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Assessment of training capacity in New Zealand general practices: a stocktake in the lower North Island and South Island
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Assessment of training capacity in New Zealand general practices: a stocktake in the lower North Island and South Island

Samantha A Murton, Susan RH Pullon

Most general practices in the lower North Island and South Island are already involved in training doctors and nurses. There is little room for increasing the number of trainees in the current teaching practices using current models. Recruiting and training new practices, better supporting existing teaching practices, coordinating placements, training more supervisors and supporting teaching in different ways will help to make more room for quality teaching in general practice.

Qualitative study: the experience and impact of living with Behcet’s syndrome

Vicky Tai, Karen Lindsay, Joanne Sims, Fiona McQueen

Behcet’s syndrome is a rare and chronic inflammatory illness that can affect various organs including the eyes, skin, joints, blood vessels, brain and gastrointestinal tract. Our study sought to explore the experiences and challenges faced by patients living with Behcet’s syndrome, and to identify potential management strategies to enhance resilience. Eight English-speaking patients with Behcet’s syndrome participated in in-depth semi-structured interviews and interview transcripts were analysed to identify common themes relating to the illness experience. The study revealed that Behcet’s syndrome patients experience delayed diagnosis and contend numerous challenges, both physical and emotional, including profound feelings of loneliness and isolation. The complexity of Behcet’s syndrome demands long-term, multi-faceted and individualised care—this requires establishing trusting doctor-patient relationships, timely access to specialist care, collaboration among specialists and GPs looking after the patient and psychosocial support.

New Zealand women have suboptimal intakes of long chain omega-3 polyunsaturated fatty acids during pregnancy—a cross sectional study

Michele Eickstaedt, Kathryn L Beck, Cathryn A Conlon

Adequate dietary intakes of long chain polyunsaturated fatty acids (LCPUFAs) such as omega 3 and omega 6 are required during pregnancy to support both the mother and growing baby. An important omega 3 fatty is docosahexaenoic acid (DHA). DHA is mainly found in fish and seafood, however women may restrict their intake of fish and seafood during pregnancy due to concerns regarding food safety and foetotoxic effects of environmental contaminants such as mercury. Most of the 500-plus women in their third trimester of pregnancy who completed an online food frequency questionnaire had low intakes of omega 3 fatty acids including DHA during pregnancy. Women who are currently pregnant or planning to become pregnant should aim to eat a variety of foods from the four food groups every day, including cooked fish. There is little concern with canned tuna, canned salmon, mackerel or sardines, farmed salmon, terākīhi, blue cod, hoki, john dory, monkfish, warehou, whitebait and flat fish like flounder, as the mercury levels in these fish are seen as low risk.
Family planning unmet need and access among iTaukei women in New Zealand and Fiji
Radilaite Cammock, Peter Herbison, Sarah Lovell, Patricia Priest
The study compares a group of indigenous Fijian or iTaukei women in New Zealand and Fiji to ascertain differences in family planning unmet need and access. The study found there was no difference in unmet need and the lower unmet need levels statistically reported in New Zealand do not reflect iTaukei women's experience. Although more women in Fiji reported concerns for a lack of female providers, this was also reported to be a problem for a third of the women in New Zealand, indicating similar cultural sensitivities between both countries. Cost was again reported to be a problem among women in both countries. More needs to be done to identify family planning needs among minority Pacific ethnic groups in New Zealand.

Cutaneous melanoma: an audit of management timeliness against New Zealand guidelines
Tess Brian, Brandon Adams, Michael Jameson
New Zealand guidelines suggest timeframes within which patients referred for the diagnosis and treatment of melanoma skin cancer should be seen and treated. A review of such patients referred to Waikato Hospital over one year found that compliance with these guidelines was low. Attention to logistical constraints (e.g., staff shortages) in the plastic surgery department would improve compliance. Removing inconsistencies in the guidelines would also help standardise and improve care.

Assessment and modelling of general practice and community setting capacity for medical trainees in northern New Zealand
Felicity Goodyear-Smith, Abbas Al-Murrani
Increasing population and demand for general practice services, combined with more GPs working part-time and many reaching retirement age, means that New Zealand needs to train more GPs. Medical students need time in general practice. Hospital doctors spend three months in a community attachment during their first two years, and doctors in GP registrar training programmes also need to be working in practices. There is insufficient capacity for general practices to accommodate all these trainees, and when some practices take on postgraduate doctors, they have no room for medical student placements. There are a number of strategies which may help increase capacity, including assistance for practices to add consulting rooms and incentivising non-training practices to participate. The proposed combined University of Auckland and University of Otago School of Rural Health would help address capacity issues in rural areas, including support of integrated vertical approaches whereby postgraduate doctors help train their more junior colleagues.

