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This Issue in the Journal

Routine vaccination coverage of 11 year olds, by ethnicity, through school-based vaccination in South Auckland
Belinda J Loring, Elana T Curtis

This study reviewed 2005 data from South Auckland schools, to find out how many children actually received the routine tetanus and polio immunisation, recommended for all NZ children at age 11. This vaccine is free and delivered in schools to all Year 7 students. Understanding vaccination rates in this age group is important because the new cervical cancer (HPV) vaccine will also be given to adolescents. The study found that coverage was lower than expected, with large differences between ethnic groups. Overall, 48% of Māori and 56% of non-Māori in Year 7 were received this immunisation in school. Assuming that parents who stated their child had already received these vaccinations were all correct, the overall coverage in this population for the recommended Year 7 tetanus and polio vaccination is 53% for Māori and 71% for non-Māori.

The use and misuse of media headlines: lessons from the MeNZB™ immunisation campaign
Nikki M Turner, Deon G York, Helen A Petousis-Harris

This research project tracked the use on headlines for stories in the NZ print media using 3 case studies of stories around the meningococcal B immunisation campaign. Headlines were compared to see if there were accurate for the story or misleading. Overall in more than 50% of the articles (26/51) the headlines were inaccurate and a further 6 headlines misleading. These small case studies illustrate the difficulties arising at the intersection between media and public health interests. Close and ongoing dialogue between media and public health professionals are important, with recognition on each side of the different drivers and needs in two different sectors.

Lack of coordination between health policy and medical education: a contributing factor to the resignation of specialist trainees in Fiji?
Kimberly M Oman, Kim Usher, Rob Moulds

Postgraduate specialist training was established at the Fiji School of Medicine in 1998. Public sector retention of graduates has been disappointing, and almost half of doctors who have undertaken specialist training are no longer working in the public sectors. Health policy in Fiji has not been adjusted to fully take into account the existence of local postgraduate training, which may have led to frustration and resignations. Policy adjustments to expedite entry into training, as well as to establish predictable career progression as a reward for training may increase training completions and overall public sector retention with little additional expenditure.
Improving participation in breast screening in a rural general practice with a predominately Māori population

Rachel M Thomson, Sue Crengle, Ross Lawrenson

The staff of Te Whanau a Apanui Community Health (a General Practice) put in place strategies to improve the number of women who participated in breast screening services supplied by Breast Screening Midland. The strategies can be divided into 2 main areas: increased local involvement and encouraging participation. These strategies resulted in an increase in participation from about 40% to over 98% in this small rural largely Māori community.
Eliminating ethnic disparities in health through immunisation: New Zealand's chance to earn global respect

Cameron C Grant, Nikki Turner, Rhys Jones

In September 2008, the HPV vaccine GARDASIL® became the second cancer-preventing vaccine to be included in the New Zealand immunisation schedule. Its inclusion occurs 2 decades after the hepatitis B vaccine (which prevents hepatocellular carcinoma) was introduced in 1985.¹

Māori have higher incidence and mortality for both hepatocellular carcinoma and cervical cancer than non-Māori.² These two diseases contribute to inequalities in mortality between indigenous and non-indigenous populations in New Zealand that are larger than those between American Indians/Alaska Natives and non-Hispanic whites in the United States.³

Now that both of these cancers are considered vaccine-preventable, can we be confident that these disparities in health will decrease? Can we even be reassured that existing disparities won’t be exacerbated? If one takes a historical perspective then there is little to inspire confidence. Whether examining vaccine-preventable deaths during the decades immediately following the introduction of a national immunisation schedule or vaccine-preventable hospital admissions in more recent times, rates in Māori have been higher than in non-Māori.⁴⁻⁶

Lower immunisation coverage is the principal reason for the excess burden of vaccine-preventable communicable disease among Māori. All immunisation coverage surveys performed in New Zealand over the past 20 years using World Health Organization-recommended methods have shown lower immunisation coverage for Māori than for non-Māori.¹,⁷,⁸ These studies have examined only those vaccines delivered in the first 2 years of life.

In this issue of the New Zealand Medical Journal, Loring and Curtis provide the first substantial piece of evidence about coverage for 11-year-old immunisations in New Zealand.⁹ While they are careful to acknowledge the measurement issues which qualify their estimates, their findings indicate that the early childhood ethnic differences in immunisation coverage persist into school-age years.

New Zealand can learn from the experience of other countries that have been successful in eliminating ethnic disparities in immunisation coverage. In the United States, the indigenous to non-indigenous ratios for receipt of the primary series of vaccines—which provide protection against diphtheria, tetanus, pertussis, polio, hepatitis B, measles, mumps, and rubella—range from 0.97 to 1.03. In contrast the indigenous to non-indigenous ratios in New Zealand for these same vaccines range from 0.62 to 0.87.³ Thus significantly less immunisation coverage for Māori compared to non-Māori, unlike in the United States where no such difference between indigenous and non-indigenous populations exists.
How has the United States achieved this commendable result? Firstly by articulating a priority to eliminate ethnic disparities in immunisation coverage. The key interventions that have led to this goal being realised have been the provision of comprehensive health services through the Indian Health Service and more recently through tribal health programmes, home visiting, utilising tribal community centres as well as schools for immunisation delivery, tracking immunisation status, and providing free immunisations.

One year earlier, New Zealand had articulated a similar although more hesitant aim to reduce and then to eliminate health inequalities that negatively affect Māori. It is disappointing that our statement of purpose was more tentative: there is absolutely no reason why ethnic inequalities in immunisation coverage should be tolerated or allowed to persist. A further source of disappointment—that progress towards equity in New Zealand has been poor compared with the United States despite our statement being made 1 year earlier—reflects this difference in priority and urgency.

What steps have been taken to prevent history repeating itself and to ensure those with the greatest potential for health gain from disease prevention receive immunisations? New Zealand did show significant progress in reducing inequities with the delivery of a meningococcal B mass epidemic programme between 2004 and 2006 given as a three dose schedule to children and youth from 6 weeks to 19 years of age.

Ethnic differences in coverage were not entirely absent but were less marked than in other immunisation programmes. This was most apparent in the school-based programmes, with the three-dose coverage of children aged 5–17 years 4% lower for Māori, —and for children aged 6 weeks to 4 years, 9% lower than for non-Māori. The key contributors to this programme’s success were a mass communication campaign, integrated information systems (schools and primary care) and more time and resources to focus on consent forms, precall/recall systems, and outreach follow-up.

So what is required to eliminate disparities in immunisation coverage and hence in vaccine-preventable disease in New Zealand? When we look at the list of things that have allowed the United States to be proud of their efforts we see that many of the components are present in New Zealand. Primary Health Organisations (PHOs) have helped to provide a stronger population focus to primary care. Some of the PHOs have iwi (tribal) affiliations.

We have a near-universal school-based delivery programme (only one district currently does not deliver the 11-year-old programme through schools). We know how to deliver catch up and outreach services. We have the beginnings of an integrated national immunisation information system. We have most of the pieces of the puzzle but they do not currently fit together, nor are they recognisable at times as even being part of the same puzzle.

Loring and Curtis cite the issue of inconsistent denominators as a weakness of their study. These same problems that made their study more difficult to perform and the data collected more difficult to interpret have exactly the same effect on the school-based programme’s ability to effectively immunise its population. The Public Health Nurse database did not include all of the children on the school roll. An immunisation service cannot deliver immunisations to every child if it does not know who all of
these children are, nor can it be expected to achieve high coverage if there is a lack of clarity about where responsibility for this critical function lies.

Lack of integrated databases between primary care and school-base programmes should eventually resolve. The National Immunisation Register (NIR) which tracks all children’s immunisation records was rolled out in a staged fashion based on the birth cohort since 2004/2005. This will become applicable for children entering school from this cohort. However, until then, delivery of state-of-the-art health care and the prevention of death and disease should not be dependent upon a piece of paper reappearing twice from a child’s school bag. We can do better than this, as has been shown in the meningococcal B campaign.\textsuperscript{13}

There is now good understanding of the need to engage the community more strongly in the issue, of the logistics of running a programme to obtain and maintain high consent form returns in school-based programmes, the need for catch-up and outreach services to find the most vulnerable, and the importance of integrating the primary care and school-based databases through the use of the NIR. A well run school-based programme backed up by a strong national communication strategy and integrated databases should be capable of delivering high immunisation coverage in the New Zealand context.

What we know about current immunisation delivery in New Zealand suggests that money spent purchasing GARDASIL\textsuperscript{\textregistered} and other new vaccines will not achieve the potential health benefits on offer because too few people will receive them. Furthermore, as things currently stand, those that need the new vaccines the most and have the greatest potential to benefit will be the least likely to receive them, with an unwarranted share of the benefits accruing to those who already enjoy relatively good health. Consequently, as is the case with most health-sector interventions, the introduction of new vaccines will increase inequalities. This is in direct contravention of the New Zealand Health Strategy.\textsuperscript{12}

The potential for cancer to be vaccine-preventable brings a broader perspective to immunisation programmes initially developed to prevent severe communicable disease in the young and to a lesser extent in the elderly. It also brings an increased focus on the poor capacity of the health system to deliver a national schedule of vaccines from infancy though adolescence and into adulthood.

That the elimination of ethnic disparities in immunisation delivery in the United States coincided with their health system achieving higher immunisation coverage across the whole population is no coincidence. Addressing the systemic problems that were responsible for inequalities in coverage led to improved outcomes for all children.

New Zealand can achieve the same but needs to raise the stakes at the individual, community, and national level. We need to:

- Stimulate desire for the product via increased community communication,
- Fund delivery of the product recognising the extra time and resources required to get informed consent within a school context, and
- Integrate (at a national level) the databases to enable every immunisation opportunity to be utilised.
Without all this in place, we risk increasing the disease disparities in our community. We will never fly to the moon if we build a spaceship with only enough fuel to get halfway there. But the moon won’t seem so far away if we get all of our children into the same higher immunisation orbit.

**Competing interests:** None known.

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Globalisation and its impact on the South Pacific

Brennan Edwardes, Frank Frizelle

This issue of the NZMJ contains articles1–3 that form part of the World Health Organization’s (WHO’s) International Joint Special Issue on scaling up training and education of health workers, a collaboration between over 20 health-related journals to publish on a common critically important theme, led by the journal Human Resources for Health (http://www.human-resources-health.com/) and the WHO department of Human Resources for Health.

The NZMJ articles relate to Pacific healthcare worker issues, which New Zealand has considerable influence over. The New Zealand Government’s international aid and development agency (NZAID) is responsible for delivering New Zealand’s official development assistance and for advising government ministers on development assistance policy and operations. NZAID is a semi-autonomous body within the Ministry of Foreign Affairs and Trade (MFAT). In the 2008/09 financial year, the Pacific Regional Social Development Programme combines, for the first time, Pacific regional health and education programmes with an enhanced focus on gender and youth and the linkages between them.

The effects of globalisation on health and the environment can be both positive and negative. Hoyt and Brooks call it a “double-edged sword”4 while Woodward et al state the linkages between globalisation and health are complex.5 Moreover, globalisation has both direct and (less noticeable and often delayed or unforeseen) indirect effects on health and the environment.6

Climate change—caused by deforestation plus burning of fossil fuels that release greenhouse gases—is a “hot” topic these days and most experts now agree the phenomenon is real and is occurring.6 WHO experts at the recent Climate Change Global Risks, Challenges and Decisions conference in Copenhagen estimate around “150,000 deaths now occur in low-income countries each year due to climate change from four climate-sensitive health outcomes—crop failure and malnutrition, diarrhoeal disease, malaria, and flooding”—and that small island states, children, and the elderly are particularly vulnerable. They draw a direct correlation—climate change has adverse consequences for health: as carbon goes up health goes down (www.who.int/globalchange/climate/en/).

Likely longer-term negative effects on Pacific island states include raised sea levels due to melting of the polar ice caps, thus affecting low-lying atolls of the Pacific. This is already happening in Tuvalu where valuable land is being eroded into the sea and the entire population may be forced to evacuate in the not-too-distant future due to a recorded sea-level rise of 5.5 millimetres per year. Actually some people have already been evacuated.7

Moreover, a warmer and wetter climate is likely to exacerbate the spread of mosquito- spread arboviral diseases such as malaria and dengue fever. Indeed, recent outbreaks of dengue fever have been recorded in Far North Queensland and across the Pacific:
New Caledonia, Kiribati, Palau, Fiji, Samoa, and Tonga all reporting unusually high levels of the virus.8

The free movement of goods and passengers between islands also facilitates the spread of communicable diseases such as influenza. This was sadly illustrated in 1918 when the influenza pandemic reached Samoa via the trading vessel SS Talune that disembarked six ill passengers arriving from Auckland. Within a week, influenza had spread throughout the two main islands of Samoa and approximately 8500 people died (one-fifth of the population).9 It is therefore important that effective pandemic and disease control plans are in place, and the WHO has an important role to play here.

Global cooperation, vaccination campaigns, and global pandemic plans—as outlined in the International Health Regulations of the WHO—have led to numerous health successes such as the virtual elimination of smallpox, polio, and hydatids throughout much of the world and reduced incidences of other major infectious diseases.

For example, a joint study conducted in Samoa in 1964 by the WHO and UNICEF recorded a rate of filaria as high as 21%.10 The WHO in collaboration with Japan provided technical cooperation with volunteers to assist in filaria control. With this cooperation, the filaria detection rate dropped to 1.1%—a marked improvement in the health of the Samoan people.

Sexually transmitted diseases remain a serious problem, however, in some Melanesian countries (especially Papua New Guinea)11 along with tuberculosis and arboviral illnesses in some Pacific Island countries.12 They all rely on the policies, resources, and technical assistance provided by WHO to help combat these diseases.

With limited resources and exports, expensive transport costs due to geographical isolation, and an increasing number of damaging cyclones (thought to be a side effect of global warming), many South Pacific countries rely on overseas development assistance to maintain their economies and a reasonable quality of life for their people. In the case of Independent Samoa, the top three contributors are Australia, New Zealand, and Japan. Assistance includes the building of education and health facilities, plus other important infrastructure such as port facilities and interisland ferries.

While stressing that New Zealand should contribute a higher proportion (currently 0.3%) of its gross national income to Pacific Island Countries and Territories (PICTs), Wyber et al,12 in this issue of the NZMJ, point out the little-known fact (at least to us) that counter to its altruistic aid, New Zealand has been exporting what they term “health-damaging products” there, notably in the form of “mutton flaps” (fatty offcuts from the sheep meat carcase). Indeed, from July 2006 to July 2007, NZ$73 million dollars of sheep meat was exported to the Pacific Islands, constituting New Zealand’s largest export to the Pacific. Similarly, byproducts (fatty turkey tails and necks) of predominantly US and Australia turkeys destined for Thanksgiving and Christmas dinner tables there have long found a willing market in the Pacific.20 Add fatty chicken frames and backs and corned beef to that list.

Unfortunately many Pacific people are ill-equipped to consume such food in large quantities as they seem particularly susceptible to developing metabolic syndrome13 due to their evolved “thrifty gene” makeup. Rod Jackson (Professor of Epidemiology
at Auckland University) stated “[Pacific] people are literally eating themselves to death.” In addition, multinational fast food chains, which are particularly numerous in American Samoa, have contributed to the obesogenic environment. Not surprisingly, Pacific people have the world’s highest obesity rates (77% of adults in Nauru and 74% of women in Samoa, in 2002) coupled with high rates of diabetes, hypertension, and other “Western diseases” as a result of this obesity.

With New Zealand’s best meat grades (along with other high-quality produce) going offshore to affluent consumers in Japan, Europe, and North America, the remainder for itself (thankfully generally lean recently), and the unsellable unhealthy meat sent to the Pacific, one could term this practice “food inequality” and an unpleasant aspect of globalisation. Interestingly the process seems to happen the other way too, with New Zealand getting Japan’s older vehicles—though not necessarily a negative.

Many Pacific consumers are not knowledgeable or motivated about the nutritional value or otherwise of mutton flaps and turkey tails, and taste and low cost is all-important, as shown by a survey conducted in Tonga and published in the WHO’s flagship periodical, Bulletin of the World Health Organization, in 2001. In that survey of 430 Tongans, the most preferred and eaten food was imported chicken parts—while fish, surprisingly, was much lower down the list.

Thus, in the overall interests of the state and the health of its people, most public health experts argue that government regulation (while trying not to contravene world trade agreements such as GATT) is required instead of reliance on consumers making healthy food choices. Such an ideological debate is documented in the previous issue of the NZMJ which contains an editorial and letter advocating restrictions on the sale of junk food in New Zealand schools through the reintroduction of regulations introduced by the previous government.

Facing a health crisis and despite threatened trade action by New Zealand (later withdrawn), Fiji was the first island nation to ban the importation of low-grade fatty meat (1999) followed more recently (2007) by Independent Samoa with its ban on US turkey tail meat as well as chicken backs.

The determinants of health are complex. Some activities done to improve one country’s economic situation can have a negative effect on another’s for instance. The WHO in promoting this series of articles is helping draw our attention to issues of workforce, training, and workforce migration while NZAID has previously recognised the complex nature of aid and health interaction.

The future health of Pacific people can’t be considered in isolation, as they are influenced by the aid we give and the effects of globalisation that New Zealand has at times espoused.

**Competing interests:** None known.

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References:


Routine vaccination coverage of 11 year olds, by ethnicity, through school-based vaccination in South Auckland

Belinda J Loring, Elana T Curtis

Abstract

**Aims** To determine vaccination coverage, by ethnicity, for the routine publicly funded vaccinations for 11 year olds, from school-based vaccination data in South Auckland, New Zealand.

**Methods** De-identified aggregate data were obtained with permission from the Counties Manukau District Health Board (CMDHB) Public Health Nurses Database on the 11-year-old tetanus and polio vaccinations from 2005, and analysed to determine percentages of form return, consent and vaccination receipt by ethnicity, including relative risks for Māori compared to non-Māori students. Reasons for vaccination refusal were also analysed.

**Results** Overall, 48% of Māori and 56% of non-Māori in Year 7 in CMDHB in 2005 (n=8642) were immunised through the school-based programme. Assuming that parents who stated their child had already received these vaccinations were all correct, the estimated overall coverage in this population for the recommended Year 7 tetanus vaccination was 67% (53% for Māori, and 71% for non-Māori).

**Conclusions** Vaccination coverage amongst 11 year olds in this population was lower than coverage for other childhood vaccinations in New Zealand, and there was a large Māori:non-Māori disparity.

New Zealand’s National Immunisation Schedule (NIS) currently includes a diphtheria, tetanus, and pertussis booster (dTap) at age 11. There are no published vaccination coverage rates for this age group in New Zealand, and data on this age-group will not be available from the National Immunisation Register until the birth cohort reach age 11 in 2016.

New Zealand’s coverage of other childhood vaccinations has historically been poor, and inequalities in coverage between Māori and non-Māori have been documented in all immunisation surveys to date. Understanding vaccination uptake in the adolescent age group is important as it is the target age-group for the new human papillomavirus (HPV) vaccine. The purpose of this analysis is to evaluate coverage data for the routine 11-year-old (Year 7) vaccinations, using data from Counties Manukau District Health Board’s (CMDHB) school-based vaccination programme.

**Methods**

De-identified aggregate data were obtained with permission from the CMDHB Public Health Nurses (PHN) Database on the 11-year-old tetanus and polio vaccinations from 2005. These were the routine vaccinations recommended by the NIS for all 11 year olds at the time, and were given as single dose, separate vaccinations. The 2005 year was chosen as it was the most recent year with all data entry complete.
Aggregate numbers, by ethnicity were extracted, for the following categories:

- Total consent forms returned.
- Total consenting to each vaccine.
- Total declining vaccination, with reason.
- Total receiving each vaccination.

The data were analysed, using standard descriptive statistical methods in STATA v9.1 software, to determine percentages of form return, consent and vaccination receipt by ethnicity, including relative risks for Māori compared to non-Māori students.

Because vaccinations were carried out throughout the academic year, the Year 7 (Form 1) school category was used rather than a specific age range. The PHNs relied on teachers to distribute consent forms to students, and only collected data from those forms returned. The PHN database did not contain the total number of Year 7 students on the school rolls, so the total number of Year 7 students in these schools, by ethnicity, was obtained from the Ministry of Education (from the July 2005 roll return).

More students were classified as “Other” in the PHN database than through the Ministry of Education’s system of ethnicity classification. This discrepancy suggests limitations in the reliability of ethnicity classification, which will be explored further in the discussion. The “Other” category is not analysed on its own in the following analyses, but is included along with the other ethnicities to make up the category “non-Māori”.

The Ministry of Education data comes from the self-identified ethnicity recorded by parents on the school enrolment form. The PHN database is populated from the CMDHB PiMS database, which is the patient record database used by the whole CMDHB. For approximately 95% of students, the ethnicity extracted from the PHN database will reflect the ethnicities given at the time of their first admission to hospital or involvement with CMDHB rather than the ethnicities they nominated on the Year 7 vaccination consent form.

For both databases, a student is recorded in one ethnic group only, even though they may list up to three ethnicities on both the school enrolment and vaccination consent forms. The Ministry of Education uses the system of ethnicity priority recommended by Statistics New Zealand which prioritises Māori, then Pacific, Asian, and Other ethnicities if more than one ethnicity is selected. The PHN database also prioritises only one ethnicity, with the primary ethnicity being the patient’s “main ethnicity” as determined by the patient or the data-entry clerk at time of entry onto the CMDHB PiMs system.

Results

Because there were no significant differences between the results for the tetanus and the polio vaccinations, only the results for the tetanus vaccination will be discussed in this article.

Table 1 shows the form return, consent and vaccination rates for each ethnic category (as total student numbers and simple percentages) for the tetanus vaccination.

Out of all students on the Year 7 school roll for 2005, only 54% received tetanus vaccination through the school-based programme. This result is influenced by findings showing 25% of parents declined consent for vaccination in school and another 13% did not return a consent form at all. This picture varied greatly by ethnicity—Māori had much higher rates of not returning a form (36%), compared with NZ European (3%), but of the forms returned, NZ European had higher rates of refusing consent (37%) than Māori (18%).

A total of 24% of Year 7 (28% of those who returned forms) did not consent to have tetanus in school. School vaccination coverage varied by ethnicity, with Pacific having the highest coverage (59%), followed by Asian (51%). There was no
significant difference between the school coverage rates for Māori (48%) and New Zealand (NZ) European (49%). Higher coverage was achieved for Pacific than for Māori, partly because the form return rate was higher for Pacific and a higher percentage of Pacific students actually received vaccination once consented, despite a higher proportion of Māori consenting to vaccination on the forms that were returned.

Table 1. CMDHB Year 7 vaccination for tetanus, 2005

<table>
<thead>
<tr>
<th>Variables</th>
<th>Ethnicity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NZ European</td>
<td>Māori</td>
</tr>
<tr>
<td>Total number on Year 7 school roll</td>
<td>2848</td>
<td>1902</td>
</tr>
<tr>
<td>Total forms returned</td>
<td>2770</td>
<td>1216</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>97.26%</td>
<td>63.93%</td>
</tr>
<tr>
<td>Number consenting to tetanus vaccination in school</td>
<td>1738</td>
<td>998</td>
</tr>
<tr>
<td>- as % of forms returned</td>
<td>62.74%</td>
<td>82.07%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>61.03%</td>
<td>52.47%</td>
</tr>
<tr>
<td>Number not consenting to tetanus vaccination in school</td>
<td>1032</td>
<td>218</td>
</tr>
<tr>
<td>- as % of forms returned</td>
<td>37.26%</td>
<td>17.93%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>36.24%</td>
<td>11.46%</td>
</tr>
<tr>
<td>Total vaccinated for tetanus by PHNs</td>
<td>1402</td>
<td>905</td>
</tr>
<tr>
<td>- as % of those consenting</td>
<td>80.67%</td>
<td>90.68%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>49.23%</td>
<td>47.58%</td>
</tr>
<tr>
<td>Number consented but not vaccinated</td>
<td>336</td>
<td>93</td>
</tr>
<tr>
<td>- as % of those consenting</td>
<td>19.33%</td>
<td>9.32%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>11.80%</td>
<td>4.89%</td>
</tr>
</tbody>
</table>

Values >100% due to discrepancy in ethnicity classification between numerator and denominator—this is further clarified in methods and discussion; *Mostly of Samoan, Tongan, Niuean, or Cook Islands origin.

Table 2 compares the form return, consent and vaccination rates of Māori with non-Māori. This table includes relative risks for Māori compared to non-Māori of returning a consent form, consenting to vaccination in school, and actually receiving vaccination in school. Only 64% of Māori on the Year 7 school roll returned vaccination consent forms, compared to 94% for non-Māori overall (RR=0.68, 95%CI 0.66–0.71).

Coverage rates for Māori were lower than non-Māori. For Māori, 48% in Year 7 were vaccinated in school. For non-Māori, 56% received the tetanus vaccination in school. Out of those who did return forms, Māori were significantly more likely than non-Māori to consent to school vaccination (RR=1.18, 95%CI 1.14–1.21).

Even though once consented, Māori were more likely than non-Māori to actually receive vaccination (RR=1.06, 95%CI 1.04–1.09), this did not overcome the effect of non-return of forms and left Māori significantly less likely than non-Māori to receive tetanus vaccination through the school based programme (RR=0.85, 95%CI 0.81–0.90).
Table 2. CMDHB Year 7 tetanus vaccination coverage for Māori and non-Māori, 2005

<table>
<thead>
<tr>
<th>Variables</th>
<th>Ethnicity</th>
<th>RR† (with 95% CI, and p value* for Māori versus non-Māori)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Māori</td>
<td>Māori</td>
</tr>
<tr>
<td>Total number on Year 7 school roll</td>
<td>6740</td>
<td>1902</td>
</tr>
<tr>
<td>Total forms returned</td>
<td>6330</td>
<td>1216</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>93.92%</td>
<td>63.93%</td>
</tr>
<tr>
<td>No form returned</td>
<td>410</td>
<td>686</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>6.08%</td>
<td>36.07%</td>
</tr>
<tr>
<td>Number consenting to tetanus vaccination in school</td>
<td>4404</td>
<td>998</td>
</tr>
<tr>
<td>- as % of forms returned</td>
<td>69.57%</td>
<td>82.07%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>65.34%</td>
<td>52.47%</td>
</tr>
<tr>
<td>Number not consenting to tetanus vaccination in school</td>
<td>1926</td>
<td>218</td>
</tr>
<tr>
<td>- as % of forms returned</td>
<td>30.43%</td>
<td>17.93%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>28.58%</td>
<td>11.46%</td>
</tr>
<tr>
<td>Total vaccinated for tetanus by PHNs</td>
<td>3762</td>
<td>905</td>
</tr>
<tr>
<td>- as % of those consenting</td>
<td>85.42%</td>
<td>90.68%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>55.82%</td>
<td>47.58%</td>
</tr>
<tr>
<td>Number consented but not vaccinated</td>
<td>642</td>
<td>93</td>
</tr>
<tr>
<td>- as % of those consenting</td>
<td>14.58%</td>
<td>9.32%</td>
</tr>
<tr>
<td>- as % of total in Year 7</td>
<td>9.53%</td>
<td>4.89%</td>
</tr>
</tbody>
</table>

†Statistically significant values are in bold; *All are p=0.0000

Table 3 compares the reasons given for non-consent between Māori and non-Māori, including relative risks. Major explanations include the child already being immunised (50%) or parents intending to have the child immunised by GP (24%).

