatic decline in the number of GPs providing full maternity care means that most women do not have the choice of a GP obstetrician (GPO).

Since the changes to maternity care legislation in the 1990s, and the introduction of the lead maternity carer (LMC) model of care, midwives can practice independently in New Zealand.¹ The LMC has overall clinical and budgetary responsibility for a woman's primary maternity care.¹

Midwives now provide at least 80% of LMC services.² Women choose their LMC, who can be either a midwife, GPO or obstetrician. An increasing number of women experience difficulties finding a suitable LMC,³ especially in rural areas.⁴ The government has allocated funding for training and retraining of GPs in maternity care.⁵ This raises the question: are the future doctors of New Zealand interested in providing maternity care?

There are no known New Zealand studies investigating medical students' views about providing maternity care as part of general practice. Reasons for declining GP maternity services identified in a review of research from Canada, USA, parts of Europe and Australia include: interference with lifestyle and interruption of office routine, fear of litigation and costs of malpractice insurance, insufficient training and insufficient numbers of cases to retain competency.⁶

A recent New Zealand study investigating factors that influence trainee interns (TIs), and junior doctors when considering career choices found that interest in a specialty and lifestyle were the two most important factors for those considering general practice as a specialty.⁷ Having personal experience in a specialty, reports from others in a specialty and having individual role models most influenced career decisions.⁷ With only 54 GPOs identified in 2006 by the Royal New Zealand College of General Practitioners,⁸ opportunities for students to gain any personal experience or exposure to this role could be limited.

This study aimed to investigate TIs' perceptions about the provision of maternity care in general practice in New Zealand, their possible role as future GPs in that service, and the factors that influence this.

Methods

This study surveyed TIs enrolled at the Dunedin (n=69), Christchurch (n=72) and Wellington (n=86) Schools of Medicine, University of Otago, for the year November 2009 - November 2010. TIs are final-year medical students in their sixth year of training. Those surveyed included 12 TIs from the 2008-2009 TI class who were still completing their final quarter, giving a total of 227 students. Twenty TIs had completed the Rural Medical Immersion Programme (RMIP) as fifth-year students, undertaking that year of their medical course in a rural setting.

Students were invited by email to participate in an online questionnaire. Two reminder emails were sent at 1 week intervals after the initial invitation. All emails included a hyperlink to the questionnaire, and a Participant Information Sheet. The second reminder email included the introduction of \$50 vouchers as spot prizes to randomly selected TIs, to encourage participation.

The questionnaire was delivered through the online programme SurveyMonkey™ and included ten questions and additional demographic data. It could be completed and submitted online. Maternity care periods were defined as: prenatal care (preparation for pregnancy), early pregnancy care (pregnancy testing, management of complications of early pregnancy), antenatal care (monitoring and support throughout pregnancy), postnatal care, shared care (seeing pregnant women on alternate antenatal visits to midwife's visits and postnatally), and full obstetric care (through pregnancy, labour, delivery, and postnatally). Full obstetric care is also described as full maternity care. Quantitative results were analysed using the statistical analysis options available through SurveyMonkey.

Ethics approval for this study was granted by the University of Otago Human Ethics Committee.

Results

Response rate and representativeness—115 surveys were completed giving a response rate of 50.7%. Fifty-four TIs were on their Elective, a 3-month module encouraging other medical experience in New Zealand or overseas. Students on elective were less likely to have access to their university email to complete the questionnaire. Response rates were highest in Dunedin, and lowest in Wellington, ranging from 46.5% to 55%.

The demographic characteristics of the respondents are shown in Table 1. Respondents could identify with more than one ethnic group. The 'Other' ethnicity category includes two counts of 'New Zealander' and a further two as 'Wellington'

and 'Waikato'. There was a slight over-representation of TIs who were younger and of New Zealand-European ethnicity.

Table 1. Demographic characteristics of respondents

Characteristic	Respondents (%)	All TIs (%)
Age (years)		
20–24	89 (77.3)	133 (58.6)
25–29	21 (18.3)	88 (38.8)
30–34	4 (3.5)	5 (2.2)
35–39	1 (0.9)	1 (0.4)
Total	115 (100)	227 (100)
Gender		
Male	50 (43.5)	99 (43.6)
Female	65 (56.5)	128 (56.4)
Ethnicity		
NZ European/Pakeha	65 (54.6)	112 (43.2)
Maori	3 (2.5)	8 (3.1)
Chinese	14 (11.8)	30 (11.6)
Indian	6 (5.0)	11 (4.2)
Korean	3 (2.5)	11 (4.2)
Other	32 (26.1)	87 (33.6)
Total	119 (100.0)	259 (100.0)

General Practice and its role in maternity care—TIs were asked what maternity care services GPs who are interested and trained in maternity care should be offering. Prenatal and postnatal care had the highest levels of support, at 94.8% and 92.1% respectively. Most TIs also thought early pregnancy care (88.7%) and antenatal care (89.6%) should be offered.

Shared care with a midwife was supported by 80.7% of TIs and 55.7% thought such GPs should provide full maternity care (including care in pregnancy, labour/delivery and postpartum). Comments showed one reservation about providing maternity care was the impact on GPs' workload (11 comments). Almost all TIs thought that pregnant women should have the option of having their GP involved in antenatal and postnatal care (98.3%), with 79.1% believing that women should have access to full maternity care with a GP.

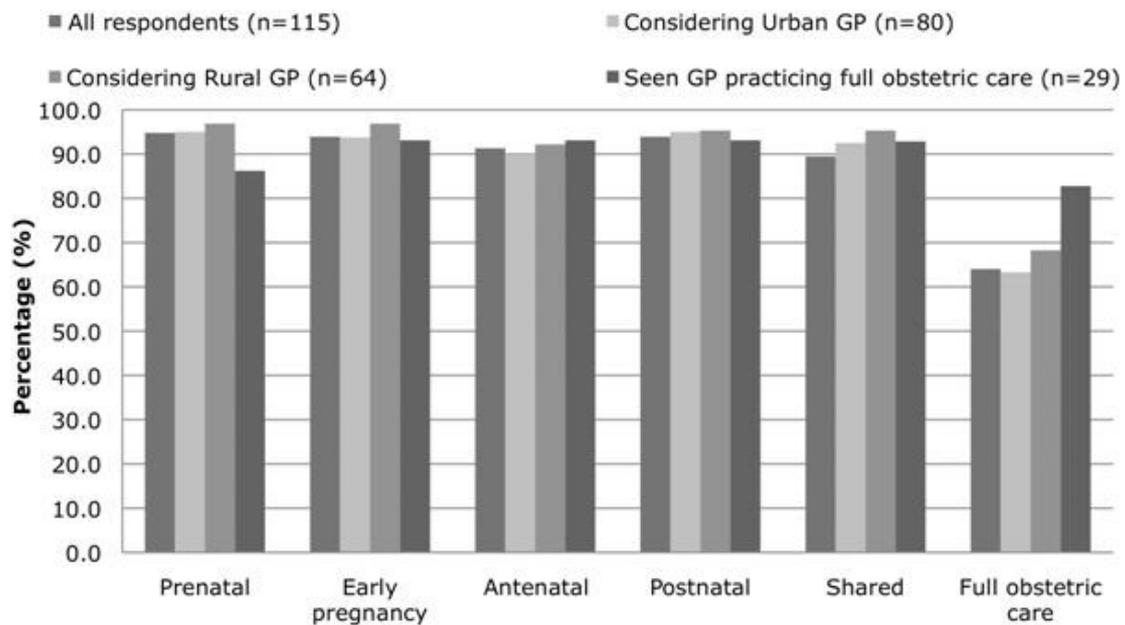
Exposure to maternity care in general practice—More than half (56.5%) of respondents had seen a GP practicing antenatal and postnatal care and 25.2% had seen a GP practicing full maternity care. This exposure to general practice maternity care was mainly as a medical student (70.1%), but also within the community (14.9%), and family (10.4%). Of the 13 respondents who undertook the Fifth Year RMIP, ten (76.9%) had seen antenatal and postnatal care, and six (46.2%) had seen full maternity care being practiced by a GP.

Our future GPs—A future career in urban general practice is being considered by 70.2% of respondents, and 56.1% are considering practicing as a rural GP. More than 90% of all respondents would consider (respondents who answered 'yes' or 'maybe') providing prenatal, early pregnancy, antenatal, and postnatal care if practicing as a GP

(Figure 1), with more than 70% answering ‘Yes’ to providing these services. Eighty-nine point five percent would consider providing shared care with a midwife. While 64.0% of respondents would consider providing full maternity care if practicing as a GP, almost half of that group (45.2%) stated, ‘Yes’, they would like to provide this service.

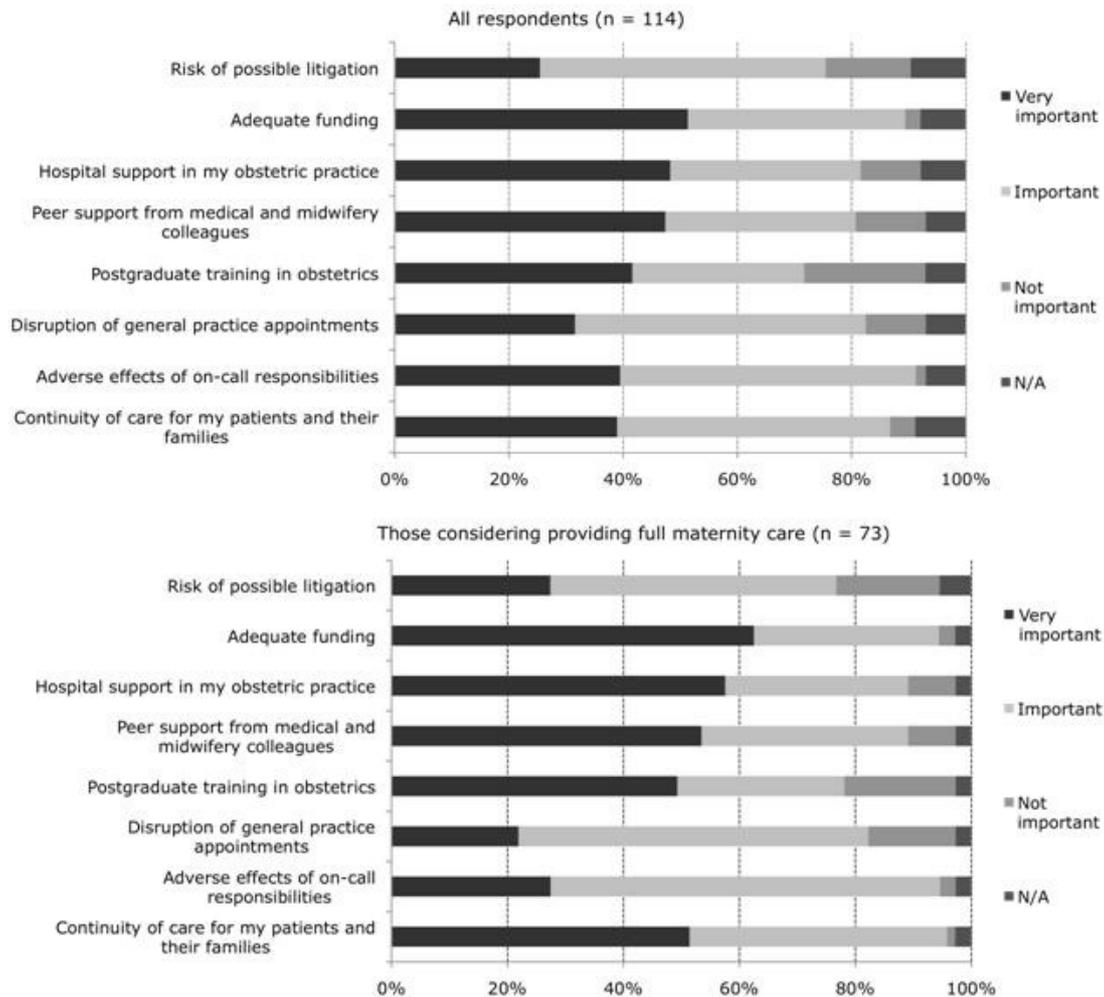
Results were similar for the subgroup of respondents who indicated an interest in general practice as a career (urban or rural). The main differences however were in regard to TIs’ interest in providing full maternity care in their general practice. Those TIs who had seen a GP practicing full maternity care were most likely to consider providing full maternity care in their general practice (82.8%) (Figure 1). Those TIs considering rural general practice as a career were also more interested to provide full maternity care (68.3%) (Figure 1).

Figure 1. Pregnancy care respondents would consider providing if practicing as GP



Respondents were asked to rate the importance of eight professional and lifestyle issues related to maternity care in general practice on a 3-stage scale of ‘not important’ to ‘very important’ (Figure 2).

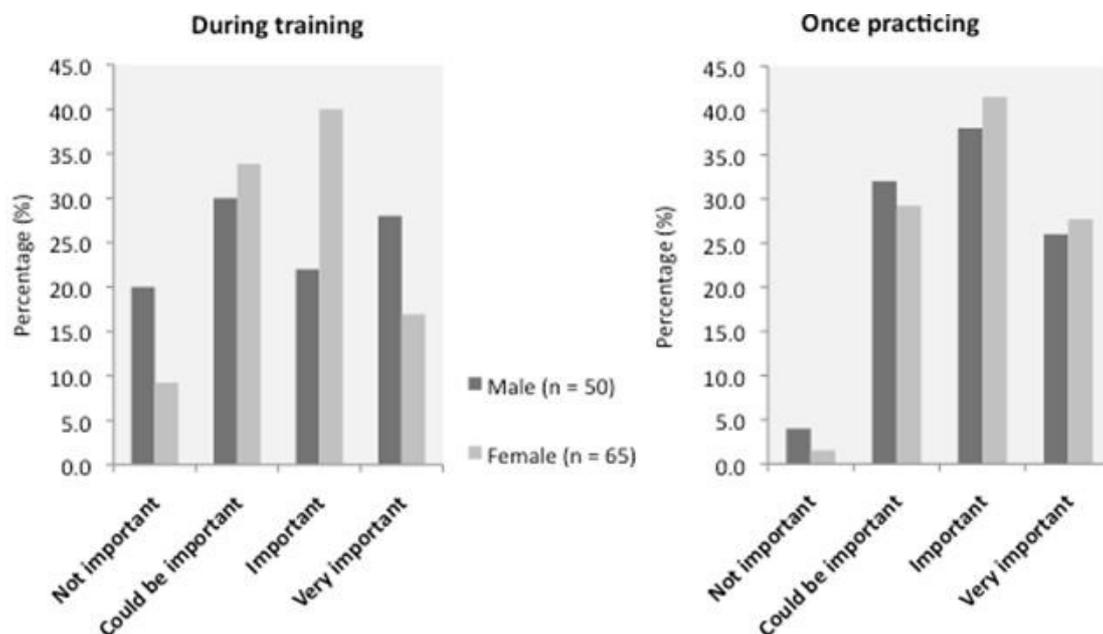
Figure 2. Importance of professional and lifestyle issues if practicing maternity care in general practice.



Although all issues presented were considered ‘important’ or ‘very important’ by the vast majority, issues most popularly rated ‘very important’ were: postgraduate training in obstetrics, peer support from medical and midwifery colleagues, hospital support and adequate funding. For the 73 TIs who indicated they would consider providing full maternity care the issues most popularly rated ‘very important’ also included continuity of care for their general practice patients, in addition to the above four issues identified by all respondents.

Flexible hours and the ability to work part-time was a big consideration for most respondents. This was valued highly both during training and once practicing, with only 2.6% indicating it was not important once practicing. The main reasons given from those who commented were family commitments (14 comments), and to have a balanced lifestyle (4 comments). Gender differences were present ‘during training’, but these disappeared ‘once practicing’ (Figure 3).

Figure 3. Importance of part-time work/flexible hours by gender (male n=50, female n=65).



Awareness of training options—Awareness of two postgraduate training options was investigated: the Postgraduate Diploma of Obstetrics and Medical Gynaecology (PGDipOMG), and the Certificate of Women’s Health. While most respondents had heard of the PGDipOMG (82.5%), only 25.4% were aware of the Certificate in Women’s Health. Many indicated they would consider (‘yes’ or ‘maybe’) undertaking these courses in the future, with 73.4% (n=109) respondents showing interest in the PGDipOMG, and 52.8% (n=106) in the Certificate of Women’s Health.

Discussion

This is the first study of TIs’ interest in maternity care in general practice in New Zealand. A moderate response rate (50.7%) was achieved, which was similar for each of the three Otago Schools of Medicine. The timing of the survey may have influenced the response rate, as it was sent out in the first week of the TI year when students are busy fitting into their new roles.

One-quarter of TIs invited to participate were on their elective period, which is generally completed overseas. A proportion of these students would not have had internet access to complete the questionnaire.

Students on elective were less likely to have accessed, or may have been unable to access, their university email to complete the questionnaire. Considering the response rate, bias may be present as those interested in general practice as a career or with views on maternity care in general practice may have been more likely to respond. These are the main limitations identified in this study. Although slight over-representation of younger TIs, and NZ European ethnicity was observed, these differences were small.

New Zealand is in the midst of a maternity workforce shortage.¹ Rural areas in particular are short of midwives and obstetricians^{1,2} and the number of active GPOs throughout the country is now very small.⁹ In addition to GPOs withdrawing from maternity care it is thought there will also be ongoing issues of recruitment of GPs into maternity care.¹⁰ Currently those doctors who do undertake the PGDipOMG no longer do so with the intention to practice intrapartum maternity care.¹¹

Our study has revealed that despite this, final year medical students (TIs) not only expect that interested and trained GPs should provide maternity care, but that of those TIs considering general practice as a future career most have an interest in providing antenatal care and shared care, and over half have some interest in providing full maternity care in their future practice (Figure 1). This suggests that the recruitment difficulties are not simply due to a lack of interest, but that other factors are responsible.

Those students who had completed the RMIP in their fifth year of training were both more likely to be considering rural general practice as a future career, and to be considering providing full maternity care in this role (Figure 1). This finding is encouraging given the particular shortage of maternity care providers in rural areas in New Zealand.

The study shows that the RMIP is successful in meeting two of its goals: to encourage interested students to pursue a career in rural medical practice;¹² and to utilise the large range of rural community clinical learning experiences which are not available to students in tertiary teaching hospitals,¹² including increased exposure to primary maternity care.

Personal experience in a specialty has been shown to have the biggest influence on career decisions for TIs and junior doctors.⁷ This was consistent with our findings that those students who reported having seen a GP practicing full maternity care were most likely to consider providing full maternity care if they were to become a GP (Figure 1). This is encouraging, but also raises the concern that with the number of GPOs continuing to fall, fewer and fewer students will experience a GP practicing maternity and the numbers who will consider it as a future career path will dwindle.

To combat the maternity workforce shortage, one governmental response has been to allocate money for training and refresher courses for GPs in maternity care.⁵ Whether this strategy will be effective is uncertain. Currently doctors still complete the PGDipOMG, but not with the intention to practice GP obstetrics.¹¹ In Australia it has been shown that of those GPs who enrol in the Diploma with the intention to practice maternity care, most decide during or after training not to pursue procedural obstetrics.¹³ Thus despite the high level of awareness of the PGDipOMG among TIs and their potential interest to enrol in it, this may not be sufficient to increase the number of GPs providing maternity care. Other areas also need targeting.

Our results suggest that although future doctors are likely to value training opportunities, improvements to overall working conditions such as availability of both peer and hospital support, and adequate funding will also be required for TIs to practice maternity care in general practice. Part-time and flexible hours were highly valued both by men and women (Figure 3), due to a desire for family time and life balance.

Overall these findings are similar to studies by Wiegers,⁶ and an Australian study of GPOs and obstetricians in Victoria, Australia.¹³ The Victoria study identified the themes: clinical issues, lifestyle and indemnity as key areas to address to recruit doctors into maternity care. New Zealand health professionals work within a unique medicolegal legislative environment compared to other OECD countries so indemnity issues are unlikely to be as important.

Conclusion

This study has shown that most TIs believe GPs should provide maternity care and women should be able to access maternity care from their GP. TIs show an interest in providing a range of maternity care services, including shared care with midwives and providing full maternity care, if practicing as a GP in the future.

The main factors that could influence their becoming involved in providing maternity care in general practice are: personal experience of GPs providing maternity care, adequate training, professional and peer support, adequate funding for maternity care, and a practice model that supports professional practice and lifestyle options.

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A survey of personal digital assistant use in a sample of New Zealand doctors

Oliver H Menzies, John Thwaites

Abstract

Aim To gather information about handheld computing hardware and software usage by hospital based doctors in New Zealand (NZ).

Method An online tool (SurveyMonkey™) was used to conduct the survey from 27 June to 10 September 2010. Distribution of the survey was via an email to all NZ District Health Boards (DHBs).

Results There were 850 responses. About half of respondents (52%) used a personal digital assistant (PDA), 90% using it at least once daily. Usage varied greatly between DHBs (27–100%), perhaps related to institutional support. Among PDA users, the most common applications were the non-clinical; Scheduler (95%), Contacts (97%), and Tasks (83%). Users felt PDAs helped considerably with organisation and time saving. For non-users there were a range of barriers to usage, cost being a large factor. Another major barrier identified by both users and non-users was lack of organisational integration and support.