Seasonal influenza and vaccination strategies—is a paradigm shift needed? A synopsis of the 3rd New Zealand Influenza Symposium, November 2016
Nadia A Charania, Diana Murfitt, Nikki Turner
There is a need for better influenza surveillance and country-specific data to guide policy-makers and healthcare providers to improve population health outcomes. This was one of the key conclusions of the 3rd New Zealand Influenza Symposium (NZIS) hosted by the Immunisation Advisory Centre (IMAC) in November 2016. Seasonal outbreaks of influenza cause substantial illness and death that burdens healthcare services every year. International and national participants discussed current issues in influenza prevention and management. One of the key topics discussed at the symposium was the use of novel vaccines and antiviral prophylaxis to protect young children and the elderly. Another area of focus was on examples of seasonal influenza vaccination strategies, particularly those that could reduce community transmission and provide individual protection, which would have great potential to reduce the burden of influenza.
Stimulating the clinical academics of tomorrow: a survey of research opportunities for medical students in New Zealand

Ibrahim S Al-Busaidi, Cameron Wells

A small proportion of medical students engage in research in New Zealand. Lack of knowledge of available research opportunities, and difficulty finding projects and suitable mentors are key barriers to engaging in research during medical school. This review provides the first consolidated source of information on medical student research training opportunities in New Zealand. A number of research training opportunities are available to medical students, and include curricular and extracurricular scholarly activities. Additional measures to facilitate students’ involvement in research should be implemented. Future studies should focus primarily on examining the prevalence of, and barriers to medical student research involvement, and evaluating the outcomes of currently offered undergraduate research training activities.

Local and regional smokefree and tobacco-free action in New Zealand: highlights and directions

George Thomson, Nick Wilson

There has been progress in the areas of smokefree dining, large smokefree outdoor worksites and ski fields, and parts of downtown areas such as squares and streets. The local activity is particularly important in providing models for smokefree outdoor hospitality areas. Action by central Government is needed to help make it easier for councils to have local smokefree bylaws. Government also needs to provide minimum outdoor smokefree laws.
Is melanoma treatment failing national standards?

Jeremy Simcock

In this issue, an audit of a year of melanoma treatment in one of our regions is reported. The focus is on timeliness of each step along the treatment pathway. In many respects the numbers present no surprises with 143 patients having melanoma treatment, of whom 66 had sentinel lymph node biopsy and 11 patients, completion lymph node dissection. They were either referred to hospital following diagnosis by GP excision biopsy (about two-thirds) or with a suspicious skin lesion (about one-third). The majority simply had adequate wide local excision without requirement for any further investigation.

What is surprising are the long waiting times for these patients. For the 83 patients who were referred with a confirmed diagnosis of melanoma, why did it take a median of 54 days (range 16–282) for them to be treated?

For the 43 patients referred with a suspicious skin lesion later found to be melanoma, why did it take a median of 114 days (range 63–320) to have their melanoma treatment? Almost half of this time was a median 51-day interval from referral to biopsy. We don't know what this interval was for the patients having their diagnostic biopsy outside the hospital.

Provisional national standards for melanoma patients were developed by the National Melanoma Tumour Standards Working Group chaired by Richard Martin. They were a major step forward from the Australian and New Zealand Guidelines, which were published in 2008, and contained many useful good practice points but did not refer to timing of care. In contrast, the provisional standards have a strong focus on timely access to services. They also contain monitoring requirements covering timeframes along the patient pathway (MR2A, MR4M, MR5B, MR6B and MR7C). As well as the familiar overall 31- and 62-day standards, they include components of the pathway such as histological reporting within 10 working days of biopsy.