Data entry in this category in the PHN database is likely to be incomplete, as only 15 non-consenters were entered as having “no option selected”, leaving a large number (n=392) of non-consenters remaining unaccounted for in these figures. There was no statistically significant difference between the number of Māori and non-Māori who did not consent because they did not agree with vaccination (8% of those declining consent), nor between the number not consenting because they preferred to take their child to the GP.

Māori were 22% less likely than non-Māori (RR=0.78 95% CI 0.66-0.93) to decline consent because their child had already been immunised.
Table 3. Comparison of reasons given for non-consent to Year 7 vaccination 2005, between Māori and non-Māori

<table>
<thead>
<tr>
<th>Variables</th>
<th>Ethnicity</th>
<th>Total</th>
<th>RR¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Māori</td>
<td>Māori</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=2000</td>
<td>n=218</td>
<td></td>
</tr>
<tr>
<td>Choose to take child to GP</td>
<td>480</td>
<td>49</td>
<td>529</td>
</tr>
<tr>
<td>- as % of those not consenting</td>
<td>24.00%</td>
<td>22.48%</td>
<td>23.85%</td>
</tr>
<tr>
<td>Do not want immunisations</td>
<td>155</td>
<td>19</td>
<td>174</td>
</tr>
<tr>
<td>- as % of those not consenting</td>
<td>7.75%</td>
<td>8.72%</td>
<td>7.84%</td>
</tr>
<tr>
<td>Child already received immunisations</td>
<td>1021</td>
<td>87</td>
<td>1108</td>
</tr>
<tr>
<td>- as % of those not consenting</td>
<td>51.05%</td>
<td>39.91%</td>
<td>49.95%</td>
</tr>
<tr>
<td>No answer selected</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>- as % of those not consenting</td>
<td>0.40%</td>
<td>3.21%</td>
<td>0.68%</td>
</tr>
<tr>
<td>No data/unaccounted for</td>
<td>336</td>
<td>56</td>
<td>392</td>
</tr>
<tr>
<td>- as % of those not consenting</td>
<td>16.8%</td>
<td>25.69%</td>
<td>17.67%</td>
</tr>
</tbody>
</table>

¹Statistically significant values are in bold.

Fifty percent of parents declined consent for school vaccination because they stated their child had already received the vaccinations. If we assume that this self-reported vaccination status is correct, this increases the coverage of the scheduled 11-year-old vaccination in this population to 67% overall, 53% for Māori, and 71% for non-Māori. If we expand this estimate to include all parents who stated their child had already received and those who were planning to receive their tetanus vaccination in primary care, this provides an optimistic upper estimate of coverage in this population of 55% for Māori and 78% for non-Māori. In both these estimates, coverage increases more for non-Māori than Māori.

Discussion

Study limitations—The absence of school roll data in the PHN database made it difficult to accurately assess form return and vaccination rates. Vaccination was undertaken throughout the school year, and the Ministry of Education denominator refers to a snapshot of the school rolls during July 2005, so it is possible that there was some minor fluctuation in school roll numbers throughout the year, especially in the South Auckland setting. It is, however, assumed that there would have been minimal net change in student numbers.

The results are limited by a discrepancy in the ethnicity classification between the CMDHB PHN data and the Ministry of Education datasets. Ethnicity numerator/denominator bias may be present because of three main factors: differences in the “Other” category, differences in the source of ethnicity data, and differences in the prioritisation of multiple ethnicities. More students were classified as “Other” in the PHN database (n=643) compared with the Ministry of Education data (n=368). If these “Other” students in the PHN database are disproportionately made up of one
particular ethnic category, the effect will be to under-represent the form return and vaccination coverage of that ethnicity. It is likely, however, that the excess “others” are made up of a mixture of Māori and non-Māori, as the relative vaccination coverage for each ethnic group found in this analysis is consistent with ethnic trends in coverage found in similar analyses, such as the MeNZB™ programme, with Pacific receiving the highest coverage followed by Asian, NZ European, and Māori.

These difficulties illustrate the ongoing problem of inadequate ethnicity data collection for Māori in New Zealand. This is despite evidence highlighting the problem of under-counting in health statistics for Māori and the creation of clear ethnicity data protocols for the health and disability sector. The fact that this problem remains within vaccination data is concerning, as it prevents Māori inequalities from being fully identified, understood, and addressed.

General discussion—In New Zealand, even where a school-based vaccination programme is in place, scheduled vaccinations may still be given in primary care. This makes it difficult to be certain about the overall vaccination coverage in this population.

This analysis found that out of the 30% of parents who declined school vaccination, half had already vaccinated their children (presumably in primary care), and another quarter intended to vaccinate their child in primary care. This information is less reliable for Māori, as we only have information on the 11% of Māori parents who declined consent, and have no information on the vaccination status or preferences of the 36% of Māori who did not return a form.

There are also well-documented problems associated with the accuracy of self-reported vaccination status, and in this analysis the status of children reported to have been vaccinated or due to be vaccinated in primary care is unable to be verified. This type of analysis would have been greatly assisted if these children had been entered on the NIR, which would have enabled confirmation of vaccinations reported as given in primary care.

Out of those refusing consent, Māori were significantly less likely to have been immunised in primary care, suggesting access barriers to primary care or preferences against using this setting, and adding further weight to the hypothesis that school-based vaccination delivery works better for Māori.

These data provide the only estimate of coverage for the 11-year-old scheduled vaccination in New Zealand. Using data from a DHB which had a high proportion of Māori enabled roughly similar sample sizes for each ethnic group, meaning close to equivalent explanatory power for Māori. As a result, all relative risks calculated for Māori compared with non-Māori were statistically significant.

This analysis only refers to one DHB, and this DHB may not be representative of the rest of New Zealand. To gain a more balanced and representative understanding of vaccination delivery to 11 year olds in New Zealand, and for a fuller assessment of Māori:non-Māori inequalities, similar analyses of coverage would need to be undertaken in rural settings and primary care, particularly in the South Island where school-based delivery is not used.
The most striking finding for Māori in this analysis was the large percentage who did not return a consent form. We have no information about the reasons for this, and do not know what proportion of these parents would have liked their child vaccinated and how many had been, or were, intending to be vaccinated elsewhere.

We know from other attitudinal studies that Māori parents do not have significantly different views on vaccinations,\textsuperscript{12–15} so it is highly unlikely that these Māori who did not return consent forms were all objectors to immunisation.

A number of factors, such as higher school mobility, illness, and absenteeism rates might explain some of this disparity in form return rates for Māori students, but it is likely that other factors also contribute. Process factors, such as how consent forms were actually distributed to students, the nature and style of the consent form, and the timeframes involved are all potential areas to explore in order to understand and improve this system for Māori.

It is encouraging that once consented, Māori were more likely than non-Māori to receive vaccinations, but with such a large percentage of Māori not returning forms it is difficult to draw strong conclusions from this, and the opposite was found in the MeNZB™ programme with Māori less likely to receive vaccinations once consented.\textsuperscript{5}

The results of this study suggest that a mixed delivery system, using both schools and primary care, works less well for Māori than non-Māori. Whilst overall coverage in this population increased when including those who had or intended to be vaccinated in primary care, the disparity in coverage between Māori and non-Māori also increased. This indicates that primary care is a less commonly accessed setting for this immunisation for Māori compared with non-Māori, and that more equitable outcomes for Māori might be achieved by concentrating on improving the school based vaccination delivery. This is supported by findings from the MeNZB™ programme, where school based delivery achieved less disparity in coverage between Māori and non-Māori compared to delivery in primary care.\textsuperscript{5}

**Conclusion**—Coverage for the Year 7 tetanus vaccination in this population in 2005 was low overall, and was much lower for Māori. Overall, 48% of Māori and 56% of non-Māori in Year 7 in CMDHB in 2005 were immunised through the school-based programme. Assuming that parents who stated their child had already received these vaccinations were all correct, the overall coverage in this population for the recommended Year 7 tetanus and polio vaccination is 53% for Māori and 71% for non-Māori.

The coverage of the year 7 vaccination was limited by the fact that a quarter of parents refused consent and another one-eighth did not respond by returning a consent form. Coverage for Māori was limited mostly by the fact that over a third did not return a consent form, and further research is needed into reasons and solutions for this.

Once consented, Māori were slightly more likely than non-Māori to actually receive their vaccinations. This evidence is limited by different methods of ethnicity data collection, and is limited to one DHB only. Further coverage assessments need to be undertaken in different settings, such as rural areas, and areas where immunisation are delivered in primary care.

**Competing interests:** None known.
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2. Dawson N. Projects Leader, Kidz First Public Health Nursing, Counties Manukau District Health Board, Auckland (Email communication); 29 March 2007.
4. Gallagher C. PiMs Functional Specialist, Counties Manukau District Health Board (Email communication); 2007.
The use and misuse of media headlines: lessons from the MeNZB™ immunisation campaign

Nikki M Turner, Deon G York, Helen A Petousis-Harris

Abstract

Aim Tracking the use of headlines with single issue stories in the New Zealand print media from their source, three case studies of the MeNZB™ vaccination campaign’s presentation in the print media were examined.

Method Article headlines were tracked in the three case studies. All headlines were coded between two researchers to review for accurate or misleading presentations in terms of whether the headlines matched the article content.

Results In these three case studies 26 out of 51 headlines were inaccurate when compared with the article content (51%), with a further 6 being misleading (total of 61%).

Conclusions These small case studies illustrate the difficulties arising at the intersection between media and public health interests. There is an inherent tension between public health publicity needs, and the print media needs. To maintain public confidence, health planners constantly need to develop and review their health promotion messages and relationships with the media. Close and ongoing dialogue between media and public health professionals are important, with recognition on each side of the different drivers and needs in two different sectors.

New Zealand’s (NZ’s) rates of meningococcal B disease were reaching over 200 per 100,000 children less than 1 year of age in 2004.¹ NZ’s largest immunisation programme was implemented in July 2004 in response. A strain-specific vaccine was designed specifically for the NZ epidemic, and provided for all children aged 6 weeks to 20 years of age in the country. The delivery programme commenced in the area of highest disease rate, South Auckland, and then rolled out progressively around the country to children in all areas over the next year.² By 2006, over 3 million doses of vaccine had been delivered to NZ children and youth.³ With the recent cessation of the MeNZB™ programme, it is timely to investigate some of the lessons learnt by understanding a snapshot of this campaign’s portrayal in the media.

Media activities can directly affect immunisation uptake both positively and negatively.⁴ Media reports questioning vaccine safety can significantly affect parental concerns.⁵⁻⁸ and ultimately immunisation coverage rates.⁹,¹⁰ Media reportage can also have a positive effect. A Cochrane review concluded that mass media should be considered a tool that may encourage use of effective health services and discourage those of unproven effectiveness.¹¹

This research project focused on tracking single issue stories from their source during the MeNZB™ immunisation campaign. We tracked their spread through the NZ
media, examining how the headlines for the stories were presented in different media in terms of accuracy or misleading presentations with respect to the story.

The reach of the mainstream print media in NZ is wide, covering all homes in all regions at least once a week (including the free regional newspapers), although not necessarily read in all homes. The NZ media uses the services of the New Zealand Press Association (NZPA), which is a 24-hour, 7-day-a-week service providing national and international news to the country's media. The NZPA news is available through its commercial division, NZPA Content Services. News is purchased for publication in newspapers and magazine, and is widely used by NZ print media nationally.

The subeditor of the newspaper, not the journalist who crafted the article, usually generates the headlines in print media articles.

Methods

NZ print media clippings were collected from 400 different national and regional publications for the years 2004/2005, covering over 5000 articles. These were obtained from a professional clipping agency which inspects all national daily and weekly newspapers, non-daily suburban and provincial papers, and magazines including health-related publications and provides copies of all articles that make reference to immunisation, vaccines, or vaccination.

All articles were entered into a Microsoft Excel database and fields included date, type and region of media source, title, and coding themes.

To analyse the use of a headline, all articles in 2004/2005 were scanned for articles that arose from a single NZPA story, and were taken up broadly by many media throughout the country. Case studies were selected based on being a single factual story around the meningococcal epidemic and vaccine, and having wide print media coverage to many regions in the country. Three examples were chosen as coming from a factual story and resulting in wide distribution throughout the country, both in national and regional print media.

The headlines were listed and coded separately by two independent researchers as being either an accurate presentation of the issue, ambiguous, or inaccurate when comparing the headline to the content of the article. The researchers were in agreement in all codings. If the headline reflected the content of the article it was coded as accurate, if it did not reflect the content of the article is was coded as misleading and if it reflected aspects of the story without clearly representing content, particularly the main focus, then it was coded as ambiguous.

Results

Story A—it is reported that initially one, then two, young children have caught meningococcal disease and are in hospital. While it is not known exactly what strain of meningococcal disease they have, it is established that neither has the epidemic strain type meningococcal B disease (type B:4:P1.7b,4). Both these children have been recently fully immunised against the epidemic strain, but this vaccine does not cover other strains of meningococcal disease.

The original story generated a total of 30 print media articles around NZ over the dates 22 November 2004 to 2 December 2004.

Of 30 articles, 9 had accurate headlines, 6 had ambiguous headlines, and 15 had misleading headlines. Two of the articles were from national media; both were in the misleading category.
Table 1. Story A: Comparing accuracy of headlines to content of article

<table>
<thead>
<tr>
<th>Accurate</th>
<th>Ambiguous</th>
<th>Misleading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunised tot catches another strain of disease</td>
<td>No meningococcal vaccine 100 percent effective – ministry</td>
<td>Child not protected</td>
</tr>
<tr>
<td>Vaccinated child catches different meningitis strain</td>
<td>No vaccine ever 100% effective, says ministry</td>
<td>Vaccinated child in hospital</td>
</tr>
<tr>
<td>Vaccinated child catches different strain of disease</td>
<td>‘No meningococcal vaccine 100 percent effective’</td>
<td>Toddler struck down</td>
</tr>
<tr>
<td>Vaccinated child catches variation</td>
<td>Vaccine not ‘100 percent effective’</td>
<td>Vaccine fails</td>
</tr>
<tr>
<td>Vaccinated boy sick with another strain of killer bug</td>
<td>Vaccinated children still at risk</td>
<td>Immunised children catch killer disease</td>
</tr>
<tr>
<td>Stay vigilant</td>
<td>Jabs can’t give complete cover</td>
<td>Vaccine fails to protect</td>
</tr>
<tr>
<td>Jabs can’t cover all strains</td>
<td></td>
<td>Two children develop meningococcal disease despite being immunised</td>
</tr>
<tr>
<td>Jabs can’t protect against all strains</td>
<td></td>
<td>Two children ill despite vaccine</td>
</tr>
<tr>
<td>Vigilance advised</td>
<td></td>
<td>Two children have disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two ill, despite vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two develop meningococcal disease after vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two children developed meningococcal disease after vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Children catch disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two meningococcal cases despite immunisation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sick children no surprise to anti-jab campaigner</td>
</tr>
</tbody>
</table>

n=9 (30%)  n=6 (20%)  n=15 (50%)

Story B—The story announces the first day of the launch of the mass meningococcal B vaccine programme for children aged 6 months to 5 years in Central Auckland, the largest city in NZ, and Northland (the most northern province). The main themes are announcing the launch, and discussing vaccine safety, quoting the Independent Safety Monitoring Board (ISMB) findings and the clinical trials findings, which all found no major safety issues.

The story also quotes the opinion of an anti-immunisation lobbyist who gives anecdotes of children reputed to have reactions to the vaccine. This story generated 8 articles all on the same day. For a total of 8 articles there were 3 accurate headlines, and 5 misleading headlines.
### Table 2. Story B: Comparing accuracy of headlines to content of article

<table>
<thead>
<tr>
<th>Accurate</th>
<th>Misleading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningitis jabs begin</td>
<td>Dispute over vaccine risk goes on</td>
</tr>
<tr>
<td>Preschoolers get jabs</td>
<td>Mass vaccination proceeding despite concerns</td>
</tr>
<tr>
<td>Vaccinations begin</td>
<td>Vaccine debate continues, 25,000 face needle</td>
</tr>
<tr>
<td></td>
<td>Vaccine row rages</td>
</tr>
<tr>
<td></td>
<td>Meningococcal vaccine risk dispute goes on</td>
</tr>
<tr>
<td>n=3 (37.5%)</td>
<td>n=5 (62.5%)</td>
</tr>
</tbody>
</table>

### Story C—The Minister of Health visits a health centre and announces a milestone in the campaign: more than 2 million meningococcal B vaccine doses have now been delivered nationally to almost 78% of the eligible population.

The programme aims to achieve 90% coverage with all 3 doses (and still has another year to run) and the Ministry spokesperson reports that it was unlikely to reach this goal in all areas, but was likely to reach targets in the most important high risk groups (see Table 3). This story generated a total of 13 articles over the period 18–19 August 2005, and a further article on 31 August 2005.

Overall 7 headlines were accurate and 6 were misleading. Note that here headlines were coded as misleading if they focused on overall campaign failure: while the statement was that some areas may not reach the target, this does not mean the target overall will not be reached, and furthermore targets were expected to be met for the highest risk groups who were the key focus of the campaign.

### Table 3. Story C: Comparing accuracy of headlines to content of article

<table>
<thead>
<tr>
<th>Accurate</th>
<th>Misleading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance of vaccine widespread</td>
<td>Vaccination goal may be missed: ministry</td>
</tr>
<tr>
<td>Milestone for vaccine plan</td>
<td>Vaccine drive short of goal</td>
</tr>
<tr>
<td>Vaccine campaign reaches 2 million</td>
<td>Vaccine goal unlikely to be met</td>
</tr>
<tr>
<td>Two million doses delivered</td>
<td>Vaccination campaign falling short</td>
</tr>
<tr>
<td>Heavy dose</td>
<td>Campaign falls short</td>
</tr>
<tr>
<td>Two million doses of vaccine delivered</td>
<td>Meningococcal likely to miss target</td>
</tr>
<tr>
<td>Two million doses of vaccine now delivered</td>
<td></td>
</tr>
<tr>
<td>n=7 (54%)</td>
<td>n=6 (46%)</td>
</tr>
</tbody>
</table>
Table 4. Summarising accuracy of all headlines to all articles

<table>
<thead>
<tr>
<th>Headline and content accuracy</th>
<th>Total (stories A, B, C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Misleading headline</td>
<td>26 (51%)</td>
</tr>
<tr>
<td>Ambiguous headline</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Accurate headline</td>
<td>19 (37%)</td>
</tr>
<tr>
<td>Total</td>
<td>51 (100%)</td>
</tr>
</tbody>
</table>

Discussion

Public health consequences of media activities are well documented internationally, and can be dramatic, such as the case of pertussis in the 1970s and 1980s where negative press lead to reduction in immunisation coverage internationally and consequent disease outbreaks. In Wales there was extensive adverse print media coverage of the measles, mumps, rubella (MMR) vaccine in one local newspaper from June to September 1997. Following this there was a 13.6% decline in vaccine uptake in the distribution area of that publication compared to a decline of only 2.4% elsewhere, illustrating the power of local newspapers.

It is a challenge for national vaccination campaigns to present data and stories that will be taken up accurately by media. These small case studies illustrate the difficulties arising at the intersection between media and public health interests. The needs and drivers for the print media differ from public health drivers. Media needs are focused around selling the story, not around accuracy of a health message. Key aspects of a good media story include making it relevant to the reader, to their personal current concerns, and of human interest. Essentially the print media needs to engage the audience to sell the product.

Research to date has focused on the content of articles, not on the headline. These case studies are focusing on the impact of the headline, and how it matches to the article. Headlines are frequently developed by subeditors independently of the journalists who write the articles, and hence there can be quite a difference in intent between the headline and the article.

In these three case studies 26 out of 51 headlines were misleading (51%), with a further 6 (12%) being ambiguous (total of 61%).

Implications—To maintain public confidence, health planners constantly need to develop and review their health promotion messages and communications with the media. This requires broad relationships with many levels of media, not just with the national origins of the stories, but also the local media management of stories and of the headlines. There is an inherent tension between public health publicity needs, and the print media needs. To reconcile these competing needs health planners need greater awareness of triggers and drivers in the media world. More research is needed into how specific public health issues are reported in the media so health planners are able to better understand media drivers.

These case studies clearly demonstrate a wide range of responses generated within the media to the same story, showing there is not a standard predictable response, and individual journalists and subeditors can chose very different angles on the same
theme. One can assume it will be difficult to consistently predict the behaviour of the print media with any one story.

Journalistic and print media needs can be in conflict with responsible presentation of public health messages. Close and ongoing dialogue between media and public health professionals are important, with recognition on each side of the different drivers and needs in two different sectors.

Competing interests: None known.

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References:

Lack of coordination between health policy and medical education: a contributing factor to the resignation of specialist trainees in Fiji?

Kimberly M Oman, Kim Usher, Rob Moulds

Abstract

Aim Specialist training was established in Fiji in 1998. This study explored whether health policy, and in particular mismatches between existing policy and the new realities of local specialist training, contributed to decisions by many trainees to ultimately leave the public sectors, often to migrate.

Method Data was collected on the whereabouts of all specialist trainees. Semi-structured interviews were carried out with 36 of 66 Fiji trainees in order to explore reasons for continuing or not completing training, as well as the reasons behind subsequent career choices.

Results Overall, 54.5% of doctors remained in the public sectors or were temporarily overseas. Completion of specialist training was particularly associated with improved retention. Policies that contributed to frustration and sometimes resignations included a lack of transparency in the selection of doctors to enter training pathways, and unreliable career progression following completion of training. Doctors who left training before completion mentioned family stresses, which were exacerbated by delayed age at entry into training and a lack of certainty in regards to the timing of improved working conditions through career advancement.

Conclusion Policy adjustments to expedite entry into training, as well as to establish predictable career progression as a reward for training may increase training completions and overall retention.

The World Health Organization estimates that there is a global shortage of over 2.5 million health care workers. These shortages are most acute in developing countries, and are exacerbated by the migration of many health workers to developed countries. Shortages of health workers and human resource issues are receiving increasing attention at an international level because of their link to poor health outcomes.1,2

The “scaling up” of health professions education has been proposed as a means to increase the numbers of health professionals in developing countries.1,3 As a component of this, in-country or regional postgraduate medical specialist education can play a role not only in providing a specialist workforce trained in the settings where they will be spending their professional lives, but can potentially improve doctor retention by overcoming the need for aspiring specialists to spend many years training in developed countries.4

The availability of local postgraduate training can also potentially serve as an incentive or reward for clinical excellence as well as for rural service. To date, few studies have been published about postgraduate programs in developing countries,
Regional postgraduate specialist training was established in 1998 in Fiji, a small developing Pacific Island nation (see Table 1), in order to address a continuing dependence on expatriates, as well as a failure of most overseas-trained Pacific Island specialists to return home. This training consisted of a 1-year Diploma, followed by an additional 3 years leading to Masters of Medicine (MMed) specialist qualifications in obstetrics and gynaecology, paediatrics, internal medicine, surgery, and anaesthesia.

It was believed at the time that offering training in the Pacific that awarded a local specialist qualification not recognised elsewhere would limit migration. Nevertheless, within a few years many doctors who had started training were leaving the public system to migrate or to enter private practice.

Table 1. Population\textsuperscript{17} and health-related statistics\textsuperscript{1} for Fiji

<table>
<thead>
<tr>
<th>Population</th>
<th>849,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Domestic Product (GDP) per capita</td>
<td>$US 3280</td>
</tr>
<tr>
<td>Under 5s mortality</td>
<td>18 per 1000 live births</td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>68 years</td>
</tr>
<tr>
<td>Annual health expenditure</td>
<td>$US 104 per capita</td>
</tr>
</tbody>
</table>

The establishment of postgraduate training coincided with a worldwide period of openness of developed countries to the migration of doctors from developing countries, and migration was exacerbated in Fiji around the time of a coup in 2000.

This study was carried out in order to determine which factors were leading to resignations of doctors from the public sectors, and whether these factors could be addressed locally. In particular, preliminary discussions raised the issue that health workforce policy had not fully adjusted to take into account the existence of local postgraduate training, and that this could potentially be a factor leading to disappointment and disillusionment among trainees.

Methods

Quantitative data were collected on all 120 doctors who undertook training to at least the Diploma level at the Fiji School of Medicine (FSMed) by 2004. Data on gender, race, highest educational attainment, and working location as of December 2006 were obtained from enrolment and graduation records from FSMed, from local specialist coordinators, and from publicly-available medical registration information in New Zealand and Australia.

Whereabouts were confirmed for all 66 Fiji doctors (the experiences of 54 trainees from other Pacific Island countries are not presented here). These data were analysed using Epi-Info software,\textsuperscript{18} with statistical comparisons utilising Chi-squared testing.
Table 2. Characteristics of Fiji School of Medicine specialist trainees 1996–2004 (Fiji doctors only, excluding regional trainees)

<table>
<thead>
<tr>
<th>Variables</th>
<th>All Fiji specialist trainees</th>
<th>Trainees interviewed</th>
<th>% interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>66</td>
<td>36</td>
<td>54.5%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>39</td>
<td>22</td>
<td>56.4%</td>
</tr>
<tr>
<td>Females</td>
<td>27</td>
<td>14</td>
<td>51.9%</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fijians</td>
<td>41</td>
<td>23</td>
<td>56.1%</td>
</tr>
<tr>
<td>Indofijians</td>
<td>20</td>
<td>10</td>
<td>50.0%</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>3</td>
<td>60.0%</td>
</tr>
<tr>
<td>Specialty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaesthesia</td>
<td>11</td>
<td>6</td>
<td>54.5%</td>
</tr>
<tr>
<td>Medicine</td>
<td>12</td>
<td>8</td>
<td>66.7%</td>
</tr>
<tr>
<td>Obstetrics and Gynaecology</td>
<td>14</td>
<td>6</td>
<td>42.9%</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>18</td>
<td>9</td>
<td>50.0%</td>
</tr>
<tr>
<td>Surgery</td>
<td>11</td>
<td>7</td>
<td>63.6%</td>
</tr>
<tr>
<td>Highest educational attainment (at Dec '06)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>42</td>
<td>14</td>
<td>33.3%</td>
</tr>
<tr>
<td>Masters or MMed student</td>
<td>24</td>
<td>22</td>
<td>91.7%</td>
</tr>
<tr>
<td>Working status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public sectors (Ministry of Health, FSMed, or UN)</td>
<td>32</td>
<td>21</td>
<td>65.6%</td>
</tr>
<tr>
<td>Temporarily overseas</td>
<td>4</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>In Fiji – private practice or not working</td>
<td>10</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>Permanent migrants</td>
<td>20</td>
<td>7</td>
<td>35%</td>
</tr>
</tbody>
</table>

Face-to-face interviews were carried out with 47 doctors who had worked in specialist departments in Fiji, including 9 senior specialists, 2 pre-training specialist registrars, and 36 of 66 who had undertaken specialist training through FSMed. Interviews took place between April 2004 and September 2006 during four trips to Fiji and three trips within Australia.