Conclusions Half of survey respondents used a PDA. PDA usage of responders from different DHBs varied considerably. Perceived barriers to PDA use included cost and lack of institutional support. A collaborative approach between clinical leadership and Information Technology teams to address barriers may result in increased utility and usage of PDAs in the NZ health system.

Personal digital assistants (PDAs), also known as smartphones, are hand-held computers which can perform a wide variety of functions including access to the internet, scheduler, task list, phone-book, reference storage, camera, and telephone. In the health sector, PDAs have been used by doctors for over a decade to store clinical data, medication databases, access and store patient information and provide communication between other health providers with more applications growing by the year.

PDAs are particularly useful for hospital doctors who often work in several different sites in their hospital or multiple hospitals—wards, office, clinic rooms, procedural suite, and operating theatre. The mobility of the current workforce presents a challenge for DHBs to provide a familiar information technology (IT) working environment across multiple locations. PDAs have a part to play in addressing this.

For junior doctors, white coats with large pockets previously contained their medical reference texts: drug references, local medical guidelines, local preferred medicines lists and medical references such as the Oxford Handbook of Clinical Medicine.¹ Now all these can be accessed via a PDA, with room to spare.

The past few years have seen considerable change in the handheld computing device area, and doctor's use of these devices. Up until January 2007 the PDA-smartphone market had three dominant operating systems (OS)—Palm® OS, Windows® Mobile (formerly Pocket PC), and Blackberry®. In 2007, Apple released the iPhone™ and iOS (the OS used on the iPhone™), which has garnered strong sales. Also in 2007 the Android OS was unveiled. Palm® released a new OS called WebOS™ mid-2009, and more recently Microsoft® has released Windows® Phone 7.

As well as changes in software, hardware has also changed substantially. Technological advances have occurred in each component that makes up a PDA, to give an overall improved user experience compared with previous. New or improved software and hardware features are allowing new applications in medical practice.

Methods

Relevant literature²⁻⁵ on PDA usage and attitudes to usage was reviewed. Most data was from North America. Questions for the current survey were designed taking into account previous surveys, to allow a degree of comparison.

The survey questions were entered onto an online survey tool – SurveyMonkey™ (www.surveymonkey.com).

Contact was made with all DHBs in New Zealand, requesting distribution of an email containing a hyperlink to the survey to all hospital based doctors in their DHB. The email contained introductory information about the survey, for both communication managers and doctors. The survey was conducted during the period 27 June 2010 to 10 September 2010.

Results were downloaded from SurveyMonkey™, compiled, and analysis performed.

Results

There were 850 responses to the survey. Demographics of the respondents are shown in Table 1.

According to Medical Council of New Zealand (MCNZ) data⁶ there were 6668 doctors who listed themselves as junior medical staff (medical officers, house surgeons, registrars) or specialists/consultants in 2008.

Characteristics of respondents

Age and gender—63% of respondents were male, 37% female. The mean age range was 36–45 years.

Main work role—51% were consultants, 45% either house surgeons or registrars. Other roles were medical officer special scale (MOSS; 3%) and other (1%). Main work type is shown in Table 1.

Table 1. Main work type

Internal medicine	227(27%)
Surgery – all	149(18%)
Anaesthesia	86(10%)
Paediatrics	82(10%)
Psychiatry	75(9%)
Emergency medicine	57(7%)
Radiology	36(4%)
Intensive care	20(2%)
Pathology	16(2%)
Other or unspecified	102(12%)
Total	850

Primary employer—88% of those that completed the survey had their primary employer as a public hospital. The remainder worked in a government department or agency (6%), private practice (3%), university or polytechnic (2%), or other/unspecified (1%). See Table 2.

Table 2. District health boards (DHBs) respondents mainly employed in

DHB	Responses	Response rate as a proportion of non GP doctors working in DHB in 2008 (MCNZ statistics ⁶)
Auckland	205	12%
Bay of Plenty	29	11%
Canterbury	125	14%
Capital and Coast	24	3%
Counties Manukau	89	20%
Hawke's Bay	37	18%
Hutt	32	21%
Lakes	18	13%
Mid-Central	31	13%
Nelson Marlborough	39	24%
Northland	17	9%
Otago (Southern)	53	13%
South Canterbury	12	21%
Tairāwhiti	11	19%
Taranaki	1	1%
Waikato	14	2%
Wairarapa	0	0%
Waitamata	91	20%
West Coast	4	19%
Whanganui	5	8%
Other or unspecified	13	
Total	850	

Average response rate 15%.

PDA usage

Total—51% (440/850) used a PDA or a mobile phone with PDA functions.

Usage by gender—59% of males and 38% of females used a PDA. Tables 3–5 show who uses them.

Table 3. Usage by age

Age ranges	Usage
16–25	17/45 (38%)
26–35	153/295(52%)
36–45	127/233(55%)
46–55	103/185(56%)
56–65	35/79 (44%)
66–75	3/11 (27%)

n=850.

Table 4. Usage by main work role

Main work role	Usage
House officer (including house surgeon, SHO)	57/123 (46%)
Registrar	123/251(49%)
Medical officer (including MOSS)	14/30 (47%)
Consultant/specialist	236/435(54%)
Other or unspecified	8/10 (80%)

n=849 (1 skipped question); SHO=senior house officer; MOSS=medical officer special scale.

Table 5. Usage by main work type

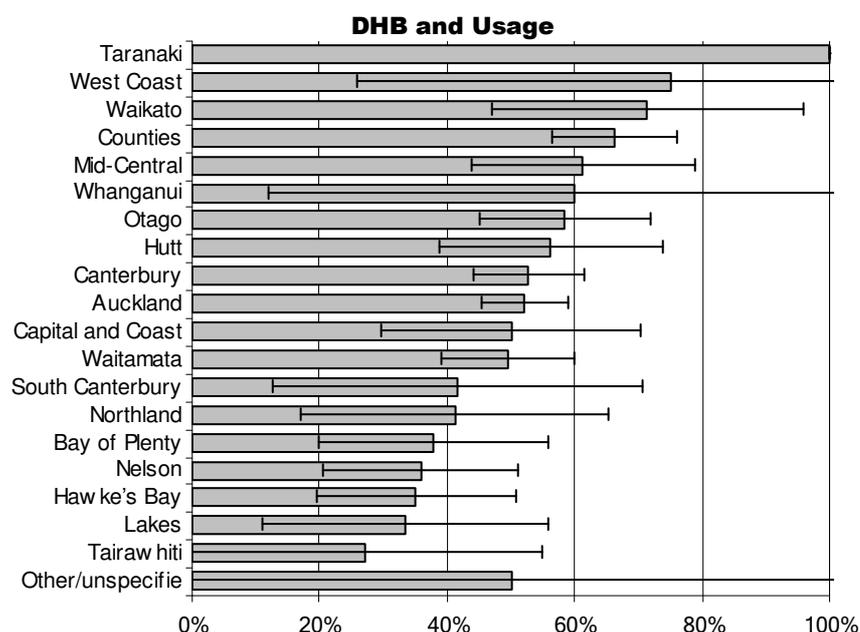
Main work type	Usage
Radiology	25/36 (69%)
Anaesthesia	54/86 (63%)
Emergency medicine	33/57 (58%)
Internal medicine	119/227 (52%)
Paediatrics	40/82 (49%)
Intensive care medicine	9/20 (45%)
Surgery—all	67/149 (45%)
Psychiatry	29/75 (39%)
Pathology	6/16 (38%)
Other or unspecified	45/79 (57%)

n=827 (23 skipped question).

Main DHB

Usage varied by DHB, shown in Figure 1.

Figure 1. Usage by DHB



Whisker bars define 95% confidence interval.

Only 1 response from Taranaki DHB – confidence interval not able to be calculated.

Hardware

In the 51% (440 users) who used a PDA, their hardware usage is outlined below.

Table 5. PDA Operating Systems used by doctors

Operating system	Usage
iOS (Apple®)	49%
Windows Mobile®	23%
Palm® ('old' Palm® OS)	10%
Symbian™ (Nokia & others)	5%
Blackberry®	4%
Android ("Google™ phone")	3%
WebOS™ ('new' Palm® OS)	1%
Other or not sure	6%

Of 440 users.

Touch screen, camera—87% of PDAs had a touch screen, 84% had a camera.

Frequency of use—Over 90% of PDA users used their PDA once a day or more

Syncing (syncing or synchronising is the process of exchanging information with a host computer)—33% synced once a day or more often. 36% synced once per week. 8% never synced.

PDA reliability—86% of respondents either never or seldom had their PDA or Phone/PDA ‘crash’ or become unusable (apart from flat batteries). About 5% had their PDA crash often or very often. Newer operating systems performed better than older ones.

Security—26% (115 respondents of 440) had patient related data on their PDA, and 4% didn’t comment. Of those who had patient data on their PDA, 31% didn’t have any password protection for that data. This 31% was comprised of those that realised they should protect the data (19%) and those that didn’t know how (1%), didn’t want to or found it too much trouble (1%), or said the data didn’t need to be secured (1%).

Respondents used a variety of encryption or password protection methods.

Software usage

The figures below show software usage in users of PDAs.

Figure 2. Usage of organiser, document management and reference software in PDA users

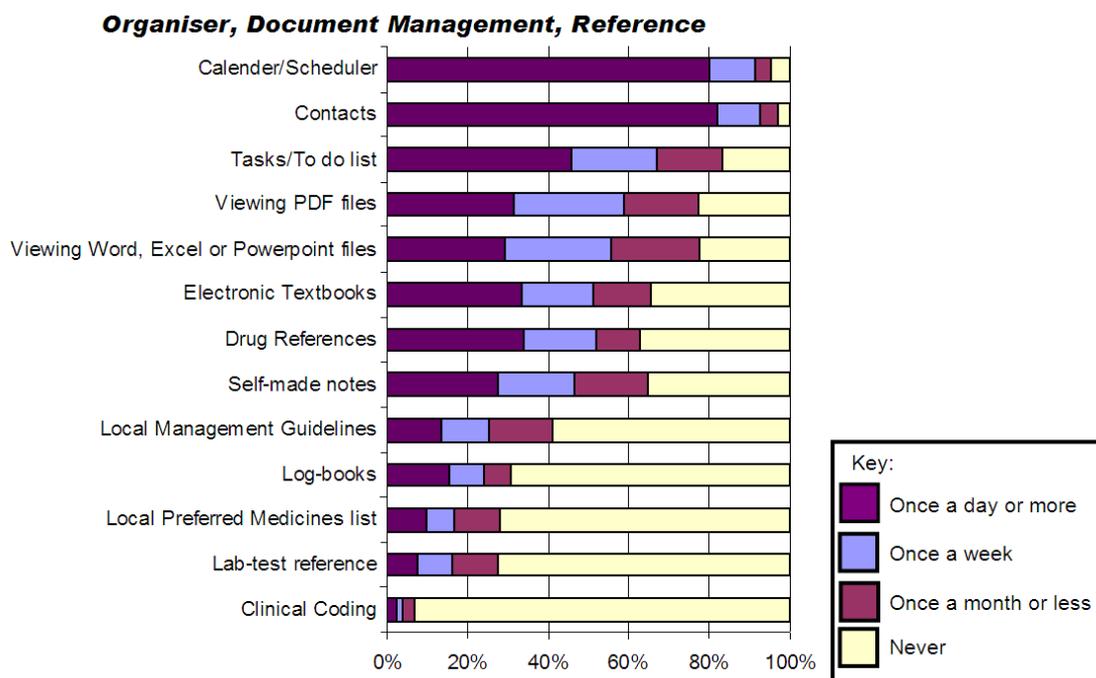


Figure 3. Usage of Education, Multimedia, Patient tracking and other software in PDA users

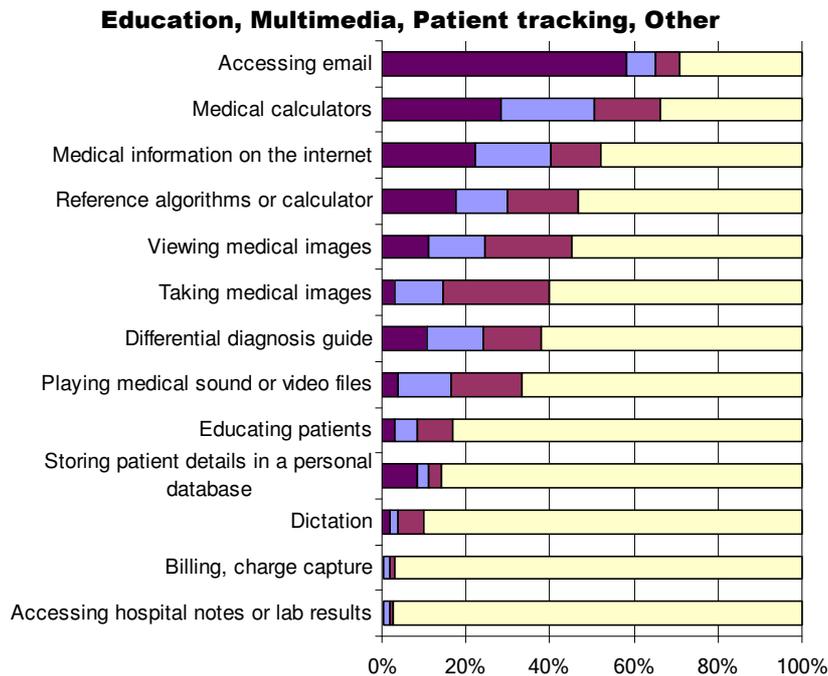


Figure 4. Overall impressions for current users of PDAs

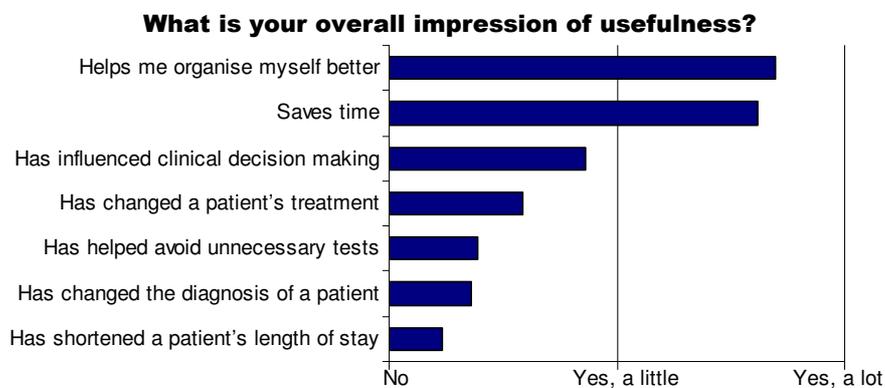
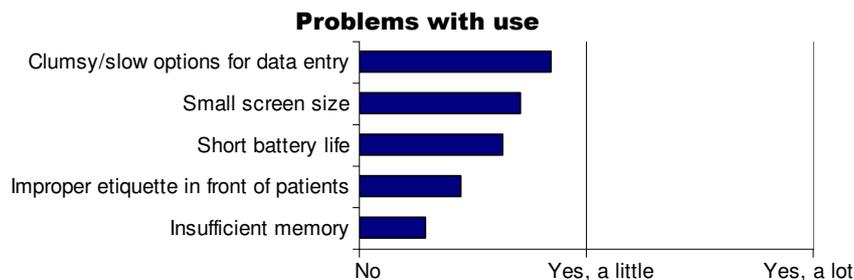


Figure 5. Problems with use for current users of PDAs



Non-users of PDAs

49% (410) of survey respondents didn't use a PDA, 35% of those that did not currently use a PDA had used one in the past. Barriers to use among non-users (multiple answers were allowed). See Table 6 below.

Table 6. Barriers to PDA use identified by non-users or previous users of PDAs

Reason	Responses
Too expensive	44%
Lack of integration and institutional supports	39%
Difficult to carry around, or too big	28%
PDA's function is performed by other hardware (e.g. PCs) or methods	28%
Data entry problems (clumsy/slow)	22%
I prefer manual method/paper	21%
No training available	20%
Screen size or buttons too small or fiddly	19%
No local expert or help desk	16%
Short battery life	13%
Applications or functions are unnecessary	9%
Difficult user interface	9%
I don't want to become too dependant on a PDA	8%
The PDA is too easy to break	8%
Not reliable enough	6%
The PDA's function is performed by other personnel	3%
I have tried PDAs before and it didn't agree with me	4%
Other	31%

General comments—both users and non-users

Thematic analysis of the free text responses identified lack of DHB support as a major barrier to usage of PDAs among respondents. Comments were made about lack of software, hardware, and infrastructure (e.g. wireless data). Security concerns were identified as one of the possible reasons for lack of support by DHBs. Other barriers to usage identified by respondents included PDA technical issues and lack of useful software.

Discussion

This study informs on PDA usage patterns in respondents to an email based survey of NZ hospital doctors. Partly because of the form of distribution of the survey, despite having a large sample size the response rate was low. It is also likely that factors associated with the use of technology and PDAs in particular influenced the response rate. The conclusions from the study therefore need to be restricted to those who responded. Because of this it was considered inappropriate to perform formal statistical analyses in the subgroups of the population from which the respondents came.

PDA's have become very much part of the clinical scene in New Zealand. In this study 52% of respondents reported using a PDA, with over 90% using their PDA more than once daily.

This falls within the range of previously reported studies. Usage rates among respondents to a survey of consultants in a British Hospital were 40% in the Horsley and Foster study "Handheld Computers in Medicine: the way forward"⁵ published in 2005. McAlearney et al in 2003⁷ describe a higher usage rate in a survey of a group of US physicians and resident doctors at 89%. A study by Morris et al in 2005⁸ involving 410 physicians and residents on a Family Medicine Training Program in North America found usage rates of 87%. Usage rates in Japanese resident physicians may be lower, at 31% in a study published in 2010 by Jacobs et al.⁹ Garritty and El Emam's literature review in 2006³ identified usage rates among survey responder healthcare professionals ranging from 45 to 85% in various studies.

There was surprisingly little variation in PDA usage with age and work role. There was however a moderate variation in usage dependent on main work type, with those working in specialties such as radiology and anaesthesia using PDA's considerably more compared with specialties such as psychiatry and pathology. Different specialties may have intrinsic factors which may make PDA's more or less useful for them.

Gender also influenced the uptake of PDA's in respondents, with males more likely to use a PDA than females.

Uptake varied considerably between DHB's. It is possible that the local DHB policies of PDA supply and support are responsible for this large variation in usage.

While respondents used their PDA's for a wide variety of different functions, there were some core functionalities that were used by almost all PDA users. Scheduler, Contacts, and Tasks software had high usage rates. Accessing email was also used by the majority of PDA users.

Users felt that PDA's made a large difference to organising themselves better, and saving time.

In their report⁵ Horsley and Forster also note that the most popular PDA applications were the standard PDA functions of address book, diary, memo pad, and calculator.

Drug references and electronic textbooks are two of the most common clinical references used. Local management guidelines have been produced by some DHB's for portable usage, and are used by a large number of respondents. Reference material is an area where PDA's have a strong advantage in that a large amount of information can be stored. Users generally agreed that PDA's had made a moderate contribution to clinical decision-making.

Doctors in North America may have higher usage of drug references on PDA than their New Zealand counterparts. A study of 2130 Paediatricians in the USA in 2002¹⁰ noted 80% usage of drug references on PDA, compared with just over 60% in the current study.

Regarding the impact of patient encounters on clinical care, this study's findings are similar to those of Dee et al,¹¹ who found a reasonably high proportion of doctors

agreeing that a PDA had influenced their clinical decision-making or changed a patient's treatment.

Improvements in portable device technology have allowed some uses that were not previously possible; multimedia functions are a good example. Multimedia functions have progressed markedly over the past 5–10 years, and PDAs now provide a satisfactory platform for taking and viewing medical imaging, and playing medical sound or video files. Approximately 30% of respondents used these functions.

How useful a device is to doctors is partly dependent on what medical software is available for use.

Software usage rates are affected by supply and demand. Given that the most used OS in this survey has been available for less than 5 years, low software availability may be affecting uptake and usage rates.

Expense was seen by both users and non-users of PDAs as a major barrier to uptake. Currently the cost of a PDA can range to over NZ\$1000. At present in NZ the purchase cost of a PDA is not reimbursed for house-surgeons or registrars, and reimbursement for consultants varies between DHBs.

Lack of institutional support and integration was also seen as a problem, with 39% of non-user respondents reporting this as a barrier.

Thirty-six percent of non-users reported either lack of training or lack of local help desk support as a barrier to use. In their review of handheld computing adoption in healthcare in 2004⁴ Lu et al. also found technical and organisational support to be a barrier to handheld computer use.

Of note is the wide variation of respondent PDA usage among DHBs ranging from 25% to 100%, which may suggest varying organisational approaches to the use of PDAs.

Given the perceived benefits for respondent PDA users in the areas of personal organisation, time saving, and clinical decision-making, a coordinated strategy to support PDA use would likely enhance utility and usage. DHBs and central governmental agencies have an opportunity to play a role in this.