The standards are widely supported by both patient and healthcare provider groups. However, there is ongoing frustration about the delay in implementation of the standards—they remain provisional four years after they were generated at great effort. As seen in the article in this edition, reporting against the standards is an important first step, however without routine reporting and standards-driven service improvement, there remains a lost opportunity. The standards should be incorporated into both planning and provision of services. For example, pathology contracts could include a requirement to report on timeliness of melanoma reports against the standard of 10 working days. The established regional multidisciplinary meeting (MDM) structure is well placed to carry routine reporting if adequately resourced. By auditing all patients against the agreed standards, we can take a patient-focused view of cancer care rather than simply reporting hospital departmental compliance with targets. Retrospective audit will identify areas for improvement across primary and secondary care, pathology, radiology and surgical oncology. Communication and coordination of care is critical, both between providers and with patients. Prospective tracking of all cancer patients waiting for treatment as they move along their pathways is either underway or a goal for us all. Visibility of patients and the length of time that they are waiting is important. This would be the most effective method of ensuring that individual patients will receive timely cancer care.

The provisional national standards fulfil the very important role of setting the expectations of adequate melanoma care for those in secondary and primary care and importantly for patients. Through these shared expectations and reflecting on them, melanoma care will improve.
It is of interest that melanoma treatment utilises the same resources as non-melanoma skin cancer (NMSC). NMSC causes a quarter of all skin cancer deaths and occurs at more than 25 times the rate of melanoma. With an increasing disease burden of all skin cancer, we must ensure that NMSC care is also maintained despite the anomaly that it is not included as a tumour stream in the Faster Cancer Treatment programme.

I do not agree with the authors comment that it is “unlikely... that the patients... suffered any consequent deleterious effect”. While clear evidence of harm from delayed diagnosis and treatment of melanoma is currently lacking, other tumour streams evidence suggests timely management improves outcomes. In addition, melanoma patients suffer similar health-related quality of life reduction to other cancer patients. One-third of patients report clinically significant levels of distress, which peaks around the time of diagnosis and reduces following treatment. Therefore it is probable that prolonging the interval between raising a suspicion of cancer and treatment increases patients’ distress and thus reduces their quality of life.

Congratulations to the Waikato team for auditing and bravely reporting the timeliness of melanoma care in their region. It demonstrates that as a system, we have some way to go to reach an acceptable standard of care. Nationwide implementation of the provisional tumour standards is a priority. Monitoring of care against these standards has a critical role in improving both quality and equity of cancer care in New Zealand.

Competing interests: Nil.

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Assessment of training capacity in New Zealand general practices: a stocktake in the lower North Island and South Island

Samantha A Murton, Susan RH Pullon

ABSTRACT

AIM: General practices are providing clinically-based training for rapidly increasing numbers of medical (and other health professional) trainees. This study investigated capacity and intention of general practices to additionally teach junior doctors (now required to undertake community-based attachments by the New Zealand Medical Council) alongside current trainees in their service.

METHODS: A web-based/telephone survey of all general practices was developed and administered November 2015–April 2016.

RESULTS: In the Otago study region (lower North Island, South Island), 463 currently operating practices were identified. (A companion Auckland-based study concurrently investigated the upper North Island.) Of the 280/463 (60%) responding practices, 93% (261/280) were currently taking health professional trainees, with 86% (241/280) taking at least one type of medical trainee. Practices indicate that 14% fewer of them will take undergraduate medical students than previously (199 practices down to 162), but more would take junior doctors (42 up to 79) and GP registrars (129 practices up to 142).

CONCLUSIONS: Most practices in these regions already contribute to teaching. Practices indicated limitations in accommodating continued increases in numbers of trainees in the current poorly coordinated system. Improved support and training for practices is needed to enable practices to take more trainees of multiple types per practice, both concurrently and sequentially.

New Zealand has a primary care-led health system, with increasing emphasis on effective care in the community, yet there is a declining proportion of doctors working in primary care and an overall shortage of vocationally trained general practitioners (GPs). In line with experience internationally, creating opportunities for clinically-based learning in primary care settings at junior doctor level, alongside existing undergraduate (and registrar) learning, is one of a number of measures recently introduced to try and address medical workforce shortages and maldistributions.

Primary care practices (mostly general practices) across New Zealand are being asked to take rapidly increasing numbers of medical (and other health professional) trainees for clinically-based training. General practices are widely recognised as effective and relevant learning environments for health professionals, with excellent potential for clinically-based, integrated inter-professional learning.