The interviews lasted ½ to 1½ hours and were semi-structured. Doctors were purposively selected for interviewing in order to obtaining broad representation on the basis of race, gender, specialty choice, highest educational attainment, and migration status (see Table 2). Due to geographic scattering, migrants, private doctors and doctors who had not completed an MMed were underrepresented. Only two doctors (both migrants living in Australia) declined to be interviewed.

As part of the interviews, doctors were asked to describe the decisions they made about completing or leaving training, and about remaining in the public sectors or resigning. The interviews were audio taped, professionally transcribed and coded into at least one of several dozen codes utilising QSR–N6 software.19

Analysis was carried out using a constant comparative method, with emerging themes being tested and refined through returning repeatedly to interview transcripts. Findings were presented for comment and feedback to interview participants and other stakeholders at the annual Fiji Medical Association conferences in 2005, 2006, and 2007.
The principal author (KO), who played a major role in establishing postgraduate training in internal medicine as part of her employment at FSMed between 1998 and 2001, carried out all of the interviews. The implications, benefits, limitations, and potential for bias arising from this semi-insider status were acknowledged, reflected upon, and discussed with supervisors during the analysis and interpretive processes.

Ethics approval was obtained from James Cook University and the Fiji National Research Ethics Review Committee. The funding sources played no role in the collection, analysis, and interpretation of data, in the writing of the report, nor in the decision to submit the paper for publication.

Results

By 2004, 120 doctors had undertaken specialist training at the Fiji School of Medicine (FSMed), of whom 66 were from Fiji and 54 from other Pacific Islands. By the end of 2006, 36 (54.5%) of the Fiji trainees were either currently working in the public sectors (32) or were training overseas with stated intentions to return (4). Ten (15.2%) who resigned were still living in Fiji (mostly in private practice), and 20 (30.3%) were believed to have migrated permanently (see Figure 1).

Policy and entry into specialist training—While health policies supported the establishment of postgraduate training in Fiji, and significantly opened up locally available career options, Fiji doctors reported that existing policies provided little clarity in regards to what the impact of training should be in terms of career advancement.

The policies on the early years after graduation remained unchanged. New MBBS graduates were told that after a 1-year internship, they would be required by the Ministry of Health to work outside of the major hospitals, often in a smaller town or
rural area. The prerequisites for entering formal specialist training included working a minimum of three years following graduation, including one year as a pre-training specialist registrar.

In practice, many more years often elapsed before the required pre-training specialist posting was offered by the Ministry of Health, which also controlled the awarding of government scholarships for undertaking specialist training. A few doctors, however, seemed to be exempted from rural service and were invited immediately after internship to join a specialist department at one of the main hospitals.

I would have loved to do postgraduate training immediately after internship. The idea that we had after internship was that you have to do 3 years rural attachment before you come back to the hospital. Somehow that applies to some but does not apply to others. But I think we need to push to identify people from internship the first year out and say 'you need to go here and here'. And then get the career identified very early on rather than leaving it towards the end, you know when you're supposed to have specialised and you're starting your postgraduate training.

The lack of timely advancement into specialist training was of concern to staff at FSMed, some of whom described a lack of transparency in how doctors were selected for specialist training. They wondered whether the lack of clarity about how to pursue specialist careers led to frustration, lack of hope, and eventually to resignations.

Policy and Masters (MMed) graduates—The new MMed qualifications allowed specialist status to be granted 2 years after graduation. Previously, specialist status could be obtained either through overseas training or through working in specialist departments for 15 or so years. Specialist status, while allowing limited private practice for public sector doctors, was separate from and did not guarantee promotions to senior roles, and there were no written policies in place in regards to the impact of an MMed on actual career advancement within the public service.

By 2006, 21 Fiji doctors had been awarded a Masters degree, of whom 18 (85.7%) were still working in public sector roles (15) or were temporarily overseas (3). Of the 11 doctors from the first two graduating MMed classes, 7 of 8 who were working in the public sectors had moved into senior roles. Three other graduates in this group had either migrated to Australia (2) or entered private practice in Fiji (1), and described neither having been promoted in a timely manner, nor having confidence that they would be promoted in the future.

And there was also a time when there were a lot of people migrating out of the country leaving their jobs, so there were a lot of vacancies at that point in time. It was really quite easy for me to slot myself in, given that I was the only one who was passing exams. That’s why my promotion relative to most other people has been quite quick.

I had the sense of getting nowhere and I felt 6, 8 years down the line and I’m still gonna be just a registrar. It’s going back and forth and yet the Ministry was not even recognising the programme itself, so I said 'Hey, I’ve just got to get out of this!'

For the 10 doctors who received their MMed qualifications between 2003 and 2006, only 2 had been appointed to senior posts. Of the other 8, many described their prolonged junior postings as being frustrating given that their postgraduate training seemed to have no impact on their career status.

I guess part of the frustration would be the way the Ministry, how their structure doesn’t allow for people to progress. If you do self-developmental things, and keep getting higher and higher recognitions, part of the frustration of that is recognising that the people who get
promoted have no interest in eventually pursuing further postgraduate training and stuff like that, but by virtue of years of service…

But I understand there was an agreement that if you finish your Diploma you automatically become a senior medical officer…and once you completed your Masters you qualified to go up as chief medical officer. But because of the fact that we have a lot of expatriates who were brought in and occupying the higher posts, and the posts are all occupied so you still have to settle with the medical officer post (lowest career grade).

It is of some concern that six MMed graduates have undertaken or were planning to undertake overseas placements. This is because in the past, the few doctors who have returned or attempted to return to Fiji after completing specialist training overseas have faced considerable frustrations, given that no specific policies or procedures were in place then (or now) to track their status while overseas or plan for appropriate senior roles on return.

I was tempted to stay away but it was basically because I didn’t get any response from the Ministry of Health when I started writing, to say that ‘I’d finished my specialist training, if there was a job I’d like to come to it’, and they didn’t respond for 8 months. My story isn’t unique, man, a lot of people report this story. I suppose I persisted a bit longer than others but it was just matter of 2 weeks. If that letter hadn’t come, 2 weeks later I would have taken up a job in England as a consultant.

**Policy and Diploma graduates at a decision point**—While most MMed graduates have continued working in public sectors, the majority of specialist trainees (42 out of 66, or 63.6%) left training with a Diploma as their highest qualification, and of these, only 13 (31.0%) are still working in public sector roles (see Figure 2).

**Figure 2. Working situation by highest qualification attained (at Dec 2006)**

![Figure 2. Working situation by highest qualification attained (at Dec 2006)](image)

Over time, Diploma graduates became increasingly aware of how difficult Masters training was, and concerns were often expressed about the quality of supervision, the workloads, and the failures to address problems with low staffing levels in specialist departments. A lack of coordination between the demands of academic and hospital supervisors was particularly cited as adding to an already stressful working environment.
It was very difficult and I guess a lot of people had bent under that, a lot of our registrars…because of a lack of commitment from our local counterparts, our local supervisors and our local consultants…what I mean by bent under, is they just can’t cope with it, the stress is too much. They’ve just given up because they haven’t found a way out and probably the only way out is get out of the system so that the system doesn’t destroy you.

In addition to educational concerns, family commitments were a very powerful driving factor behind the career decisions that Diploma graduates made. Due to policies that did not serve to expedite entry into specialist training, many doctors started specialist training a number of years above the minimum required after medical school, and the majority had started or were planning to start families.

Both men and women faced challenges related to the difficulties of undertaking training on top of already challenging jobs. They often stayed for prolonged periods at junior postings, earning low salaries. Women in particular struggled to find time to devote to their families at a very demanding time in their careers.

Men also struggled with a desire to spend more time with their families, but they particularly mentioned financial stresses related to supporting young families. Interestingly, there was little difference in resignation rates between men and women (see Figure 3).

I was so frustrated! Why I left was, my number one thing was for my family. I thought I wasn’t giving enough time. I have three kids, so that was my main reason leaving. I’m not that ambitious, but the main thing is that I have to get my children started off and then see my husband do something, then for myself.

One of them, he couldn’t cope with his two children, and his wife was a nurse and he had just bought a house. For them to be able to look after their financial commitments, both of them needed to work, true. But they had two small children. So then they decided it wasn’t going to work. They wanted to bring up their children properly, so his wife, he didn’t want his wife to work, just to sort of stay home and look after the children, and that was the main reason he moved to American Samoa. ’Because I could do that over there.’ And he earned enough to support them. And pay off his house as well. The money was good. That was the main reason he left.

The interviews suggested that in Fiji, both female and male doctors faced a “biological clock”, or perhaps a “family clock”, which was probably exacerbated by delayed entry into training. The fact that there were no policies in place to guarantee timely promotions as a reward for undertaking training (with their associated better working conditions and higher salaries) made “hanging in there” at times of stress much more difficult. On the other hand, quick relief was readily available through local private practice, and while migration posed its own uncertainties, opportunities to migrate were readily available.
Discussion

The establishment of postgraduate training in Fiji has created new conditions and situations that pose both opportunities as well as challenges. The interviews with doctors who undertook local specialist training in Fiji suggested that the structures and policies in the public system have not adjusted to take into account the realities of local specialist training, and that this may be having a negative impact on retention.

While it is unlikely that additional resources will be come available in the near future to substantially increase salaries and improve overall working conditions, there are some changes that could be made in health policy that may improve the retention and satisfaction of specialist trainees without large outlays of funding.

Firstly, although this study did not focus on doctors prior to entering specialist training, overall retention may be helped by developing a more transparent process of selecting doctors to work in specialist departments. Available positions should ideally be advertised at least yearly, and include more predictable intakes of pre-training specialist registrars (at least every 2 years in each specialty).

Potential trainees should ideally be judged according to merit by a panel with representatives from the Ministry of Health, the Fiji School of Medicine, and other important stakeholders. In the interest of rewarding service, priority should given to those who have spent the longest time working in regional or rural areas.

Because the retention of Masters graduates has been much greater than for doctors with only a Diploma, interventions should focus not only on providing career paths for doctors who leave training with a Diploma, but on retaining as many trainees as possible through to MMed graduation.

Interventions should include improving coordination between the hospital and the academic components of the training programme, and supporting the working environment through actively recruiting into established but unfilled posts in specialist departments. The availability of part-time work and training may increase the retention of doctors with young families, especially women.
Because the conflict between family and working roles can be particularly stressful, the expediting of specialist status and working in senior roles could provide considerable relief and encouragement. In addition to earlier entry into specialist training, trainees would likely be encouraged through receiving automatic promotions both when they receive their Diploma and their Masters.

Overall, attention to the promotions process should increase transparency, should reward merit, and should facilitate promotion to senior postings for Masters graduates. Granting eligibility for specialist status at Masters graduation (which allows limited private work for public sector doctors), rather than 2 years later, may provide for welcome and predictable financial relief.

Finally, specific steps should be taken to plan for the return of doctors who have undertaken overseas training, whether for full specialist training or shorter attachments. Retention of these doctors may be improved by actively tracking their overseas progress and allowing, in some instances, overlapping senior postings when they return if an expatriate is in a senior position but has not finished his or her contract.

This study adds to the limited current literature about the outcomes of establishing local postgraduate training in developing countries, and has a number of strengths as well as limitations. Interviews were carried out with over 50% of Fiji specialist trainees, and the exploratory nature of the interviews allowed for novel or unexpected insights to arise.

A particular strength of the study is the identification of possible interventions that can be made at a policy level without large increases in funding, though the potential for success of these interventions is not guaranteed, and would merit further study. The involvement of the interviewer for almost a decade in Fiji, as well as her role in helping to establish these courses is both a strength and a limitation, as it was likely to have allowed for a deeper understanding of the situations of the interview participants, but could have potentially lead to some degree of bias.

The under-representation of migrants, private practitioners, and doctors who left training with a Diploma may also contribute to bias. The overall narrowness of the study is another limitation, and the experiences of medical students, new medical graduates, and non-specialist doctors were not explored. Generalisation to other countries may also be limited.

Doctor salaries in Fiji are arguably “livable” though modest, so this study may have limited applicability to more impoverished nations.

This study may provide some insights for individuals and institutions that will be increasingly called upon to help scale up postgraduate training in developing countries. It is reassuring that even with disappointing losses of trainees to resignation and migration, postgraduate training at FSMed has succeeded in adding 15 Masters-qualified specialists to the public sector workforce, with three more planning to return from overseas. This compares to only 5 Fiji doctors with overseas specialist qualifications currently working in the public sectors.

Health educators need to keep in mind that their interventions to strengthen medical education take place within a health system, not in a vacuum. Health policies can have
a profound impact on the success or failure of educational interventions, and failing to advocate for adjustments to health policy to take into account the existence of new training programs may undermine such programmes.

On a more personal level, those who support the scaling up of medical education, especially outsiders, should attempt to develop a full understanding of the stresses their students are facing.

“Survival of the fittest” approaches are probably inappropriate or counterproductive in situations where many doctors end up dropping out and then resigning from the public sectors, often to migrate. Compassionate approaches based on genuine understanding, especially if coupled with a willingness to be an advocate for trainees with government departments and funding bodies, may also lead to improvements in retention and satisfaction, and ultimately to stronger health workforces.

Competing interests: I, Kimberly Oman (principal author) have the following conflicts of interest: I worked at Fiji School of Medicine (FSMed) from 1998–2001 and was employed initially by the FSMed and was later by AusAID through the Royal Australasian College of Surgeons, which was contracted to establish postgraduate training in Fiji. Part of this study was funded by consultancy fees from the Royal Australasian College of Surgeons in 2002 for two follow-up visits to oversee the progress of the postgraduate training in internal medicine. Neither the FSMed as an institution (apart from individuals as co-authors or supportive colleagues) nor AusAID had input into the planning, data collection, analysis and interpretation of data, in the writing of the report, nor in the decision to submit the paper for publication. I have no other conflicts of interest to declare.

I, Robert Moulds, have the following conflicts of interest: before being appointed Professor of Medicine at the FSMed, I was the external advisor for the establishment of the internal medicine component of the AusAID-funded postgraduate program at the FSMed. I have no other conflicts of interest to declare.

I, Kim Usher, have no conflicts of interest to declare.

Note: This article forms part of the NZMJ’s contribution to the International Joint Special Issue on scaling up training and education of health workers, a collaboration between over 20 health-related journals to publish on a common critically important theme, led by the journal Human Resources for Health (www.human-resources-health.com) and the WHO department of Human Resources for Health. For more information, please see the website.

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Improving participation in breast screening in a rural general practice with a predominately Māori population

Rachel M Thomson, Sue Crengle, Ross Lawrenson

Abstract

Aim The aim of this paper is to describe the strategies used to increase breast-screening participation in a rural general practice with a high Māori population.

Method A retrospective process evaluation.

Results The participation rate increased from less than 45% in 2003 to about 98% in both 2005 and 2007.

Conclusion The general principles underlying the specific strategies are discussed and may be used by other General Practices and Primary Care Organisations to assist with improving breast screening participation.

Significant ethnic inequalities in breast cancer diagnosis and outcomes have been documented. Over the period 1996 to 2001, Māori women were 21% more likely to be diagnosed with breast cancer than non-Māori women.

Once diagnosed, Māori women were 68% more likely to die from the disease than non-Māori women. Māori women are more likely to be diagnosed with later stage disease; however, differences in stage do not account for all the disparities in outcome. Improving population outcomes and eliminating ethnic inequalities in breast cancer stage at diagnosis and mortality may be achieved through initiatives across the breast cancer pathway—i.e. detection, diagnosis, and treatment.

Early detection of breast cancer can be achieved through breast cancer screening programmes. In Aotearoa New Zealand, a publicly funded organised breast cancer screening programme (BreastScreen Aotearoa; BSA) for women aged 50 to 64 years has been available since 1998 and was extended to include women aged 45–69 in 2004. High levels of participation in screening programmes, and effective and timely follow-up of identified abnormalities, are necessary for screening to lead to improvements in breast cancer outcomes and inequalities.

Population coverage in BSA is increasing but remains below targets. For the 2 years to December 2006, 60% of eligible women aged 50–64 years had participated in BSA (target 70%). Ethnic inequalities in participation among eligible women in this age group are evident with 41% of Māori, 41% of Pacific, and 62% of Other ethnic group participating in the programme. In the area served by BreastScreen Midland (BSM), participation was 38.8% for Māori, 42.2% for Pacific, and 64.7% for Other ethnic group women.

Reasons for non-participation in breast cancer screening include practical difficulties such as access to transport, travel time, and inconvenience. Twenty percent expressed concern or fear of the procedure, or were influenced by negative reports from other women.
Māori and Pacific ethnic group women report higher levels of worry about developing breast cancer than New Zealand European and Asian women. Rural women have been shown to have lower participation in breast cancer screening than urban women, although breast cancer outcomes are similar in both groups.

The Te Whānau ā Apanui Community Health Service (‘TWAACH’, ‘the Service’) provides primary health care to a rural, coastal, predominantly Māori community in the Eastern Bay of Plenty. Health services are provided to the population living in the Te Whānau ā Apanui rohe (tribal region) with a 220 kilometre boundary from Te Taumata o Apanui in the south to Potikirua in the north.

At the time of screening in 2005 the registered practice population, excluding casual patients, was 1680 people, of whom 90.5% were Māori. TWAACH has one full-time equivalent (FTE) general practitioner, 2.5 FTE nursing staff and two administration staff.

BSA breast screening is undertaken in a mobile breast screening unit that visits the district every two years. The unit provides breast screening at Waihau Bay for 3 days and at Te Kaha for 6 days. At other times women have to travel for 2 - 3 hours to Whakatāne to access breast screening services. In 2003, organising breast screening in this area was undertaken by the region’s BSA provider and followed standard BSA procedure. These are summarised in Table 1. Participation in breast screening had been low.

In 2003 it is estimated no more than 45% of eligible women had a mammogram when the mobile unit visited the area. This paper describes issues that were identified to address participation rates and strategies that were implemented to increase participation in breast screening when the mobile unit visited in 2005 and 2007.

Method

A retrospective process evaluation of the strategies used to improve the uptake of breast screening was undertaken and is reported here. Qualitative information was primarily obtained from service staff that had been involved with the breast screening initiative. BreastScreen Midland provided information about the systems that had been in place in 2003. Quantitative data about screening coverage was obtained from the computerised practice management system (PMS).

Implementing change in 2005—Prior to the 2005 breast screening biennial visit, service staff discussed the previously low participation rate and how this could be increased in the 2005 round. Issues that may have affected the uptake of breast screening in 2003 were identified by talking with women in the eligible age groups, other community groups, and service staff. The TWAACH administrator was the project leader and was responsible for the organization and coordination of all the identified strategies.

The issues that were identified as having adversely affected participation in 2003 are detailed in Table 1. After identification the staff devised strategies to address these issues. Broadly speaking the strategies can be divided into two categories: increased local involvement, and reducing barriers to participation.

Increased local involvement—Involvement of the TWAACH and the local community:

- Facilitated the provision of information about and promotion of breast screening,
- Improved the identification of eligible women, and
- Improved the registration and appointment making processes.
Table 1. BreastScreen Midland processes for arranging and providing breast screening in 2003, and issues identified by Te Whānau ā Apanui Community Health Service

<table>
<thead>
<tr>
<th>BreastScreen Midland (BSM) process in 2003</th>
<th>Issues that needed to be addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>BreastScreen Midland provides health promotion and information about BSM screening programme and breast screening</td>
<td>Lack of information and knowledge about breast screening, risks and benefits of screening, and how to access the screening service among women Many women did not know when the mobile unit was in the area or the duration of its stay as invitations were only sent to women who had previously undergone breast screening or had enrolled themselves in the previous two years</td>
</tr>
<tr>
<td>BreastScreen Midland responsible for implementation of screening programme</td>
<td>Limited involvement of the local health service in the screening process Service involvement had been limited to:  - parking of the mobile screening units beside the clinics - display of posters about screening in the practice rooms, and - opportunistic encouragement to participate in screening.</td>
</tr>
<tr>
<td>Identification of eligible women</td>
<td>Incomplete registration of eligible women:  - some women do not have access to a phone - others did not feel comfortable making use of the 0800 number</td>
</tr>
<tr>
<td>Eligible women who had not previously had a mammogram had to initiate contact with BSM through the BSA 0800 phone number to start the registration process</td>
<td></td>
</tr>
<tr>
<td>Registration and appointment process</td>
<td>Unreliable mail service in the area also caused problems with receiving registration forms, the return of registration forms and receiving appointment times. Some women had literacy problems that interfered with their ability to participate in the registration process</td>
</tr>
<tr>
<td>BSM sends women with previous breast screen invite and appointment</td>
<td></td>
</tr>
<tr>
<td>Registration forms sent to ‘new’ women who had contacted BSM</td>
<td></td>
</tr>
<tr>
<td>Registration forms completed and returned to BSM</td>
<td></td>
</tr>
<tr>
<td>BSM makes appointment time, date and location for screening.</td>
<td></td>
</tr>
<tr>
<td>Letter of invitation with appointment details sent to women.</td>
<td></td>
</tr>
<tr>
<td>Mammogram taken</td>
<td></td>
</tr>
<tr>
<td>Women attend at location, date and time of appointment</td>
<td></td>
</tr>
<tr>
<td>Normal breast screening – women notified by letter from National Screening Unit (NSU)</td>
<td></td>
</tr>
<tr>
<td>Abnormal breast screening – women phoned by the breast care nurse who was located in Rotorua</td>
<td></td>
</tr>
<tr>
<td>Notification of breast screening results</td>
<td></td>
</tr>
<tr>
<td>Women with abnormal mammograms were contacted about their result and the need for follow-up several days after others had received a letter advising them their breast screen was normal. The women who were left waiting for their result found this a very stressful experience</td>
<td></td>
</tr>
<tr>
<td>Follow-up of women with abnormal breast screens in Rotorua</td>
<td></td>
</tr>
<tr>
<td>Appointment for follow up made during phone call with breast care nurse</td>
<td></td>
</tr>
<tr>
<td>Some women had difficulty with transport. Appointments were made for times that were incompatible with the length of time required for travel (e.g. given an early morning appointment without considering travel time of 3–3 ½ hours to get to the appointment). Appointments not made for groups of women</td>
<td></td>
</tr>
<tr>
<td>Results of follow-up given at appointment with breast surgeon</td>
<td></td>
</tr>
<tr>
<td>Requirement to travel to Rotorua problematic. For example difficulties with transport, travel times and appointments, costs of having to make a second trip to Rotorua within 2–3 weeks. Some women felt uncomfortable receiving results from a virtual stranger and preferred the local GP to provide results.</td>
<td></td>
</tr>
</tbody>
</table>
Following a number of discussions BSM agreed that the Service could enrol and make appointments for women and send this information to BSM who then sent women the standard information pack and a letter confirming the appointment time. This agreement reduced the number of contacts between women and BSM that were necessary for successful registration and appointment making. The Service’s involvement ensured that local factors which impacted on women’s ability to access BSM services and attend breast screening were taken into account. However, BSM retained final control of the mobile unit timetable.

A master list of eligible women, created from the PMS, was used to generate letters inviting women to enrol for breast screening. Two weeks prior to screening the Service staff made phone or face-to-face contact with women who had not enrolled, discussed breast screening, and invited them to enrol. The use of the Service for the coordination of registration and appointments overcame barriers associated with unreliable rural mail delivery, literacy, and competing priorities. When marking appointment times, Service staff were able to arrange group bookings for women who lived in the same household, whānau (family) group, or area. This addressed transport barriers and allowed groups to travel together and undergo screening.

A system for proactively reminding women about appointment times was implemented and a flexible approach to mammogram scheduling was adopted. The Service contacted women the day prior to their appointments to confirm their appointment time and their transportation needs. Women who did not arrive at their appointment were contacted and asked if they needed further assistance to attend that day or would they prefer a rescheduled appointment. Woman who “dropped in” were enrolled and screened if they wished. Women who required repeat films for technical reasons were contacted, given an explanation of the need for repeat films and following this appointments were made. Women who did not or could not attend while the unit was based in the local area were offered appointments for screening at the next site the mobile unit would be based (Opotiki) or the fixed site in Whakatane.

The Service was also involved in the notification of abnormal results and arrangements for follow-up appointments in Rotorua (a 3–4 hour drive). The BSA provider advised the Service of abnormal breast screening results in advance of written notification of normal results to unaffected women. Service staff contacted these women, delivered the results, discussed follow-up, and ascertained if they would like transport and an appointment time at the same time as other affected women. Appointments for women who wanted this were arranged as a group, in liaison with the Rotorua breast care nurse. These processes ensured that women requiring follow up were advised of their results in advance of women with normal mammograms receiving written notification of results from BSA. It also ensured that transportation and travel time issues were proactively addressed and that mutual support from other women having follow-up was available.

During their appointments for investigation the women asked the breast surgeon to send the results and information about subsequent follow up to the Service’s GP. This overcame difficulties such as the costs associated with a repeat trip to Rotorua within a short timeframe, and difficulties with timing of follow-up appointments in relation to the time required for travelling. It also ensured that women received their results in a familiar and safe environment.

**Encouraging participation**—A number of strategies designed to reduce barriers and foster positive participation were employed.

Members of the community were encouraged to advocate for breast screening among the community, whānau and friends. Two well known women, who had participated in breast screening in 2003 and were found to have early cancers, told their story and voiced strong support for the programme in the Service’s newsletter Horirerire which is widely read in the community. Women who had previous mammograms encouraged their sisters, aunts, and friends to enrol. The driver of the van used to transport women was in the screening age group, and as a well known member of the community she encouraged and reassured women as needed.