One of the difficulties faced by DHBs is that PDA operating systems and usage have experienced large changes over the past 10 years. When planning software provision DHBs need to choose a careful path between multi-platform and OS-specific solutions.

Improvements in the areas of education, security and software provision would also be beneficial. Training on PDA device use is noted by respondents as a significant need. More awareness and training in current clinical software could increase use. Teaching on device security could enhance privacy. More support of software development could encourage novel software of benefit in medical decision support. Central coordination and cooperation between DHBs is essential for the development of a cohesive nationwide strategy. This may also be more cost effective than individual DHBs trying to address these issues locally.

However, it must be acknowledged that PDAs do not work for all people. There are variations in doctor's work types, locations and personal factors which may mean handheld devices are not useful for a particular doctor, or in a particular situation.

It was difficult to ascertain the overall response rate for this survey. Using the number of non-GP doctors working in a DHB in 2008 (Medical Council of New Zealand⁶ statistics) as a denominator gave an overall response rate of 15%. Those who were interested in PDA use may have responded disproportionately to the survey. Since the survey used digital distribution, this would select out those who had low usage of technology in general. The response rates also were strongly dependent on staff at DHBs distributing the survey email, and the effectiveness of email distribution at DHBs. This was a hospital doctor survey and as such General Practitioners were not represented.

In conclusion, 52% of respondents in this sample of hospital based doctors in New Zealand report using PDAs. Of PDA users, over 90% report using them at least once daily. Overall, users felt PDAs helped them significantly with organisation and time saving, but had a more moderate effect on clinical decision-making. For non-users there were a range of barriers to usage with cost being a major factor. For both users and non-users, institutional support was also perceived as a barrier to use.

DHBs and medical staff need to work collaboratively to maximise the potential benefits of PDAs in the clinical setting. Suggested areas to pursue include software provision, device support and education. Decisions should be made by clinical leadership teams in conjunction with senior IT management to ensure a shared vision for the future.

Competing interests: None declared.

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Binge drinking and alcohol-related behaviours amongst Pacific youth: a national survey of secondary school students

Tasileta Teevale, Elizabeth Robinson, Shavonne Duffy, Jennifer Utter, Vili Nosa, Terryann Clark, Janie Sheridan, Shanthi Ameratunga

Abstract

Aim Previous studies show Pacific youth polarised as either non/occasional drinkers or heavy binge drinkers. The aim of this study is to describe the demographic, cultural, home & neighbourhood environments of the two types of Pacific drinkers (non-binge drinkers and binge drinkers) to develop risk and protective profiles for alcohol related behaviours.

Methods Data were collected as part of Youth'07, a nationally representative survey of the health and well-being of New Zealand youth. 1,190 Pacific students who identified any of their ethnicities as Samoan, Cook Islands, Tongan, Niue, Tokelauan, Fijian, or Other Pacific Peoples were included.

Results Data was available on 974 students of whom 31.6% were binge drinkers. Students who were younger and had parental Pacific language use at home were less likely to binge drink than other students. Parents' knowledge of young people's activities after school and at night time was also protective of binge drinking, while participating in sports teams or a sports club was associated with increased risk of binge drinking.

Conclusion This study indicates the transnational nature of Pacific communities in New Zealand who bring and maintain traditional cultural practices which seem health protective. While participation in sports activities may have health benefits, our findings indicate the need for a more proactive approach on the part of policymakers and the sporting sector to address the associated risk of binge drinking. Alcohol interventions that de-normalise alcohol overconsumption are warranted for young Pacific New Zealanders.

Pacific children and youth are a priority population in New Zealand's *Child Health Strategy* because they tend to experience poorer health outcomes.¹ Alcohol consumption has been identified by the latest Ministry of Health's Pacific youth health report as a high risk behaviour,² particularly because it is associated with other risky behaviours such as injury and unprotected sex.^{3,4}

In general, youth are considered to be at increased risk of harm from alcohol use than older adults as they bear the greatest risk of injury related to alcohol use, have an increased risk of alcohol dependence, and a lower tolerance to alcohol than older adults.

Much of the physical and social harm associated with alcohol results from heavier drinking occasions or binge drinking.^{5,6} Binge drinking increases the risk of acute

health effects—in particular unintentional injury, motor vehicle accidents, violence, criminality, self-harm and increased risk of chronic diseases such as liver cirrhosis.^{7–10}

Pacific people experience a disproportionate burden of alcohol-related harm compared to the general population.¹¹ Alcohol is more frequently consumed by Pacific peoples in New Zealand than in their Island nations, possibly due to it being more readily available and having increased disposable income.^{12,13}

Previous surveys of Pacific peoples' alcohol use indicate that Pacific peoples tend to be polarised as either non/occasional drinkers or heavy drinkers.^{14–17} As a whole, fewer Pacific New Zealanders drink alcohol compared to the general population, but those who do drink alcohol tend to drink larger quantities of alcohol on a typical occasion.

Pacific youth

The first national survey of the health and wellbeing of New Zealand youth in 2000, reported that Pacific youth drinking habits were similar to adults, with high proportions of non-drinkers, but also high numbers of youth who were binge drinkers.¹⁸ Pacific youth were less likely to report drinking at home and with their families than New Zealand European youth.

The usual drinking places were reported as outdoor places including parks, malls, streets, parties or bars/nightclubs.¹⁹ This indicates that for Pacific youth, drinking often takes place away from family surroundings and family monitoring. Binge drinking behaviours were also associated with being male, attendance at higher SES schools and being NZ-born.²⁰ A qualitative investigation into factors that support abstinence or responsible drinking amongst Pacific youth living in New Zealand, found parental and church/religious influences, a previous negative experience with alcohol, and peer group influences supported abstinence or responsible drinking.²¹

Variance between Pacific communities

New Zealand's Pacific populations are diverse. They are complex and heterogeneous with distinct cultural, language and lifestyle differences both between Island groups and within each ethnic group category (for example, NZ-born Samoans and Island-born Samoans).²²

There are also significant differences in alcohol use and views about alcohol amongst these diverse groups.¹² Available data suggests Cooks Island Māori and Niuean groups are more likely to consume alcohol compared to Samoan and Tongan groups,¹⁹ with this trend also observed for Pacific youth.²⁰

The objective of this paper is to further explore the prevalence of binge drinking among Pacific students by age, gender, NZDep, specific Pacific ethnicities; describe the context around binge drinking for Pacific students and determine the cultural, spiritual, home and neighbourhood environment characteristics of Pacific binge and non-binge drinkers.

Method

Survey background—Data for the current study were collected as part of Youth'07, a nationally representative sample of the health and wellbeing of secondary school students in New Zealand. First,

115 schools were randomly selected and 96 agreed to participate in the survey, representing an 84% response rate for schools. The participating schools reflected the general characteristics of secondary schools in New Zealand.²³ From the participating schools, students (n=12,355) were randomly selected from the school roll and invited to participate. Of these, a total of 9,107 students formed the final Youth'07 sample, representing a 74% response rate.

On the day of the survey, students were asked to come to a designated room. Upon arrival students were given an anonymous login code to access the survey. The survey included a 622 item multimedia questionnaire administered on a Nokia internet tablet and identification of their census meshblock number (based on their residential address) to determine the extent of their neighbourhood deprivation. The multimedia nature of the questionnaire meant that all students could read each question and fixed-response options themselves, while listening to the questions and responses being read aloud through headphones.

The University of Auckland Human Subject Ethics Committee granted ethical approval for the study. School principals consented to participation in the survey on behalf of the Boards of Trustees. Students and their parents were provided with information sheets about the survey. Students consented themselves to participate in the study on the day of the survey. A more detailed description of the research methodology can be obtained elsewhere.²³

Secondary analysis of the data provided by Pacific students (13% of the total sample) was undertaken. Ethnicity was recorded using New Zealand 2006 Census ethnicity question whereby participants select all of the ethnic groups that they identified with from one of 5 major ethnic groups using Statistics New Zealand Ethnic prioritisation method.²⁴ All students who self-identified any of their ethnic groups as Samoan, Cook Islands, Tongan, Niue, Tokelauan, Fijian, or Other Pacific Peoples are included in these analyses (n=1190). Of the Pacific students in the sample, 53.7% were female and 67.7% were 15 years or younger. Intra-Pacific ethnicity analyses required ranking multi-ethnic students in the following order: Niuean, Tongan, Cook-Island Māori, and Samoan.

Outcome measures—*Binge drinking* was measured by a series of branching questions. First, students were asked if they had ever drunk alcohol (not counting a few sips) and continued to drink alcohol by asking the *frequency of alcohol consumption in the last 4 weeks*. If they responded yes, they were asked “*In the past 4 weeks, how many times did you have 5 or more alcoholic drinks in one session within 4 hours?*” with response categories “none at all”, “once in the past 4 weeks”, “two or three times in the past 4 weeks”, “every week”, or “several times a week”. Those who reported drinking 5 or more alcohol drinks in one session at least once in the last 4 weeks were classed as binge drinkers. Non-binge drinkers were students who did not currently drink (n=506) or who had not drunk 5 or more drinks in a session in the last 4 weeks (n=157).

Context around drinking—Students were asked to indicate the *source of their alcohol when drinking; types of alcohol more commonly consumed; people that they would normally drink with; reasons for drinking alcohol; to report whether they experienced any alcohol related problems and whether they were worried about their alcohol consumption*.

Demography—Age, gender and ethnicity were determined by self-report. *Small area deprivation* (NZDep) was determined using the 2006 New Zealand Deprivation Index.²⁵ For descriptive purposes, the NZDep Index deciles were categorized into three groups reflecting low deprivation (1-3), middle levels of deprivation (4-7), and high deprivation (8-10). Three items were used as proxy measures of household deprivation, including; the *number of times moved home* in the last 12 months; perceiving parents or caregivers worrying about having *enough money to buy food and places other than bedrooms used as bedrooms* as a proxy measure of household overcrowding.

Pacific cCultural factors—Five items were chosen to assess Pacific cultural factors, three were related to *use of a Pacific language* (e.g., Samoan, Tongan, Fijian, Niuean, Cook Islands Māori) *by a parent* (or caregiver) and *by the student*. Students were also asked whether they could *understand their respective Pacific spoken language*. A cultural identity item asked students how *important it was to be recognized as Niuean, or Tongan, or Cook Island or Samoan*. A cultural maintenance item asked students to reflect about their *level of comfort at Niuean, or Tongan, or Cook Island or Samoan social events or gatherings*.

Spiritual factors—Three items were chosen to assess spiritual factors; *attending a place of worship, the importance of spiritual beliefs or religious faith* and a question that asked specifically *how much*

spiritual faith or beliefs affect daily life choices including activities like sex, taking drugs or drinking alcohol.

Home and environment factors—Home environment items used in analyses were the *number of parents (or caregivers) present in the home, and parents' knowledge of the student's friends, whereabouts after school, and whereabouts at night time.* Items used to assess environment factors included *the number of secondary schools a student may have attended since entry into high school (year 9), students feeling safe in their neighbourhood, and extra-curricular engagement via taking part in a sports teams or clubs outside of school time.*

Analysis—Frequencies and 95% confidence intervals were used to describe the characteristics of students who reported binge drinking and the context around binge drinking. Chi square tests were used to test for differences between those who reported binge drinking and those who did not. Chi-square tests were used to investigate the univariate associations between binge drinking and hypothesised demographic, cultural, home and environment factors. Using factors that reached a significance level of 0.1, a logistic regression model was used to investigate the associations between binge drinking and demographic, cultural, home and environment factors, after controlling for other variables in the model. All analyses were conducted using the survey procedures in the SAS software v9.2 (Cary, NC) to account for the weighted and clustered design of the data.

Results

Information on binge drinking was available for 974 (81.8%) students (209 did not answer the alcohol section and 7 said they had drunk alcohol but gave no further information). Of these 974 students, 31.6% ($n=308$) reported binge drinking in the last 4 weeks. There were no gender differences in binge drinking behaviours, but there was a significant association with age, with almost half (47.1%) of all older students (17 years) binge drinking compared to only 15.2% of younger students (13 years) (see Table 1).

Table 1. The association of binge drinking with key demographic variables amongst Pacific students

Variables	Binge drinkers		Non-binge drinkers	
	n	% (95% CI)	n	% (95% CI)
Gender				
Males	154	30.6 (24.8–36.3)	351	69.4 (63.7–75.2)
Females	154	33.0 (28.6–37.4)	315	67.0 (62.6–71.4)
Age				
13	37	15.2 (9.3–21.1)	207	84.8 (78.9–90.7)
14	61	29.5 (23.6–35.4)	148	70.5 (64.6–76.4)
15	68	34.0 (25.6–42.5)	132	66.0 (57.5–74.4)
16	79	42.2 (35.0–49.4)	108	57.8 (50.6–65.0)
17	63	47.1 (39.5–54.6)	71	52.9 (45.4–60.5)
NZDep				
low	31	34.5 (24.2–44.7)	60	65.5 (55.3–75.8)
medium	93	37.2 (30.5–43.8)	158	62.8 (56.2–69.5)
high	177	28.7 (24.6–32.9)	440	71.3 (67.1–75.4)

NZDep=New Zealand [socioeconomic] Deprivation Index.

Students living in the most deprived neighbourhoods were less likely to binge drink than those from the least and medium deprived areas. Assigning to a single specific Pacific ethnicity resulted in 10.4% Niuean; 18.5% Tongan; 20.4% Cook-Island

Māori; 35% Samoan and 15.6% Other Pacific distinct ethnic groups. By specific Pacific ethnicity, Cook Island students appeared to have a higher prevalence of binge drinking (38.5%), compared to Niuean (31.7%), Tongan (29.9%) and Samoan (29.9%) students (data not shown).

Context around drinking—Students who were binge drinkers were asked to indicate the *source of their alcohol when drinking 5 or more alcoholic drinks in one session*. Most students who reported binge drinking got their alcohol from “friends” (71%); got “someone else to buy it” (43%) or got it from their “brothers/sisters” (34%).

Approximately a quarter of students reported getting it from “another adult they know” (29%); their “parents” (26%) or “buying it themselves” (22%). Fewer students sourced alcohol by “taking it from home” (17%) or by stealing it (11%). With regards to *types of alcohol they usually drink* a high proportion of Pacific students (42%) preferred ready-made alcoholic drinks (or RTDs ready-to drink), followed by beer (26%); spirits (17%); other (10%) and preferred wine the least (5%).

Students reported they normally drank alcohol with “friends” (88%), and then “family” (52%), “other people” (40%) and 11% “by myself”. Having fun and socialising with their friends were the most common reasons for consuming alcohol. Eighty-one percent of students drank alcohol to have fun (81%) and to enjoy parties (60%).

Almost half of students (47%) reported they consumed alcohol “to get drunk” and “to relax” (45%). Over a third (36%) drunk alcohol because they were “bored” or “to forget about things” (35%). Nearly a quarter of students drank “because my friends do” (23%) and “to make me feel more confident” (23%).

Of concern, almost one in four students experienced alcohol-related harm. The most commonly reported alcohol-related problems for Pacific students were: doing things that could get them into trouble (29%), having unsafe sex (28%), having friends and family talk with them about cutting down on their alcohol use (26%), and getting an injury as a result of their alcohol use (25%).

One in five students (20%) reported that their performance at school or work was affected by alcohol use and that they had caused an injury to someone else (19%). High risk was also reported with 14% reported having unwanted sex, 8% were injured requiring medical treatment and 5% experienced a car crash through alcohol use. However, the majority of students reported not being *worried about their alcohol consumption* (59%).

The relationships between binge drinking and socioeconomic, cultural, spiritual and environment factors are described in Table 2. Among the socioeconomic variables, students who lived in homes where other rooms were used as bedrooms were more likely to binge drink than students who do not live in crowded homes. Most of the cultural and all of the spirituality/religious variables appeared to be inversely associated with binge drinking, such that students with strong Pacific cultural and spiritual/religious competencies were less likely to binge drink. From the seven variables used to assess home and environment factors, only parents’ knowledge of students’ whereabouts after-school and at night time was significantly associated with less binge drinking.

Table 2. Binge drinking by selected SES, cultural, spiritual/religious, home and environment variables amongst Pacific students

Variables	Binge-drinkers (n=308)		Non-binge drinkers (n=666)		P-value
	n	% (CI)	n	% (CI)	
Socioeconomic status (SES)					
<i>Times moved home in the last 12 months</i>					
None	236	31.0 (26.8–35.1)	530	69.0 (64.9–73.2)	0.349
Once or more	71	34.8 (26.4–43.1)	133	65.2 (56.9–73.6)	
<i>Parents' worried about having enough money to buy food</i>					
Never	127	32.7 (27.8–37.5)	264	67.3 (62.5–72.2)	0.881
Occasionally/sometimes	113	31.1 (25.5–36.6)	252	68.9 (63.4–74.5)	
Often/All the time	48	31.6 (23.3–39.9)	104	68.4 (60.1–76.7)	
<i>Other rooms used as bedrooms</i>					
No	181	29.5 (25.0–34.0)	436	70.5 (66.0–75.0)	0.0189
Yes	125	35.8 (30.3–41.3)	224	64.2 (58.7–69.7)	
Cultural factors					
<i>Parents speak a Pacific language</i>					
No	131	38.5 (31.9–45.2)	212	61.5 (54.8–68.1)	0.001
Yes	177	28.1 (23.9–32.2)	454	71.9 (67.8–76.1)	
<i>How well Students can speak a Pacific language</i>					
Not very well/no more than few words	141	39.0 (33.5–44.5)	222	61.0 (55.5–66.5)	<.0001
Very well/Well/Fairly well	114	24.8 (20.8–28.8)	345	75.2 (71.2–79.2)	
<i>How well Students can understand a spoken Pacific language</i>					
Not very well/no more than few words	109	39.7 (33.6–45.7)	167	60.3 (54.3–66.4)	<.0001
Very well/Well/Fairly well	149	27.0 (23.3–30.8)	402	73.0 (69.2–76.7)	
<i>Importance of being recognized as Pacific</i>					
Not important/Not at all important	66	44.6 (35.7–53.4)	83	55.4 (46.6–64.3)	<.0001
Very important/Important/Somewhat important	194	28.6 (24.7–32.6)	484	71.4 (67.4–75.3)	
<i>Comfortable in Pacific events or gatherings</i>					
Very uncomfortable/Uncomfortable	71	32.5 (24.8–40.2)	149	67.5 (59.8–75.2)	0.0564
Very comfortable/Comfortable/Slightly uncomfortable	190	31.5 (26.8–36.2)	413	68.5 (63.8–73.2)	
Spiritual/religious factors					
<i>Attend a place of worship at least once a week</i>					
No	114	41.3 (35.2–47.3)	163	58.7 (52.7–64.8)	<.0001
Yes	88	22.9 (18.8–27.1)	297	77.1 (72.9–81.2)	
<i>Importance of spiritual beliefs/religious faith</i>					
Not important	115	40.4 (35.4–45.3)	171	59.6 (54.7–64.6)	<.0001
Very important/Somewhat important	82	22.4 (18.0–26.7)	285	77.6 (73.3–82.0)	
<i>Importance of spiritual beliefs/religious faith in daily life activities</i>					
Not at all/A little	115	36.5 (30.1–42.8)	201	63.5 (57.2–69.9)	0.0002
A lot/Some	75	23.9 (20.0–27.8)	240	76.1 (72.2–80.0)	
Home and environment factors					
<i>Number of parental figures at home</i>					
1 parent	87	34.4 (26.5–42.4)	166	65.6 (57.6–73.5)	0.327
2 or more parents	221	30.8 (26.9–34.7)	500	69.2 (65.3–73.1)	
<i>Parents knowledge of student's friends</i>					
Not at all/A little/Doesn't apply	193	32.5 (27.7–37.4)	402	67.5 (62.6–72.3)	0.5468
A lot	111	30.6 (25.1–36.1)	254	69.4 (63.9–74.9)	
<i>Parents knowledge of student's whereabouts after-school</i>					
Not at all/A little/Doesn't apply	176	46.4 (40.0–52.8)	204	53.6 (47.2–60.0)	

Variables	Binge-drinkers (n=308)		Non-binge drinkers (n=666)		P-value
	n	% (CI)	n	% (CI)	
A lot	125	22.4 (19.1–25.7)	436	77.6 (74.3–80.9)	<.0001
<i>Parents knowledge of student's whereabouts at night</i>					
Not at all/A little/Doesn't apply	187	50.0 (44.0–56.0)	189	50.0 (44.0–56.0)	
A lot	113	21.4 (17.6–25.2)	416	78.6 (74.8–82.4)	<.0001
<i>Number of secondary schools attended</i>					
1 (current school)	280	31.7 (27.9–35.6)	605	68.3 (64.4–72.1)	
2 or more	28	32.3 (20.3–44.3)	59	67.7 (55.7–79.7)	0.9152
<i>Students feeling safe in their neighbourhoods</i>					
No, mostly no/Sometimes	68	30.4 (24.9–35.8)	157	69.6 (64.2–75.1)	
Yes, all the time/ Most of the time	220	31.4 (27.0–35.9)	483	68.6 (64.1–73.0)	0.6784
<i>Participation in a sports teams/clubs</i>					
No/ Less than once a week	132	28.7 (23.3–34.0)	329	71.3 (66.0–76.7)	
Yes/1-2/3-4 times a week	168	34.2 (29.4–39.0)	326	65.8 (61.0–70.6)	0.0674

Table 3. Logistic regression model examining the effect of selected demographics and cultural, home and environment factors on the risk of binge drinking alcohol among Pacific adolescents in New Zealand. (n=791)

Variables	OR	95% CI	P-value	
Gender (reference Male)				
Female	0.737	0.507	1.071	0.1094
Age (reference 17 years)				
13	0.184	0.092	0.368	<.0001
14	0.467	0.321	0.68	
15	0.493	0.259	0.94	
16	0.747	0.458	1.219	
SES				
Alternatives used as bedrooms vs no alternative rooms used	1.302	0.952	1.78	0.0991
Low vs high deprivation	1.055	0.453	2.456	0.4687
Medium vs high deprivation	1.331	0.842	2.105	
Cultural factors				
Parents use of Pacific language vs not being able to speak language	0.497	0.305	0.808	0.0049
Student's use of a Pacific language vs not being able to speak language	0.784	0.561	1.095	0.1535
Importance of being recognised as Niuean or Cook Islander or Tongan or Samoan vs not important	0.706	0.437	1.141	0.1547
Home & environment factors				
Parents knowing student whereabouts afterschool vs not knowing	0.505	0.345	0.74	0.0005
Parents knowing student whereabouts at night vs not knowing	0.451	0.313	0.649	<.0001
Participating in sports teams or clubs outside of school time vs not participating	1.696	1.219	2.361	0.0017

Variables where the association with binge drinking reached a significance level of 0.1 were examined further in a regression model (Table 3). Due to missing data from

the spirituality variables and the potential biases that may occur, the spirituality variables were also excluded from the final model to retain greater sample number for analyses.