The Service and its staff became actively involved in the promotion of breast screening and provided information to the local community in conjunction with other community events where women would be present. Hui (meetings) to specifically promote breast screening were not held as staff felt promotion in conjunction with other events would reach more women. Events where breast screening promotion was undertaken included: the kohanga reo purapura day, kaumātua days, and raranga (weaving) groups. Registration forms were taken to all community meetings allowing women to enrol at the time of the meeting. In addition, staff actively promoted breast screening at any opportunity in
the Service and the dates of the mobile unit’s availability were advertised repeatedly in the Service newsletter, at all the local marae, in the shop, and in the windows of the local ‘pub’.

Increased community awareness was also fostered by the involvement of the local iwi authority, Te Rūnanga o Te Whānau who actively assisted with health promotion activities. Te Rūnanga o Te Whānau also provided a van and driver to transport women to breast screening and for follow-up appointments in Rotorua. BSM provided petrol vouchers.

When women attended breast screening, the Service provided a ‘cup of tea’ with the opportunity for women to share and debrief with one another. In general there was a great atmosphere and a lot of laughter with women leaving and encouraging their other whānau members to attend. The Service also gave women a small gift after they had undergone breast screening (a bag of lavender made from donated products).

Group booking of appointments and travelling together was well received by women and appeared to make the process more acceptable and friendly for women involved.

**Strategies used in 2007**—The strategies used for the 2007 round of breast screening were similar to those used in 2005 because these strategies had improved coverage and seemed to be acceptable to women. A small number of the previously enrolled women responded to a letter sent by BSM and made appointments for themselves. One modification to the process was the prioritisation of women who had not participated in 2005. These women were identified and approached first, by staff from the clinic. Through the education activities of 2005, women’s knowledge of breast screening was considered more than sufficient therefore community promotion was not undertaken in 2007.

TWAACH felt that the time and resources required for education and promotion was less intensive as, for many women, the process had been ‘normalised’ by their prior experience and the impact of other external social factors regarding participation were now evident. However, promotion of the arrival of the mobile screening unit was undertaken in the same manner as 2005.

The mobile unit was scheduled to visit during the Kiwi fruit picking season. Community members, who were receiving the unemployment benefit, were required to undertake casual work in kiwi fruit orchards an hour’s drive from Te Kaha. This impacted upon their ability to participate in the breast screening programme causing some difficulties with organising appointments. They were also only available to attend if the weather meant that picking was cancelled for the day.

**Results**

**Impact on participation in breast screening**—In 2003, less than 45% of eligible women (aged 50–64 years) enrolled with TWAACH, underwent breast screening. Information about participation in 2005 and 2007 is contained in Table 2 and Table 3.

In 2005, 185 of 189 eligible women (97.9%) underwent breast screening. The majority (163/185; 88.1%) underwent screening in the mobile units (data not shown). The Service arranged screening at more distant sites for the remaining 22 women. Most of these women (21/22) had screening in Opotiki or Whakatane. One woman was screened in Whangarei. Participation was slightly higher among Māori women (98.7%) compared with 93.9% of non-Māori women (Table 2).

In 2007 97.6% of eligible women underwent breast screening. Participation rates were slightly higher among Māori women (98.9% for Māori compared to 91.4% for non-Māori) (Table 2).

In 2005 participation was lowest among women aged 65–69 years (93.1%). All eligible women aged 50–59 years and around 97% of women in the 45–49 and 60–64 year age groups were screened. In 2007 participation (98%) was similar to that of 2005. However participation among women aged 60–64 had dropped slightly (from 97% to 94%—representing 1 woman), and had increased slightly among women aged 65-69 years (93% to 97% - a difference of six women) (Table 3).
Table 2. Participation in breast screening by *ethnicity* in 2005 and 2007

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>2005</th>
<th></th>
<th>2007</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number eligible</td>
<td>Number who had breast screening</td>
<td>Participation (%)</td>
<td>Number eligible</td>
<td>Number who had breast screening</td>
</tr>
<tr>
<td>Māori</td>
<td>156</td>
<td>154</td>
<td>98.7</td>
<td>177</td>
<td>175</td>
</tr>
<tr>
<td>Non-Māori</td>
<td>33</td>
<td>31</td>
<td>93.9</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>189</td>
<td>185</td>
<td>97.9</td>
<td>212</td>
<td>207</td>
</tr>
</tbody>
</table>

Table 3. Participation in breast screening by *age group* in 2005 and 2007

<table>
<thead>
<tr>
<th>Age</th>
<th>2005</th>
<th></th>
<th>2007</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number eligible</td>
<td>Number who had breast screening</td>
<td>Participation (%)</td>
<td>Number eligible</td>
<td>Number who had breast screening</td>
</tr>
<tr>
<td>45–49</td>
<td>43</td>
<td>42</td>
<td>97.7</td>
<td>51</td>
<td>50</td>
</tr>
<tr>
<td>50–54</td>
<td>47</td>
<td>47</td>
<td>100</td>
<td>49</td>
<td>48</td>
</tr>
<tr>
<td>55–59</td>
<td>37</td>
<td>37</td>
<td>100</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>60–64</td>
<td>33</td>
<td>32</td>
<td>97.0</td>
<td>33</td>
<td>31</td>
</tr>
<tr>
<td>65–69</td>
<td>29</td>
<td>27</td>
<td>93.1</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>189</td>
<td>185</td>
<td>97.9</td>
<td>212</td>
<td>207</td>
</tr>
</tbody>
</table>

Discussion

We acknowledge that since 2003 there have been changes to BSM processes. In particular, BSM endeavours to phone women to make mammogram appointments once they have been enrolled by their primary health care provider, and women are now able to enrol over the phone. However, ethnic disparities in breast screening coverage persist.

This paper describes the improvements that can be made to breast screening participation using a variety of community and practice-based strategies. In particular the initiative demonstrated that by using appropriate strategies, very high participation rates for Māori women can be achieved. The key strategies are discussed.

Community education strategies—Community education and information strategies have been shown to improve breast screening participation. TWAACH provided education and information about breast screening and the impending mobile unit visit. These activities were delivered using the community’s established methods of communication and routine community activities, rather than developing new communication approaches or arranging meetings specifically to deliver breast screening information. Increased use of existing methods of communication by General Practices and PHOs could increase participation. Similarly, already established community fora and community networks could be utilised to provide information about breast screening. Community health workers located in PHOs and health services, and well known members of the community may be used to assist with these activities. The National Screening Unit (NSU) contracts with nine independent service providers to deliver breast screening health promotion, but these workers have not been active in the region in which TWAACH provides primary care.
**Improving access to breast screening**—Cooperation between BreastScreen Midland and TWAACH improved the responsiveness of the system to local needs and facilitated access to breast screening. The on-going active involvement of TWAACH improved coordination for local women. TWAACH staff enrolled women and made appointments. Assistance with appointment making has been shown to improve participation.\(^9\) Internationally the key factors shown to increase participation include a letter of invitation, educational material, use of phone calls and direct reminders. All these strategies were used. Screening programme staff adopted flexible approaches to changes in the daily appointment schedule and supported the TWAACH’s commitment to ensuring that all women were screened and no-one was turned away. These strategies demonstrate both the importance of cooperation between BSA and primary care services, and the ability to successfully do so to meet local need.

Access to services was also facilitated by providing women who lived in the same area with appointments at the same time, and by providing transport to the unit for those that required this assistance. Women requiring follow-up of abnormal results had appointments made for the same day and were given the option of travelling together. This allowed appointments to be made for times that took into account the time required to travel to the provincial centre and allowed women to provide each other with support during this time. In urban centres this function may be able to be provided by community health workers.

**Recommendation by GP and other staff**—All members of the TWAACH staff were actively involved in the breast screening activities. Team work including non-medical staff has been shown to be important in increasing participation in screening.\(^{12,13,14}\) Recommendation and encouragement to participate in screening by all clinical and non-clinical TWAACH staff was an important strategy. Recommendation by GPs and other health professionals is an important influence on participation in breast screening. Failure of physicians to recommend screening has been noted as an important factor in non-participation.\(^{13,14}\) Recommendation by trusted health professionals has been shown to increase participation in breast screening programmes.\(^{9,10}\) The use of community health workers has also been shown to increase breast screening participation.\(^9\) A study from the USA using “well connected” Samoan women to promote breast screening was shown to improve uptake and supports the community approach used in this initiative.

**Practice system strategies**—Office based strategies to improve preventive health service delivery are important tools. Identifying people who are in need of preventive care services\(^{12}\) and recall and reminder systems have been shown to be effective.\(^{13,14}\) Unlike most organised screening programmes internationally, New Zealand does not have a population register from which to invite unenrolled women, but once women are screened they are routinely invited two-yearly if they are still eligible. Office based strategies employed by TWAACH service included the creation of a list of all eligible women, notification that breast screening was due, follow-up of women who had not responded to the notification, reminding women the day before their appointment, immediately contacting women who did not arrive for their mammogram, and making alternative arrangements for these women.

The staff of TWAACH were committed to 100% participation rather than registration with the programme as an end point. The strategies adopted by TWAACH were
universally applied i.e., were applied to all women who were eligible for breast screening. However, in 2007 women who had recently become eligible or had moved into the area since the last screening round were prioritised for individual contact by staff of the clinic. No new resources were required to implement these strategies with the major ‘opportunity cost’ being associated with the administrator’s time.

**Recommendation for future research**—This paper is a retrospective evaluation. Future directions for research could include comprehensive prospective evaluation of initiatives to improve screening coverage and the impact of these initiatives on longer term outcomes such as breast cancer stage, at diagnosis and survival rates. On-going monitoring of screening coverage at TWAACH will provide information about the sustainability of the high coverage rate. The involvement of patients in future studies will provide useful information about the relative importance of different components of the initiative and allow assessment of patient satisfaction with the initiative.

**Conclusion**—This article describes the strategies used to increase breast screening participation in a rural General Practice with a high Māori population. Nationally the poor delivery of breast screening to Māori women is of concern and is one of many examples of inequalities in health care. TWAACH has shown that if appropriate strategies are used then a high proportion of Māori women will participate. The strategies used did not require new services or resources, requiring only local input, flexibility and collaboration between existing services. As a result breast screening participation improved from less than 45% to about 98% in both 2005 and 2007. The general principles underlying the strategies employed can be implemented in other General Practice and PHO settings to improve breast screening coverage, reduce ethnic inequalities in coverage and ultimately, improve breast cancer survival.

**Competing interests:** None known.

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**References:**


Delivering a safe and effective strain-specific vaccine to control an epidemic of group B meningococcal disease

Jane O’Hallahan, Anne McNicholas, Yvonne Galloway, Eileen O’Leary, Christine Roseveare

Abstract

In response to a devastating group B meningococcal disease epidemic in New Zealand, a case was prepared for new health funding and a new outer membrane vesicle vaccine, MeNZB, developed. Following clinical trials demonstrating satisfactory immunogenicity and safety profiles a national implementation strategy was prepared. MeNZB was introduced halfway through the 14th year of the epidemic with a campaign targeting children and young people aged under 20 years delivered over 2 years. By its completion in June 2006, the vaccine had been delivered to more than 1 million young people. All of the above steps were achieved within 5 years. This unique endeavour was possible due to a private/public partnership between the New Zealand Ministry of Health and Chiron Vaccines. This paper summarises the outcomes of this campaign including coverage levels achieved, evidence of vaccine effectiveness and safety, and the strategies used to manage key events and risks that emerged during the campaign.

A strain-specific group B meningococcal epidemic began in New Zealand in 1991.1 Prior to 1991, about 60 cases of meningococcal disease occurred each year.2 Reported cases rose to a peak of 650 (17 per 100,000) in 2001.3 On average during the course of the epidemic 75% of all cases were due to the epidemic strain. The highest rates of disease occurred in Pacific peoples followed by Māori, and 80% of cases occurred in those aged under 20 years.

MeNZB was developed by Chiron Vaccines (now Novartis Vaccines and Diagnostics) in collaboration with the Norwegian Institute of Public Health.4,5 It underwent Phase I and II clinical trials in New Zealand in the target groups.6–10 On the basis of safety and immunogenicity data from these trials and data from similar vaccines,11 including the parent Norwegian vaccine,12 the vaccine was granted a provisional consent for use.5 Similar to other meningococcal vaccines13,14 Phase III trials were not undertaken, therefore a key component of this challenging vaccination programme was the requirement to collate extensive safety data and evaluate vaccine effectiveness in the post-marketing phase.

A safety monitoring plan was developed involving the collection of real-time data with oversight by an Independent Safety Monitoring Board.15 A National Immunisation Register (NIR) implemented at the same time as the campaign was essential for the safety and effectiveness assessments, as well as monitoring vaccine coverage throughout New Zealand.
Programme design

A phased submission to New Zealand’s regulatory body, Medsafe, allowed an initial vaccine delivery to those aged 6 months and over while the Phase II trial in the youngest infants (aged 6–10 weeks) was being completed and assessed.

The vaccination campaign started in July 2004 with a three-dose series for children aged 6 months to under 20 years in parts of Auckland, then gradually extended nationwide from late 2004. Vaccination of infants aged under 6 months began in the wider Auckland area in February 2005, then extended nationwide 3 months later. In January 2006 a fourth dose was added for infants who had started their vaccination series before the age of 6 months.

The key limiting factors to the speed the campaign could be delivered at were: safety monitoring requirements; NIR readiness; the logistics of delivering a large campaign, recruiting additional staff and establishing additional services; and finally, vaccine availability. Several strategies were assessed, with delivery ultimately staggered by age and region implemented from north to south in the North Island, and then from south to north in the South Island. This ensured delivery to those living in areas of greater risk first whilst also delivering early to Māori and Pacific peoples, most of whom live in the top half of the North Island, thereby reducing inequalities for these groups. Two delivery services were employed with public health nurses vaccinating in schools and primary care organisations vaccinating preschoolers and out-of-school youth.

Vaccination coverage

We set a coverage target of 90% for three doses. With no expectation of herd immunity it was essential to provide individual protection to as many children as possible. With the emphasis on those groups most at risk of disease (Māori, Pacific, low socioeconomic status, and those aged under 5 years) primary care payments were weighted for Māori and Pacific and outreach services prioritised these children.

Vaccinations were recorded on the NIR. The NIR could not be used to identify unvaccinated children, however, once children were vaccinated for the first time it became an important tool for ensuring they completed the full course. The NIR facilitated the most up-to-date vaccination monitoring ever undertaken in New Zealand, tracking coverage by dose, region, and ethnicity. The timeliness of the information enabled District Health Boards (DHBs) to focus on defined areas and populations and identify where effort should be applied so that services could be more effective.

At the end of the mass campaign in June 2006 over 90% of those aged under 20 years in the highest risk area (Counties Manukau) had received three doses with highest coverage achieved in Pacific children, the group who suffered disproportionately more from the disease. Nationally, 80% had received three doses, including 86% of those aged 5–17 years.

Key coverage issues that arose were the slower and lower uptake by Māori preschoolers, non-completion of the course, lower coverage for those aged 15 years and over, and lowest coverage (54%) in those aged 18 and 19 years (Table 1). The latter group’s lower uptake of the vaccine through primary care contrasted strikingly with
younger teenagers vaccinated through school-based programmes. We partly attribute the lower coverage from 15 years to some teenagers leaving school (especially for Māori).

Table 1. Vaccination coverage by age, ethnicity and dose, current age at 30 June 2006

<table>
<thead>
<tr>
<th>Age group</th>
<th>Ethnic group</th>
<th>Population</th>
<th>Dose 1</th>
<th>Dose 2</th>
<th>Dose 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>6w–4y</td>
<td>Māori</td>
<td>74,716</td>
<td>55,682</td>
<td>75%</td>
<td>50,023</td>
</tr>
<tr>
<td></td>
<td>Pacific*</td>
<td>28,759</td>
<td>27,450</td>
<td>95%</td>
<td>25,621</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>174,927</td>
<td>164,100</td>
<td>94%</td>
<td>155,962</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>278,402</td>
<td>247,232</td>
<td>89%</td>
<td>231,606</td>
</tr>
<tr>
<td>5–17y</td>
<td>Māori</td>
<td>182,350</td>
<td>162,585</td>
<td>90%</td>
<td>157,690</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>66,540</td>
<td>68,991</td>
<td>90%</td>
<td>67,495</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>537,380</td>
<td>476,860</td>
<td>89%</td>
<td>470,330</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>786,270</td>
<td>708,436</td>
<td>90%</td>
<td>695,515</td>
</tr>
<tr>
<td>18–19y</td>
<td>Māori</td>
<td>22,590</td>
<td>21,695</td>
<td>52%</td>
<td>20,249</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>8350</td>
<td>6214</td>
<td>74%</td>
<td>5680</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>90,740</td>
<td>58,399</td>
<td>64%</td>
<td>55,376</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>121,680</td>
<td>76,571</td>
<td>63%</td>
<td>71,305</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,186,352</td>
<td>1,032,239</td>
<td>87%</td>
<td>998,426</td>
</tr>
</tbody>
</table>

Source: National Immunisation Register; *Mostly of Samoan, Tongan, Niuene, or Cook Islands origin.

The consent rate from Māori parents in the school-based programme was equivalent to other ethnic groups, indicating Māori were as willing to have their children vaccinated. The slower vaccine uptake in Māori preschoolers indicated that primary care staff had difficulty accessing all Māori families. Another possible reason for the slower vaccine uptake was concern about vaccine safety with an evaluation of the campaign finding this was more of a concern for Māori than other groups, although the high consent rate in school-based programme appears to contradict this finding.

The lower coverage in Māori pre-schoolers resulted in a refocusing of effort towards Māori in the second half of the campaign, including additional outreach services and a new Māori communication plan involving television and radio advertisements.

Later in the campaign it became apparent that the coverage for Māori was better than original estimates. Coverage calculations from the NIR used ethnic-specific population estimates, based on census data, as the denominator. Both the NIR and the population estimates used 'prioritised ethnicity', whereby a single ethnicity was assigned with the order of prioritisation Māori, Pacific people, and Other. Misclassification could result if the ethnicity for vaccination records on the NIR was not recorded in the same way and detail as for the census.

Ethnicity data for children vaccinated in schools came from a question on the consent form completed by parents/caregivers using the same wording as the census ethnicity question. However, ethnicity data for vaccinations in primary care came from primary care records where the information was not always collected in the same way as for the census.

Comparing ethnicity information from school consent forms with the primary care records for the same children, primary care were less likely to classify a child as
Māori. Adjusting for similar misclassification in pre-school children, Māori coverage was shown to be equivalent to “other” (non Māori, non Pacific) coverage for Dose 1 but was still lower for Dose 3 (Table 2).

Table 2. Impact of ethnicity adjustment on coverage estimates, children aged 6 weeks to 4 years, at 30 June 2006

<table>
<thead>
<tr>
<th>Ethnic group</th>
<th>Dose 1</th>
<th></th>
<th>Dose 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NIR</td>
<td>Adjusted</td>
<td>NIR</td>
<td>Adjusted</td>
</tr>
<tr>
<td>Māori</td>
<td>54,659</td>
<td>65,486</td>
<td>41,632</td>
<td>49,739</td>
</tr>
<tr>
<td>Pacific</td>
<td>26,994</td>
<td>27,847</td>
<td>22,517</td>
<td>23,818</td>
</tr>
<tr>
<td>Other</td>
<td>161,728</td>
<td>150,048</td>
<td>141,869</td>
<td>132,461</td>
</tr>
</tbody>
</table>

Note: These data were extracted on an earlier date than those used in Table 1 and therefore some vaccinations given before 30 June 2006 may not have been recorded on the NIR at the time.

Ultimately the coverage achieved for Māori exceeded that achieved in previous campaigns. This coverage was achieved by ensuring that Māori were a focus of the National Implementation Strategy and that the delivery strategies and contractual arrangements explicitly prioritised Māori.

The high Pacific coverage rates can, in part, be attributed to Pacific health and community leaders, who were passionate about reducing the high disease rate among their children. A collaboration of Pacific providers developed the Pacific strategy, which resulted in a real sense of ownership of the strategy by Pacific. Pacific communities used all of their networks and strong church links to ensure children were offered MeNZB.

Safety monitoring

A Data Management Group within the Ministry of Health’s Meningococcal Vaccine Strategy team led the safety monitoring initiatives, with oversight by an Independent Safety Monitoring Board appointed by the Health Research Council. Based on consideration of safety data provided by the Data Management Group, the Board advised the Ministry regarding expansion of the campaign. This process supported public and health professional confidence in the vaccine’s safety and decreased the risk of unsubstantiated allegations undermining the campaign, as has happened in other countries and during a vaccination campaign against group A meningococcal disease in New Zealand.

The safety monitoring methods and findings are described fully elsewhere. In summary, the key safety monitoring activity was the surveillance undertaken at Auckland City, Middlemore, and Whangarei Hospitals, where admissions and emergency department consultations were monitored. In addition, the New Zealand Pharmacovigilance Centre continued to operate a routine reporting system whereby health professionals voluntarily report adverse events following vaccination. They also prospectively collected data on a cohort of children aged 6 weeks to 4 years, with vaccination and clinical data from the child’s medical centre electronically transferred for assessment. Finally, all deaths nationwide that occurred within 90 days of vaccination were reviewed. With over 3.1 million doses of MeNZB administered, the
combined results of the monitoring provided confidence regarding the safety of MeNZB.\textsuperscript{15,23–25}

**Vaccine effectiveness**

The main methods we used to assess vaccine effectiveness were the analysis of meningococcal disease incidence data, monitoring of vaccine breakthroughs\textsuperscript{26} (cases of epidemic strain disease occurring 28 days or more after the third dose) and statistical modelling.\textsuperscript{27}

The number of notified cases of meningococcal disease (both laboratory-confirmed and probable) peaked in 2001 and was decreasing at the time the campaign began in mid-2004 (Figure 1). Epidemic strain cases in those aged under 20 years followed a similar pattern from around 1995 and continued to decrease after the introduction of MeNZB.

**Figure 1. Notified cases of meningococcal disease and epidemic strain cases aged under 20 years, New Zealand, 1990-2007**

Changes in laboratory confirmation methods over the last two decades and increasing use of antibiotics prior to hospitalisation (which decreases the likelihood of isolating the organism by culture) make some time trends difficult to assess. Prior to 1997 confirmed cases were largely identified by culture whereas from 1997 increasing
numbers were identified by PCR leading to a greater proportion of cases with laboratory confirmation - from a low of 66% in 1993 to 90% in 2006.

Since 2004, rates of epidemic strain meningococcal disease have decreased in all age groups (Figure 2) and ethnic groups (Figure 3) although they are still highest in Māori and Pacific children and under 5 year olds.

Figure 2. Rates of epidemic strain meningococcal disease by age group, aged less than 20 years, New Zealand, 2003–2007

![Graph showing rates of epidemic strain meningococcal disease by age group, aged less than 20 years, New Zealand, 2003–2007](image)

From January 2005 to December 2007 a total of 167 epidemic strain cases occurred in those aged under 20 years, of which 55 were vaccine breakthrough cases including two vaccine breakthrough deaths (one in a child who was overdue for a fourth dose). Investigation of the 34 vaccine breakthrough cases that occurred to the end of 2006 confirmed the expectation that cases would occur in immune-competent individuals. Such breakthrough cases were expected based on experience with other group B meningococcal vaccines.11,12
It is impossible to say whether the decrease in cases from 2002 to 2004 would have continued without the vaccination programme. A Poisson regression model was developed which included the effects of year, season, region, age, ethnicity, and deprivation and was able to estimate the effect of the vaccination programme independently of the decreasing annual trend. The effectiveness of the vaccination programme was calculated as 73% (95% confidence interval: 52–85) from data to 30 June 2006, meaning that an unvaccinated child was nearly four times more likely to get the epidemic strain than a fully vaccinated child. The decrease in disease is therefore likely to be a result of both the vaccine and natural decline of the epidemic.

Programme risk management

Introducing a new vaccine is challenging, even on the back of a devastating epidemic. Presentation of facts for a variety of audiences in ways that they are understood and retained by the greatest number of people is required to communicate intended messages. Responsible, non-sensational communication about the epidemic, the safety, and effectiveness of the vaccine, and the complex science behind its development would always be difficult, especially in the face of media emphasis on the “newsworthy” with risks of vaccination more likely to make headlines than stories about vaccine safety.
Most importantly, we needed to ensure that nurses and doctors were well informed and equipped to address their patients’ concerns, given trusted frontline health professionals are the key providers of information about vaccinations for parents.\textsuperscript{29} Written information was provided to all primary health care professionals and vaccinators and was also available on a dedicated website. Detailed presentations were provided to health professionals at a series of meetings throughout the country. All stakeholders were informed of progress, good ideas, and results through regular newsletters.

The key components used to inform the public were an advertising campaign; working actively with the news media to ensure positive coverage of important milestones; and promoting local initiatives to raise community awareness. Extensive printed information was provided to families through schools and primary care and, importantly, was available in Pacific languages as well as Māori.

We encountered a small number of individuals who were prolific in their criticism of the campaign. They exhibited behaviours commonly reported among vaccination opponents in other countries,\textsuperscript{30–32} displaying an extreme mistrust of authority and a strong belief that there was a conspiracy between the vaccine manufacturer and the government. At times an overstretched media gave equal or even more weighting to this small but vocal group compared to that given to recognised experts in infectious diseases and vaccinology who attempted throughout to provide evidence-based scientific information. We recognised early the need for a strong communication response to address allegations that risked undermining confidence in the vaccine. This comprehensive communication strategy combined with the independent peer review of real-time safety data allowed us to manage a number of potential setbacks, some of which are described below.

Early in the school-based campaign, 50 students (out of over 1700 students who consented to vaccination) at the same school complained of various symptoms including feeling faint, nausea, and headache. The majority of cases were 13 and 14 year old girls. All the cases, including three treated as possible anaphylaxis and transferred to hospital,\textsuperscript{15} were ultimately judged to have had an anxiety response similar to other episodes reported in school settings.\textsuperscript{33,34} The good relationship between the public health nurses and school staff meant this issue was dealt with locally and did not attract media attention. Information went to parents through the school newsletter outlining what had happened, the conclusions drawn, and recommendations to prevent it happening again. These included improved use of partitions to ensure privacy in the recovery areas, requesting students have breakfast on the day of vaccination, and restricting cellphone use so that students could not scare each other with text messages. The nurses subsequently delivered further vaccinations in the school without incident.

An epidemic of influenza B in children coinciding with the start of many DHBs’ school-based programmes in the winter of 2005 had the potential to temporarily halt the campaign, and illustrated the importance of independent safety monitoring. There was intense media interest around the ‘flu’ epidemic. A link to the vaccine was postulated with suggestions that MeNZB rather than influenza-like illness was causing school absenteeism and school closures. A survey of schools undertaken by a regional public health unit showed high rates of absenteeism also occurred in schools.
where vaccination had not started (Margot Maclean, Medical Officer of Health, Personal Communication, May 2005).

Over the same period as the influenza outbreak, the vaccine safety monitoring identified a small number of possible infection-related deaths. The Mortality Review Group (set up under the auspices of the Child, Youth and Mortality Review Committee to assess deaths in vaccine recipients) and the Independent Safety Monitoring Board assessed both the influenza surveillance data and mortality data and concluded that there was no relationship with MeNZB.

During the campaign, 170 deaths occurred within 90 days of MeNZB vaccination. None of the deaths were attributed to vaccination, however privacy issues made it difficult to make public statements about the causes of the deaths which at times presented us with a dilemma. On occasion the family or the community falsely linked a death to the vaccine, leading to the community questioning the vaccine’s safety. Such issues were best handled by health professionals locally with some national oversight.

During 2005 the ‘anti-vaccination’ group gained traction in the media regarding the lack of Phase III trials for MeNZB. One region estimated that approximately 1% of parents withdrew their consent from the school programme as a result of this publicity. We were able to counteract the impact of this negative coverage with a concerted media effort over many days as we explained the reasons for not undertaking Phase III trials. Reassuringly, leading health professional groups publicly reiterated their confidence in the vaccine.

While initially taken aback by the fierce opposition from opponents of the vaccine, we developed a position of ‘engaging on our terms’. This meant that while we recognised the need for a public dialogue we ensured that the key spokespeople representing different stakeholder groups were heard. Community meetings were arranged by DHB staff organising the campaign in their areas and attended by a variety of local health professionals. We avoided participating in meetings organised by vaccination opponents because of the lack of opportunity for balanced discussion. Other important strategies in dealing with our opponents were preparing and disseminating written information to counter claims quickly and without restating negativity, and provision of an 0800 number for parents wanting to speak to a health professional.

Conclusions

This ambitious undertaking has paid off. We have seen a significant reduction in disease cases and vaccine effectiveness estimates confirm an effective vaccine.

Central to the campaign’s success was the ability to work collegially with stakeholders and to engage the public. We faced challenges common to other developed countries introducing new vaccines: distrust of authority and a vocal anti-vaccination group spreading misinformation.

Our experience highlights the importance of an Independent Safety Monitoring Board to oversee the introduction of new vaccines especially when a Phase III trial has not been undertaken. This independent review enhanced health professional and public confidence and assisted us in responding to unsubstantiated claims made by anti-vaccination groups.
A key success is that past disparities in vaccination coverage and disease rates have been reduced for Māori and Pacific. The lessons learnt in the policy development and implementation of this campaign form a model for the delivery of other public health programmes to these groups.

Competing interests: None known.

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New Zealand’s impact on health in the South Pacific: scope for improvement?

Rosemary Wyber, Nick Wilson, Michael Baker

Abstract

We examined how New Zealand activities impact on health in Pacific Island Countries and Territories (PICTs) in two domains: the provision of development assistance and the impact of trade. The available evidence suggests that New Zealand’s official development assistance (ODA) is capably and strategically administered by its development agency, NZAID. However, New Zealand contributes comparatively little of its economic capacity to ODA; only 0.30% of gross national income, with a relatively small proportion spent in the health sector. Increasing this level of ODA and proportional spending on health is likely to be important for enhancing the long-term impact and credibility of the country’s development assistance programme. New Zealand has a liberalised trade policy toward the PICTs which is likely to provide economic benefits. However, the country also exports health-damaging products to PICTs such as high-fat mutton flaps and tobacco. Permitting such exports may undermine non-communicable disease control strategies and are a significant area of policy incoherence given other support provided (e.g. for tobacco control). Overall there remains significant scope for New Zealand to contribute more effectively via aid and trade to health in the South Pacific.

As a South Pacific nation, New Zealand has strong historical, geographical, cultural, emigrant, and legal ties to nearby Pacific Island Countries and Territories (PICTs). These relationships, in conjunction with aid and trade programmes, inexorably link the practice and policy of New Zealand with health outcomes in the Pacific.

The PICTs are defined in this article as 22 island nations who are members of the Secretariat of the Pacific Community (SPC), with a combined total population of 9.15 million people. The developing PICTs share regional commonalities of: narrow-based economies, limited national infrastructure, and aid dependence.

Governance, security, and education are variable throughout the region. Health indicators also vary widely between PICTs, but most experience high prevalence of non-communicable diseases (NCDs). NCD rates are high throughout the Pacific and obesity is endemic. In 10 of the PICTs, 50% of the population are overweight or obese; in a further 7 PICTs, 75% of the population are overweight. Compounding NCDs, regional smoking rates are high—exceeding 50% in a number of PICTs.

Communicable disease burdens include relatively high rates of tuberculosis in many PICTs, concern around HIV/AIDS in Papua New Guinea (PNG) and with malaria in PNG, Solomon Islands and Vanuatu. All PICTs are at threat from pandemic influenza, especially if they cannot rapidly instigate rigorous border control measures as in the past.
Health workforce shortages exacerbate the high burden of disease. Currently in the Pacific there are only 0.05—1.5 doctors per 1000 people. In contrast, the same ratio is 2.37 per 1000 in New Zealand. While there are two regional medical schools and a number of nursing colleges within the PICTs, these do not appear to be meeting health workforce needs. The small number of doctors in the Pacific must also contend with geographic limitations to provide care in a diverse, dispersed population. This context significantly worsens the effect of the low doctor to population ratio in rural and outlying areas.

There are many key areas where New Zealand policy and practice significantly impact on health in PICTs. These include the provision of development assistance, trade, health workforce migration, short-term natural disaster relief (e.g. after cyclones), conflict resolution, security assistance, and support for protecting key resources such as fisheries. New Zealand also contributes by providing leadership on global issues that may impact on PICTs (e.g. bans on nuclear weapons testing, nuclear weapons disarmament, and preventing global climate change).

This review focuses on just the first two of these areas (development assistance and trade) which arguably have the greatest health impact. Other future reviews can hopefully investigate these other important areas.

Methods

We undertook Medline searches from 1 January 1995 to 20 November 2007, using a wide range of search terms (including for the names of all PICTs and the word “Zealand”). We chose to focus on the impact of New Zealand since the instigation of NZAID in 2005 to avoid an undue focus on the shortcomings of its predecessor, New Zealand Overseas Development and Aid (NZODA), which have been covered in previous independent reports. Additional online searches covering this time period were conducted through the websites of the New Zealand Government’s development assistance organisation (NZAID), World Health Organization (WHO), and the SPC. Other sources were traced from the bibliographies of relevant documents.

To contextualise these sources, we considered key recent international documents on best practise in development. Our own work experience also allowed us to reflect on the quality of the available literature as all of us have worked in PICTs (10 different PICTs collectively) for a range of agencies.

Results

Health-related development assistance—New Zealand’s development assistance organisation was substantially restructured in 2002 with the formation of NZAID, a semi-autonomous body within the Ministry of Foreign Affairs and Trade. The previous aid administrative body, NZODA, had been heavily criticised in two independent reviews.

NZAID appears to have worked consistently to address the weaknesses of the previous NZODA programme. Since 2002, the official development assistance (ODA) programme has grown significantly in funding and strategic development. In the 2007/2008 financial year, New Zealand is budgeted to provide $466.4 million in official development assistance, representing 0.30% of New Zealand’s Gross National Income (GNI). This allocation is set to rise to $636.3 million in 2010/2011, equivalent to 0.35% of GNI. New Zealand has focused its ODA programme on the Pacific region for many years and 51.7% of the 07/08 budget will be contributed to the Pacific. This contribution is
split between bilateral agreements with individual countries, regional programme contributions, and NZAID scholarships.

Bilateral programmes are direct arrangements with overseas governments on areas of development priority. Traditionally, spending on the health sector within bilateral Pacific arrangements has been small (<10% of the total programme). There have been recent increases for some countries—e.g. for funding HIV/AIDS control in PNG taking the proportion spent on health up to 47% (for 2006/07). However, for other countries the health proportion remains very low (e.g. 2% for the Solomon Islands).

Within the regional programme, NZAID allocations to the health sector in the Pacific were 17.8% in 06/07. The NZAID regional health programmes are focused on three key areas; NCDs, communicable diseases and human resources for health. Additional support is provided to regional agencies acting in the health sector, such as SPC.

Sector spending on health is complicated by definitional difficulties. OECD Development Assistance Committee (DAC) data allows comparison between nations but probably underestimates actual sector spend. According to 2006 DAC figures, New Zealand targeted 5.0% of it’s ODA to health which was slightly less than the OECD average of 6.3%. This percentage differs from NZAID reports suggesting 8.5% of their total budget is health expenditure. Of ODA spending, 3.6% was on “basic health” which was also similar to the OECD average of 3.5%.

NZAID also undertakes workforce development through the provision of tertiary scholarships for New Zealand universities and some regional training centres. Scholarship places and some direct funding are also provided to the Fiji School of Medicine.

Trade—New Zealand plays a dual role in trade with the South Pacific. It supports PICTs trade development initiatives through ODA contributions and also acts as a major trading partner. As the latter, New Zealand has a liberalised trade policy and an open market for PICT products. This support of Pacific trade has the potential for secondary improvement in health through economic development. However, New Zealand also has a direct impact on health through ongoing export of products to PICTs that are hazardous to health.

New Zealand is a major exporter of “mutton flaps” (scraps from butchered lamb and mutton) to the South Pacific. From July 2006 to July 2007, NZ$73 million dollars of sheep meat was exported to the Pacific Islands, constituting New Zealand’s largest export good to the Pacific.

Import data from Tonga indicates a three-fold mutton flap increase from 1976 to 1996. In 1992, mutton flaps accounted for 22% of food imports to Tonga. According to a 2002 SPC report, the PICTs represent a global market of US$30 million for all low-grade meat cuts.

In much of the Pacific, mutton flaps have become a dietary staple and in Tonga are consumed an average of 2.3 times per week. The mean fat content of uncooked mutton flaps is 27.4%; considerably more than traditional island sources of protein.

Mutton flaps are relatively low cost and easily accessible for Pacific Peoples. One study suggests they are 15% to 50% cheaper than local sources of protein in Tonga. Surveys of food preference and nutritional knowledge indicate that cost, not
preference or poor nutritional information, is the primary determinant for consuming mutton flaps. In some Pacific cultures, however, the consumption of mutton flaps has become a matter of social and ceremonial importance.

Many researchers have reported that excess consumption of imported food, especially imported fatty meats, has a causative relationship with endemic obesity in the Pacific.

New Zealand also exports tobacco to the Pacific Islands, worth NZ$2.8 million in 2006. In 2000, this export market represented 87.3 million cigarettes, causing an estimated 75 premature deaths in the Pacific. Yet NZAID is simultaneously working with the PICTs to implement the WHO Framework Convention on Tobacco Control (FCTC).

Discussion

This article briefly considers the direct effects of New Zealand’s impact on the health of PICTs in just two domains and for only a 12-year period. Our analysis is limited by the general reliance on published data and website reports which are probably only a small fraction of the information held by stakeholders. Systematic key informant interviews could have provided additional contextual information, but this method was beyond the scope of this project which had no external funding support. Nevertheless, the work presented here may stimulate discussions around how New Zealand can further develop its contribution to health in the South Pacific.

The importance of health in development—There are five core arguments for New Zealand to focus on health aspects of development in the Pacific. Firstly, health is a human right and providing good health should be a goal of all responsible members of the international community. Secondly, the increasing burden of NCDs in the Pacific is, in part, a predictable consequence of New Zealand’s development assistance policy which encompasses economic development as an expressed goal.

Countries in transition show a characteristic increase in NCDs when economic development produces import-driven changes in diet and lifestyle. Therefore, New Zealand should consider funding programmes to combat the rise in NCDs in parallel with economic development programmes. Thirdly, NZAID aims to work in partnership with PICT governments and leaders, as per the Paris Declaration on Aid Effectiveness and similar guidelines.

The PICTs have clearly expressed that they consider health is a regional priority, via the Healthy Islands Plan. As a development partner, New Zealand should therefore consider facilitating the articulated priorities of the PICTs.

There are two further pragmatic reasons for New Zealand to focus on health in the Pacific. Firstly to respond to growing data that prioritisation of health in development programmes has significant economic benefits. The overwhelming message of the UN’s Commission on Macroeconomics and Health was that health was under-recognised as an essential prerequisite for global development. In addition, New Zealand should logically attempt to improve Pacific health to limit the demands on its own domestic health service. Reports suggest that New Zealand health services may have been strained by the demand from immigrants and visitors from the Pacific with NCD conditions.
Secondly, improved Pacific health is also likely to reduce the risk of the spread of infectious diseases to New Zealand.\textsuperscript{37} Of particular concern is HIV/AIDS which is threatening to spread further throughout PICTs and has the potential to contribute to the disease burden in New Zealand.

Tuberculosis has a similar risk of international transmission. Over the 2000–2004 period, 14\% (249/1722 with known birth country) of tuberculosis cases notified in New Zealand were born in Pacific countries.\textsuperscript{38} The requirement for New Zealand to help strengthen surveillance and response capacity in the Pacific is now supported by the new International Health Regulations 2005 (IHR 2005).

The IHR 2005 came into force in June 2007 for all 193 World Health Organization member states including New Zealand. This international law includes obligations to assist with assessing and building capacity, and responding to public health risks and public health emergencies of international concern.\textsuperscript{39} One specific area where New Zealand could assist capacity building would be in supporting PICTs in pandemic influenza planning.

**Health-related development assistance**—The UN, with broad international support, identified a global target of 0.7\% of GDP for ODA donations from all donor countries in 1971. Achieving this goal by 2015 was reiterated by the Millennium Declaration in 2002, to which New Zealand is a signatory. However, New Zealand’s ODA contribution as a proportion of GNI peaked at 0.52\% in 1975 and currently stands at 0.30\%; the only planned increase is to 0.35\% by 2010/2011.\textsuperscript{33} This level is significantly below the OECD average country contribution of 0.47\% of GNI in 2005.\textsuperscript{33}

Current ODA is also much less than the estimated minimum ODA:GDP ratio to meet Millennium Development Goals (MDGs) (0.44\% by 2006 and 0.54\% by 2015).\textsuperscript{41} The New Zealand Government has made repeated public commitments to reaching the 0.7\% ODA:GDP goal and to the MDGs. However, New Zealand is now one of only two OECD countries without interim targets or a timeline for achieving this goal.\textsuperscript{42}

There is significant pressure on the New Zealand Government to commit to a timetable of ongoing increases in ODA. For instance, an opinion survey in 2004 indicated that 61\% of New Zealanders were in favour of increasing aid to the 0.7\% of GNI threshold.\textsuperscript{43} The New Zealand NGO community, under the banner of Centre for International Development, has launched a campaign to advocate for a timeline to reach 0.7\% ODA:GNI.\textsuperscript{42}

The formation of NZAID as an ODA distribution group in 2002 represented a national commitment to excellence in aid delivery. The organisation has been widely lauded for its achievements and it seems illogical and unethical not to provide NZAID with increased ODA funds to expand their commendable development programmes.

New Zealand spends a modest proportion of its small ODA allocation on the health sector. Evidence, ethics, and pragmatism suggest that focusing on health is critical for development. In their 2005 health policy, NZAID foreshadowed increased spending in the health sector: “It is envisaged that the proportion of NZAID’s overall expenditure on health will increase considerably within the next five years from the current level of approximately 8.5\% of total ODA”.\textsuperscript{15}
Health has also been identified as a high priority sector in the NZAID Multilateral Engagement Strategy through to 2010.\textsuperscript{44} This move towards increased health focused funding is important in the ongoing strategic evolution of New Zealand’s development assistance activities.

**Trade**—New Zealand has a liberalised trade policy with PICTs and allows duty free and unrestricted access to all products of Pacific Island origin.\textsuperscript{43} Although this is probably a positive contribution to development overall, the export of health-harming products is undermining this benefit.

Concern over high fat food imports and increasing obesity in the Pacific has been raised by numerous authors.\textsuperscript{19,23,25,45} It is also recognised that the cost of these products is a key determinant in their consumption.\textsuperscript{21,23} Thus, the effects of public health promotion alone are likely to be limited and economic intervention must be considered a primary NCD preventative policy.\textsuperscript{19,23,46}

Some Pacific nations have attempted to reduce high fat imports under domestic law. Fiji banned mutton flap imports in 2000 and New Zealand responded by threatening to refer the issue to the World Trade Organisation (WTO).\textsuperscript{47} New Zealand later withdrew plans to approach the WTO and the ban still stands.\textsuperscript{24} Tonga considered imposing mutton flap import quotas but withdrew the proposal in view of WTO concerns.\textsuperscript{48} The legality of trade bans and tariffs in the health sector are complex and subject to considerable international debate.\textsuperscript{48} However, for the New Zealand Government to actively resist the attempts of PICTs to address the critical health burden of NCDs is inconsistent with promoting health in the region.

Tobacco exports to PICTs represent further incoherence in New Zealand policy from a health and development perspective. We suggest therefore that New Zealand halt tobacco exports to PICTs and encourage other nations to follow this lead. This action would fit with the spirit of the Framework Convention on Tobacco Control (ratified by New Zealand 2004) and greatly improve congruence with NZAID health programmes.\textsuperscript{27,49} Similar concerns may apply to the exports of alcohol, soft drinks, and various processed foods that are high in fat, sugar, and salt.

**Conclusion and recommendations**

The PICTs are fragile states, dependent on aid for the foreseeable future. Thus, bilateral donors such as New Zealand have a significant role to play in supporting the development of a stable and healthy South Pacific region. As globalisation and interdependence between nations intensify, the importance of this role will probably continue to increase.

The first priority for New Zealand should be developing a timeline for reaching an ODA contribution of 0.7% of GNI, as supported by reviews of NZAID, the NGO sector, and the New Zealand public. The DAC average country effort (0.47%) could serve an appropriate medium-term goal. New Zealand’s continued affirmation of the 0.7% goal without any tangible planning is a significant threat to its international credibility and to the success of NZAID development programmes.

NZAID should increase the proportion of ODA spent in the health sector, as alluded to in its health policy. The evidence for an increased focus on health is soundly based in pragmatism, economics, and ethics. An increased emphasis on prevention and
primary care would better meet regional health priorities than previous tertiary health interventions.

New Zealand’s liberalised trade policy is an important contribution to economic stability in the Pacific region. However, this benefit is significantly undermined by its export of health-damaging products. New Zealand should consider removing its opposition to PICTs using domestic law to limit the sale of imported mutton flaps into their countries. Continued export of tobacco is particularly inappropriate and should be stopped immediately. Consideration could also be given to possible controls on the trade in alcohol and processed foods that are high in fat, sugar, and salt (e.g. restrictions, or at least improved labelling around risks to health).

Competing interests: One of the authors (NW) has previously undertaken contract work for NZODA and NZAID. One of the authors (RW) has previously undertaken an internship at SPC. One of the authors (MB) has carried out short-term consultancies for WHO in the Pacific. The authors declare that they have no other competing interests. There was no external funding for this work.

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Education of eye health professionals to meet the needs of the Pacific

Rènée du Toit, Garry Brian, Anna Palagyi, Carmel Williams, Jacqueline Ramke

Abstract

Vision impairment has significant impact on quality of life and substantial economic consequences. Yet, in the Pacific Islands, as in other low resource settings, it is predominantly caused by chronic conditions that can be treated or prevented. A whole of health approach is required to rectify this, and must include an increase in workforce capacity, both in size and effectiveness, by providing competency-based education for eye care professionals. Training in curative clinical skills is not sufficient: broader competencies—including those for chronic conditions, issues of care quality, integration into the wider health care system, and commitment to professionalism and life-long learning—need to be addressed. Using current best practice approaches in education, and taking into consideration local needs, The Pacific Eye Institute, an initiative of The Fred Hollows Foundation New Zealand, aims to produce graduates with these core competencies who are capable of effectively and acceptably working in community or hospital settings to provide sustainable high quality, comprehensive eye care with ongoing desirable and consistent eye health outcomes.

Worldwide, an estimated 314 million people have impaired vision, of whom 45 million are blind.\(^1\)\(^2\) Vision impairment is an important public health problem, with significant impact on quality of life\(^3\)\(^–\)\(^5\) and substantial economic consequences.\(^6\) More than 90% of visual impairment occurs in developing countries,\(^7\) predominantly from conditions\(^8\) that can be prevented or treated using established and cost-effective means.\(^2\)\(^,\)\(^9\)

Globally, the major causes of blindness and low vision are cataract (39% and 25%, respectively) and refractive error (18% and 49%, respectively).\(^7\) In Timor-Leste, in people over 40 years of age, cataract accounted for 72.9% of blindness, and uncorrected refractive error for 81.3% of low vision.\(^10\) In Papua New Guinea, in the over-50 age group, cataract caused 71.9% of functional blindness. Uncorrected refractive error was responsible for 44.9% of low vision.\(^11\)\(^,\)\(^12\) However, as non-infectious chronic diseases increase in low- and middle-income countries,\(^13\) vision-threatening diabetic retinopathy is assuming greater importance.\(^14\)

The International Agency for the Prevention of Blindness and The World Health Organization’s (WHO) Vision 2020: The Right to Sight initiative was established to eliminate avoidable blindness by the year 2020.\(^15\) It is unrealistic to expect the current global eye care workforce to achieve this goal; workforce capacity, both in size and effectiveness, must be increased.\(^16\)\(^,\)\(^17\)

The 16 low-resource countries of the Pacific have a total population in excess of 9 million people, who are predominantly rural dwellers (85%), either in rugged
mountainous Papua New Guinea, or on thousands of islands in Melanesia and Polynesia spread across nearly a million square kilometres of ocean. Although a private ophthalmic workforce offers some services, most eye care is provided in the public sector by an indigenous Pacific workforce of fewer than 15 eye doctors and 65 eye nurses.

A whole-of-health approach is needed to effectively tackle this workforce shortage, including strategies such as: increase the output of undergraduate medical and nursing schools so that the balance of eye to other health care providers can be suitably maintained; swell the number and output of postgraduate eye care courses; encourage workforce retention, in part by reducing attrition to Australia and New Zealand; and increase the capacity of the public health sector to employ and deploy personnel. Further, strategies for workforce support are needed to improve effectiveness of current and future eye care personnel, including by capital works and equipment acquisition, recurrent funding for service provision, and development of management and monitoring and evaluation systems to underpin functioning and capable services.

It is, however, the quality and content of the preparatory education for eye care professionals, and their commitment to professionalism and life-long learning, that is fundamental to improvement in workforce effectiveness. Therefore, using current best practice approaches in education, the aim should be to produce a sufficient number of competent eye health personnel who are capable of effectively and acceptably providing eye care to meet local needs within community and hospital settings.

What constitutes appropriate education for eye care professionals in the Pacific?

Various agencies have defined competencies for health care providers to enable them to provide appropriate, high quality care. The Accreditation Council for Graduate Medical Education (ACGME) have proposed a core set of competencies to be included in medical education to improve the quality of patient care and to facilitate working effectively within health care systems. These relate to medical knowledge, systems-based practice, patient care, interpersonal and communication skills, practice-based learning and improvement, and professionalism. These encompass competencies developed by The Institute of Medicine in 2003; being able to work in interdisciplinary teams, utilise informatics, provide patient-centred care, apply quality improvement, and employ evidence-based practice. The AGCME competencies are considered relevant to health care providers around the world, and have been recommended for inclusion in curricula for ophthalmologist training.

Another set of competencies for the management and treatment of chronic disease have been provided by WHO. These relate to a public health perspective; partnering/working as a member of a health care team; patient-centred care; use of communication, technology, and information; and quality improvement.

The broad scope of the competencies for medical education and disease management suggests that Pacific eye health providers, if only taught clinical skills based on a curative approach to individual patients, would be unlikely to successfully meet the
challenge of delivering optimal eye care and making a significant impact on reducing visual impairment. This eye health workforce needs a broader base of competencies. Therefore, in addition to clinical eye care competencies relevant to the workplace environment and available equipment, the WHO and ACGME competencies have been adapted and embedded in curricula for the training of Pacific eye health professionals and linked to course outcomes, content and assessment (Table 1).

Table 1. Core competencies* required of Pacific Eye Institute (Suva, Fiji) graduates

Graduates must be able to:

<table>
<thead>
<tr>
<th>Public health perspective / systems-based practice</th>
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<tbody>
<tr>
<td>• Provide population-based eye care, and encourage equitable access to eye care services</td>
</tr>
<tr>
<td>• Apply a public health perspective by shifting the focus from caring for one person at a time to planning care of populations</td>
</tr>
<tr>
<td>• Recognize the larger health systems context; work within these systems; advocate within these systems for accessible, equitable eye care</td>
</tr>
<tr>
<td>• Coordinate and provide comprehensive eye care (clinical, rehabilitation, prevention and promotion), integrated with primary health care systems</td>
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<tr>
<td>• Use a proactive approach; coordinate continuous and timely care; participate in evaluation and planning improvements</td>
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<table>
<thead>
<tr>
<th>Partnering / work in teams</th>
</tr>
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<tbody>
<tr>
<td>• Partner with patients, communities and other health providers, to ensure optimal eye care that meets patient needs</td>
</tr>
<tr>
<td>• Share power and provide sufficient information to involve patients in decision making about the management of their eye health</td>
</tr>
<tr>
<td>• Partner with communities to develop an understanding of their expectations and needs to provide appropriate eye care services</td>
</tr>
<tr>
<td>• Collaborate in interprofessional teams providing care at different times, in different places, at different levels and from different disciplines, to enhance the scope, quality and safety of eye care</td>
</tr>
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<table>
<thead>
<tr>
<th>Patient-centred care / interpersonal and communication skills</th>
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<tbody>
<tr>
<td>• Create and sustain therapeutic, ethical relationships with patients through an understanding of the experience from the patient’s perspective, and showing empathy and compassion for each patient</td>
</tr>
<tr>
<td>• Respect patient dignity, autonomy, and confidentiality</td>
</tr>
<tr>
<td>• Build trust by treating patients with respect, politeness and honesty</td>
</tr>
<tr>
<td>• Communicate with patients, families and health care personnel and organizations, using effective listening, verbal, non-verbal, questioning, explanatory and writing skills</td>
</tr>
<tr>
<td>• Provide care that is responsive to and respectful of the needs, values, differences, and preferences of the patient</td>
</tr>
<tr>
<td>• Prevent disease and impairment; promote wellness and healthy behaviour by not only providing education, but also assisting changes in health-related behaviours and supporting self-management, while being mindful of beliefs and environmental constraints</td>
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<table>
<thead>
<tr>
<th>Information and communication technology</th>
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<tbody>
<tr>
<td>• Use available technologies to support decision-making and care of patients</td>
</tr>
<tr>
<td>• Exchange information with other partners in distant settings, using communication systems such as telephones, mobile devices and the internet</td>
</tr>
<tr>
<td>• Organize and monitor patient registries, responses to treatments and outcomes using information systems such as paper records and electronic databases</td>
</tr>
<tr>
<td>• Use technology to optimize learning and implement evidence-based care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quality improvement / practice-based learning and professionalism</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Demonstrate professionalism by showing accountability and responsiveness to the needs of all patients and society through a commitment to ongoing learning and quality improvement</td>
</tr>
<tr>
<td>• Demonstrate compassion, humanism, and ethical actions at all times</td>
</tr>
</tbody>
</table>
Provide eye care that is accessible, safe, efficient and effective
Continually measure and improve structure, process, and outcomes of eye care delivery; articulate the intended outcomes of eye care service and of personal development; evaluate and implement changes that will lead to improvements in quality of care
Demonstrate a commitment to self-improvement by incorporating formative evaluative feedback into daily practice, using reflective practice to analyse experiences and identify strengths and deficiencies in skills and experience
Demonstrate a commitment to professional competence, asking for help when needed; identify learning needs; set learning and improvement goals and implement appropriate learning activities that lead to integration and synthesis of new learning
Translate into practice evidence from published and personal / organizational efforts

**Evidence-based eye care**

- Provide evidence-based care by using clinical reasoning and problem solving skills to integrate research findings, clinical expertise and patient needs and values
- Diagnose / classify, manage, and prevent eye conditions, as determined by the scope of practice for the cadre to which the health worker belongs:
- Verify, analyse and integrate clinical findings and knowledge and use analytic / critical thinking to classify the level of seriousness or to establish a diagnosis
- Develop informed and appropriate management plans, within a defined scope of practice, using a ‘first do no harm’ approach, following evidence-based standard clinical guidelines
- Decide on a management plan in consultation with the patient; document and implement the plan; maintain medical records - confidentiality and security.