Protective factors associated with binge drinking were age (younger less likely to binge drink), cultural factors (parent's use of a Pacific language), and home factors pertaining to parental knowledge of the students whereabouts after-school and at night time. Participating in a sports team or sports club outside of school was found to be associated with increased risk of binge drinking after controlling for other variables in the model.

A sensitivity analysis with reduced datasets with and without spirituality showed little change in the estimates of the odd ratios for the other variables in the model although as expected the significance levels were reduced. In a model including the spiritual variables, weekly church attendance remained a protective factor after controlling for other variables but beliefs did not (Results not shown).

Discussion

The aim of the study was to profile the demographic and contextual characteristics of the Pacific students who do, and do not consume alcohol in a binge or hazardous manner.

Protective factors associated with binge drinking were related to cultural and spiritual/religious factors and parental knowledge of their children's activities. This study supports others which have found traditional Pacific cultural maintenance protects against harmful alcohol consumption.^{12 21} Culture, spirituality and religiosity are intertwined elements of traditional Pacific cultures.

Religious doctrine forbids the use of drugs, alcohol included, therefore it would be expected that migrant Pacific communities without the experience of alcohol will continue to view alcohol in this manner.^{13 26-28} That these cultural practices and values are maintained through language and religion which are passed onto Pacific young people, supports New Zealand-based Pacific communities' ambitions for cultural democracy to buffer against substance use and its related health risks.

An expected finding for the association of parental monitoring in protecting youth from engaging in binge drinking and substance abuse more generally adds to the sizeable evidence already in the field.²⁹⁻³³ An unexpected result was binge drinking occurring more frequently among Pacific students from relatively well-off neighbourhoods. This is contrary to national data which indicated that living in neighbourhoods with high deprivation was associated with increased likelihood of binge drinking.^{16 34} This result could reflect the transitional nature of Pacific communities in New Zealand, with the more affluent and middle-class adopting mainstream use of alcohol.¹⁷ National surveys have not analysed Pacific alcohol use by socio-economic position, which future research should address.

Participation in sports teams or sports clubs outside of school was found to be associated with greater risk of binge drinking. A recent international review on alcohol and sports participation found a positive association³⁵ and New Zealand data confirms this trend exists for the general population.^{36 37} This study contributes to the literature by confirming the association of binge drinking and sports participation for

Pacific youth in New Zealand. Although there is a growing body of research detailing the drinking behaviour of sportspeople^{36,37}, little is known about the causes of hazardous drinking in this group and even less is known by Pacific participants, which is an area for future research to consider.

Due to small sample sizes, pan-Pacific analyses were used in this study. Considering the emerging health patterns between East Pacific (Cook Island and Niuean) and West Pacific (Samoan and Tongan) island groups³⁸⁻⁴⁰, future research should consider the principle of equal explanatory power⁴¹ and sampling equally by specific Pacific groups. This analysis is preferable as distinct Pacific groups generally commune separately in the New Zealand environment. This data would be particularly useful for targeting community interventions for Pacific populations most at risk of alcohol harm (e.g., Cook Islands and Niuean populations).

This study contributes important information for developing alcohol-relevant interventions targeting young Pacific New Zealanders. The study explored the factors that also supported non-binge drinking behaviours and found that modifiable family and community factors were important.

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Every child to thrive, belong and achieve? Time to reflect and act in New Zealand

Amanda J D'Souza, Nikki Turner, Don Simmers, Elizabeth Craig, Tony Dowell

Abstract

New Zealand continues to grapple with poor and inequitable child health and wellbeing outcomes. The associated high economic costs, the long-term impact on adult health and New Zealand's international children's rights obligations provide further grounds for action. Although there have been many different reports offering solutions and some key areas of progress, gains have been limited and there has not been sufficient clarity and agreement on wider actions. The environment is complex and solutions cross agency and disciplinary boundaries.

This paper reviews the current situation and proposes a set of actions to improve child health and equity. These include a group of recommendations on high-level leadership and coordination, actions to address social conditions, and a range of specific health and wellbeing actions. Progress will require the will, commitment and courage of many to acknowledge the issues and find a way forward.

Preventing suffering and ensuring the wellbeing of our youngest citizens during their formative years is an ethical issue for our nation, an issue of what we value as a society, and the best investment for a highly productive, innovative and resilient nation for the future.

New Zealand (NZ) is a world-leader in child health and development research¹ and ratified the United Nations Convention on the Rights of the Child (UNCROC²) nearly 20 years ago. Despite these achievements, our child outcomes are extraordinarily poor with large equity gaps.

NZ was ranked second to last in health and safety of 30 countries in an OECD report on child wellbeing and did not score highly in any category.³ Public investment in children is low by OECD standards throughout childhood, and is less than half the OECD average for our youngest children.³

Knowledge of this state of affairs is not new.⁴ Reports over the last decade have expressed concern and called for improvement. We recognise that there have been some advances such as in immunisation, and recent investments in rheumatic fever, Whānau Ora, and Gateway Assessments.

Recent developments include the Government's *Green Paper on Vulnerable Children* with its laudable vision of "Every Child Thrives, Belongs, Achieves" and the Māori Affairs Select Committee *Inquiry into the Determinants of Wellbeing for Māori Children*.^{5,6} It appears that the desire to do better is growing and currently there may be significant opportunities for positive change.

The health of New Zealand children

While major causes of mortality, such as injury and sudden unexpected death in infancy (SUDI) have been declining, the rate of decline has been less than in other nations and inequalities have persisted or even widened.⁷

Socioeconomic conditions have had a major impact on child health. Hospitalisations for socioeconomically sensitive conditions such as infectious and respiratory diseases steadily increased for children during the 1990s and early 2000s, with the significant rises occurring for those from lower socioeconomic backgrounds, particularly for Māori and Pacific peoples.^{8,9} During this period, NZ experienced major socioeconomic changes, the second largest increase in income inequality in the OECD, and a marked rise in child poverty.¹⁰⁻¹²

These hospitalisations peaked in 2002, gradually declined, and increased during 2007–2010, resulting in around 4800 extra admissions in 2010 compared to 2007.¹³

Disparities are seen across a range of child health indicators and can be observed very early on in life. For example, Māori infants are nearly five times more likely to die from SUDI than European infants.¹³

Māori and Pacific children bear the greatest burden of ill-health and there is a social gradient evident for most conditions (i.e. with rates progressively increasing with increasing socioeconomic deprivation). Such disparities are well illustrated with NZ's 14-fold higher rate of rheumatic fever compared to the OECD average, the burden of which predominantly falls on Māori and Pacific children and children living in more deprived areas.⁸

Similarly, hospitalisation rates for injuries arising from maltreatment demonstrate a marked social gradient, with rates rising from 4.2 per 100,000 for children living in the least deprived areas to 42.2 per 100,000 for those from the most deprived areas.¹³ This gradient across the population shows that such outcomes are not confined to those living in the most deprived areas, but affect children throughout society.

While trends for many conditions have been disappointing, some gains have been made. Immunisation rates, for example, have steadily improved so that by the end of 2011 more than 90% of 2 year olds are fully immunised and disparities have markedly reduced.¹⁴ This has been due to leadership, the effective use of target setting, infrastructure such as the national immunisation register, effective service delivery and use of specific evidence-based strategies.¹⁴

The environment, early relationships, and children's health

The social and physical environment has a powerful effect on children's health with complex and interactive pathways being involved. For example a respiratory illness can be the result of the transmission of the pathogen (encouraged by overcrowding), host factors (such as being more vulnerable from poor nutrition or chronic stress) the physical environment (damp housing, exposure to tobacco smoke) and the social environment (access to health care services, parental education, social support).¹⁵

While genetic variation accounts for some diseases, of far more importance are diseases that occur as a result of the way in which the genome interacts with its environment. From the moment of conception factors such as maternal nutrition, the

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presence of stress, and the effects of various molecules including toxins such as alcohol, influence chromosomal activity in the developing fetus.^{1,16}

Crucial maturation processes continue during early childhood, and these are critically shaped by the milieu of each child. This period of rapid brain and organ development can be profoundly influenced by a lack of nurturing and secure relationships and the presence of “toxic” stress such as violence.^{16–18} These exposures can divert brain development away from learning and skill development to a persistently activated physiological stress response, the long-term impact of which depends on intensity, duration and the presence of protective factors such as supportive relationships.¹⁷

These negative early life circumstances can have life-long consequences resulting in poorer social and cognitive skills and poor mental resilience in later life. Many chronic diseases of adulthood, such as cardiovascular disease and mental illness, as well as longevity itself, are linked to early life circumstances.^{1,18}

The impact of poverty on child health and wellbeing also involves complex pathways. One important example may be the impact of economising behaviours or “enforced lacks” such as children having to share a bed or several to a bedroom, cutting back on fresh fruit and vegetables, having difficulties heating the house in winter, being exposed to damp or mouldy housing and postponing doctor’s visits because of cost.

These economising behaviours are a common experience for many children in NZ. The 2008 Living Standards Survey found that over half (51%) of Pacific children aged 0–17 years, 39% of Māori children, 15% of European children, and 59% of children whose main source of family income was a Government benefit scored four or more on a composite deprivation index of “enforced lacks”.¹³

Hence efforts to improve child health and equity must consider the impact of social conditions, the wellbeing of parents, and the social and economic policies which shape these.¹⁹

The imperatives for action

There is a compelling case for a special focus on children. Firstly, there is an ethical and rights-based argument. The United Nations Committee on the Rights of the Child (UNCROC) acknowledges the special position of children in society; that the best interests of children must be a primary concern in decision-making, and that the family should be afforded protection and assistance so that it can fully assume its care-giving responsibilities.²

Successive Governments have committed to progressively realising this international treaty in our legislation, policy and practice.²⁰ However, children do not vote and there are currently no formal mechanisms in place to ensure that their rights and interests are considered in public policy decision-making processes.^{4,12}

Last year the UNCROC provided further recommendations to the NZ Government, including the need for a coordinating mechanism, an action plan, urgent action to address disparities for Māori children, greater resource allocation for children, greater consideration of the views of children, and reduced discrimination, maltreatment and violence.²¹

Secondly, there is an outcomes-based argument. Reducing morbidity and mortality in children is important in itself. However, early childhood is also a crucial time for adult development and for attaining more equitable health and social outcomes throughout the lifecourse.^{22,23}

A healthy start to life produces individuals who are more likely to participate effectively in society and who are less likely to contribute to the growing burden of long term conditions such as mental illness, type 2 diabetes and cardiovascular disease.¹⁷

Thirdly, there is an economic argument. Two recent NZ reports estimate the economic cost of a poor start to life as being in the order of 3 to 4.5% of GDP per year (at least \$6 billion), due to increased expenditure on health, welfare, education, and criminal justice and lower productivity.^{24,25}

Finally, there is a societal argument around what sort of community NZ wishes to be and what we value as a nation. Media reports of child abuse receive brief intense moments of attention and there is rhetoric around the desire to be a more cohesive, caring and less inequitable society. These reports are often followed, however, by uncertainty about how to move from the unacceptable present.

Challenges and opportunities

Given the compelling case for action, how can further progress be gained? There is no shortage of excellent reports, analyses, recommendations and strategic documents.^{3,4,7,19,21,26-32}

There have been some important gains, such as the repeal of Section 59 of the Crimes Act to provide better protection of children from assault. If focused on children, there is much to be gained from the growing use of quality improvement approaches within the health sector.

There is promise from recent investments in Whānau Ora, Integrated Family Health Centres, Gateway Assessments, and a disease focus such as for rheumatic fever. However, overall, action remains fragmented, insufficient and lacking a coordinated national framework across health and other sectors.⁴

We acknowledge that the current fiscal environment presents challenges and will do so for some time. However, as NZ's poor performance in child health and wellbeing predated the global financial crisis and recession, the barriers to action are more complex than a difficult economic climate alone. Furthermore, our current approach is costly and unsustainable.^{24,25}

Solutions are complex and cross agency and disciplinary boundaries. One of the fundamental difficulties is that there are strongly-held disparate views on the causes of the problem, and hence, the solutions. The issues can become polarised and entrenched in rhetoric and emotion.

There is a perceived tension between differing beliefs of who ought to be responsible—creating a false dichotomy between the roles of parental authority and the State. Parents and caregivers have the primary responsibility for child-rearing, however not in isolation; the broader environment within which the family is living also affects their child-rearing capacity and child outcomes.

The Government and civil society can do much to support the role of parents and to ensure good outcomes for our children.^{2,17} Furthermore, there is the need to acknowledge children as citizens, competent in their own right and able to exercise agency, while still needing to be nurtured and protected.^{2,33}

A further challenge relates to balancing the needs of the growing child with the advantages from having a parent in paid work. There may be a tension between paid work and the important role of child-rearing, particularly if employment is poorly paid, is not family-friendly, or if quality child care is not affordable or available.

NZ has a high proportion of children living in one-parent families (28% of families), where the likelihood of poverty and deprivation is much higher.³⁴ The majority of one-parent families are headed by mothers (23.5% of families) compared to 4.7% headed by fathers.³⁴

While paid employment may be potentially the best way out of hardship, particularly over the longer term, in NZ about 40% of children in poverty are from families with at least one full-time worker.³⁵

There appears to be a general recognition in NZ of the need for a basic level of provision by the State for children. However the optimal level and adjustment of this has varied since the 1980s, with more recently, a discriminatory lower level of State provision for children of beneficiaries than for other children,³⁶ unlike the universal basis of superannuation with an inflation-adjusted set baseline.

The economic challenge of sustaining this level of superannuation is not reason to avoid the dialogue on what should be a basic level of provision for children.

Finding a way forward

While there are many areas of uncertainty, some issues are clear. NZ's child health and wellbeing statistics are not acceptable. There is recognition of the need for all children to receive the necessary provisions for healthy growth and development. However how to achieve this has not been agreed. Our current approach of piecemeal, ad hoc action is not sufficient.

There is not one simple solution for NZ or indeed for other comparable countries and there will remain areas of significant debate about how to act. It is clear that multiple actions are needed in many areas and that we need to prioritise and invest more in children, starting early and prioritising children from disadvantaged backgrounds.

There are a range of international and national frameworks to guide action, a wealth of dedicated community and professional organisations and individuals and a skilled workforce to help plan, commence and sustain action and to monitor progress.

As a society, when we choose to focus we can produce results, such as our success with immunisation. Despite the fiscally constrained environment, NZ has the means to substantially improve child health and wellbeing. It will require reprioritisation and the will, commitment and courage of all our community to acknowledge the issues and negotiate a way forward. This will require a common understanding of the above imperatives for action.

How to act

NZ already has many components in place. Some actions may take time to negotiate and implement; some changes can be made relatively quickly. There will be some areas in which the course of action is clear, where there is strong evidence of effectiveness or where action is clearly based on what is valued as a nation. However, many areas will not have such clear linear solutions and further dialogue will be required.

There are common themes for action, many well expressed in the recent New Zealand Medical Association equity statement³⁷ and highlighted from many previous reports.^{3,4,7,19,21,30} These broadly include starting with strong nationwide leadership with a voice for children at the highest level of Cabinet.

All policies and strategies need child and equity impact assessments. Healthy children's policy requires an equitable fiscal and social policy which includes measures for, and monitoring of, progress on child hardship. Greater co-ordination and integration is required across all policy and service delivery domains. Enhanced effort and integrated approaches are required particularly in the early childhood years and they must be given adequate investment and time to develop and be reviewed.

Leaving society's provision for children to philanthropy is ad hoc and insecure, and its failure to provide adequately for all children in need led to the establishment of State welfare programmes last century.³⁸

Based on the available evidence an approach based on a universal platform is required to achieve the gains necessary and to enable identification of need.^{22,39} Proportionate universalism refers to a universal approach but with actions scaled in proportion to need or the level of disadvantage.²²

A universal platform means that all children and their families are identified at birth, preferably antenatally, their needs and strengths being identified early on, and then appropriate resources or services being made available and accessible, with follow up occurring in a timely manner.^{16,29,31,32,40}

Recommendations

The following 10 recommendations to Government are based on the key themes emerging from a range of local and overseas reviews, which have considered the best ways of achieving optimal child health and wellbeing. While they are ranked by number, an effective and long-lasting solution requires a comprehensive approach, and not cherry-picking of individual recommendations. We recognise that action will require stepped implementation and will require the combined efforts of many, not Government alone.

A comprehensive policy framework for children:

1. **Enshrine a whole-of-Government and public sector commitment to children.** Through, for example, a Children's Act, a senior Minister for Children within Cabinet, greater investment, child impact assessments, use of the UNICEF Child Friendly Cities Framework by local authorities, and consideration of a core public sector office or Ministry for Children.

2. **Develop a comprehensive National Children's Action Plan.** Underpinning principles should include UNCROC, te Tiriti o Waitangi, and proportionate universalism. The plan should be cross-sectoral and include a focus on prevention and equity.
3. **Establish fair and comprehensive fiscal and social policies for children.** This includes a minimum level of support and services for all children and their parents so that they can 'thrive, belong and achieve.'
4. **Establish indicators for child health and wellbeing.** Where possible, develop these as targets for service delivery (in addition to immunisation rates).

Specific health and wellbeing actions:

5. **Build on existing quality improvement and integrating frameworks for children's services.** Many activities have already been initiated in other areas of healthcare delivery but there now needs to be a focus on integrating the early life service platforms of maternity, primary care, Well Child/Tamariki Ora services and early childhood education.
6. **Resource effective community-led development initiatives to improve child wellbeing and reduce inequities.** Ensure that these are evaluated.
7. **Introduce evidence-based measures to protect children from harmful exposures.** Starting with maltreatment and violence, the second-hand effects of alcohol misuse and tobacco, and the excessive promotion of unhealthy food.
8. **Implement or broaden specific evidence-based measures in important child health areas.** Particularly for child nutrition, infant and child mental health, reducing respiratory and infectious diseases, injury prevention, oral health and SUDI prevention.
9. **Continue and broaden the programmes which improve home heating and insulation.** Both for state and private rental housing.
10. **Ensure that the momentum towards all children having free access to primary care services continues and that the additional services that they and their parents need are available at no cost and in a timely fashion.** Special effort may be needed to reach Maori and Pacific children, children in the care and protection system, children with disability or chronic conditions, and children from refugee backgrounds. There needs to be a greater focus on child development services, mental health services (infant, child and for parents), special education services, parenting training and support, and other community-based interventional services. The concept of Integrated Family Health Centres may provide an ideal platform for delivering these services.

Conclusion

NZ has poor and inequitable child health and wellbeing outcomes. Child wellbeing in NZ is one of the most important issues facing the nation. Now is the time to seize opportunities and develop new strategies to improve our child health and wellbeing statistics.

Preventing suffering and ensuring the wellbeing of our youngest citizens during their formative years is an ethical issue for our nation, an issue of what we value as a society, and the best investment for a highly productive, innovative and resilient nation for the future.

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Options for postgraduate anatomy education in Australia and New Zealand

Ian S Campbell, Carly M Fox

Abstract

Aims Medical education in Australia has changed considerably in recent times. As a result, hours dedicated to subjects such as anatomy have been reduced. Young doctors preparing for a career in anatomy-focussed specialties such as surgery and radiology require an indepth knowledge of this subject matter. Many Australian and New Zealand universities now offer postgraduate anatomy courses to address this potential gap in a budding surgeon's education. This article summarises the current options for postgraduate surgical anatomy education in Australia and New Zealand.

Methods All universities in Australia and New Zealand were contacted between September 2010 and December 2010 regarding the nature and content of course offerings. An Internet-based search was also conducted.

Results There are currently nine universities in Australia and New Zealand offering postgraduate anatomy courses. Courses vary in contact hours, dissection time, lecture content, and examination methods. There are currently two universities offering a Postgraduate Diploma of Surgical Anatomy—the University of Melbourne, and the University of Otago. University of Western Australia and the University of New England offer a graduate diploma and a graduate certificate, respectively. Several other universities offer courses that deliver quality anatomical education but do not award students a university-recognised qualification. The Australian Orthopaedic Association now offers courses in Perth, Sydney and Brisbane, which delivers anatomy education specific to orthopaedics.

Conclusions There are a number of courses available to budding surgeons and radiologists to help fill the anatomy education void. With the development of such courses questions of accessibility, affordability and equity remain.

Over the last 20 years, medical school curricula have been “modernised”. At the heart of these reforms is a shift from the acquisition of detailed factual knowledge, to an appreciation of core concepts, taught within a problem-based framework.

In an increasingly overcrowded timetable, subjects such as communication, professionalism and psychosocial medicine jostle for airtime alongside traditional subjects including physiology, microbiology and anatomy.¹

Increasing class sizes and a reduced availability of cadaveric specimens means that traditional anatomy teaching by dissection, whilst still occurring in some Australasian medical schools, is no longer the norm.

As a result, total hours dedicated to anatomy education in Australian and New Zealand undergraduate medical curricula have been truncated, with wide variation in the amount of anatomy taught in medical schools.²

Many authors have lamented the demise of traditional anatomy teaching.³⁻⁵ Others concede that in this age of information where facts are available at the click of an iPad, there is no longer a need for students to acquire an intricate knowledge of the human form at the undergraduate level.⁶ This issue remains contentious with junior doctors and surgeons alike questioning the adequacy of modern anatomy education and their resulting preparedness for clinical practice.^{7,8}

There remains little doubt though, that students and junior doctors preparing for a career in surgery or radiology will need to acquire this knowledge, and it is clear that the provision of this knowledge is no longer in the domain of undergraduate medical programmes. As such, there exist an increasing number of postgraduate anatomy programmes that aim to prepare doctors for careers with a heavy focus on anatomy including surgery and radiology. This shift echoes movement in the UK to implement courses for Foundation Year 1 and 2 doctors. This move has been well received as “an expression of a new focus on applied anatomy for surgical trainees”.⁹

At present, there is little information available to junior doctors regarding the options for further anatomy education. This article will examine options for postgraduate anatomy education in Australia and New Zealand. This article will not pass judgment on the quality of these programmes, as this may undermine the need to promote ongoing anatomy education, and a method of reliably concluding how these programmes perform is beyond the scope of this article.

Methods

All 47 Australian and New Zealand Universities, as listed on the Good University Guide website,¹⁰ were contacted regarding anatomy programme offerings. All universities were emailed requesting information regarding anatomy programmes offered, the method of content delivery, course duration, cost, whether dissection is offered, if the course is approved by the Royal Australasian College of Surgeons (RACS), and the presence of surgical/clinical focus. The usual contact point was the head administrator of the anatomy course (Table 1).

Thirty-six universities responded to the email via return email or phone call. A Medline search as well as Internet search was conducted to obtain information about courses not found in the initial survey of universities. This search revealed information relating to one additional course (Australian Orthopaedics Anatomy). The information received from the universities was combined with relevant information from websites listed.

Results

A summary of anatomy courses available at tertiary institutions in Australia and New Zealand is outlined in Table 1.

Postgraduate Diploma in Surgical Anatomy (PGDipSurgAnat)^{12,13}

This course is offered at two universities in Australia and New Zealand, both of which are supported and recognised by the Royal Australasian College of Surgeons (RACS).

University of Otago—The University of Otago, in Dunedin New Zealand, offers a postgraduate diploma in surgical anatomy. The course is fully accredited by RACS and aimed at postgraduate Year 1 to three doctors interested in surgery and radiology.

Table 1. Postgraduate anatomy programmes in Australia and New Zealand

UNIVERSITY	DEGREE	TIMEFRAME	MODE	COST	DISSECTION	RACS APPROVED	CONTACT PERSON
Postgraduate Diploma in Surgical Anatomy (PGDipSurgAnat)							
University of Otago	PGDipSurgAnat	Full-time: 1 year 164 contact hours	External with 2-week block modes	Domestic ~NZ\$8763 International ~NZ\$30,000 (note: bursaries available up to \$13,500)	Yes – 4 weeks Total – 2 blocks of 2 weeks	Yes	Kathryn McClea Course Administrator Dept of Anatomy and Structural Biology Otago School of Medical Sciences University of Otago PO Box 913 Dunedin New Zealand P: 0800580500 E: kathryn.mcclea@anatomy.otago.ac.nz W: http://surgicalanatomy.otago.ac.nz/
University of Melbourne	PGDipSurgAnat	18 weeks. Total 160 contact hours	Internal	Domestic AU\$10,600 International AU\$10,600	Yes – 2 evenings per week for 18 weeks	Yes	Mary Georges Project Manager Melbourne Consulting and Custom Programmes The University of Melbourne P: +(61 3) 9810 3185 E: m.georges@mccp.unimelb.edu.au W: http://www.mccp.unimelb.edu.au/courses/award-courses/postgraduate-diploma/surgical-anatomy
Graduate Diploma in Anatomical Sciences (GradDipAnatSciences)							
University of Western Australia	GradDipAnatSciences	Full-time 1 year Part-time 2 years	Internal	Domestic AU\$14,538 International AU\$28,500	No	No	School of Anatomy and Human Biology +(61 8) 64883288 enquiries@anhb.uwa.edu.au Website: http://www.science.uwa.edu.au/courses/postgraduates/coursework/graddipanatsc
Graduate Certificate in Applied Anatomy by Dissection (GradCertAnat)							
University of New England	GradCertAnat	Full-time 6 months Part-time maximum 2 years	External + 11-day intensive	Domestic ~AU\$9,100	Yes – 11 days	No	Julie Mills School of Rural Medicine University of New England Armidale NSW 2351 (+61 2) 6773 3087; jmills24@une.edu.au; http://www.une.edu.au:80/courses/2011/courses/GCAAD

Advanced Studies in Clinically-Oriented Anatomy							
Monash University	Nil – Certificate of attendance	23 sessions broken (4 modules). Note: Can undertake individual modules	Internal	Domestic AU\$2200 International AU\$2200	No	No	Marilynne Helms Centre for Human Anatomy Education Email: marilynne.helms@med.monash.edu.au Webstie: http://www.med.monash.edu.au/anatomy/clinanatomy/advanced-studies-2011-flyer.pdf
Applied Anatomy for Surgical Trainees							
University of Adelaide	Nil – Certificate of attendance	24 weeks. Total 72 contact hours	Internal	AU\$2200	No	No	Associate Professor Mounir Ghabriel Discipline of Anatomy and Pathology School Medical Sciences, Faculty of Health Sciences University of Adelaide, SA 5005 P: 83035481 E: mounir.ghabriel@adelaide.edu.au http://health.adelaide.edu.au/school_medsci/research/aandp/Applied%20Anatomy%20for%20Surgical%20Trainees%20Overview.pdf
Australian Orthopaedic Surgical Anatomy Course							
Australian Orthopaedic Association (AOA)	AOA Surgical Anatomy Course Certificate - not university recognised	20 weeks. Total 60 hours contact	Internal and Video	AU\$5445	Yes – relevant to orthopaedics	No	Annie Gibbins AOA National Education Manager Email: annie.gibbins@aoa.org.au Ph: 02 80718000 W: http://www.aoa.org.au/Training/Becoming_a_trainee/Anatomycourses.aspx

This programme consists of two semesters (6 months each) of anatomy education consisting of two elements:

- 24 weeks of distance learning, including selected readings, podcasts, questions and four research essays.
- Two separate, 2-week periods of campus-based tuition and whole body dissection.

A maximum of 30 people are selected from the application process, enabling four persons per cadaver. This course is taught primarily via two surgical anatomists with input from a broad range of specialist surgeons and radiologists.

University of Melbourne—The University of Melbourne conducts a postgraduate diploma of surgical anatomy in the first semester. The course runs on two evenings per week, for 18 weeks, totalling 160 hours contact. The course is aimed at participants who intend to sit the RACS part one examination.

This course consists of lectures, tutorials and directed dissection sessions with the option of additional independent dissection. There is currently no option for distance learning. Six students are allocated to one cadaver, however only three students dissect at any given time, rotating with prosected specimens. Both anatomists and specialist surgeons with an interest in anatomy deliver lectures.

Graduate Diploma in Anatomical Sciences (GradDipAnatSciences)¹⁴

University of Western Australia—The Graduate Diploma in Anatomical Sciences is not specifically aimed at medical graduates or those interested in surgery, and thus does not have a surgical focus. Previously the course consisted of five subjects based around an anatomy project.

Students are taught to develop, design and conduct a research project, acquire and record and analyse experimental data and analyse concepts and development in the anatomical sciences. Students then use this basis to conduct an anatomy investigation.

This course is not didactic learning of human anatomy and there is not a set prerequisite for dissection, however dissection is an option. The course length is 1-year full-time or 2 years part-time. It is undertaken at the Perth Campus, with no option for distance learning.

Graduate Certificate in Applied Anatomy by Dissection (GradCertAnat)¹⁵

University of New England—The course is aimed at medical and dental graduates and is a preparation course for those interested in surgical and radiology training. The course consists of an external self-directed component, using web-based, DVD, CD and virtual library technology, and an internal 11-day intensive course of cadaver dissection. At the time of writing endorsement from RACS is being sought. The dissection component is only offered in the second half of the year and occurs in Armidale. For those solely interested in dissection, the option to undertake dissection without obtaining the Graduate Certificate is possible at a reduced fee (2010 cost \$6650 AUD).

Advanced Studies in Clinically-Oriented Anatomy¹⁶

Monash University—This course consists of twenty-three sessions each of 3 hours duration, covering anatomy relevant to surgery within four modules. Anatomists and specialist surgeons present this course. There is no dissection available, however prosected specimens are examined. It is offered in the second half of the year and candidates can elect to take one or more of the modules. This is not a recognised university qualification, but recognition of completion is given.

Applied Anatomy for Surgical Trainees

Adelaide University—The Anatomy Course for Surgical/Radiology Trainees offered through University of Adelaide consists of 24 weeks of evening practical demonstrations and lectures. Each weekly session runs for 3 hours, during which students examine prosected specimens. There is no dissection undertaken. The course is separated into three modules, which are studied for 8 weeks each. This is not a recognized university qualification, but recognition of completion is awarded.

Australian Orthopaedic Association Anatomy Diploma

The Australian Orthopaedic Association (AOA) has recently developed an anatomy diploma, which is run through a number of universities. This diploma is not a university-recognised qualification, however it is formally recognised by the AOA in applications for orthopaedic training. This course is aimed at those wanting to pursue a career in orthopaedics and thus has a strong focus on surgical anatomy relevant to orthopaedics.

This course is run in Perth and Brisbane and Sydney. This diploma consists of 15 modules of surgical anatomy, particularly relevant for orthopaedics. It does not cover abdominal or thoracic anatomy in detail is therefore not the course of choice for a budding general surgeon. Each module is presented on one afternoon per week for 3 hours. There is the option for video link up.

Discussion

Undoubtedly undergraduate anatomy education is on the decline. Students no longer undertake dissection as a mandatory component of their formative medical education in many Australasian Universities. Whether this is to the detriment of the quality of medical graduates is questionable, but junior doctors wishing to pursue a career in anatomy-heavy specialties require an indepth knowledge of anatomy, greater than that currently provided by the majority of contemporary medical schools.

As the responsibility for providing such education and dissection experience no longer lies with medical programmes, an educational void develops. This void has been filled to a degree—there now exist multiple options available for formal anatomy education at the postgraduate level, as demonstrated by the variety of courses offered in Australia and New Zealand.

Several of these courses are approved by the Royal Australasian College of Surgeons, through a rigorous endorsement process. Course coordinators are required to submit a detailed analysis of course content, educational foundations, assessment schedules, and internal and external review procedures. Whilst this does not necessarily

guarantee a superior learning experience, and an indepth analysis of the educational merits of each course is beyond the scope of this article, potential surgical trainees set themselves in good stead having completed a course aligned with RACS learning objectives.

Anecdotal evidence also suggests that surgeons within hospital departments have responded to the reported anatomical deficits of their trainees by independently developing preparation courses for trainees sitting examinations.¹¹ Senior surgeons are to be applauded for this, and no doubt young trainees will likewise teach their junior colleagues in years to come. It is difficult to quantify the number of such courses that exist.

It would be worthwhile to consider providing this informal education to trainees at a regional or state level. However, this shift in responsibility is not without controversy. Questions of adequacy, cost, and accessibility remain. For example, should a trainee who has already spent thousands of dollars on a medical degree, and who will potentially spend thousands more during his or her surgical training, be expected to cover the cost of an anatomy course that addresses subject matter that arguably should be covered in the trainee's undergraduate and/or fellowship training?

Should the cost be shifted to the hospital health board where the student currently works? Furthermore, these courses could potentially constitute a new standard of prerequisite education prior to admission to SET training. Completion of anatomy courses attracts a variable but significant number of points in applications to several of the SET specialities. These questions will inevitably be addressed with time and will no doubt be a subject of ongoing discussion in the medical education literature.

Regardless, there is no doubt that anatomy and dissection experience allows a prospective trainee to “know his/her way around the human body”⁴ and sets him/her in good stead for his/her burgeoning surgical career.

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Medical students performing lumbar punctures: are we doing enough?

Yassar A Alamri

Abstract

It is safe to suggest that every medical student in their clinical years (and certainly every doctor) should be able to act alone in emergency situations and with limited resources. This includes supporting life functions, performing diagnostic procedures, establishing a clinical diagnosis, and/or initiating treatment. However, medical school curricula do not always cater for such demands. Lumbar puncture is a basic procedure performed routinely in emergency departments, neurology wards and elsewhere in hospitals. Medical students, however, do not usually get the chance to perform lumbar punctures during their basic training. In fact, Australian and New Zealand medical students seem to get the least exposure when compared to other students in other developed countries. This article examines the current status of medical students performing lumbar punctures around the world, and the ethical considerations around this issue.

Medical students are required to achieve certain clinical and procedural competencies before they graduate. However, defining what constitutes a 'competency' or when a student can be deemed competent has been challenging, and clear guidelines are generally still lacking. Moreover, a student's definition of competence can substantially differ from that of supervising personnel.¹

In a broad sense however, it is safe to suggest that every medical student in their clinical years (and certainly every doctor) should be able to act alone in emergency situations and with limited resources. This includes supporting life functions, performing diagnostic procedures, establishing a clinical diagnosis, and/or initiating treatment.²

While clinical knowledge can often be obtained from ward-rounds and bedside-teaching, procedural skills require more than that. Familiarising students with a procedure and getting them to perform it under appropriate supervision is crucial to students reaching procedural competence. This process should start in medical school and later be reinforced during postgraduate studies.³

Why is it an important issue?

Lumbar puncture (LP) is a basic procedure performed routinely in emergency departments (EDs), neurology wards and elsewhere in hospitals. It is one of the most difficult procedures in medicine because it requires specialised equipment and a highly skilled practitioner.

When a cohort of US third-year medical students was surveyed, LP was a skill that they perceived to be highly important, but that they commonly lacked confidence in.⁴ When the same cohort were surveyed again toward the end of their fourth year, there

was a significant increase in the number of students performing LPs, as well as in students' self-confidence in the skill.⁵ However, similar results were not reproduced in another survey of fourth-year medical students.⁶

Still unfortunately, this has not changed the way that this important procedure is taught to medical students, or how often they are given the opportunity to perform it. Junior residents have been observed to make frequent errors while performing LPs, as they are seldom adequately prepared for the task as medical students.^{7,8} Therefore, junior housestaff will have to have gained some prior competency with such a skill if they are expected to perform it comfortably later in their careers.⁹

Medical students performing lumbar punctures

In 2002, the Institute for International Medical Education issued a report on the global minimum essential requirements in medical education. It stated that a medical graduate must be able to “apply basic diagnostic and technical procedures” and to “perform appropriate diagnostic and therapeutic strategies” to diagnose patients effectively and efficiently.¹⁰ These guidelines have been extrapolated to include LPs, as can be seen in the published literature.¹¹

United States—Almost all the published literature that discusses medical students performing LPs comes from the USA. In their learning objectives for medical student education, the Association of American Medical Colleges acknowledges that before graduation students should be able to perform routine technical procedures (including LPs).¹² In a sample of 698 senior medical students from various medical schools throughout the USA, an average of 90% of the students rated themselves as adequate or very adequate in performing LPs.¹³ Furthermore, when 100 medical students were asked about performing procedures during their third year, only 22% stated that they had not performed an LP yet.¹⁴

Australia—Data from outside the USA is less robust. A recent survey targeted a random sample of interns graduating from one of New South Wales' three medical schools.¹⁵ They were asked to indicate whether they would have liked more medical education before graduating on any of 226 core skills. These core skills were identified as ‘required at graduation’ by reviewing the relevant literature as well as consulting intern supervisors, discipline heads, hospital nurses, registrars and interns. These skills were divided into five groups: clinical conditions, investigations, procedures, core practice and professional development. Performing an LP topped the investigations list and was among the 20 most frequently acknowledged skills identified as needing more medical school preparation.¹⁵

New Zealand—Performing an LP appears as an ‘important procedural skill’ in students' logbooks and skill development manuals in New Zealand medical schools. For example, the Canterbury District Health Board has developed an LP skill development package, specifically targeting supervised medical students.¹⁶

Disappointingly however, medical students in New Zealand very rarely get the chance to perform LPs. A survey of 93 skills was conducted to examine any differences experienced by traditional hospital-based versus rural medical students.

The survey covered a group of fifth-year students located at several different campuses of the University of Otago. LP was one of only four skills (i.e. alongside

venous cut down, needle thoracocentesis and cricothyroidotomy) of which no students at any location reported any hands-on experience.¹⁷

Taiwan—In a review of 207 logbooks of 7th year medical students in Taiwan, 49% stated that they did not learn well through observing an LP. The authors of the study concluded that students should be given structured opportunities to practice the required clinical and procedural skills to increase their learning outcome.¹¹

Nepal—In a survey of 59 medical students' perceptions and attainment of certain clinical and procedural skills, 20.4% have performed one to five LPs before graduation. However, only two students felt confident about performing LPs on patients.¹⁸

Issues surrounding medical students performing lumbar punctures

Impact of experience on errors and complications—The experience level of the personnel performing an LP is directly related to the number of technical errors that will occur when performing the procedure,⁷ but not with the rate of complications. Although this may seem counterintuitive, the common belief that a practitioner's level of experience will correlate with the incidence of complications is only an assumption; data are lacking to support this assumption.¹⁹ Therefore, allowing students to perform such a procedure is key and 'practice makes perfect'; arguing that letting students practice LPs will *harm* patients is therefore refuted.

When asked about the number of times the procedure needs to be performed for the student to reach complete competence, PGY1 residents estimated an average of 8.1, while consultants estimated an average of 6.9.¹ Moreover, Wu and his colleagues have found that there is a positive relationship between the frequency of performing a procedure (such as an LP) and the practitioner's level of self-confidence in it.⁴ They have also suggested that proper teaching, formal assessment and the addition of curricular material about the procedure will increase the likelihood of students performing it more often.^{4,8} Furthermore, students who worked with the same attending for longer periods (e.g. more shifts in the ED) were found to have performed significantly more procedures than their peers who did not.³

Simulation-based learning was found to improve the technical skills of students performing LPs.²⁰ However, this did not change patients' attitudes toward having their LP performed by a medical student.²¹

Patients' attitudes and opinions toward medical students performing lumbar punctures—If given the chance to anonymously make a decision without having to confront an authority figure, most patients would not agree to be the subject of a medical student's first procedure, no matter what it is.²² However, unless there are very specific reasons, information should never be held back from a patient, and their autonomy should be respected at all times.

Withholding information that an LP is the student's first is a form of deception, and is generally unjustifiable—even if it is for a 'good reason' (such as training future doctors). Jeopardising the autonomy of a *present* patient for the potential benefit of a *future* patient is ethically unacceptable. This is because the practitioner has a stronger obligation to the present patient; future patients may never exist.¹⁹

When 173 patients were surveyed about whether they would be willing to be the subject of a student's first LP, 52% said they would be. The number increased to 61% when the patients were asked beforehand and were told that the students would be under *close* supervision. When the rest of the population was investigated, it was found that much of the reluctance was attributable to poor patient understanding of the procedure and its complications. For example, half the patients erroneously thought that there was a high risk of paralysis. Therefore, better patient education and further development of policy boards would enhance the patient response.¹⁹

Another study found that patients who have a longer working relationship with a medical student are more willing to agree than patients who do not (such as patients seen in EDs). Interestingly, the type of medical insurance patients hold (i.e. self-pay, personal-insurance or government-insurance) does not seem to make them any more or less likely to agree.²²

Lastly, for medical students' first procedures, some have suggested targeting a selected population such as willing young patients, or cancer patients who will have had many LPs before.¹⁹ While this can ultimately result in increased patient numbers (i.e. more who are likely to agree), this would place an undo burden on this segment of the patient population for the benefit of others. Nobody ideally wants to be a medical student's first patient, and everybody wants to receive care from the best-trained doctors; however, these two goals are contradictory and are almost mutually exclusive!