*Adapted from Accreditation Council for Graduate Medical Education*, and *World Health Organization\(^8\)*

The Pacific Eye Institute, an initiative of The Fred Hollows Foundation New Zealand, delivers these curricula in Suva, Fiji. Programs include a Postgraduate Diploma in Eye Care for nurses and Diploma in Ophthalmology offered for doctors. Both are conferred by The Fiji School of Medicine. Masters qualifications are presently undergoing development.

**Public health perspective / systems-based practice**—Students are introduced to a public health perspective and the importance of providing eye care integrated in the broader health systems, especially those of primary health care. To enable graduates to provide accessible and sustainable eye care services at the community, district and national level, they learn to develop and coordinate curative, rehabilitative, promotive, and preventative services.\(^{16,18}\) They also develop skills with which to advocate for these.

**Partnering / working in teams**—Students learn to work as part of a team, consisting of an ophthalmologist, “eye doctor” trained to perform cataract surgery and manage uncomplicated eye conditions, and eye care nurses providing comprehensive eye care, diagnosing and treating common anterior eye conditions and referring of more serious and posterior eye abnormalities.\(^{23}\)

This model of care, based on mid-level personnel providing the bulk of care, has proven to be effective in the Pacific Islands: nurses and nurse practitioners provide health care across remote and sparsely populated areas.\(^{24}\) Partnerships with other health care personnel, social agencies and the community are initiated by inviting guest lecturers from other disciplines, and organizing visits to the community.\(^{16,18}\)

**Patient-centred care / interpersonal and communication skills**—Students explore differences in perspectives of eye care. This encourages them to provide care that is
responsive to and respectful of the needs and preferences of the patient. Creating and sustaining ethical relationships with patients and providing care that meets patient expectations, supports effective self-management and adherence to management plans, and healthy behaviours to achieve good outcomes. These factors are all emphasised throughout the courses. So too is the development of effective communication skills.

**Information and communication technology**—Many eye nurses in remote areas are expected to provide eye care with limited opportunities for referral or to discuss cases. Given current restrictions in information technology in the Pacific, the courses emphasise radio and mobile phones for information exchange, and paper-based systems to organise and monitor patients and their information.

**Quality improvement/practice-based learning and professionalism**—Pacific eye care providers habitually work with little direct support or supervision, or opportunity for peer and supervisor appraisal. Therefore, it is especially important that they have the awareness and skills to monitor and evaluate their work and its outcomes. To this end, students use reflective journals and learn how patient outcome, expectation and satisfaction feedback can be used to continually improve the eye care they provide. The courses model the continuous improvement process in that formative assessments are used to identify areas of learning that need attention, and evaluations of the classroom and practical sessions are used to improve the learning environment and its outcomes.

**Provide evidence-based eye care**—Students learn to integrate research findings, best practice guidelines, and patient needs and values into their clinical activities. They practise using this information when under close supervision they diagnose and manage eye conditions, correct refractive errors, perform surgery and/or provide assistance in the operating theatre.

**How can learning be facilitated in the Pacific context?**

The Pacific Eye Institute offers courses in circumstances and with equipment similar to that in the individual’s home country. It attempts to apply current best practice in medical education delivery to its courses to facilitate student learning. However, implementing innovative education strategies is not a simple process. Identified barriers include financial constraints and lack of qualified staff, political instability, cultural factors, and a lack of motivation to adapt to health environment.

The Pacific Eye Institute supports faculty to develop skills conducive to student-centred, case-based, experiential self-directed learning. As more eye care personnel graduate and gain work-experience, the intention is to increase the number of local faculty at the Institute.

Those interested in joining will be able to complete an effective teaching and learning module as part of their masters qualification. To ensure ongoing improvement, curriculum, course, lecturer, supervisor, and learning environment evaluation are regularly undertaken by students, peers and the education director.

**Curricula to facilitate outcome-based education and an integrated approach**—

Education at The Pacific Eye Institute is competency and outcomes based. Curricula
are presented in a "know-how" (students learn what they need to know to provide eye care) rather than "know-all" approach.\textsuperscript{18,28,30}

Learning outcomes, evidence-based management, and clinical guidelines have been developed to reflect the competencies and context\textsuperscript{19} required by the Pacific workforce. Ongoing evaluation will ensure these remain current.

Curriculum delivery is designed to be interactive, creating opportunities for students to apply concepts and develop skills and appropriate attitudes.\textsuperscript{19} Biomedical and social sciences are presented in the context of Pacific communities—to facilitate acquisition, retention, consolidation, and application of knowledge.

Teaching and assessment are context-rich, with at least 50\% of a programme’s course-time practical or applied. This encourages a departure from rote learning of “pure theory”.

To ensure students learn to work as part of a team, nurses and doctors share didactic and practical sessions during the operating theatre and refraction courses.

**Assessment: competency- and performance-based**—The Pacific Eye Institute uses continuous assessment to give feedback to students, so that each can identify learning gaps/areas in need of improvement. A battery of assessments\textsuperscript{31} is used. For example: supervisor and patient assessment of patient-centred care, including professional demeanour and communication skills; supervisor assessment of clinical skills by grading student suggested diagnosis and management; self-assessment of performance by students.

Students keep logbooks to record clinical skill attainment. Reflective journals are used to encourage students to think critically about the eye care needs of individuals and their communities. This is not only from a treatment, service or infrastructure viewpoint, but with consideration of the whole person, and the barriers each faces to accessing care. These journals also document the application of learning. Portfolios assist in identifying where further learning is required, and hopefully promote a commitment to life-long learning and professional development.\textsuperscript{32}

**Learning technologies**—The Pacific Eye Institute Resource Centre has computers with Internet access. Students are required to become familiar with these technologies as they develop an evidence-based approach to their learning and work. This prevents the lecturer being the sole source of information, and reliance on textbooks, which soon become outdated.

The Pacific Eye Institute envisages that increasing reliance on e-learning will facilitate learner-centred education. Students will be better able to learn at their own pace and in response to identified learning needs. Also to this end, the possible use of video-based instruction and assessment\textsuperscript{33} will be examined.

However, until more reliable internet connection and increased bandwidth become available in the Pacific, paper-based systems and radio or phone communication will be the norm for patient care and continuing education. Their use is discussed and modelled during Pacific Eye Institute courses.
Conclusion

Using the best education practices available, The Pacific Eye Institute aims to produce graduates who have the necessary competencies to deliver good quality, effective, comprehensive eye care services to meet their communities’ needs. As these eye care professionals move into the workforce, the Institute and its partners provide equipment and help establish a productive and supportive working environment.

The success of The Pacific Eye Institute’s education and workplace integration activities will be determined in time, through continued evaluation with improvements where required, and ongoing development to meet changing needs. Although small, this is a definite step toward ensuring education of eye health professionals meets the needs of the Pacific.

Competing interests: None known.

Note: This article forms part of the NZMJ's contribution to the International Joint Special Issue on scaling up training and education of health workers, a collaboration between over 20 health-related journals to publish on a common critically important theme, led by the journal Human Resources for Health (www.human-resources-health.com) and the WHO department of Human Resources for Health. For more information, please see the website.

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References:


Mid-level cadre providing eye care in the context of Vision 2020

Rèneé du Toit, Garry Brian

Abstract

The contribution of the mid-level cadre of eye care providers is an essential component of the Vision 2020: The Right To Sight initiative, to eliminate avoidable blindness by 2020. However, for the past 20 years the functions of this cadre have not been definitively outlined, or universally accepted. Consequently, the competencies they require to provide high quality comprehensive eye care have not been established. This has had implications for both training programmes and the subsequent deployment of the graduates of these programmes.

This paper examines, mainly through a review of World Health Organization (WHO) documentation, the progress that has been made in defining the role and outlining appropriately enabling training of this cadre of mid-level personnel. As a result of this analysis, recommendations are made concerning the development of this cadre to provide eye care in the context of Vision 2020:

• Develop consistent and widely applicable nomenclature
• Outline workplace functions and job descriptions, so that personnel can be categorised by their competencies and functions.
• Develop curricula based on the competency requirements of job descriptions and that will prepare personnel for those jobs.
• Establish and/or develop training centres, including those capable of training trainers.
• Establish government recognition, resources, support, and evaluation and feedback systems to ensure that this mid-level cadre can implement their training, and have the opportunity of providing high quality eye care.

The concept of deploying eye care personnel educated to an appropriate level to meet the needs of communities has been advocated for more than a quarter of a century. The enduring relevance of a primary health care approach as a basis for this was recently confirmed. Forming teams of complementary cadres of eye care providers, working in one location or geographically spread, these personnel should provide accessible and timely eye care, either as a carer where training and facilities allow, or as a referrer in a chain of escalating care. This concept has crystallised as one of the key strategies underpinning the Vision 2020: The Right to Sight initiative to eliminate avoidable blindness.

The eye care team is generally thought of as an integrated working unit consisting of ophthalmologists, a mid-level cadre of eye care personnel, primary eye care providers, and support personnel, such as managers. While the roles of ophthalmologists, primary eye care providers, and support personnel are relatively well defined, exactly
who comprises the mid-level cadre, the functions they undertake, the education they require, and the circumstances in which they work remain largely unresolved. The only consensus is about the vital role this cadre has to play in the eye team, and the contribution it can make towards achieving the goal of Vision 2020.

An optimally functioning workforce is essential: attaining the Millennium Development Goals is dependent on skilled, supported and motivated health care personnel. The 2006 World Health Report’s attempt to add to the limited information about enhancing workforce performance was criticised for erroneously considering health care personnel as an artificially homogeneous group.

Eye care, along with other disciplines, needs to contribute specific detailed planning and recommendations for different cadres of workers. These include workforce planning, differences in emphases in education and setting standards to ensure quality, responsive and professional practice. Some of these issues are considered in this paper.

Further, this paper reviews the expectations of and recommendations made by the broader eye care community about the roles of the mid-level cadre, as documented in World Health Organization (WHO) publications and elsewhere. The need for a mid-level eye care cadre, the confusion surrounding its role and nomenclature, and the training required are discussed. Based on this analysis, recommendations are made on how this cadre may be supported to contribute optimally to eliminating avoidable blindness.

**The need for a mid-level cadre of eye care providers**

Avoidable vision impairment will not be eliminated by 2020 using just the current global eye care workforce. Its capacity—both in numbers and effectiveness—must be increased. While increasing the number and skill of ophthalmologists in low resource countries should be a priority, this strategy by itself will not be sufficient to overcome the need for increased human resources.

Optometry, with its non-medical history, has defined an independent position for itself, but its role is underdeveloped and uncertain in most low resource countries. Training for ophthalmologists and other more highly skilled eye care personnel takes a long time and is expensive. Further, these professionals tend to stay in urban centres, leaving the rural population, who are often poor, largely deprived of eye care.

The emphasis has shifted away from hospital-based acute care with an ophthalmologist at the peak and helm, and nurses in mostly ancillary roles, generally directed by medical staff. The old systems are being supplanted by new paradigms encompassing comprehensive patient-centred care and district-based eye care for the community that require team-driven systems, new competencies, skill substitution, interdisciplinary collaboration, and continuity of care (Figure 1).
Figure 1. Characteristics and contributions of different cadres to providing eye care. The mid-level cadre could provide the bulk of eye care.

Mid-level health personnel can, and do, perform some of the functions of the more traditional health professionals with specialist qualifications, with the advantages of lower entry educational qualifications and a shorter period of training than ophthalmologists.\(^{15}\) Also, this cadre can be more readily deployed across remote and sparsely populated areas, such as the outer islands in the Pacific,\(^{16}\) to provide accessible and much needed care. By managing minor eye conditions, referring appropriately and assisting more specialist staff, they can also help lower the costs of health care.\(^{15,16}\)

This is not a new suggestion. For many years the eye care community and attendees at WHO meetings have discussed the need for optimally trained and functioning eye care personnel in general, and a mid-level cadre specifically (Table 1).\(^{1,4,14,17-20}\) Despite this, the mid-level cadre remains an underutilised resource, hampering the development of sustainable eye care programmes in areas of high need and priority.\(^{9}\)
Table 1. The mid-level cadre of eye care personnel: Observations from WHO meetings and reports

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
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<tbody>
<tr>
<td>1979</td>
<td>Trained “auxiliary health personnel” working at both the primary care and intermediate level, would be essential to deliver eye care and prevent blindness.</td>
</tr>
</tbody>
</table>
| 1988–90 | Five cadres of eye workers in Africa were defined by function:
- community (preventive and first aid)
- integrated eye worker (any level of medical staff but providing eye care full-time), at the primary level*
- ophthalmic assistant (full-time eye diagnosis and treatment but not cataract surgery)
- cataract surgeon* (role of ophthalmic assistant, but with cataract surgery) at the intermediate level*
- ophthalmologist at tertiary eye care level*. |
| 1989 | In the Western Pacific Region, medical officers, nurses and medical assistants should be provided with in-country training to manage eye conditions. A nursing shortage might make this difficult. |
| 1992 | Issues concerning Mid-level Eye Care Personnel (MLEP) were a priority in the South East Asia Region (SEAR). |
| 1993–96 | A regional model of a standard curriculum for MLEP training was produced. |
| 2000 | Review of the strategies and current situation in MLEP training, and development of the subtasks and core competencies for training of MLEP in the SEAR. Recommendation: “Immediate steps should be taken to increase the number of mid-level eye care workers” in the SEAR. |
| 2001 | Report containing information about the availability, production, distribution and utilisation of Mid-level Ophthalmic Personnel (MLOP) in the SEAR to be used:
- as an advocacy tool,
- as a guide for regional and national level actions,
- for discussion during a workshop in December 2001 |

Workshop to provide guidelines for comprehensive planning of human resources for eye care for Vision 2020, sensitive to the needs of the population. The recommendations the workshop made included:

Establish taskforces to:
- Recommend uniform generic nomenclature, define roles and job descriptions for MLOP
- Investigate the options for training programmes for MLOP
- Provide advocacy, role clarification/job descriptions
- Participate in a planning workshop to iron out critical issues

Establish a working group to review existing policies, curricula and training manuals
- Determine equivalence of degrees and diplomas of comparable educational programmes
- Explore and utilise avenues for professional development and continuing education
- Distance education as an alternative strategy for training
- Determine how training programmes can be designed to create opportunities that will provide avenues for career advancement, professional and academic development.

Recommendation that the WHO and Regional International Agency for the prevention of Blindness (IAPB) should provide:
- Advocacy at meetings of Health Ministers and Health Secretaries of Member Countries
- Assistance in planning workshops for human resources in eye care within the context of Vision 2020 to determine the long-term goals for the country. Consider in future planning the prevailing weak licensing system, absence of accreditation system and variations across training institutions
- Support and strengthen training institutions, designate Regional Training Centres and facilitate and support networking of these institutions for sharing information, resources and expertise. |

* Note the level at which the cadres work was also included in this definition, illustrating a source of confusion: the title of mid-level personnel is interchangeably used to mean either the level of service at which they work, or the level of skills they perform; # Since the role of cataract surgeons is similar to that of an “ophthalmic assistant”, except for the addition of the well-defined function of cataract surgery, it will not be discussed separately to mid-level cadre of eye care personnel.
Defining the role of mid-level personnel in eye care services

A significant impediment to establishing the role of mid-level eye care workers is the confusion concerning the terminology and definitions used to describe this cadre. It has been suggested that this is due to the involvement of non-government organisations in eye care, resulting in a proliferation of training programmes, and of worker categories, each with differing levels of competency, that have been trained and deployed.\(^{14}\)

Over the years there has been considerable discussion of and great variation in nomenclature, with terms used interchangeably and in parallel, even within single documents (Table 2).

### Table 2. The mid-level cadre of eye care personnel: nomenclature/designations from WHO meetings and reports

<table>
<thead>
<tr>
<th>Mid-level Ophthalmic Personnel (MLOP)(^{(7)})</th>
<th>Mid-level Eye Worker (non-physician)(^{(25)})</th>
<th>Mid-level Eye Care Personnel (MLEP)(^{(28)})</th>
<th>Middle Level Eye Care worker(^{(38)})</th>
<th>Mid-level Eye Care Personnel (^{(4)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ophthalmic nurse</td>
<td>Nurse</td>
<td>Ophthalmic nurse</td>
<td>Nurse practitioner</td>
<td>Allied eye health personnel</td>
</tr>
<tr>
<td>Ophthalmic technician</td>
<td>Ophthalmic medical officer</td>
<td>Ophthalmologist substitute</td>
<td>Ophthalmic assistant</td>
<td></td>
</tr>
<tr>
<td>Ophthalmic assistant (outreach)</td>
<td>Ophthalmic assistant medical officer</td>
<td>Ophthalmologist assistant</td>
<td>Ophthalmic assistant</td>
<td></td>
</tr>
<tr>
<td>Paramedical worker</td>
<td>Auxiliary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optometrist, Refractionist, Optician, Orthoptist</td>
<td>Technician</td>
<td>Optometrist</td>
<td>Optician</td>
<td></td>
</tr>
<tr>
<td>Eye care worker (outreach)</td>
<td>Primary eye care worker</td>
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</table>

The most recent and comprehensive definition of mid-level ophthalmic personnel (MLOP) specifies their workplace (facility-based or on outreach), training (not doctors; not provide health services other than eye care), and provision of eye care on a full-time basis:

“…all categories of professionals who work full time in eye care, except qualified doctors / ophthalmologists. Broadly, MLOPs have so far been grouped in two categories: (1) those working in regular facilities (clinics/hospitals), which include ophthalmic nurses, ophthalmic technicians, optometrists, refractionists, opticians, orthoptists; and, (2) those with outreach/field functions, which would include primary eye care workers and ophthalmic assistants. Health care workers who perform eye care as an additional task to other key responsibilities (e.g. village health workers, midwives, and auxiliary nurses) are not included in the group of MLOPs, because their deployment and training would be entirely different.”\(^{14}\)

Defining the mid-level cadre according to the infrastructure level where they provide eye care (e.g. secondary or intermediate facility), or according to the level of assumed skill (e.g. “not a community worker, and not a doctor”), is problematic. It is possible for a person to perform mid-level functions (e.g. treatment of uncomplicated anterior eye problems) in a primary care capacity (i.e. first level of contact for patient), whilst...
working at a secondary level facility (e.g. a district hospital) or providing outreach to a community centre (i.e. community level).

One of the reasons for confusion surrounding nomenclature and role is that the middle level cadre of eye care worker is not of uniform skill or deployment, for which a single training course or workplace arrangement is applicable. These depend on local needs and perceptions, legislative constraints, finances, and health systems.\(^{24}\)

It was recommended that a taskforce suggest uniform generic nomenclature, define roles and job descriptions for all MLOP in the South-East Asia Region (SEAR).\(^{14}\) Thereafter, it was proposed that closely related categories should be merged to minimise the current plethora of categories.\(^{4}\) While this may alleviate some confusion, the different functions and roles that necessitated the creation of the separate categories in the first place must be considered.

In the same way that optometry\(^{25}\), ophthalmology,\(^{26}\) and ophthalmic nursing are defined by their legal scope of practice as well as by competencies, so too should the mid-level cadre be defined by the tasks required of them and the skills required for these. The mid-level cadre should be populated by workers united by their membership of an integrated eye care team, and their complementary overlapping competencies (Figure 1).

Defining a cadre based on function is not a new concept: five categories of eye workers were defined almost 20 years ago (Table 1).\(^{17,18,24}\) Defining members of the mid-level cadre by what they do, and not by whom they are or where they work, clearly differentiates these personnel from the other team members. Additionally, this information will be useful for compiling job descriptions,\(^{24}\) making decisions about what should be included in curricula; in workplace policies and planning.

The tasks required from mid-level eye care providers for the delivery of comprehensive eye care have been identified in various reports (Table 3). There is some overlap in the tasks of the mid-level and primary-level workers, and also with the tasks fulfilled by ophthalmologists, at different times and in different places.

These tasks should, therefore, be divided amongst the available workforce in such a way that the relatively few capable of high end tasks are freed to deliver those. So, if competencies for the mid-level cadre are defined, then relevant competencies can be selected from these as required for a particular team setting.

For recognition, this may mean that the individual worker will be a member of a particular mid-level cadre with a subdivision, such as a refractionist. For service provision, this means that a given task can be fulfilled at different levels, depending on local circumstances and their reflection in the competency-set of the local workers.
### Table 3. The mid-level cadre of eye care personnel: Suggested topics for training from WHO meetings and reports

<table>
<thead>
<tr>
<th>MID-LEVEL CADRE OF EYE CARE WORKERS</th>
<th>PRIMARY LEVEL OF EYE CARE WORKERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overview on Blindness / Community Eye Care</strong></td>
<td></td>
</tr>
<tr>
<td>- Blindness and visual impairment with its implications, social, economic and quality of life&lt;sup&gt;22&lt;/sup&gt;</td>
<td>• Identify those with visual impairment or blindness in the community&lt;sup&gt;1,4,17&lt;/sup&gt;</td>
</tr>
<tr>
<td>- Structure of National Program for PBL&lt;sup&gt;22&lt;/sup&gt;</td>
<td>• Assessment of visual acuity&lt;sup&gt;88&lt;/sup&gt;</td>
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<tr>
<td>- Concept of avoidable and unavoidable blindness&lt;sup&gt;22&lt;/sup&gt;</td>
<td>• Blind Register in villages&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>- Necessary actions for blindness elimination/control - based on understanding magnitude and distribution&lt;sup&gt;22&lt;/sup&gt;</td>
<td>• Record severe visual impairment&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

| **Clinical Functions** | | |
| - Knowledge of ocular function and eye examination<sup>22</sup> | • Identify nutritional disorders<sup>4</sup> |
| - Recognition of eye conditions (external examination)<sup>1,17,20</sup> | • Recognition of normal eyes<sup>17</sup> |
| - Manage common eye conditions and emergencies, eye medications<sup>96</sup> | • Diagnosis, treatment and/or referral of common causes of red eye and injuries<sup>17</sup> | Manage common eye infections<sup>4</sup> |
| - Manage (treatment or referral) common eye conditions, including vitamin A deficiency<sup>1,17,20</sup> | | |
| - Recognise cataract, manage glaucoma<sup>1,20</sup> | • Referral of cataract and corneal scar<sup>17</sup> |
| - Recognise, refer conditions requiring more sophisticated care, direct ophthalmoscopy<sup>17</sup> | • Identify common external diseases, cataract, treat red eye, remove foreign bodies, provide emergency care, postoperative follow-up<sup>4</sup> |
| - Measure IOP<sup>1,17</sup> | • Manage eye injuries<sup>17</sup> | remove foreign body, epilation, apply ointment, eye pads<sup>17</sup> | Immediately refer serious eye problems after first aid<sup>17</sup> |
| - Rehabilitation of visually impaired people<sup>22</sup> | • Provide eye health education<sup>1,17,4</sup> | prevent injuries<sup>1,17</sup> |
| - Effective communication with patients, colleagues and the community (public education)<sup>22</sup> | • Ensure treatment has been taken<sup>4</sup> | • Ensure newborn babies’ eyes cleaned, Crede’s or similar<sup>17</sup> | • Promote immunisation<sup>17</sup> | • Give Vitamin A to children with measles or malnutrition<sup>17</sup> | • Refraction, prescription of glasses<sup>4</sup> |
| - Education: primary eye care (health promotion, prevention)<sup>2</sup> | | |
| - Initiate and collaborate in community development activities, especially related to eyes<sup>1</sup> | | |
| - Health education<sup>20</sup> | | |
| - Refraction, orthoptics, low vision,<sup>22</sup> testing vision<sup>1</sup> | | |
| - Providing spectacles for presbyopia and postcataract<sup>1</sup> | | |
| - Refraction work<sup>20</sup> | | |
| - *Minor surgery, eye bank management<sup>22</sup> | | |
| - Remove foreign bodies, chalazion surgery, in trachoma areas: eyelid surgery, evisceration<sup>17</sup> | | |
| - Select, prepare patients for surgery, assist with surgery<sup>17,20</sup> | | |
| - Manage an eye clinic, including record and stock keeping<sup>1</sup> | | |
| - Manage an outpatient unit<sup>20</sup> | | |
| - Provide frontline workers with administrative, logistic, and organisational support<sup>1</sup> | | |
| - *Screening methodology<sup>22</sup> | | |
| - Organise and run outreach clinics and school screening<sup>17</sup> | | |

| **Eye Health Management Functions** | | |
| - Epidemiological approaches: application to programme management<sup>22</sup> | • Have knowledge of common eye conditions that occur in the community<sup>17</sup> |
| - Collect and report data on visual status<sup>1,20</sup> | • Accurate recording and reporting maintained for monitoring<sup>17</sup> | • Basic recording and reporting as designated by supervisor<sup>17</sup> | |
| - Competence in programme planning, management, monitoring and evaluation<sup>22</sup> | | |

| **Training Function** | | |
| - Manage an eye clinic, including record and stock keeping<sup>1</sup> | | |
| - Provide frontline workers with administrative, logistic, and organisational support<sup>1</sup> | | |
| - Manage an outpatient unit<sup>20</sup> | | |
| - Provide frontline workers with administrative, logistic, and organisational support<sup>1</sup> | | |
| - *Screening methodology<sup>22</sup> | | |
| - Organise and run outreach clinics and school screening<sup>17</sup> | | |
| - Eye screening<sup>4</sup> | | |
Training for a cadre of mid-level eye care personnel

Just as the definition and promulgation of an agreed role for a mid-level cadre has been vexed, so too has devising and delivering their training. A workshop on training materials considered job descriptions for mid-level personnel to be “fairly well defined”, and dependent on their geographic region. Although the job descriptions did not include management tasks, the meeting recommended the development of training materials for a management module. This illustrates the disparity that often exists between job requirements, the expected competency, and the training offered.

Consideration of training seems to have been in isolation, without continuum or progress. For example, a 2001 workshop recommended that “top priority should be accorded to the training and/or retraining of mid-level eye care personnel, of whom there was an acute shortage”. It was recognised that “in the present context of poorly defined training of mid-level eye care personnel, WHO should constitute a working group…to review existing policies, curricula and training manuals”. This was surprising, given that these issues had previously been addressed by WHO meetings and had produced a standard curriculum.

Five modules had been proposed (Table 3) to encompass the necessary basic functions of mid-level eye care workers. Broad outlines were provided with the expectation that contents of subtopics would be developed at a national level because these were country-specific. Subsequently, a taskforce met to finalise and prepare the curriculum for field-testing.

Thereafter “…recognition and adaptation of these modules for MLEP [Mid-Level Eye Care Personnel] training should be officially distributed…” “…to the national trainers should be implemented as early as possible for them to train other MLEP in each country of the region”. No mention, however, was made of this curriculum either in the 2001 report or at the subsequent workshop, and no further progress on the implementation of a standard curriculum has been documented.

Currently, there are several training courses, each with its own curriculum, for mid-level low vision and rehabilitation professionals and those involved in management.

As result of this review, recommendations are made to facilitate the development of a mid-level cadre to provide eye care in the context of Vision 2020 (Table 4).
Table 4. The mid-level cadre of eye care personnel: 
Author recommendations

A consistent and widely applicable nomenclature should be determined.

Although confusion has surrounded this terminology in the past, the “mid-level” terminology is so widely used, it would be difficult to replace. This cadre of eye care workers could still be known as MLEP. Within this group, and defined by the particular subset of competencies possessed, there should be specialised workers (e.g. MLEP Refractionist, MLEP Cataract Surgeon). This subdivision would be analogous to the sub-specialisation that occurs in ophthalmology (e.g. Paediatric Ophthalmologist).

Personnel should be categorised by their competencies and functions.

Eye care personnel, including those in the mid-level group, should be categorised by their competencies, required for the functions they perform. This will permit setting of job descriptions, scope of practise and standards of care.9

A comprehensive set of competencies for the mid-level cadre should be agreed upon. The roles and specific tasks that particular personnel may be required to perform, in particular eye care systems, locations or circumstances, should then be defined (e.g. refraction, cataract surgery or service management).

Training curricula should be based on the competency requirements of job descriptions and that will prepare personnel for those jobs.1,24

With the required competencies agreed, appropriate training for MLEP could be sought or designed. A review of existing training manuals and curricula, including the existing standard curriculum, could inform the development of these curricula, and ensure equivalence of qualifications from comparable educational programmes.4,21,22 This should be accomplished through participatory planning, with input from both medical education and medical services experts.4

In addition to the skills listed in Table 3, WHO core competencies for chronic care 29 should be included in competency based curricula, assessment methods,9 and evidence-based learning. Graduates should competently deliver high quality, acceptable and comprehensive eye care, including preventative and promotive eye care in teams or partnerships with the community.30 This would include personal and professional development with an emphasis on quality improvement. Evaluations of the extent to which objectives have been reached, and effectiveness of programme and teachers,1,14,21, will allow ongoing improvement in training.

Training centres, including those capable of training trainers, should be established or developed.

The establishment of accredited, standardised, well-resourced training centres will encourage maintenance of training standards and MLEP of uniform experience and competency. Networking of training institutions will permit sharing of information, resources and expertise.24 Distance education, can be explored as an alternative strategy,9 but may have more application to continuing education.

Government recognition, resources, support and evaluation and feedback systems should be established to ensure that this mid-level cadre can implement their training, and have the opportunity of providing high quality eye care.

Establishing professional credibility is important so that the contribution that could be made by the mid-level cadre is recognised and respected by other health professionals or administrators.15 Standardised training, uniform competency attainment, with appropriate well-resourced and supported workforce deployment, incorporating avenues for professional and academic development and career advancement, all within an environment of policy and legislative support, will facilitate this credibility. Demarcation of professional boundaries between mid-level and other cadres will assist regulatory and professional bodies. These boundaries are not only important for a sense of professional identity, but will also help secure status 31 upon which community acceptance is based.

Planning for human resources, including those of the mid-level cadre, should be done within the overall context of Human Resource for Health planning, and according to national policies on training, deployment and utilisation of personnel and within the scope of national eye care plans.4
Conclusion

Recommendations concerning a mid-level eye care cadre have been made repeatedly over the past 20 years. Why then, if there is general agreement on the urgent need for MLEP, and the issues identified and deliberated, has seemingly little progress been made to facilitate either their training or implementation of training?

Although essential, defining roles, competencies and training is not sufficient to ensure the mid-level cadre can provide high quality eye care. Careful selection of candidates for training, fair and reliable compensation, resources, infrastructure, supportive supervision and evaluation, and feedback systems must be in place to allow graduates to implement their training. There must be opportunities for career advancement in tandem with professional and academic development. Lifelong learning must be inculcated and accessible to ensure continued quality of care.4,9,14,24,32 These can be achieved.

Information on creative strategies, success stories, and lessons learnt should be assembled and dispersed.10,11 Evaluation and research about improving workforce effectiveness, planning, policy, and programmes is needed. An international collaborative research agenda, coordinated, and aligned with other initiatives on health systems research, will avoid wasting time and resources and can also provide opportunities to develop capability of new scientists.

Ministries of Health and international organisations should be encouraged to help translate research results into action.32 A link across training and education, health care systems, and labour markets will assist in developing a system that will address these synergistically.10 What an eye care provider is called, what their education will be, how they fit into an eye care team, and if and how much they are paid by government will vary from country to country.

Effective workforce strategies must, therefore, be context-specific and be matched to a country’s unique history and situation by working in partnership with all stakeholders in both problem diagnosis and problem solving.9

Competing interests: None known.

Note: This article forms part of the NZMJ’s contribution to the International Joint Special Issue on scaling up training and education of health workers, a collaboration between over 20 health-related journals to publish on a common critically important theme, led by the journal Human Resources for Health (www.human-resources-health.com) and the WHO department of Human Resources for Health. For more information, please see the website.

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References:


Dilemmas in managing oral dysplasia: a case report and literature review

Hannah Jack, Kai Lee, Ajith Polonowita

Abstract

Oral epithelial dysplasia (OED) is a premalignant lesion which has an unpredictable course of progression. Its management has remained controversial due to a lack of high-quality prospective studies evaluating the different treatment modalities.\(^1\) We present a patient with a long history of OED which subsequently transformed into malignancy. The clinical features of OED and the controversies surrounding its management, as they present in the current literature, will also be reviewed and discussed.

OED is a chronic, often progressive premalignant disorder of the oral mucosa. It is a term used to describe the histopathological changes seen in the oral mucosa and may be graded histologically along a continuum of cellular change as mild, moderate or severe (‘carcinoma in situ’), where lesions with more cellular disorganisation are generally believed to have a greater risk of malignant change.\(^1\) Clinically it may present as leukoplakia (white lesion), erythroplakia (red lesion), or leukoerythroplakia (mixed lesion).\(^2\)

Erythroplakia is defined as bright red velvety plaque or patch which cannot be characterised clinically or pathologically as being due to any other condition.\(^3\) It is associated with a significantly higher rate of dysplastic change than leukoplakia.\(^4\)

Leukoplakia is a clinical diagnosis and describes an oral white lesion that cannot be rubbed off or characterised as any other definable lesion.\(^5\) The term has been more recently defined as a predominantly white lesion with premalignant potential.\(^6\) Clinical variants are classified into two groups: homogeneous and non-homogenous leukoplakia.

Homogeneous leukoplakia is defined as a lesion of uniform flat appearance that may exhibit superficial irregularities, but with consistent texture throughout. Non-homogeneous leukoplakia is a predominantly white or mixed white and red lesion with an irregular texture that may be characterised by a flat, nodular, or exophytic appearance.\(^7\)

The clinical appearance of leukoplakia is important as homogeneous lesions are reported to have a lower rate of malignant transformation than lesions which are speckled, erosive, ulcerative, or verrucous in appearance.\(^2\)

The rate of malignant transformation of oral leukoplakia into oral mucosal squamous cell carcinoma (OMSCC) varies from 2.2–17.5%.\(^8-10\)

Despite advances in surgery, radiotherapy, and chemotherapy, the 5-year survival rate for oral cancer has not improved significantly over the past decades and remains at around 50%.\(^11\)
Case report

A 52-year-old Caucasian woman presented to an oral and maxillofacial surgeon complaining of an intermittently uncomfortable white patch on her left lateral tongue of 2 years duration. She was generally fit and well and was not taking any regular medications. There was no history of tobacco use, but she had a weekly consumption of 1–2 units of alcohol.

On examination, a 1cm-diameter white lesion was present on left lateral surface of the tongue adjacent to a sharp amalgam restoration on her lower left first molar. As she was a clarinet teacher it was thought that her tongue movement against the sharp amalgam restoration may be causing the lesion. The amalgam restoration was smoothed and the lesion was monitored regularly.

At the 4-month review, the lesion had grown to 2.5 cm diameter. A biopsy of the left tongue was carried out (Figure 1 and Figure 2), and histopathology indicated a squamous dysplasia with an associated candidal infection. Amphotericin B was prescribed to treat the candidal infection, and the lesion was monitored.

Figure 1. Low-magnification photomicrograph showing squamous dysplasia
At the 2 months review, the lesion had not resolved, and the patient was referred to the Oral and Maxillofacial Surgery/Oral Medicine Clinic for further management. A diagnosis of OED secondary to chronic dental trauma was made based on the lesion’s clinical and histological features.

She was referred to her private dentist for a crown on the heavily restored tooth, and was instructed to return to the Oral Medicine Clinic should the lesion not resolve.

After 2 years she presented again to the Oral Medicine Clinic. There had not been any improvement in the lesion which was still 2.5 cm in diameter and had developed a granular leukoerythroplakic appearance. An incisional biopsy at this stage diagnosed a poorly differentiated squamous cell carcinoma (Figure 3). A primary diagnosis of T2N0M0 was made. There was no palpable neck node and the computed tomography scan did not reveal regional disease.
The patient was then referred to the Multidisciplinary Head and Neck Oncology Clinic. Subsequent surgery involved a left partial glossectomy and pandescopy to exclude concurrent lesions. The histology of the tumour demonstrated an adequate clear surgical margin, but there was a maximum tumour thickness of 10 mm, which correlated to a high risk of occult metastasis.

A left supraomohyoid neck dissection was performed 3 weeks later to determine the presence of neck disease and ensure elimination of such pathology. A small biopsy of her posterior tongue was also performed at this stage, as she had complained of discomfort in this area and there was some subtle induration on palpation.

The neck dissection yielded one positive node without extracapsular spread. Histopathology from the tongue biopsy confirmed the diagnosis of a poorly differentiated squamous cell carcinoma under the mucosa of the posterior tongue, with perineural invasion evident.

A further excisional biopsy of the posterior tongue squamous cell carcinoma was undertaken, and a 1.5 cm wedge of tissue was taken from the posterior end of the scar which identified the site of the previous partial glossectomy. The tonsillar pillar and inferior portion of the tonsil were included in the resection.

Histopathology from the tongue biopsy confirmed the diagnosis of a poorly differentiated squamous cell carcinoma under the mucosa of the posterior tongue, with clear margins of the surgical specimen. This was believed to be an area of metastatic spread, rather than a primary site.
Due to the narrow excisional margin around the tumour, as well as the development of a metastatic lesion, the patient underwent postoperative radiation therapy receiving 60 Gy in 30 fractions.

The patient is currently being reviewed in the multidisciplinary head and neck oncology clinic and has remained disease-free 6 months post treatment.

**Discussion**

This case study presented a patient with chronic OED who was lost to follow-up and subsequently developed malignancy in the lesion. The difficulty for practitioners when managing OED is not only to identify a malignant lesion (Figure 4), but also to monitor the progressive changes in a dysplastic lesion and act appropriately.

**Figure 4. An example of OMSCC right lateral border of the tongue**

Histological examination of tissue from a biopsy is the only definitive method of diagnosing OED. It has been reported that only 25% of leukoplakias undergo biopsy, so clinicians must be aware of the clinical features which are associated with a higher risk of malignant transformation (Table 1) and systemic risk factors for development of OMSCCC (Table 2).

A patient with one dysplastic lesion also has a higher risk of developing dysplastic lesions elsewhere in their mouth. This is due to field changes within the oral mucosa, which involves cellular changes due to environmental and genetic influences, such as tobacco use, which render the whole mucosa susceptible to malignant change. It is possible that these patients may have multiple areas of oral mucosa which are at risk
of malignant transformation. This makes regular examination of the whole mouth important, as these patients may develop multiple dysplastic lesions.

In the early stages, OMSCC may appear as a small area of induration with localised change, such as erosion, erythema, or keratosis.\textsuperscript{13} The changes are often subtle and asymptomatic. It is important for the clinician to maintain a high index of suspicion, especially if risk factors such as tobacco or alcohol use are present.\textsuperscript{31}

Due to the lack of a predictable natural history, there is no general consensus regarding the management of premalignant lesions.\textsuperscript{4} Several strategies have been used including observation, non-surgical treatment, cryotherapy, laser vaporisation, and/or excision and scalpel excision.\textsuperscript{29}

Management of suspicious lesions should begin with the removal of any obvious associated factors such as trauma from adjacent teeth or prostheses. Candidal infection should be treated with a suitable antifungal medication, and any nutritional deficiencies addressed. Other risk factors such as tobacco and alcohol use should be eliminated.\textsuperscript{31}

Any oral lesion that does not respond to initial therapeutic measures within 2 weeks should undergo biopsy.\textsuperscript{31} While monitoring patients with leukoplakia, any changes in signs and/or symptoms indicate that the lesion should be re-biopsied.\textsuperscript{12}

If the lesion persists, or shows moderate to severe dysplasia, treatment by excision is generally recommended.\textsuperscript{29} This applies in particular to lesions in high risk sites (Table 1), or in patients who are at high risk for cancer development due to associated risk factors (Table 2).\textsuperscript{18} Research shows that 20–35\% of oral leukoplakias recur after surgical excision, so ongoing review of these patients is vital.\textsuperscript{4,32}

Table 1. Clinical features associated with malignant transformation of leukoplakia

<table>
<thead>
<tr>
<th>Feature</th>
<th>Studies</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical type</td>
<td>Silverman et al\textsuperscript{7}</td>
<td>Speckled leukoplakia and leukoplakia with histological evidence of dysplasia have a higher rate of malignant transformation than homogeneous leukoplakia.</td>
</tr>
<tr>
<td>Site</td>
<td>Kramer, El Labban, Lee\textsuperscript{14}, Waldron, Shafer\textsuperscript{15}</td>
<td>Leukoplakia of the floor of mouth or ventral surface of the tongue are at a higher risk of malignant transformation.</td>
</tr>
<tr>
<td>Demarcation</td>
<td>Saito et al\textsuperscript{16}</td>
<td>Patients with multiple oral leukoplakias have a higher rate of developing OMSCC than patients with localised lesions.</td>
</tr>
<tr>
<td>Size</td>
<td>Holmstrup et al\textsuperscript{13}</td>
<td>Lesions larger than 200mm\textsuperscript{2} are 5.4 times more likely to undergo malignant transformation.</td>
</tr>
<tr>
<td>Candida infection</td>
<td>Bánóczy, Sugar\textsuperscript{17}</td>
<td>A higher malignant transformation rate has been reported in leukoplakias with associated chronic candidal infections.</td>
</tr>
<tr>
<td>Human papilloma virus (HPV)</td>
<td>Reibel\textsuperscript{18}, Miller, Johnstone\textsuperscript{19}</td>
<td>HPV has been linked as a risk factor, especially HPV 16 and 18. The likelihood of detecting HPV was 4–5 times higher in OMSCC than in normal oral epithelium.</td>
</tr>
<tr>
<td>Epithelial dysplasia</td>
<td>Silverman et al\textsuperscript{4}</td>
<td>Leukoplakia with pre-existing oral dysplasia has a shorter interval of time to malignant transformation compared to leukoplakia without dysplasia.</td>
</tr>
</tbody>
</table>
Table 2. Systemic risk factors for malignant transformation of leukoplakia

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Studies</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco consumption</td>
<td>Hashibe et al(^{20}) Balaram et al(^{21}) Lewin et al(^{22})</td>
<td>The risk of developing oral cancer is 2.5–6.5 times greater for smokers than non-smokers. Betel nut or quid chewing is also associated with a higher risk of OMSCC.</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>Hashibe et al(^{20}) Mashberg et al(^{23})</td>
<td>Moderate to heavy alcohol drinkers have a 2–8 times greater risk of developing OMSCC. The harmful effect of alcohol and smoking is synergistic.</td>
</tr>
<tr>
<td>Diet</td>
<td>Petridou et al(^{24}) Maserejian et al(^{25})</td>
<td>A diet high in vitamin C, carotene, thiamine, vitamin B6, folic acid, potassium, and iron has been found to have a decreased risk of developing OMSCC.</td>
</tr>
<tr>
<td>Genetic factors</td>
<td>Ichikawa et al(^{26})</td>
<td>p53 is a tumour suppression gene which mediates the cellular response to DNA damage. It is frequently mutated in OMSCC.</td>
</tr>
<tr>
<td>Female gender</td>
<td>Silverman(^{27}) Bánóczy(^{28})</td>
<td>Although leukoplakia is more common in men, it has been found that women with leukoplakia have a higher rate of malignant transformation than men.</td>
</tr>
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There is a lack of randomised controlled clinical trials analysing the effectiveness of surgical treatment in preventing the progression of these premalignant lesions to OMSCC.\(^7\) However, it remains the most commonly practiced approach in managing leukoplakia for many clinicians,\(^{33}\) as it provides a biopsy specimen which can be examined for the extent of dysplasia or malignancy. A split thickness skin grafting or mucosal grafting may be necessary in a large defect to prevent restriction of oral function.\(^{59}\)

Carbon dioxide laser is an alternative method of carrying out ablation or excision of the lesion. The main criticism of laser ablation is that the tissue is vapourised and not available for histological examination.

Multiple biopsies need to be taken of the affected area before ablation to determine the histopathology of the lesion.\(^{35}\) For this reason, the laser should be used to excise rather than ablate the lesion to allow for histological evaluation of the entire lesion. The disadvantage of this technique is that epithelial migration is delayed and wounds may take slightly longer to heal than if the lesion is surgically excised.\(^{49}\)

Another surgical approach to treating OED is liquid nitrogen cryotherapy, which involves the use of extreme cold to destroy abnormal cells. It has been shown that malignant transformation of oral leukoplakia is higher amongst patients who receive cryosurgery or cryosurgery and excision when compared with patients who have only surgical excision.\(^{35}\)

At present there is no evidence of effective nonsurgical treatments in preventing progression of dysplastic lesions to OMSCC. Interventions with topical bleomycin, systemic cis-retinoic acid, and systemic lycopene may help to resolve oral epithelial dysplastic lesions in the short term, but there is no evidence that these treatments are effective in preventing the malignant transformation of dysplastic lesions.\(^{36}\)
Conclusion

There is a lack of consensus on the management of oral dysplasia. It is essential to remove any possible aetiological factors, and all dysplastic lesions require regular follow-up.

A surgical approach has not been shown to consistently prevent malignant change; however, it may be useful in moderate-to-severe dysplasia as it removes the bulk of the lesion and allows for histological assessment. Randomised controlled trials are required to determine the effectiveness of surgical and non-surgical treatment in preventing malignant transformation.

We recommend a 6-monthly review by the GP or specialist to ensure early detection of malignant transformation. The importance of clinical photographs to accurately document any lesion progression can not be overstated. If there is any uncertainty regarding the diagnosis or screening of these patients, a specialist opinion should be promptly sought.

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Eosinophilic, polymorphic, and pruritic eruption associated with radiotherapy after chest wall irradiation

Miriama Delaibatiki, Claire Hardie, Cynric Temple-Camp

Radiotherapy is commonly associated with acute cutaneous reactions. Eosinophilic, polymorphic, and pruritic eruption associated with radiotherapy (EPPER) is a rare complication. We describe a patient with breast cancer who developed EPPER after chest wall radiation.

Case report

An 82-year-old woman with right breast infiltrating ductal carcinoma (T2pN2aM0) underwent mastectomy and axillary lymph node dissection and adjuvant tamoxifen. Adjuvant radiation to the right chest wall was delivered in April 2008 to a dose of 50 Gray (Gy) in 25 fractions over 5 weeks. At 36 Gy she developed a bright patchy erythematous pruritic rash in the radiation field in addition to a typical radiation dermatitis. Aqueous cream, topical corticosteroids, and dressings to the chest wall were administered.

The rash extended a few days later to outside the radiation field into the right axilla and onto the left chest and anterior neck and was associated with vesicle and blister development (Figure 1). Superimposed fungal, bacterial, and viral infections were considered and treated accordingly with no effect. Four weeks after treatment completion, the rash persisted unchanged and two punch biopsies were taken of the affected skin from within and outside the radiation field. Histology from both biopsy specimens confirmed eosinophilic polymorphic and pruritic eruption associated with radiotherapy. She was commenced on an antihistamine with good effect with almost complete resolution of the rash after 2 weeks of treatment.

Figure 1. EPPER on chest wall after radiation therapy
Discussion

EPPER was first described by Rueda et al in 1999 as a distinct clinicopathological, eosinophilic eruption associated with radiotherapy. Patients presented with a generalised pruritic rash with excoriations, erythematous papules, and less frequently with wheals, vesicles, tense bullae, and nodules. They described 14 cases of EPPER (all in women) of which 13 had cervical cancer and one had a Meibomian gland sebaceous carcinoma. It was not associated with other forms of cancer therapy and in contrast to radiation dermatitis, the rash was not limited to the irradiated areas and predominantly affected the lower and upper extremities.

There have been only four case reports of EPPER associated with breast cancer radiotherapy. Two of these cases documented EPPER developing outside the radiation field and the other two cases described EPPER on the chest both outside and within the radiation field.

The histopathological findings are of a lymphohistiocytic infiltrate with a superficial and deep perivascular dermal distribution. The prominent feature is the presence of eosinophils. EPPER has been differentiated from well documented skin conditions that have been associated with radiotherapy including erythema multiforme, Stevens-Johnson syndrome, subacute radiation dermatitis, bullous pemphigoid, and other diseases that show tissue eosinophilia.

The pathogenic mechanism of EPPER is unknown although theories have been proposed, such as a Type 1 hypersensitivity reaction mediated by IgE and a delayed Type 4 hypersensitivity reaction. The role of hormones has also been suggested by the strong female predominance in most cases reported to date. The relative risk of developing EPPER has been shown to be dose dependant with a mean radiation dose at onset of 30Gy. The disease is usually self-limiting and runs a course of weeks to months. In the reported cases, successful treatments have included topical corticosteroids, antihistamines, and UVB light. In our case, an antihistamine was effective. Adverse complications have not been described and there is no known correlation with either morbidity or survival.

Since its description, there have been few published cases of EPPER, most of which have been associated with cervical cancer. Our case adds to the previous four reported cases of EPPER in patients with breast cancer and it is the first case of EPPER reported in New Zealand.

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A pulmonary mass
Wan-Hsiu Liao, Sheng-Hsiang Lin, Tsu-Tuan Wu

Clinical
A 46-year-old male presented to the outpatient department with a 3-day history of fever and cough with purulent sputum. He had a history of smoking but no known respiratory disease. His physical examination gave normal results. While a routine employment chest radiograph performed 6 weeks ago was unremarkable, a rounded density located in the lower third of the right lung was observed this time (Figure 1). The patient received oral antibiotics initially, and repeat chest radiographs performed 4 weeks later showed nearly complete resolution (Figure 2).

What is the diagnosis?
Answer

Round pneumonia. Most cases of round pneumonia are in children\(^1\) and tend to be solitary and resolve on follow-up imaging.\(^2\) The initial differentiation between round pneumonia and a neoplastic disease is difficult.

To avoid unnecessary invasive examinations, which carry complications, empiric antibiotics and a serial follow-up of chest radiograph are favoured when the clinical scenario suggests an infectious disease.

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References:

Gluteal lithiasis

Wan-Hsiu Liao, Sheng-Hsiang Lin, Tsu-Tuan Wu

A 75-year-old female presented with progressive dyspnoea for 1 week. The patient had a history of asthma for decades and had received frequent intramuscular injections during the previous 30 years. On examination, multiple palpable, hard, and non-tender lumps were noted over the buttocks, with intact overlying skin. Serum electrolytes and creatinine were normal.

A plain abdominal radiograph was performed (Figure 1).

Figure 1. Plain abdominal radiograph

What is the diagnosis?
Answer

The abdominal radiograph shows multiple *focal calcifications* consistent with fat necrosis over both gluteal regions, secondary to tissue damage at the injection site after intramuscular injection.

Local inflammation, necrosis, and crystal deposition may lead to dystrophic muscular calcification. Infection, skin irritation, and ulceration may occur. Rarely, surgical removal may be considered.

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Australasian Medical Congress 1908: the Maori, diseases of children, and syphilis


Dr. Pomare’s paper on “The Maori”—embracing references to ancient customs, modern ailments and sanitary reform—was read in the section of Public Health. All who heard this paper were intensely interested, and may it be said, amused. Regrets from those unable to attend at the section were many and profound. It certainly was a most comprehensive paper, starting, as it did, with the arrival of the fleet of canoes from the legendary Hawaiki 500 years ago, and ending with mention of cases of Neurasthenia amongst the Maoris of to-day.

Speaking of the aboriginal inhabitants who were supposed to have existed in New Zealand prior to the arrival of the Maoris, and who were credited with having had red hair, Dr. Pomare said, “My ancestors absorbed these,” and the twinkle in his eye as he said it seemed to add, “without the assistance of pepsin.” But this paper must be read to be properly appreciated.