Therefore, the ultimate goal should be trying to distribute the burden/risk of medical education as impartially as possible among all in society. This means educating patients about why they may wish to give up some autonomy and consent to having procedures done by *properly* supervised students.^{21,22}

Conclusion: main messages and what next?

Graduating medical students are expected to perform at a certain level, for which they are not always adequately prepared. LP, an important diagnostic and therapeutic procedure, is rarely performed by medical students in New Zealand and Australia before graduation.

Medical students performing LPs, and other manual procedures, can be ethically justified, given that a number of patients would be willing to sacrifice some autonomy in order to train future doctors. Perhaps a step-wise plan to achieving this, by protecting some curriculum time and making use of simulations and logbooks, will result in higher numbers of medical students performing an LP before graduation.

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Modelling empathy in medical and nursing education

Phillipa J Malpas, Andrea Corbett

Abstract

Medical and nursing student numbers are expected to increase significantly in NZ over the next few years. The ethical, and professional and clinical skills' training of trainee health practitioners is a central and crucial component in medical and nursing education and is underpinned by a strong commitment to improve patient health and well being. In this discussion we reflect on the virtue of empathy and the importance of role modelling in the education of nurses and doctors. We endorse the claim that as medical educators, *how* and *what* we teach matters.

Over the past several decades, the moral domain of medicine has assumed an increasingly prominent role in the healing, care, and treatment of patients. No longer is it appropriate (if it ever was) that the focus centre predominantly on the disease or illness that a patient presents with (for instance, patients as problems to be solved). Now there is greater recognition for the psychological, cultural, emotional and spiritual aspects of a patient's wellbeing.^{1,2}

Within the New Zealand context, recognition of this can be evidenced in a number of different ways from the development and implementation of the Health and Disability Code of Consumers' Rights (in response to the Cartwright Report in 1988³), to greater emphasis placed on respecting the preferences of patients in the area of decision-making at the end of life (for instance in promoting advance directives), and respect for cultural diversity.

The nursing profession adopted the concept of cultural safety into its undergraduate degree programme in 1992. Cultural safety includes recognition of the rights of all patients and their families, respecting their unique cultural identity, and ensuring their needs and expectations are met and safeguarded.⁴

In 2010 Ron Paterson (then New Zealand's outgoing Health and Disability Commissioner) commented, in the *New Zealand Medical Journal*, on some of the lessons learnt from complaints to the Commission, and the implications these lessons may have for medical education.⁵

His insights included remarks on the importance of effective communication, the virtues of courtesy, kindness and empathy in one's relationships with patients, the ability to be self-reflective and open to criticism, and the significance of teamwork and clinical leadership.

In the article he claimed; "*First, how we teach may be as important as what we teach. Our behaviour as educators matters. Do our tutorials and lectures (and later our ward rounds and teaching sessions) model good communication? Do students see courtesy and kindness in the approach of teachers*"?⁵ (pg 9)

Informing and steering his focus and subsequent discussion in the paper were the complaints made to the Health and Disability Commission over a ten year period when he was Commissioner. When we consider the publically available reports detailing complaints against health practitioners, it is troubling to reflect that some of them involve grievances about a lack of professionalism (notably poor communication skills) and concerns around a lack of courtesy, empathy and team work.⁶

The Commissioner noted in the 2011 Annual Report that “*consumers complain about the attitude and manner of the provider, communication with families, the adequacy and accuracy of information, informed consent, and communication of test results*”⁶ (pg 9).

Paterson went on to comment in his paper that “*as educators, we should teach medical students about the nature of suffering and the value that patients place on courtesy, kindness and empathy*”⁵ (pg 7)

Medical and nursing student numbers are expected to increase significantly in NZ over the next few years. The ethical and professional and clinical skills’ training of trainee health practitioners is a central and crucial component in medical and nursing education and is underpinned by a strong commitment to improve patient health and well being (as well as continued public confidence and trust in the health care system).

We endorse Paterson’s challenge that *how* and *what* we (as medical educators) teach matters and expand on the *how* by claiming that the virtue of empathy can, and must, be reflected in medical and nursing education through appropriate role modelling. Congruence is vital—if medical and nursing students are expected to develop patient-centred attitudes and skills, those teaching them should be student-centred themselves.⁷

What is empathy?

We use the concept of empathy to refer to a cognitive attribute that involves an understanding of the inner experiences and perspectives of the patient as a separate individual combined with a capacity to communicate this understanding to the patient.⁸ In other words, empathy is the ability to emotionally identify *with* others—to feel what they are feeling⁹—and to convey that sense of identity to the patient.

To be empathetic is to have altruistic concern for others, and thus is demanding because it requires health practitioners to listen and connect with others. In essence it requires them to step into the other’s shoes. It is a quality needed by both nurses¹⁰ and doctors.¹¹

Within the literature, whilst there is considerable disagreement about how the concept of empathy is understood, and whether it can - or even should - be taught to medical and nursing students, there is widespread agreement empathy is a crucial and significant part of the relationship a patient has with a health care practitioner.^{2,11,12} Modelling empathy towards students, and being empathetic with patients is an important aspect of good medical care.

Hornblow and colleagues argue that empathetic skills ought to be taught in medical education and that it should not be assumed that such skills will be automatically acquired in the course of clinical training.¹³

The Medical Council of New Zealand states in its guide '*Good Medical Practice*' that working in partnership with patients entails listening to them and responding to their concerns and preferences. It is this emphasis on listening and responding to patients that is at the heart of Paterson's call to elevate the virtue of empathy within medical and nursing education.

The Nursing Council of New Zealand requires that student applicants (for State Final exams leading to registration) demonstrate four core competencies. The third domain of competencies—Interpersonal Relationships—requires of nurses that they '*demonstrate respect, empathy and interest in the client*'. This has to be demonstrated and maintained in practice before a student may be judged competent to nurse.¹⁴

Student nurses preceptored by experienced Registered Nurses are required to meet Nursing Council competencies which go to the core of ensuring the Registered Nurse workforce has a culture of excellence in nursing practice. It goes without saying that communication skills including empathy are high on the list of 'must achieve'.

The erosion of empathy

Several studies have explored the alleged erosion in empathy amongst medical students^{8,15-17} nursing students¹⁸⁻²⁰ and in other health disciplines.^{21,22}

A recent study in which self-reported empathy levels were examined in students from five health disciplines (dentistry, pharmacy, medicine, veterinary medicine and nursing) found that the decline in self-reported empathy scores began during the first year of training.²³

The authors argue that whilst some of the decline may be attributable to a 'settling in' period (moving from an idealistic approach to one that is increasingly realistic in the medical setting), the decline may also reflect greater responsibilities and an increased workload (time pressures and fatigue).

It is also likely that empathy is eroded when students and junior staff become socialised into a culture whereby the implicit messages received are strongly contrary to the formal curriculum. This 'hidden' or 'silent' curriculum is powerful because often the most influential and lasting lessons learned are those that are conveyed in the corridors, at the bedside, and on the ward.²⁴⁻²⁸ In their paper, Christakis and Feudtner discuss some of the cases reported by medical students in their ethics class.

When students witness patients being attended to with little in the way of empathetic concern by more senior health professionals, they may end up relinquishing such virtues as being redundant or superfluous to the medical setting.

It is well documented within the literature that implicit attitudes and behaviour towards patients and junior medical staff (trainee doctors and nurses) from some senior health professionals leave much to be desired.^{29,30-33.}

Role modelling empathy

A number of studies have explored role modelling in medical education.³⁴⁻³⁸ and the importance it has on shaping behaviours and attitudes. Weissman et al studied (via qualitative observation) twelve clinical teachers who were identified as excellent teachers of humanistic care by medical residents enrolled in four medical universities in the United States.³⁶

The authors found that the clinical teachers taught humanistic and professional values such as respect, patient care, empathy, and sensitivity, “*almost exclusively by role modelling*” (pg 662).

They relate an encounter between one of the clinical teachers and a patient who had recently been transferred to a different floor. She was distressed and weeping when seen by the clinician. He asked her why she was crying - was it pain that was causing her such distress? She replied that it wasn't, she was worried that her daughters would be unable to find her when they visited the hospital and found she had moved. Recognising her distress and seeking to understand what was causing it resulted in someone phoning her family to let them know where she was.

The authors identified as important a number of elements that were observed by the clinical teachers in their teaching: nonverbal communication such as touch and eye contact; overt demonstrations of respect such as asking permission of the patient and introducing oneself; building a personal connection such as recognising the patient outside the context of patient care rounds; eliciting and addressing patients affective response to illness; and attending physicians self awareness (pg 664). “*Implicitly, teachers assumed that learners would recognise, accept, and ultimately embody desirable behaviours*” (pg 664-5).

Yet the assumption that modelling desirable behaviours and attitudes will be explicitly understood by learners may be premature if these elements of learning are not stated unequivocally.

Egnew and Wilson³⁷ explore how medical students learn doctor-patient relationship skills in their medical education. They found that much of the teaching of these relationship skills was not concerted or coordinated and that whilst the majority of learning in the hospital environment occurred through modelling, it wasn't necessarily structured or clear.

One student commented that, “*we're getting thrown in the deep end and we just have to find out for ourselves...*” (pg 202). Commenting in a similar vein, another student said, “*we're little sponges and we're trying to suck up everything that we possibly can*” (Ibid).

Reuler and Nardone comment that medical educators “*should affirm the enormous influence role models have on education. Positive role models pass on perspectives that may have broad and long-term effects for both patients and physicians*”³⁸ (pg 336). They argue these effects can be both positive and negative and that role models are important because they are a substantial part of how students are socialized into the world of medicine. This is also affirmed by Kenny et al.³⁵

Wright and colleagues³⁹ explored the possible associations between role models that were encountered in medical school and students' later choice of clinical field. They

concluded that personality, clinical skills and competence, and teaching ability were most important in the selection of a role model, while research achievements and academic position were least important.

Personality ranked first and included qualities such as compassion, integrity, social conscience, accessibility and leadership.

Nursing students also reinforced the importance of positive role models in a study that explored the value of role modelling in teaching and learning within the clinical setting.⁴⁰ Donaldson and Carter found that good role models had tremendous influence not only on the clinical learning environment, but also on students' confidence and competence.⁴¹

Role modelling the kinds of attitudes, skills and behaviours expected of health practitioners lies at the centre of medical education and in the development of a culture of excellence. Yet as Paice and colleagues note, "*being a role model is serendipitous; there is no training programme, appointment panel or certificate. That you have been a role model for a young colleague can come as a surprise, either flattering or alarming depending on your conscience*"⁴² (pg 709).

Concluding comments

As students progress through their medical and nursing training they spend significant periods of time under the supervision of senior staff who teach, supervise and grade their performance. It is well documented that senior staff who teach students have a crucial role in the development of particular attitudes, skills, and behaviours.

When Paterson asks, "*do our tutorials and lectures (and later our ward rounds and teaching sessions) model good communication? Do students see courtesy and kindness in the approach of teachers*"?⁵ (pg 6), he is really drawing attention to the importance of modelling good communication, courtesy, empathy, and kindness in the relationships a student has with a health professional during their medical education.

It is perhaps self-evident to state that the kinds of attitudes, behaviours and skills we want to see and develop further in our students must be explicitly identified and taught. Role modelling is one important way of achieving this.

The challenge for those of us who teach, supervise and work alongside medical and nursing students is to reflect on and re-examine our own values, attitudes and behaviours, be prepared to receive critical and constructive feedback from students, and seek to improve our own performance so that we exemplify excellence in medical and nursing education.

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Sildenafil: a novel therapy in the management of cardiac syndrome X

Jamal N Khan, Nilan Patel, Rick Steeds, Chetan Varma

Cardiac syndrome X (CSX) is characterised by anginal pain in the presence of positive myocardial stress-testing but normal vessels on coronary angiography. Driven by dysfunction of the coronary microvasculature ('small vessel angina'), prognosis is usually excellent, but symptoms can be limiting. Management is aimed at symptom control and is based on standard anti-anginal drugs.^{1,2}

Case report

A 42-year-old man was limited by daily, exertional, anginal chest pains for 6 months. Symptoms could also occur during rest. He was a non-smoker and generally well, with mild hypercholesterolaemia (total cholesterol 6.4 mmol/L). Exercise ECG testing replicated his chest pain at 7 minutes on a standardised Bruce protocol with ECG changes diagnostic for ischaemia.

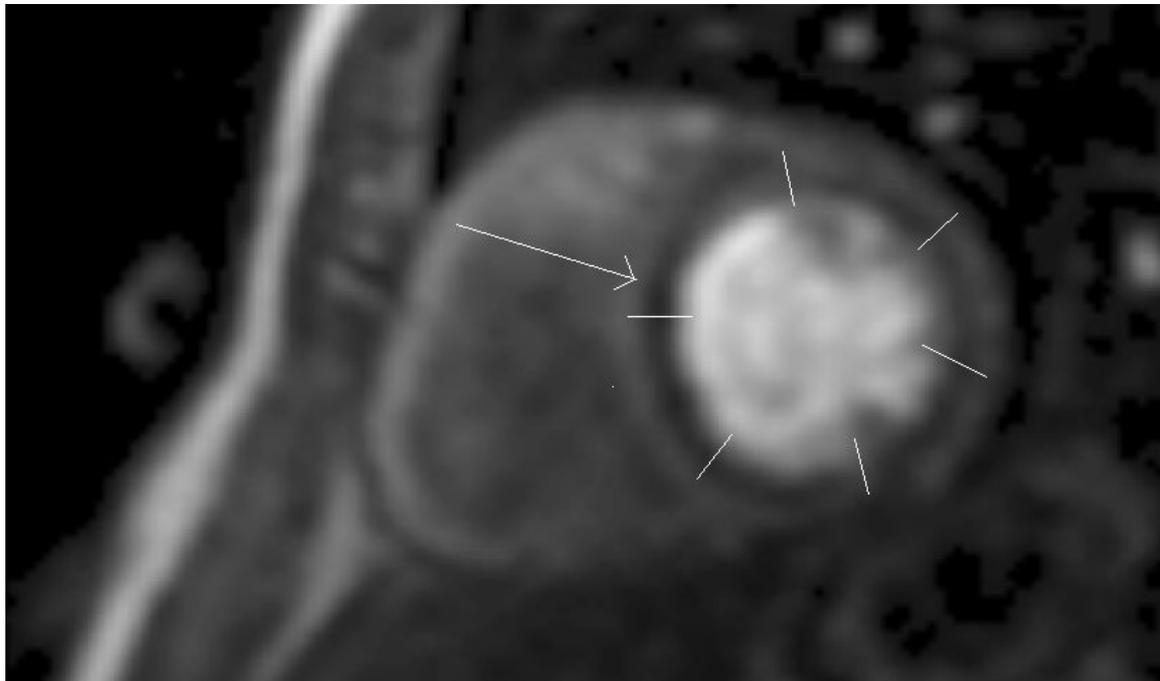
Subsequent coronary angiography revealed normal epicardial coronary vessels. He was further investigated with adenosine stress-perfusion cardiac magnetic resonance imaging (CMR) which showed diffuse subendocardial hypoperfusion, suggesting a diagnosis of cardiac syndrome X (Figure 1).

The image was obtained during the last minute of a 4-minute adenosine infusion (140 µg/kg/min) with a saturation prepared single shot fast spoiled gradient echo pulse sequence. This image is a short-axis view of the left ventricle (arrow at 9 o'clock positioned over septum, clockwise from this point are the six segment separated by white markers: anterior septum, anterior wall, lateral wall, posterior wall, inferior wall and inferior septum). The dark rim around the left ventricle demonstrates subendocardial ischaemia.

Sequential attempts to control symptoms using conventional anti-anginal drugs (long-acting nitrates, calcium-channel inhibitors, beta-blockers, and nicorandil) failed due to his intolerance to these medications, primarily citing headaches. A novel approach of 25 mg sildenafil daily was tried. This vastly improved his chest pain symptoms without side effects.

At 3 years follow-up, he remains stable with an extremely low symptom burden (less than three episodes per year). On occasions he has tried to discontinue therapy which has led to recurrence of symptoms. This raises the possibility of using sildenafil for the treatment of cardiac syndrome X (CSX).

Figure 1. Diffuse subendocardial hypoperfusion (arrow) persisting more than 5 cycles post appearance of gadolinium contrast within the LV myocardium in the short axis using a 1.5T whole body MRI scanner*



*Magnetom Sonata, Siemens, Erlangen, Germany. The image was obtained during the last minute of a 4 minute adenosine infusion (140 µg/kg/min) with a saturation prepared single shot fast spoiled gradient echo pulse sequence. This image is a short-axis view of the left ventricle (arrow at 9 o'clock positioned over septum, clockwise from this point are the six segment separated by white markers: anterior septum, anterior wall, lateral wall, posterior wall, inferior wall and inferior septum). The dark rim around the left ventricle demonstrates subendocardial ischaemia.

Discussion

The diagnosis of CSX can be aided using stress-perfusion CMR, which as shown by Panting and colleagues demonstrates diffuse subendocardial hypoperfusion during intravenous administration of adenosine (Figure 1). This supports the notion that CSX is ischaemic in origin¹.

It has been suggested that myocardial ischaemia in CSX results from dysfunctional small coronary arteries not visible at angiography, described as 'microvascular angina'.

Mosseri and colleagues demonstrated that endomyocardial biopsies show luminal narrowing and fibromuscular thickening in vessels under 1mm in diameter in CSX.² Functional abnormalities of the coronary microvasculature have also been demonstrated.

Piatti and colleagues reported that patients with CSX have a blunted nitric oxide (NO•) response and endothelin-1 inhibition to insulin, suggesting defective endothelium-dependent dilatation.³ Therefore both anatomical and functional abnormalities exist in CSX.

Phosphodiesterase-5 enzymes are found in most vascular beds and by causing their inhibition, NO• driven cyclic guanosine-monophosphate breakdown is reduced, resulting in potent vasodilatation.⁴ Sildenafil, a PDE-5 inhibitor is a vasoactive drug developed for the treatment of erectile-dysfunction also used in the management of pulmonary hypertension and Raynaud's phenomenon.

Adverse cardiac effects have been reported in patients with ischaemic heart disease using sildenafil for erectile-dysfunction. These include myocardial infarction, arrhythmias, and hypotension. These concerns have been questioned, suggesting that these adverse events may instead stem from the cardiac demands of sexual activity, the health of the population for whom sildenafil is prescribed, and adverse interaction with nitrates. Indeed, Arruda-Olson and colleagues demonstrated that in patients with stable coronary artery disease who were not taking nitrates, sildenafil did not potentiate myocardial ischemia.⁵

Our case is the first to demonstrate the effectiveness of sildenafil in treating CSX. It could potentially counter the functional defects noted within the coronary microvasculature. It may have a future role in managing CSX.

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Macrodystrophia lipomatosa: multidetector CT and MRI findings

Mustafa Koplay, Mecit Kantarci, Gökçen Kilinc

Clinical—A 13-month-old male patient presented with disproportionate overgrowth of the left foot big toe (Figure 1). There was no family history and other anomalies were not detected.

Plain radiography of the left foot revealed an enlarged distal phalanx of the big toe, together with thick soft tissue. To obtain a detailed view of the bone or soft tissue pathologies, computed tomography (CT) was performed using a 16-detector-row CT scanner (multidetector CT, Aquillon; Toshiba Medical Systems, Tokyo, Japan).

CT scan revealed macrodactyly with hypertrophy of the subcutaneous fat tissue and enlargement of the bone in the big toe (Figure 2). Magnetic resonance imaging (MRI; 1,5 Tesla, Siemens, Germany) imaging showed in detail prominent proliferation of fatty tissue of the big toe (Figure 3).

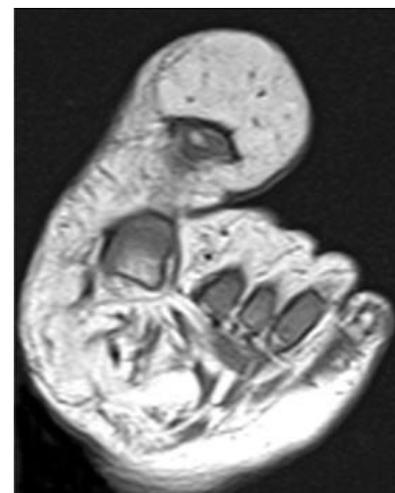
Figure 1. Clinical image shows overgrowth of the left foot big toe



Figure 2. 3-D volume rendering image shows enlargement of the bone in the big toe. It shows dorsiflexion of big toe due to hypertrophy of the fat tissue



Figure 3. T1-weighted axial MRI image shows prominent proliferation of fatty tissue of the big toe



Discussion—Macrodystrophia lipomatosa, termed congenital macrodactyly, is a rare congenital malformation characterised by progressive enlargement of all mesenchymal elements of the digit, except the metacarpal and metatarsal.¹ It is more common on the hand than the foot.