Friday, the 24th., was the last working day of the Congress, and much excellent work was accomplished. At 9 a.m. there was a demonstration in the Museum of Pathology at the University (Gynecology). Hospital demonstrations, including cases of Infantile Paralysis at the Children’s Hospital. Section meetings at the University.

In the section for Diseases of Children, Dr. Douglas Stephens read a paper dealing with 120 cases of “Epidemic Infantile Paralysis,” and Dr. Kent Hughes on the “Surgical treatment of Infantile Paralysis.” In the Surgical section, papers were read on “The association between dental caries and appendicitis,” by Dr. Jackson (Brisbane); and on “The removal of the Gasserian ganglion for facial Neuralgia,” by Dr. Duncan (Kyneton). In other sections many interesting papers were read.

In the afternoon there was a general meeting at the Masonic Hall, Collins Street, to discuss “Syphilis.” The attendance was very large. This subject had been already discussed in various aspects in the different sections, and speakers were nominated to represent the views of their respective sections to the general meeting. The President was in the chair and opened the discussion. He dealt with the disease from a pathological standpoint.

In 1904 he analysed records of 100 consecutive autopsies, and found evidence of Syphilis clearly defined in 34 cases, 19 were doubtful and one case suspicions. He thought Syphilis was often responsible for many cases of Aneurism and valvular heart trouble, and he enlarged on the manner it invaded every department of medicine and surgery. He thought the main mortality of children from slight causes was due to congenital specific taint. The consideration of the whole subject was of the most vital importance to the individual and community.

More about old doctors

Recently (NZMJ 27 February 2009) we reviewed a paper on cognitive decline in ageing Australian doctors. This report from Germany examines ageing doctors from another perspective. In 1993 a law was enacted that resulted in a compulsory retirement age of 68 for GPs and specialists in primary care in Germany.

The age limit was introduced to try and prevent a predicted surplus of doctors and to give younger doctors a chance. It applied only to the treatment of non-private patients, who make up about 90% of the population. This was repealed in January of this year. The German Medical Association opposed the 1993 law on grounds of age discrimination. The reason for the repeal was, however, pragmatic rather than ethical. The predicted surplus of doctors failed to materialise. In fact the opposite is occurring, a shortage of doctors, particularly in rural areas. Sounds somewhat familiar.


Interaction between general practice and the pharmaceutical industry—what do patients know or expect from their doctors?

In recent years there has been much hand wringing about the relationship between clinicians and the drug industry. Should doctors receive free biros, dinners, overseas trips, etc? Should medical authors declare competing interests? Take your pick. But what do the patients know about it? In this paper 906 patients from 3 general practices in Sydney were surveyed.

76% were unaware of any relationship. When made aware, 71% wanted to know of benefits, including cash, their doctor received. 69% wanted to be told of financial benefits for research participation and 61% wanted to know about sponsorship to attend conferences. Overall 80% felt they would have more confidence in their doctor’s decisions if interests were fully disclosed.


On the other hand, some really good news from big pharma—GlaxoSmithKline chief surprises the industry

Andrew Whitty, the new head of GlaxoSmithKline (GFK) says that his company will cut prices for all drugs in the 50 least developed countries to no more than 25% of the levels in the UK and US—and less if possible. And put any chemicals and processes over which it has intellectual property rights that are relevant to finding drugs for neglected diseases into a “patent pool”, so they can be explored by other researchers. And reinvest 20% of any profits it makes in the least developed countries in hospitals, clinics, and staff. And invite scientists from other companies, NGOs, or governments to join the hunt for tropical disease treatments at its Spanish research institute.
We await the response from Pfizer and others, including the generic companies who currently are the main suppliers of drugs to the poorer countries.


Treatment of urinary incontinence in nursing home residents

There is a lot of it about. The authors of this review state that urinary incontinence affects more than half of nursing home residents in the United States, leading to such health consequences as pressure ulcers, urinary tract infections, falls, worsening quality of life, and caregiver morbidity including stress and depressed mood. So there is more to it than the big laundry bill.

After reviewing 14 trials they conclude that prompted voiding alone and prompted voiding with exercise were associated with modest short-term improvement in daytime incontinence. The only medication with any useful effect is oxybutynin which has anticholinergic and antimuscarinic properties. When used with prompted voiding it was slightly better than placebo.


Dusty jobs and chronic obstructive pulmonary disease (COPD)

Cigarette smoking is the dominant risk factor for COPD, and certain occupational risks also exist. Just how important is exposure to toxic vapours, dust, or fumes in the workplace? This question is analysed in this paper which compares such exposure in 742 COPD patients with 302 matched controls who did not have COPD. Occupational exposures were assessed using two methods: self-reported exposure to vapours, gas, dust, or fumes on the longest held job (VGDF) and a job exposure matrix (JEM) for probability of exposure based on occupation. Multivariate analysis was used to control for age, sex, race, and smoking history.

VGDF exposure was associated with an overall risk (OR) factor of 2.11 and the JEM analysis showed the OR to be 2.27. And as expected joint exposure to both smoking and occupational factors markedly increased the risk of COPD (OR 14.1). No surprises here.

An epidemic of nonexistent iodine deficiency due to inappropriate urine iodide testing and reference ranges

There has been a recent explosive increase in urine iodide testing at Labplus, the diagnostic laboratory for Auckland Hospital, New Zealand. Most of these requests have come from general practitioners. Discussions with some of these requestors have revealed that there is a belief among many patients, and some doctors, that (a) iodine deficiency is a common clinical problem in New Zealand, and (b) the urine iodide test is the best way to diagnose iodine deficiency.

To counter these misconceptions, it may be helpful to re-state some of the facts about the urine iodide test:

- **Iodine deficiency is diagnosed by examination of the thyroid gland for goitre and measurement of thyroid hormones. Iodine deficiency has no known effects other than on thyroid hormones.**¹ (For example, there is no good evidence that "subclinical" iodine deficiency causes chronic fatigue syndrome or increases breast cancer risk, despite what appears on the Internet.)

- **The urine iodide test is not appropriate to diagnose iodine deficiency in individuals.**² Urine iodide levels are variable from day to day in a given patient, and have a low predictive value for iodine deficiency. Even an accurate 24-hour collection cannot be reliably used to assess iodine status in an individual.³ This is because urine iodide reflects only recent iodine intake, whereas the thyroid gland can store large amounts of iodine. A "low" urine iodide no more indicates iodine deficiency than a low urine sodium indicates sodium deficiency. Using it to test for iodine deficiency is of no benefit to patients, and may give misleading results, leading to harmful interventions, as excessive iodine supplementation can cause hyperthyroidism and may increase the risk of autoimmune thyroid disease.

- **Urine iodide levels have been widely used in epidemiology to assess the iodine status of populations. Some laboratories (including the author's) have historically quoted urine iodide reference ranges which are based on population medians.** These ranges are meant for population studies, and should not be applied to individuals. The majority of individuals with urine iodide levels which are "low" in relation to guidelines for population medians are not iodine deficient.

- **Measurement of urinary iodide in individual patients has only two indications:** (1) assessment of iodine status at the time of therapeutic radioiodine administration, and (2) as part of the investigation of some cases of mild hyperthyroidism. Endocrinologists may need this information, but general practitioners should not need to do this test.

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¹ For example, there is no good evidence that "subclinical" iodine deficiency causes chronic fatigue syndrome or increases breast cancer risk, despite what appears on the Internet.
² Urine iodide levels are variable from day to day in a given patient, and have a low predictive value for iodine deficiency. Even an accurate 24-hour collection cannot be reliably used to assess iodine status in an individual. This is because urine iodide reflects only recent iodine intake, whereas the thyroid gland can store large amounts of iodine. A "low" urine iodide no more indicates iodine deficiency than a low urine sodium indicates sodium deficiency. Using it to test for iodine deficiency is of no benefit to patients, and may give misleading results, leading to harmful interventions, as excessive iodine supplementation can cause hyperthyroidism and may increase the risk of autoimmune thyroid disease.
³ Measurement of urinary iodide in individual patients has only two indications: (1) assessment of iodine status at the time of therapeutic radioiodine administration, and (2) as part of the investigation of some cases of mild hyperthyroidism. Endocrinologists may need this information, but general practitioners should not need to do this test.
References:
Ninety years’ growth of New Zealand complementary and alternative medicine

Increasing numbers of complementary and alternative medicine (CAM) consultations in New Zealand\(^1\) seem to confirm that New Zealanders have developed a “love affair with all things alternative”.\(^2\) One aspect of this ‘love affair’ yet to be investigated is the extent to which the businesses of established CAM practitioners have thrived or new practices have opened.

I therefore investigated growth in the numbers of practitioners offering the six most widely available types of CAM (acupuncture, chiropractic, homeopathy, hypnotherapy, natural therapies, osteopathy) in Auckland and Dunedin by counting their advertisements in Wise's New Zealand Post Office Directory (up to and including 1971) and the New Zealand Yellow Pages Telephone Directory of Classified Advertisements (1972 to date).

Auckland and Dunedin were chosen for the following reasons: Auckland is New Zealand’s largest city; the earliest advertisements for CAM practitioners were in the 1918 Wise’s directory for Dunedin; and, the Yellow Pages for these two cities currently service approximately 38.6% of New Zealand’s population (Auckland 33.8%; Dunedin 4.8%).\(^3\) The exact years reviewed were determined by the availability of both directories.

From 1990, directories were examined every 2 years, between 1960 and 1989, practitioners were counted approximately every 3 years, and prior to 1960, the count was approximately every 5 years. No practitioner was counted twice under the same heading and practitioners only listed on registers placed by associations were not counted (as some may be registered but not currently practicing). From 2004, the category of Natural Therapy split into a number of separate category headings. By 2008, Alexander Technique, Feidenkruas Method, Herbalist, Naturopath, and Reflexology, were no longer listed under Natural Therapy, but as separate sub-categories. Therefore, from 2004 the count for Natural Therapy practitioners also includes practitioners now listed under the aforementioned headings.
### Table 1. CAM practitioners by type and year

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**Figure 1. Increase in CAM practitioners since 1918**
The increasing numbers of CAM practitioners suggests that increased consultations have been spread across new and existing practitioners, rather than existing practitioners having become significantly busier. There is some indication that Natural Therapy and Chiropractic practitioners may have reached a plateau, the latter even beginning to decrease, albeit after particularly strong growth in the last 10 years.

The number of practitioners and consultations may in part be an artefact of the relatively strong economic growth and high levels of disposable income in recent years. As such, the current economic downturn may see numbers of customers and practitioners in some areas of CAM decreasing and consultations with general medical practitioners increasing.

A potential weakness of my methodology is that not all practicing CAM practitioners had listings in Wise’s Directory or the Yellow Pages (e.g. some may currently gain sufficient patients via referral from general medical practitioners) or a different pattern of growth occurred in the other major cities of New Zealand.

It is clear from my brief investigation that the CAM industry in New Zealand is thriving and that our ‘love affair with all things alternative’ is growing stronger over time. What is more, the increasingly high-profile of CAM may create yet more momentum to the industry and even raise the possibility that CAM is viewed more as an alternative to orthodox treatment, than a complement.

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References:


Pretibial injury: prevention is possible and preferable

Pretibial injury (Figure 1) affects approximately 33 per 1000 population per year, commonly females older than 50 years.\textsuperscript{1} It leads to significant morbidity and suffering for the affected individuals with socioeconomic impacts on their families and carers. Household items are implicated in 44\% of cases, and another 24\% of cases are caused by garden objects.\textsuperscript{1}

Approximately 60\% of patients remain hospitalised for 2–14 days with an estimated cost of $1.5 million per year nationally.\textsuperscript{1} As not all patients with pretibial injury are referred to a hospital,\textsuperscript{2} the actual cost is undoubtedly much higher. The published literature on this type of injury has focused on treatment rather than prevention.\textsuperscript{1, 2}

Figure 1 Pretibial injury with haematoma
Development and implementation of strategies to help reduce the incidence and/or severity of pretibial injury is needed. Our preferred approach is to avoid the need to wear specialised clothing/equipment because:

- For most individuals this injury is the first of its type, thus general adoption of precautionary protective measures seems unlikely; and
- Compliance with wearing specialised protective devices/clothing is equivocal.\(^3\)

Our recent published work\(^4\) characterised pretibial injury and evaluated the protection against tibial impact offered by typical fabrics/garments. Seventy-five patients treated for pretibial injury at the Wellington Regional Plastic, Maxillofacial and Burns Unit at Hutt Hospital, Wellington, New Zealand were interviewed to record circumstances surrounding the injury, including clothing worn. Most (>85%) patients sustained injury to one site, and required surgery. Injuries, typically graded 3 or 4, were of variable dimension (10–250 mm wide, 30–350 mm long), and located at the middle to lower third of the tibia.

The mean injury severity grade was lower when at least one layer of fabric covered the pretibial region and slightly lower again with more than one layer, when the item worn was from a knitted rather than a woven fabric, and the garment was trousers/trouser-type rather than a skirt.

We further developed laboratory test procedures to determine the potential protection against impact provided by typical apparel fabrics and combinations\(^4\). Two methods were applied: 1 the pendulum, a common laboratory instrument used in a range of applications; and 2 the 'impact and scrape', developed specifically for this study based on typical injury agents and reflecting the gait of elderly persons.

Fabrics impacted represented garments worn by our cohort of patients (as single and as multiple layers of different fabrics) and included pantyhose fabrics (knit structures; 100% polyamide and 84%polyamide/15% elastane/1% cotton; 0.49±0.03 mm, 0.76±0.07 mm thick), denim (twill woven structure; 95% cotton/5% elastane; 0.87±0.02 mm thick), and fabric for sweat pants (knit structure with a brushed inner surface; 100% cotton, 1.90±0.04 mm thick).

We demonstrated that the force transmitted through multiple layers of fabric was less than through one layer for all fabric combinations, irrespective of which instrument was used. Thick pantyhose and either denim or fabrics used in sweat pants would minimise transmitted force and maximise impulse.

Pretibial injury is a common problem for older women in New Zealand, mostly caused by household and garden objects. As the result of an aging population, the annual incidence is expected to rise. Prevention is clearly preferred. Fabric and fabric combinations for minimising pretibial injury can be screened using laboratory procedures. Clothing with two fabric layers over the pretibial area provides more protection than those with one layer. Wearing thick pantyhose (or knee highs) under jeans or sweatpants is recommended, and trousers and trouser-type garments are preferable to skirts. A public education programme may reduce the incidence and the severity of pretibial injury.
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References:

Potential impact of pandemic influenza interventions in New Zealand: a brief modelling study

Background and aim—Some simple modelling approaches have been used for examining the potential impact of pandemic influenza in New Zealand, along with possible control interventions. Since this work was undertaken, many studies have been published internationally, including detailed historical analyses of the 1918 pandemic. One of the latter suggested that social distancing interventions was of considerable value during this pandemic (i.e. a study of 43 US cities). We aimed to utilise a more sophisticated modelling approach to examine what might be the benefit of plausible social distancing interventions as well as use of antivirals for treatment of severe cases.

Methods—In our analysis, the basic model components and parameters were based on the published deterministic model InfluSim (version 2.1). This model and freely available software has been used for published modelling studies (e.g. on non-pharmaceutical interventions and studying antivirals and resistance to them). The programming of InfluSim has also been repeatedly improved following feedback from other programmers (as the code for InfluSim is also open source) and as a result of its use by health sector agencies for pandemic planning.

The scenarios we examined included: partial isolation of cases only, social distancing, antiviral treatment of severe cases, and all of these three interventions together (see Appendix for further details). The population age structure used was that for the New Zealand population in December 2008. However, due to persisting epidemiological uncertainty around key parameters, we selected values within plausible ranges for these (see Appendix), using Latin hypercube sampling. We then ran 2000 simulations of each scenario using a simulation application that was programmed in Java.

Results and discussion—The results in Figure 1 show the diverse range of possible outcomes in terms of cumulative number of hospitalisations per 100,000 population for different basic reproduction numbers. Figure 2 indicates that social distancing (by 5 to 25%) is generally not as effective as antiviral treatment of severe cases for reducing the hospitalisation burden. Combining all three interventions produces the maximal average benefit in terms of lower hospitalisation burdens. Figure 3 shows how the more effective intervention scenarios also reduce the peak size of the epidemic curve and delay this peak (i.e. relative to case isolation alone). Therefore the use of the multiple interventions would even out the burden on hospital beds over time and reduce the risk of this sector being overwhelmed for long periods.

Although this model uses over 1300 differential equations, this deterministic model still involves many simplifying assumptions. Similarly the parameter ranges sampled from are still subject to considerable uncertainty. Indeed, it is quite possible that social distancing levels could be even more substantial (e.g. >50% over the course of the pandemic). This could occur if pre-schools and schools were closed early and for long periods, if mass gatherings were cancelled, if more people used alternatives to public transport (e.g. walking or cycling), and if the population made greater use of...
the Internet in their lives (e.g. for working from home, home schooling, shopping and leisure pursuits). Furthermore, the benefit of antiviral treatment could be substantially reduced by the emergence of viral resistance and so its value relative to social distancing is far from certain. Finally, these results could be expanded upon by undertaking more sophisticated parameter sensitivity studies (as conducted for other health sector agencies e.g. Switzerland) and considering other health outcomes (e.g. medical consultations and deaths).

In conclusion, New Zealand health authorities could consider undertaking more modelling work to better explore a wider range of possible public health and health care setting interventions (including use of pre-pandemic vaccine and the possible emergence of antiviral resistance by a new pandemic strain). In the meantime these authorities should continue to plan for the use of social distancing interventions and antivirals for treatment in the next revision of the national influenza pandemic plan.

Figure 1. Cumulative number of hospitalisations per 100,000 population for different basic reproduction numbers in the New Zealand setting (case isolation only scenario, n=2000 simulations)*

* Note: We sampled $R_0$ and the other parameters from a normal distribution so that 99% of sampled values are within the ranges specified in the Appendix. However, 1% of the samples lie outside these intervals and hence 1% of values are where $R_0$ is < 1.5 or >3.5.
Figure 2. Cumulative number of hospitalisations per 100,000 population for various scenarios in the New Zealand setting (boxes show inter-quartile range and whiskers the 95% range for 2000 simulations for each scenario)

![Graph showing cumulative hospitalisations per 100,000 population for different scenarios.]

- A: Case Isolation (CI)
- B: CI + Social Distancing (SD)
- C: CI + Antiviral Treatment (AT)
- D: Combined CI + AT + SD

Intervention Scenarios

Figure 3: Daily prevalence of hospitalised cases for the various scenarios in the New Zealand setting (for each individual scenario but otherwise using default settings in InfluSim and R₀=2.5)

![Graph showing daily prevalence of hospitalised cases for different scenarios.]

- A: Case Isolation (CI)
- B: CI + Social Distancing (SD)
- C: CI + Antiviral Treatment (AT)
- D: Combined CI + AT + SD
### Appendix. Key parameter ranges used in the modelling*

<table>
<thead>
<tr>
<th>Key parameter</th>
<th>Range of values used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Natural history of the disease</strong></td>
<td></td>
</tr>
<tr>
<td>Basic reproduction number (R₀) with this range reflecting most values reported for the second (most severe) wave of the 1918 influenza pandemic (and is consistent with a New Zealand estimate for this pandemic).</td>
<td>1.5 – 3.5</td>
</tr>
<tr>
<td>Contagiousness during the first half of the infectious period. The range used is consistent with the pattern for viral shedding reported for seasonal influenza.</td>
<td>75% – 95%</td>
</tr>
<tr>
<td>Proportion asymptomatic (based on 95% confidence interval of the values for seasonal influenza reported in a meta-analysis).</td>
<td>26% – 42%</td>
</tr>
<tr>
<td><strong>Disease control interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Partial isolation of cases: moderately sick cases (10% isolation), severe cases at home (20% isolation), and severe cases in hospital (30% isolation). These values for partial isolation were applied in all of the scenarios used in this analysis.</td>
<td>Set values only (see to the left)</td>
</tr>
<tr>
<td>Social distancing reduction i.e. the general reduction in contacts throughout the population (best guess estimate of plausible range when averaged over the full course of the pandemic).</td>
<td>5% – 25%</td>
</tr>
<tr>
<td>Reduction of contagiousness as a result of antiviral treatment where treatment occurs one day since symptoms develop on average and assuming no antiviral resistance. In InfluSim it is assumed that moderately severe cases will not be treated but that all severe cases will be treated at home or hospital with antivirals (and these severe cases comprise 50% of all symptomatic cases). The range used is an arbitrary one around the default value of 80% used in InfluSim. The size of the antiviral stockpile was not considered to be a limiting factor (as in all simulations the current New Zealand stockpile was sufficient for treatment only usage).</td>
<td>70% – 90%</td>
</tr>
</tbody>
</table>

* With 99% of the Latin hypercube sampling occurring within the ranges specified and assuming a normal distribution for values within the range. All other parameter settings are as per the default settings used in InfluSim version 2.1.⁶

**Competing interests**: Dr Schwehm has had financial contracts with health agencies in various countries concerning extensions of the software InfluSim. Dr Wilson has had contracts with the Ministry of Health on pandemic influenza modelling. However, there was no funding for this work.

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Most smokers support smokefree council-owned playgrounds: national survey data

Background—From an international perspective, New Zealand has been one of the world leaders in passing smokefree environment laws to protect the health of non-smokers and advance tobacco control. It passed a major law in 1990 and the updated 2003 legislation (implemented during 2004) extended smokefree areas to all restaurants, bars and additional indoor workplaces that were not covered by the 1990 law.

There has also been progress in terms of outdoor smokefree areas. Smoking in outdoor settings is prohibited in the grounds of all schools by the 2003 legislation.

“Educative” smokefree parks policies have been currently adopted by 29% (21/73) of the city and district councils in New Zealand. These are policies which rely on signposts, media coverage and public pressure to limit smoking, rather than on legal enforcement. The grounds of some hospitals, some stadiums, and the campuses of at least one university (Massey) are also covered by smokefree policies.

A 2007 survey in Upper Hutt found that 83% of adult park users thought that having a “smokefree parks policy” was a good idea. There was even majority support (73%) by smokers for the Upper Hutt smokefree park policy. A 2007 national survey gave options of agreeing that smoking in various settings was acceptable anywhere, in set areas, or not at all. Over a third (38%) said that it was not at all acceptable in local parks or reserves, and 76% said it was not at all acceptable in outdoor children’s playgrounds. Nevertheless, there has been no national survey data on what smokers think about smokefree parks – an issue we address in the results below.

New NZ data on smokers’ attitudes—Between March 2007 and February 2008 we surveyed a national sample of 1376 New Zealand adult (18+ years) smokers. One question asked: “Do you think smoking should be allowed at council-owned playgrounds?” Further detail on the survey methods is available elsewhere.

Results weighted to reflect the national population of smokers showed that 65.7% disagreed (95% confidence interval = 62.3% to 69.1%) and only 31.9% agreed with this question. That is, there appears to be substantial majority support by smokers themselves for not allowing smoking in council-owned playgrounds.

New Zealand advocates and local government policymakers now have additional evidence of public support to continue to further progress smokefree parks. This evidence for support can be combined with the evidence that children tend to copy what they observe, and are influenced by the normality and extent of smoking around them. Outdoor smokefree policies may also reduce secondhand smoke-related health impacts, and also reduce rate-payer and tax-payer costs associated with smoking-related fires and litter. Overall we suggest there are strong arguments for these type of smokefree outdoor places.
Acknowledgements: The ITC Project New Zealand team thank: the interviewees who kindly contributed their time; the Health Research Council of New Zealand which has provided the core funding for this Project; and our other project partners (see: http://www.wnmeds.ac.nz/itcproject.html).

Competing interests: Three of the authors (GT, NW, RE) have undertaken work for health sector agencies working in tobacco control.

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References
William Norman Clay

(25 March 1922–24 January 2009)

William (Bill) Clay was born at St Kilda in Melbourne of an English mother and a New Zealand father. The young family came to Auckland to live in Epsom when Bill was 6 weeks old. He was educated at Southwell School Hamilton, and King’s College Auckland.

On leaving school he travelled to the United Kingdom with the intention of studying medicine at Edinburgh, but soon after he got there war broke out, and he volunteered for the RAF, hoping to be a pilot. Colour-blindness put a stop to that, but he did join the Air Force and was posted to Malta, working under hazardous conditions when that island was being subjected to relentless air attacks.

At the end of the war Bill returned to New Zealand and at last did take up medicine. While doing his intermediate year in Auckland he met a fellow-student Trudie Cutter from Matamata. Bill had to go off to Dunedin the next year, 1947, for the 2nd year of the medical course, and Bill and Trudie were married at the end of that year. Dunedin became their home for the next 3 years, and that is where their twin daughters, Christine and Deborah, were born in 1949.

They then moved to Auckland, where Bill did his final student year and 2 years as a house surgeon. He set up in general practice in Hillsborough after that, and Julian was born in 1955.

Bill was an early member of the Auckland Faculty of the College of GP’s, originally a part of the London-based College, of which he was made a Fellow in 1967, and he did a lot of the pioneering work in the formation of the Royal NZ College, of which he was made a Foundation Fellow in 1974. He well earned the honour of being elected the second President of the College. In 1966 he was awarded a Nuffield Travelling Fellowship and travelled extensively through Europe, the United States, and Australia for 7 months.

Bill had a year in 1971 as president of the Auckland division of the Medical Association, and for 19 years was a member of the Medicines Adverse Reactions Committee.

In 1965, in addition to his general practice, Bill became a visiting medical officer to Wesley Hospital in Mt Eden, where he served until his retirement. In 1973 he gave up his general practice to become medical director, and later consultant, for Pfizer Laboratories Ltd where he remained until retirement in 1989.
Bill and Trudie became proud grandparents with the birth of Emma in 1985, but sadly Trudie died of cancer only 3 years later.

Bill had a good many interests outside medicine. He was an enthusiastic skier and fly fisherman, and Bill and Trudie were members of the Wine and Food Society. In addition, Bill was a keen member of U3A, Probus, the Medico-Legal and Medical History societies, and was one of the last surviving members of the local Malta veterans’ group. Services in the community were given to the St John Ambulance Brigade and as a literary visitor to the Foundation for the Blind.

Bill and I worked together on a number of College and other medical committees, but none were more enjoyable than the 1951 Medical Graduates’ Committee, which organised reunions of our year in different parts of the country.

Bill was a man of high standards, which he set for himself (and hopefully others) to follow. Apart from his standards as a doctor, he was a stickler for correctness in other aspects of life such as the use of written and spoken English, running meetings, dress, and punctuality.

For all this, he was one to enjoy life to the full, at least till the last few months. He was a great conversationalist who loved good music (especially opera), food and wine, and the company of friends. An evening with Bill was never dull.

Bill Clay was always a strong family man, and he had a loving and devoted family, to whom our profession extends their sympathy.

Dr Bill Brabazon wrote this obituary.