Soft tissue hypertrophy is most marked in the distribution of the plantar or median nerves.² The differential diagnosis of macrodactyly includes acquired causes such as

dactylitis secondary to infection, infarction and osteoid osteoma, Still's disease, melorheostosis, and congenital causes including haemangioma, lymphangioma, plexiform neurofibroma.^{3,4} In addition, fibrolipomatous hamartoma and fibrolipoma should be considered in different diagnosis.⁴

Multiphase reconstruction and three-dimensional (3-D) volume rendering imaging features of multidetector CT and MR images give important information in different diagnosis of pathologies causing macrodactyly.

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A rare but fatal complication of end stage renal disease

Manchanda Aarti, Punj Shweta, Sharma Ankur, Beeravolu Swathi, Jinxing Jiang,
Babu Ambika

Clinical—A 49-year-old male with end stage renal disease (ESRD) on haemodialysis was referred for further management of painful, extensive bilateral lower extremity ulcerations present for 8 months (Figure 1).

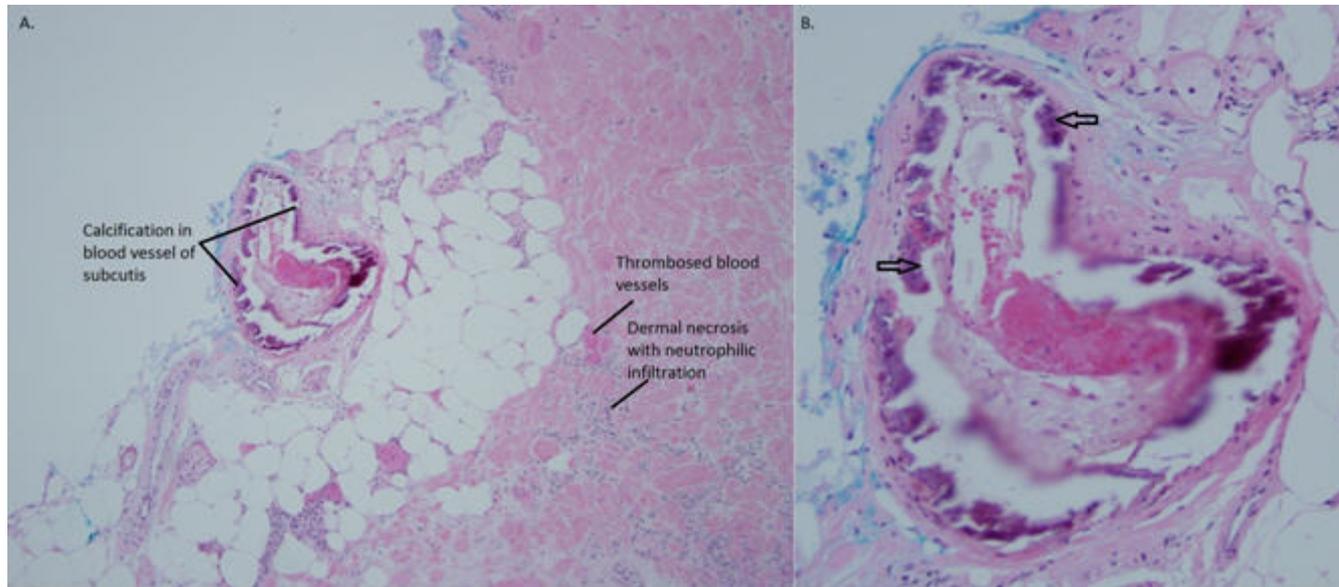
Figure 1. Lower extremity ulceration and overlying eschar



Significant labs were leukocytosis, elevated calcium-phosphorus product (CaxP) of $97.5 \text{ mg}^2/\text{dl}^2$ and parathyroid hormone (PTH) level of 3708 pg/ml (10–60).

Biopsy of the cutaneous lesions revealed epidermal and dermal necrosis, thrombosis and calcifications in small blood vessels of subcutis (Figure 2).

Figure 2. (A) Skin biopsy showing dermal necrosis with neutrophilic infiltration, subcutaneous arterial vessel with thrombosis, marked intimal proliferation and near circumferential calcification causing occlusion of the lumen. H&E magnification $\times 100$; (B) Inset showing the thrombosed vessel with circumferential calcification in the vessel wall (black arrows). H&E magnification $\times 400$



What is the diagnosis?

Answer—*Calcific uremic arteriolopathy (CUA).*

Discussion

CUA, also known as calciphylaxis, is a rare life-threatening syndrome of vascular calcification and necrosis that presents in 1% of ESRD patients each year with a prevalence of 4% in patients on dialysis. Risk factors include duration of dialysis, abnormal CaxP, hyperparathyroidism (especially with PTH levels >1000 pg/ml) and use of calcium-based phosphate binders and vitamin D analogues.¹ Other rare causes include obesity, trauma and coagulopathy.

Non-ESRD causes of CUA include primary hyperparathyroidism, vitamin D intoxication, malignancy, multiple myeloma, alcoholic cirrhosis and use of long-term steroid and methotrexate.^{2,3}

Increased CaxP can precipitate metastatic calcification in arterioles leading to intimal fibrosis and vascular thrombus causing occlusion with tissue ischemia, necrosis and gangrene. It manifests as violaceous plaques with subcutaneous nodules which progress to necrotic ulcers with eschars and superadded infection. The mortality rate is reported to be as high as 60–80%¹ and the leading cause of death is sepsis. Confirmation of diagnosis is by skin biopsy.

Recommendations for prevention include maintaining phosphorus level <5.5 mg/dL, calcium level <9.6 mg/dL, and a CaxP product <55 mg²/dL². This can be accomplished by low calcium dialysate, dietary protein restriction, using calcium-free phosphorus binders and newer vitamin D analogues. Paricalcitol and doxercalciferol may reduce PTH and calcium concentrations more rapidly than calcitriol.

A multidisciplinary team management with aggressive local wound care, debridement and control of CaxP is required.

Available treatment options include cinacalcet, a calcimimetic which lowers PTH and calcium levels and is indicated in patients where CaxP remains high despite standard therapy⁴. Novel therapeutic options, not well validated include sodium thiosulfate, which increases the solubility of calcium deposits, hyperbaric oxygen, corticosteroids, and bisphosphonates.

The treatment of choice remains early parathyroidectomy⁵ which has shown improved wound healing and survival rates versus nonoperative treatment.

Our patient was treated with aggressive wound care, debridement, cinacalcet and sodium thiosulfate. Despite these measures, he succumbed to sepsis and died.

This case illustrates the importance of prevention and early detection of CUA which may facilitate treatment and possibly reduce mortality. Evaluation of skin for breakdown should be part of the routine care of these patients. A diagnosis of CUA should be considered in ESRD patients with a non-healing ulcer.

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Coughing: think about long-standing bronchial foreign body

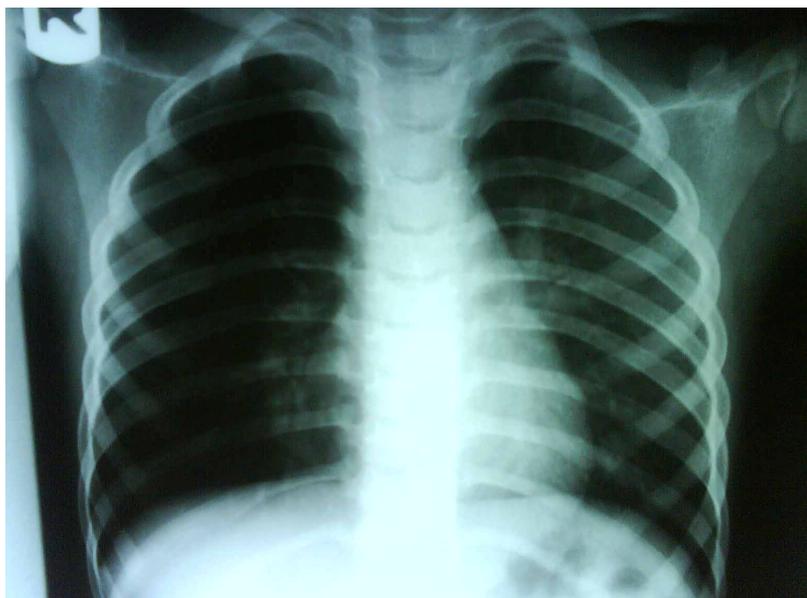
Leila Rasi Marzabadi, Samad Shams Vahdati, Arezou Tajlil

Clinical—A 5-year-old-boy presented to our hospital with coughing, sneezing and low-grade fever from 2 days earlier. On physical examination, he didn't have any evidence of respiratory distress such as fast breathing, stridor, subcostal or suprasternal retraction.

On lung auscultation, diffuse wheezing sounds over both hemithorax and coarse crackles over the right hemithorax could be heard, and the right hemithorax was hyper-resonant to percussion.

PA chest X-ray of the patient is seen in Figure 1.

Figure-1. PA chest X-ray of the patient



With suspicion of a foreign body in the right bronchus, bronchoscopy was performed and a plastic foreign body was found partially obstructing the right main bronchus and successfully removed.

After we asked more questions his mother mentioned that he had swallowed the plastic part of a pen 17 days earlier but his parents hadn't noticed any respiratory symptoms after the event.

Figure-2. Foreign body removed from right main bronchus



Discussion—Foreign body aspiration (FBA) can be a tremendous cause of death and disability, and age is the most important factor in the incidence of FBA.¹ The incidence of FBA is higher in children younger than 3 years old.²⁻⁴ It also occurs more in males than females.^{3,4} Most aspirated foreign bodies are of vegetable origin and the majority of them are located in the right bronchial tree.⁴

In most cases aspiration of the foreign body is diagnosed 2–3 days of the event, but in a few cases the diagnosis may not be made for several days or weeks.⁵

In this case, a coughing episode mimicking pneumonia resulted from a long-standing foreign body. Thus in coughing cases with some doubt in diagnosis, we should take a chest X-ray to rule out a predisposing factor such as a foreign body.

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Proposed rules relating to procedure in ethical matters

Excerpt from NZMJ 1912 May:11(42):141–142.

The officers of this Branch, and, to a lesser extent, those of the Divisions also, are constantly being faced with the fact that we have very few stated rules in respect to Ethical matters and still less any rules of procedure to such cases. What rules and regulations we have are generally mixed up with those governing the general procedure of meetings, etc., and are thus practically useless for our purpose. Now that the Branch is growing to fuller dimensions, and its responsibility and activities increasing correspondingly, it is very important that these matters should be attended to before an occasion arises which will forcibly emphasize their non-existence.

Proceedings of the Health Research Society of Canterbury AGM Scientific Meeting, 15 November 2011

Because of the Canterbury earthquakes, this was the only scientific meeting held by the Health Research Society of Canterbury in 2011.

Intermittent hypoxic exposure has a positive effect on heart rate variability in a sedentary population

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Increased heart rate variability (HRV) is associated with increased physical fitness (1) while lower HRV indicates cardiac disease (2). Intermittent hypoxic exposure (IHE) is a technique used to simulate altitude exposure, and may enhance exercise tolerance in unhealthy adults (3). We aimed to explore the effects of IHE on HRV in a sedentary population.

Sixteen participants (5 male, 11 female, aged 56.3±5.1 years, BMI 28.9±6.2, mean±SD) were exposed to 16 IHE sessions [IHE: 5min normobaric hypoxia (F₁O₂=0.16 at week 1, decreasing to F₁O₂=0.10 at week 4):5min ambient air, repeated for 1 hour, n=8] and [Control (C): 5min placebo (F₁O₂=0.21):5min ambient air, repeated for 1 hour; n=8]. Arterial blood pressure (BP), HRV and oxygen uptake (VO₂) were monitored during lying, standing, sub-maximal exercise and recovery pre- and post- intervention.

Relative to the control group the IHE group decreased lying HR by 9.1±8.3% (mean±90% confidence limits) [IHE: 59.2±6.1 to 56.8±6.2, mean±SD beats/min; and C: 64.6±11.0 to 66.2±9.2 beats/min for the pre and post groups respectively]. HRV (rMSSD) increased in the IHE group relative to the C group during lying (76.8±67.0%; IHE: 32.51±15.12 to 35.95±12.07 rMSSD; C: 21.04±8.75 to 20.35±9.54 rMSSD), and exercise (23.2±27.7%; IHE: 4.13±1.86 to 5.08±2.96; C: 4.64±3.84 to 4.06±2.58 rMSSD; mean±SD beats/min for pre- and post-measurements). There were no beneficial BP or VO₂ changes between groups, or in standing or recovery HRV measures.

These findings suggest 16 IHE sessions in a sedentary population may improve resting HRV and HR, but has little effect on BP or VO₂. As HRV is generally associated with improved health, this may prove beneficial for patients unable to engage in physical activity such as those with spinal injuries or musculoskeletal conditions. More research with a larger population is needed to test these findings.

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How testicular salvage data may influence future management of perinatal torsion of the testis

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The incidence of testicular torsion peaks in neonates and puberty. Animal models have demonstrated loss of spermatogenesis at 4-6 hours following torsion, and of hormonal function at 10 to 12 hours (1) – findings which have shaped management of this condition. While there is consensus about the management of torsion in older children, the best management of perinatal torsion has been less certain.

For a long time, it was believed that all neonatal testicular torsion resulted in death of the testis, such that neonates with testicular torsion warranted no surgical intervention. Recent observations, however, have distinguished between two apparently separate entities within torsion of the testis affecting neonates: pre-natal and post-natal. Increasingly, evidence is pointing towards a different prognosis and consequent management for each condition. Torsion occurring after birth, if picked up and managed promptly by surgical exploration may achieve testicular salvage in a few instances, unlike testicular torsion occurring before birth. The distinction can be made clinically, in that prenatal testicular torsion is evident at the time of birth with an indurated and enlarged scrotum, whereas postnatal torsion becomes evident some days later (2). Moreover, improvements in the safety of neonatal anaesthesia makes emergency surgery, in selected circumstances, a safe prospect (2).

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Model-based diagnosis of acute pulmonary embolism and septic shock in porcine trials

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Acute pulmonary embolism (APE) and septic shock (SS) are prevalent dysfunctions in the intensive care unit (ICU) and are associated with high rates of mortality. The aim of this research is to test the ability of a model-based technique to diagnose and track disease-dependent hemodynamic changes resulting from these forms of shock.

In two porcine studies, APE (N=5) and SS (N=4) were induced using autologous blood clot injections and endotoxin infusions, respectively. In both studies hemodynamic measurements were recorded every 30 minutes. Subject-specific cardiovascular system (CVS) models were fitted to each pig from a minimal set of typically available ICU measurements. Identified parameters and outputs were compared to experimentally derived indices, measurements not used in the identification, and trends from the literature to validate the subject-specific models.

The models accurately predicted the maximum ventricular pressures and end diastolic ventricular volumes to mean absolute errors of less than 7.1% and 6.7%, in both studies. Modelled pulmonary vascular resistance (PVR) compared well (R=0.68 for APE and R=0.73 for SS) to the experimentally derived values. Importantly, in the APE study a large rise in PVR, a major hemodynamic consequence of APE, was identified in all five pigs as expected. In response to endotoxin infusion a drop in systemic vascular resistance of 26% (on average) was identified by the model, in contrast to an increase seen in the APE pigs. In addition, hyperdynamic states were observed in two of the pigs, consistent with known trends for septic shock.

These results indicate that subject-specific CVS models can be used to diagnose APE and SS. Furthermore, the identified models can accurately monitor acute hemodynamic changes resulting from these two common forms of shock, indicating the potential for the model to be used as assistive tool for therapy decisions.

Intracellular antioxidant activity of 7,8-dihydroneopterin protects macrophages from oxidised low-density lipoprotein.

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Immune system activation and the oxidative modification of lipoprotein are considered the key processes in atherosclerosis. Reactive oxygen species generation in response to actual or perceived damage is a defense mechanism of the immune cells. However, if excessive or unresolved, the oxidative stress can lead to further cellular damage, dysfunction and death. Oxidative stress and cellular death in response to oxidised low-density lipoprotein (oxLDL) may contribute to the formation of a necrotic core region in an atherosclerotic plaque.

Interferon-activated macrophages are known to produce 7,8-dihydroneopterin and its oxidised form neopterin, both of which have been detected in atherosclerotic plaques. We have shown 7,8-dihydroneopterin can protect human monocyte-derived macrophages (HMDM) and monocyte-like cell lines from a variety of oxidative stress. 7,8-Dihydroneopterin prevents the oxLDL-induced loss of glutathione but also decreases the uptake of DiI-labeled oxLDL and causes the down regulation of scavenger receptor for oxLDL, CD36¹. We investigated which of these effects of 7,8-dihydroneopterin protect the HMDM cells from acute oxLDL-induced death.

7,8-Dihydroneopterin down-regulates CD36 protein level over 12h. Measurement of intracellular 7-ketocholesterol also showed that 7,8-dihydroneopterin significantly decreased the uptake of oxLDL. 7,8-dihydroneopterin incubated with oxLDL-treated

HMDM reduced intracellular reactive oxygen species generation (detected using dihydroethidium fluoroprobe) as early as 3h. 7,8-Dihydroneopterin was oxidised in the process suggesting direct scavenging of the oxidants. Pre-incubation of HMDM with 7,8-dihydroneopterin to reduce the CD36 levels, followed by exposure to oxLDL in the absence of 7,8-dihydroneopterin, failed to significantly inhibit the cell death.

This suggests that it is the antioxidant activity of 7,8-dihydroneopterin rather than reduced uptake of oxLDL that prevents acute oxLDL-induced cell death in macrophages.

Reference:

1. Gieseg, SP, Ami, Z, Yang YT, Shchepetkin, A, Katouah H. (2010) Antioxidants and Redox Signalling doi:10.1089/ars.2009.3065.

Proceedings of the Waikato Clinical School Biannual Research Seminar, March 2012

Vitamin D status of psychiatric inpatients in New Zealand's Waikato region

David B Menkes, Kaye Lancaster, Michael Grant, Reginald W Marsh, Peter Dean, Stephen du Toit

Vitamin D deficiency is widespread in New Zealand and may be particularly common among people with a psychiatric illness. We studied 25-hydroxy vitamin D₃ levels in an unselected sample of adult psychiatric inpatients in Hamilton (latitude 36.5 S) during the late winter when levels are near their nadir. Of 102 consenting subjects, 74 (73%) had vitamin D levels <50 nM and thus had at least mild deficiency, while 19 (19%) were moderately to severely deficient with levels <25 nM. Rates of deficiency were comparable for men and women; only the former showed a correlation of vitamin D levels with age ($r = 0.45$, $p < 0.01$). Maori participants constituted half the sample ($n=51$) and were more likely to be deficient than their European counterparts ($p=0.04$). Vitamin D also varied by diagnosis, with schizophrenia associated with markedly lower levels than mania and depression ($p < 0.001$). These findings support proposals to provide vitamin D supplementation to NZ psychiatric patients, particularly during the winter months.

Thyroid cancer and graves' disease: is surgery the best treatment option?

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Introduction: Graves' disease is a common cause of thyrotoxicosis. Treatment options include anti-thyroid medications or definitive therapy: either surgical removal of the thyroid gland or radioactive iodine (I^{131}) therapy. Traditionally, I^{131} has been the preferred definitive treatment for Graves' disease in New Zealand. Reports of concomitant thyroid cancer occurring in up to 17% of Graves' patients suggest surgery, if performed with low morbidity, may be the preferred option.

Aims: The aim of this study was to determine the rate of thyroid cancer and surgical outcomes in a New Zealand cohort of patients undergoing surgical treatment for Graves' disease.

Method: Retrospective review of patients in Waikato undergoing thyroid surgery for Graves' disease during the 10 year period prior to 1 December 2011 to assess the

incidence of associated thyroid cancer and surgical complication rates compared to patients with toxic multinodular goitre.

Results: A total of 833 patients underwent thyroid surgery. Of these 117 were for Graves' disease. The median age of the Graves' patients was 42 years. Total thyroidectomy was performed in 82, near-total in 33 and subtotal in 2 patients. Recurrent thyrotoxicosis developed in one subtotal patient requiring I¹³¹ therapy. There were two cases of permanent hypoparathyroidism (post total thyroidectomy) and one of permanent recurrent laryngeal nerve palsy (post near-total thyroidectomy). Eight patients (6.8%) had thyroid cancer detected, none of whom had overt nodal disease.

Five were papillary microcarcinomas (one multifocal), two were papillary carcinomas (11mm and 15mm) and one was a minimally invasive follicular carcinoma. During the same time period 34 patients underwent surgery (total thyroidectomy in 27 and near-total thyroidectomy in 7 patients) for a toxic multinodular goitre. Three cancers were identified all of which were papillary thyroid cancers (ranging from 0.5 to 10mm in size). No complications occurred in this group.

Conclusions: A low rate of incidental thyroid cancer was identified as compared to some previous reports. This may be influenced by how carefully the pathologist reviews the specimen. A low complication rate (<2%) of permanent hypoparathyroidism and nerve injury (<1%) supports surgery being a safe alternative to I¹³¹ especially for patients with young children, ophthalmopathy, compressive symptoms and those desiring pregnancy.

The effects of neonatal hypoglycaemia on vision and visual development at the age of two-years

Tzu-Ying (Sandy) Yu on behalf of the CHYLD Study team

Background: Neonatal hypoglycaemia is a perinatal adversity encountered by many newborns. When severe, this condition is known to have detrimental effects on neurodevelopment including vision. However, little is known about how the severity of hypoglycaemia can affect visual development and visual motion processing. The CHYLD (Children with Hypoglycaemia and their Later Development) group is a multi-disciplinary team investigating the neuropsychological development of young children who were at risk of developing neonatal hypoglycaemia. Currently, a follow-up study is being carried out on a cohort of children who as newborns were part of the BABIES and Sugar Babies studies conducted at Waikato Women's Hospital. As part of these previous studies, participants had continuous blood glucose monitoring from the time of birth until two to seven days of age.

Aim: To investigate the effects of neonatal hypoglycemia on visual function and cortical motion processing at the age of two-years.

Methods: Visual function assessments are performed using age-appropriate optometry tests within a 1 month window around two years' corrected age. Cortical motion coherence thresholds are measured with a psychophysics programme using a random dot kinetogram (RDK) stimulus. The two methods used to detect whether the

motion is visible are (i) objective measurements derived from observations of optokinetic reflex (OKR), and (ii) subjective measurements from the behavioural responses of the child (where possible).

Results: To date 250 study participants have been assessed. The mean of the motion coherence thresholds measured by OKR in this cohort of children is approximately four times poorer than normal values expected in adults. Preliminary results have also shown that although the majority of standard optometry tests do not correlate with our measure of cortical processing, there is an association between motion coherence thresholds and stereoacuity. Any relationship between neonatal hypoglycaemia and visual development is yet to be determined.

This analysis will be possible in approximately 12 months when all participants entering this study have been assessed and the investigators are un-blinded from blood glucose measurements.

Conclusion: Motion coherence psychophysics and clinical optometry tests can be applied to two-year-olds as a potential method of assessing cortical visual development.

Immune defence proteins in human milk: differences between pre-term and term deliveries.

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Besides providing a balanced source of nutrition, milk also contains a range of proteins that contribute to the defence against pathogens. These include immunoglobulins, as well as a range of less well characterised innate immune-related proteins. When ingested by the newborn, these proteins may contribute to maintaining a healthy digestive system for the baby by facilitating a normal repertoire of commensal bacteria and suppressing pathogenic bacteria.

The levels of some of these proteins have not been very well characterised in human milk. In particular, the extent to which they may be altered in milk from mothers that have had a shortened gestation period, for which the volume of milk supplied to the premature infant as well as its host defence requirements, may be significantly different compared with full term infants. We therefore obtained a preliminary estimate of the mean concentration in milk and the degree of variability in a population, of five innate immune proteins: IgA, lactoferrin, IgG, secretory component (SC), and the complement protein C3 as well as total protein.

Milk samples were obtained from 30 mothers having had either a normal gestation length (>36 weeks, n=10; T), a premature baby (between 33 and 36 weeks, n=10; P), or a very premature baby (between 28 and 32 weeks, n=10; V). Milk samples were

collected from each volunteer at approximately 2 weeks and 5 weeks after giving birth. The data were analysed by REML. Significant variability was observed over time within individual mothers, with coefficients of variation (CV) of 28%, 21%, 22%, 15% and 32% for IgA, lactoferrin, IgG, SC and C3, respectively. For IgA and C3, this was substantially higher than the technical variability of the assays, for which the CV ranged from 10-15%. A significant decrease from week 2 to 5 was observed within the T and P groups for all five proteins except IgG, but over this time the V group remained unchanged. The variability between individuals was substantially higher than that within an individual, with CVs ranging from 26 to 52%. While there were significant differences between the T, P and V groups for some of the comparisons, this was not consistent across all the proteins and time points. The total protein concentration decreased from week 2 to 5 in the P group but no changes over time were observed in the V and T groups. Comparing the total protein concentration among the groups, the only significant difference was that the T and P groups were higher than the V group at week 2.

It is conceivable that some of the observed variability is due to differences in milk volume. In summary, these results show there is considerable biological variability in the concentrations of these host defence associated proteins among individuals and that gestation length by itself appears to have no substantial effect on milk composition.

Cortisol suppression after a single dose of dexamethasone at surgical induction

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Purpose: The synthetic glucocorticoid dexamethasone is routinely used in patients receiving a general anaesthetic to reduce the risk of nausea, vomiting and the postoperative inflammatory response. Dexamethasone is known to suppress the hypothalamic-pituitary-adrenal axis however the duration of this suppression with the standard dose of 4-8mg used in anaesthesia is unknown.

Methodology: A randomised controlled double-blind crossover trial assessing the effects of intravenous 8mg dexamethasone versus saline control was performed using 10 healthy male volunteers. The cortisol and ACTH response was assessed over the next 5 days.

Results: Baseline testing demonstrated normal hypothalamic-pituitary-adrenal axis function in all individuals. No significant differences in cortisol levels as compared to placebo were demonstrated at either four hours or eight hours after dexamethasone administration however by 24 hours the cortisol had dropped to <5% of baseline and a significant difference in cortisol levels was demonstrated until day four post dexamethasone administration.

Conclusions: At the dexamethasone dose commonly used at induction significant suppression of the hypothalamic pituitary adrenal axis occurs. Whilst this suppression is maximal 24 hours post administration, the serum cortisol may not return to normal until the 4th day after dexamethasone administration. This may result in a risk of being misdiagnosed with adrenal insufficiency based on low cortisol levels over this time period.

Narrowband UVB phototherapy induces change in melanocytic naevi

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Introduction: Exposure to narrowband ultraviolet B (NBUVB) is known to induce morphological changes in melanocytic naevi but there have been few systematic studies of this process.

Method: Macro and dermoscopic images of prominent melanocytic naevi found in 51 subjects were taken immediately prior to a course of NBUVB; after 10 exposures; after 30 exposures or at the end of the treatment course if earlier; and 3 months after discontinuing treatment. Four dermatologists reviewed the images and agreed on the specific clinical and dermoscopic features of the naevi by consensus.

Preliminary Results: 36 of 51 patients had complete sets of images of a total of 440 naevi. The most common global dermoscopic patterns were reticular in 50%, and globular in 32%.

Following NBUVB exposure, 50% (218/440) of naevi underwent changes in local features ($p < 0.001$). Blurring or merging of lines was noted in reticular naevi, whereas increased colour intensity and increased number of dots/globules were observed in globular naevi. Changes in local features were more readily observed in lighter skinned subjects ($p = 0.05$). 40% of naevi (167/419) underwent change in size following UV exposure; of these, 54% (91/167) decreased in size, whilst 46% (76/167) increased in size. The trend was for these naevi to return to their pre-treatment size after phototherapy.

No changes suspicious of malignancy were observed in any lesions.

Conclusion: Around half of exposed naevi undergo changes following a course of NBUVB. Size tended to revert to pre-treatment values 3 months after discontinuing phototherapy.

Son of Doctor Strangelove: how we learned to stop worrying and love PHARMAC (New Zealand consumers' perceptions of private insurance for pharmaceuticals)

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Introduction: New Zealand's pharmaceutical strategy depends heavily on PHARMAC's effectiveness. PHARMAC has been praised for increasing access to pharmaceuticals while containing costs [1]. However, PHARMAC has also been criticised for denying patients timely access to expensive but potentially life-saving pharmaceuticals [2]. New Zealand's access to high cost medicines has been shown to lag behind comparable countries [3]. In light of this controversy, we aim to explore consumers' experience of public coverage, and willingness to pay for alternative coverage through private insurance.

Methods: Thirty pharmacies in the greater Auckland region were randomly selected from a list provided by the Pharmaceutical Society. An investigator approached every second customer over 5 days. Customers were asked to fill out an 18 question self administered questionnaire.

The questionnaire had been developed for this study and validated by two rounds of pilot tested. The study was approved by the University of Auckland Human Participants Ethics Committee.

Results: 46% of the 433 respondents had private insurance, but only 19% had coverage for pharmaceuticals. 52% were willing pay extra for pharmaceutical coverage. Of these, 67% were only willing to pay \$20 per year, and only 7% were willing to pay \$40 or more. Willingness to pay (or lack thereof) wasn't affected by age, gender, ethnicity, household income, level of education, frequency of pharmacy visits or pharmacy spending.

80% of respondents had experienced no problems with the public funding of their pharmaceuticals in the previous 12 months, 8% had problems with funding changes, 6% had problems with availability, and 5% with affordability. 67% were confident or very confident in the public system, with 15% not being confident and the remainder neutral.

Conclusion: Consumers show low willingness to pay for private insurance coverage of pharmaceuticals, and the majority have confidence in the public system.

References:

1. Cumming J, Mays N, Daubé J (2010) Analysis: how New Zealand has contained expenditure on drugs. *BMJ* 340:c2441.
2. Isaacs RJ, Frampton CM, Kuper-Hommel MJ (2007) PHARMAC's funding of 9 weeks Herceptin: many assumptions in a high-risk decision. *N Z Med J* 120(1259). <http://journal.nzma.org.nz/journal/120-1259/2676/content.pdf>
3. McCormack P, Quigley J, Hansen P. Report to Minister of Health, Hon Tony Ryall- Review of access to high cost, highly specialised medicines in New Zealand.

Prostate-specific antigen (PSA) testing in Waikato general practices

Obertová Z, Hodgson F, Scott N, Brown C, Lawrenson R

Objectives: To examine patterns of PSA testing and its outcomes in twelve general practices in the Waikato region.

Methods: The study population included 11,346 men aged 40+ years enrolled in 12 Waikato general practices, who had a PSA test in 2010. All PSA results for 2007-2010 were obtained from the community laboratory with permission from the individual practices. Each practice provided baseline data of men aged 40+ years, including National Health Index number (NHI), date of birth and ethnicity. The practice records of men with elevated PSA test were searched for information on the reasons for testing and its outcomes, including biopsy and diagnosis of prostate cancer. Patterns of PSA testing were analysed by age and ethnicity.

Results: In total, 2,878 men aged 40+ years (25.4 %) had a PSA test in 2010; ranging from 12.1% to 36.7% for the 12 general practices in the Waikato region. The testing rate for Māori men was 12.9% compared with 27.7% for non-Māori men. Three hundred and eighteen men (11%) had an elevated PSA, but only 56 (17.6%) of these could be considered as being asymptomatic screened patients. Out of the 318 men 78 had a biopsy (24.5%), and 41 were diagnosed with prostate cancer. The cancer per elevated PSA test rate was 13% in total; 6.7% for men aged 40-49 years, 10.7% for 50-59 year old men, 18.2% for 60-69 year old men, 14.9% for 70-79 year old men, and 4.1% for men aged 80+ years.

Conclusions: Significant disparities were observed in PSA testing between Māori and non-Māori men. Other factors, such as patient's age and practice policy seem to influence the testing rate. Further research will be conducted in the Midland region to explore the patterns and outcomes of PSA testing with regard to age, ethnicity, and rural/urban residence.

Myostatin splice variant in humans – does it exist?

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Introduction: Myostatin is an inhibitor of skeletal muscle myogenesis and antagonism of this protein provides potential for increasing muscle regeneration and growth.

A myostatin splice variant (MSV) is present in the Certartiodactyla clade of mammals due to a cryptic intron site in exon 3 of the myostatin gene. MSV acts as an endogenous antagonist of myostatin by binding directly to myostatin and the activin IIB receptor. The predicted gene structure including cleavage sites and an active C-terminal domain is present in humans. To date MSV mRNA has not been detected in

humans and the aim of this study was to determine whether MSV is expressed in humans.

Methods: qPCR was performed on a total RNA panel of pooled RNA (minimum 3 donors) from 20 different normal human tissues (Ambion) and specific primers designed for the predicted sequence of human MSV. All qPCR products were sequenced.

Results: No MSV mRNA was detected in any of the human tissues.

Conclusion: MSV mRNA was not detected in a selection of normal human tissues. Possible explanations include that MSV is not expressed in humans, that MSV is expressed but only in very low abundance or that MSV is only expressed at certain stages of development e.g. the linear growth phase at puberty, or during foetal development.

Acknowledgements:

Waikato Medical Research Foundation; Royal Australasian College of Physicians.

Safety and effectiveness of oseltamivir (Tamiflu)

The neuraminidase inhibitor oseltamivir is widely used as it is believed to be the most reliable antiviral option for the treatment of influenza. So it is somewhat surprising to find that a new meta-analysis by the Cochrane collaboration says that the safety and effectiveness of this anti-influenza drug remain uncertain. Roche, the pharmaceutical giant which markets oseltamivir as Tamiflu claim that the drug prevented complications and reduced the number of people needing hospital treatment. The Cochrane researchers say that Roche's refusal to provide full access to all its data leaves critical questions about how well the drug works unresolved (BMJ 2012;344:d7898). Roche, however, maintain that they have provided sufficient information for an evaluation.

BMJ 2012;344:467.

Topical honey for wound care

The historical practice of using honey in wound care is rooted primarily in tradition and folklore. This paper reviews this matter and reports that there are biological reasons why honey might be useful. They include bactericidal properties which may be derived from the tree genus *Leptospermum*. Manuka belongs to this genus. It is possible that honey may prevent biofilm development and there is some evidence that honey may have an immunomodulatory effect. In addition, it may have modulatory effects on inflammation. So there are hints from biology on its effectiveness. But what about clinical evidence? A 2008 Cochrane review of the use of honey in 19 trials in 2554 patients with acute and chronic wounds concluded that there are insufficient data to satisfactorily assess the effects of honey on most wound subjects

Drugs & Therapy Perspectives 2012;28:24–26.

Nicotine-replacement therapy patches in pregnancy

Such treatment is regarded as being effective in the general population. This paper reviews the efficacy and safety of nicotine patches used to curtail smoking during pregnancy. 1050 participants aged 16–50 years with pregnancies of 12–24 weeks gestation and who smoked 5 or more cigarettes per day were involved. All received behavioural cessation support. Half were randomised to have treatment with active nicotine patches (15 mg per 16 hours) and the others used matched placebo patches. The primary outcome was abstinence from smoking to delivery. Abstinence was better in the nicotine replacement group at 1 month but there was no significant difference in smoking cessation rates at delivery. Fortunately the rates of adverse pregnancy and birth outcomes were similar in the 2 groups. However, the study was marred by low compliance; only 7.2% of women assigned to nicotine-replacement therapy and 2.8% assigned to placebo used patches for more than 1 month.

N Engl J Med 2012;366:808–18.

Pulmonary embolism—an association with autoimmune disorders?

Some autoimmune disorders have been linked to venous thromboembolism. The authors of this study note that autoimmune disorders are associated with inflammation which may modulate thrombotic responses by upregulating procoagulants, downregulating anticoagulants, and suppressing fibrinolysis which in turn would predispose such patients to venous thrombosis and pulmonary embolism.

Data was obtained from over 500,000 subjects admitted to Swedish Hospitals between 1964 and 2008 with venous thromboembolism and autoimmune disease. All 33 autoimmune disorders were associated with a significantly increased risk of pulmonary embolism during the first year after admission (overall risk 6.38). Some disorders had a particularly high risk—immune thrombocytopenic purpura (10.79), polyarteritis nodosa (13.26), dermatomyositis (16.44) and systemic lupus erythematosus (10.23). The increased risk decreased with time and was absent at 10 years.

Lancet 2012;379:244–9.

Donepezil and memantine for moderate-to-severe Alzheimer's disease

Clinical trials have shown the benefits of cholinesterase inhibitors for the treatment of mild-to-moderate Alzheimer's disease. It is not known whether treatment benefits continue after the progression to moderate-to-severe disease. This trial involved 295 patients with Alzheimer's disease who had been treated with donepezil for at least 3 months. They were randomised to continue donepezil, discontinue donepezil, discontinue donepezil and start memantine, or continue donepezil and start memantine. The results at 52 weeks were that those assigned to continue donepezil had less cognitive decline than did those assigned to discontinue donepezil. The combination of donepezil and memantine did not confer benefits over donepezil alone.

N Engl J Med 2012;366:893-901.

Percy Walter Bryce Pease

2 September 1937 – 13 February 2012

It is with sadness we note the death of Percy Pease. Percy (as he was universally known) was an institution in Paediatric Surgery in New Zealand and the South Pacific. He was the first full-time Paediatric Surgeon in New Zealand and established Paediatric Surgery as a specialty here.



Percy was a “coloured” South African, born in Alice, a small town in rural South Africa. Through perseverance and determination, and in the face of poverty and many hardships, he went to Medical School. Despite the difficulties he encountered from entrenched apartheid, he graduated. The casual insults and denigration he experienced as a young man instilled in him the determination to treat and console the disadvantaged.

He worked initially in Baragwanath Hospital in Johannesburg (Soweto), where he was exposed to, and thrived on, a wide and demanding clinical load. That experience influenced his approach to clinical problems both in New Zealand and the South Pacific. Percy trained as a Paediatrician but his qualifications were not recognised in South Africa.

Percy became involved in the African National Congress (ANC) and knew such luminaries as Bishop Desmond Tutu. The ANC protected him as best they could, but Percy was arrested for his political activities and then released. Percy realised that he was in imminent danger of re-arrest, and he crossed the border from South Africa to Swaziland, leaving all his possessions behind.

Percy worked in the Hlatikulu Hospital in Swaziland from 1968 to 1970 where he developed an interest in Surgery. He was responsible for the clinical work in the hospital but, as they only had a single handyman, Percy was also responsible for the maintenance of all the plant and equipment. It was a skill he had developed as a child, and which was to remain with him all his life. He maintained many cars that had long since passed their use-by date, and used his skills to maintain his house and garden.

Percy married his wife Sandra in Swaziland. They established and maintained a very close and loving relationship all their married life. Sandra died just 9 weeks before him after a long battle with illness.

Percy next moved from Swaziland to England and gained his qualifications in Surgery before working at the Birmingham Children's Hospital. It was while he was there that he found the opportunity to come to New Zealand.

When Percy arrived in Auckland he recognised that children with complex needs were looked after by adult specialists. He did not recognise such boundaries and set about ensuring that all children were looked after by paediatric specialists. He was determined to provide a proper paediatric patient-centred service. His reputation as a clinician and a surgeon grew and he began to attract children from throughout New Zealand and then from the South Pacific.

Percy had a gregarious personality and a philosophy that encouraged cooperation and respect in the treatment of patients, and so was able to maintain strong relationships with clinicians from around New Zealand and with the parents of patients as well.

The original children's hospital was called Princess Mary and it occupied the site of the current Ronald McDonald House. It had been built as a hospital for American servicemen wounded in Pacific operations during World War 2. It had an expected life of only 5–10 years but lasted 50. Percy was one of the original team of Paediatricians who, together with Paul White, were determined that children deserved better than that. They campaigned in the face of considerable opposition for a proper children's hospital. Resistance to their plans from many quarters thwarted the original vision, but Starship Children's Hospital was the result of their endeavours.

Percy was a founding member of Variety, the children's charity, in New Zealand, and remained involved for the rest of his life. Percy was their medical advisor, and was instrumental in establishing and funding the mobile ear clinic programme together with numerous other activities. He received Variety's highest international honour.

Percy took part in the annual Variety Club fundraising event (the 'Bash') for many years. The Bash always travels through back roads and small towns. It was like a royal tour with Percy. He would know at least one person in every town, he could also remember the names and conditions of children he had operated on, and he could remember their families.

Patients from the South Pacific started to be referred Princess Mary and Starship Hospitals. Percy made an initial trip funded by Auckland Rotary with some Paediatricians. He realised that many of the conditions he was being referred could be looked after in the first instance, in the islands if the local surgeons could be supported and up-skilled.

He made trips to Fiji, Samoa and Tonga, sometimes as part of NZAid, but also at his own expense. He always used the resources available to the locals. He taught and encouraged them and established robust relationships with them so difficult clinical problems could be properly looked after with best interests of the patients and their families at heart.

Percy also encouraged local surgical trainees to consider paediatric surgery, and is responsible for many locals entering that specialty, some with international recognition.

Percy was a loving husband, father and grandfather, a loyal friend and a man with a vision of a better world for its children.

Percy was passionate about the care and welfare of children. He was determined to play his part in providing that care, and we are the better for it.

Our condolences go out to his children and grandson. Correspondence can be sent to peasefamily2012@gmail.com

Chris Chambers, a long-time friend of the family and colleague, wrote this obituary.

Erratum

Jane L Elmslie, J Douglas Sellman, Ria N Schroder, Frances A Carter.

The NEEDNT Food List: non-essential, energy-dense, nutritionally-deficient foods.

N Z Med J. 2012 Feb 24;125(1350):84–92.

<http://journal.nzma.org.nz/journal/125-1350/5073> and
<http://journal.nzma.org.nz/journal/125-1350/5073/content.pdf>

The authors have advised some minor but significant corrections to the abstract and results sections as well as to the legend and body of Table 1 of this article.

Please refer to the links above to view the corrected copy of this article.