General practices currently receive requests from multiple sources: from the Royal New Zealand College of General Practitioners (RNZCGP) for GP registrars, district health boards (DHBs) (junior doctors–PGY 1 and 2s), universities (Yr2–Yr6 medical students), nursing education providers (20+ nursing training programmes), other health education programmes and internationally from elective students requesting placement.
Since the introduction of New Zealand’s Primary Health Care Strategy in 2001, reiterated in the 2016 Health Strategy, there has been an increasing emphasis on the importance of a primary care-led health system, with a corresponding need for an appropriately skilled primary care workforce that can meet the needs of an ever-increasing and increasingly diverse population, including a growing health burden of chronic condition management.

Vocationally trained, experienced general practitioners are essential to primary care health teams, and although many more nurses, midwives and other health professionals are now working effectively in important primary care roles, this does not obviate the need to train sufficient numbers of medical graduates for careers in general practice and other primary care settings, with the target proportion of medical graduates going into primary care in comparable health systems being between 45–50%. Paradoxically, since 2000, although the total medical workforce increased from 9,779 in 2000 to 15,366 in 2014, the proportion of those working in general practice and primary care categories decreased from 39% to 31% over the same period. It is important to note that in the UK, there is an explicit aim to recruit 50% of new graduates into general practice training posts, although this is still considerably higher than the only 19% of new graduates and the 35% of postgraduate Year 3s, whose first preference is to go into general practice in the UK. In contrast in New Zealand, in the decade or so from the mid-1990s to mid-2000s, only 50 first-year New Zealand GP registrar training places a year were funded by the then Clinical Training Agency (CTA); far off approaching 50% of postgraduate training places and well below replacement and with no allowance for population growth. However, since 2004, gradually increasing numbers of training places for medical students and GP registrars have been progressively created to reach current numbers to belatedly help fill the gap. Medical student intake across both medical schools has gradually increased from 365 in 2009 to 565 in 2014 (and due to reach approx. 600 by 2020) as government-funded domestic places have been progressively increased. GP registrar numbers have increased from 50 funded places per annum in 2000 to 187/565 (33% of postgraduate training places) in 2016.

From 2014, new community-based attachments (CBAs)—three-month attachments for junior doctors—also aim to give medical trainees further valuable clinical experience in a community-focused service (most often but not exclusively a general practice). Mandated by the New Zealand Medical Council (MCNZ), CBAs are being progressively implemented across the country with an expectation that all junior doctors be able to complete such an attachment from 2020. Although these are much needed and welcome changes in policy to address a significant training and distribution shortfall, the consequence is unprecedented pressure on general practices to take many more medical trainees at multiple levels, a problem predicted for some time. When capacity is at a premium, there is not only a risk of displacing some learners by others but also stretching goodwill at practices over time, such that they withdraw from teaching altogether. Coordination and support is key to avoid compromising general practices and their ability to accommodate all trainees, including nursing and other health professional students.

This study therefore aimed to establish the capacity and future intentions of general practices to take on an increasing number of health professional students at all training levels in the all-of-Otago study region. It was conducted in collaboration with the University of Auckland, who investigated DHB areas in the northern part of the North Island. Their results will be reported separately. This national stocktake project was proposed by the universities and endorsed by RNZCGP, Health Workforce New Zealand (HWNZ), General Practice New Zealand (GPNZ), NZ Rural General Practice Network and DHB representatives in November 2015 (working party meeting, RNZCGP offices).

This paper provides a snapshot of general practices across the Otago study area by DHB region in relation to each of the main Otago campuses and considers nationwide implications.
Methods

Training context
There are approximately 1,000 primary care practices nationally, ranging from those with 1–2 consulting rooms to those with over 15 consulting rooms. At pre-registration (undergraduate) level, the two medical schools at University of Auckland and University of Otago request undergraduate students’ placements in practices in a coordinated way across the country. Auckland generally requests placement for students in practices in the upper the North Island, and Otago requests placements in the more lightly populated lower North Island and South Island. At Otago, undergraduate trainees spend varying time in practices based on the year they are in and the campus they belong to (see Table 1). Practices do not necessarily take a student every attachment, and most often only have one trainee at a time for a variety of reasons (eg, holidays, room availability and supervisory capacity).

All attachments commence in November each year and rotations run successively (12 month training year) for final (6th) year medical students, junior doctors and GP registrars. Attachments vary in length but all of these students require a consulting room most of the time in practice. Practices are usually contacted separately by each agency placing trainees so there is little knowledge, apart from at practice level, of how many and what type of trainees each practice takes.

Table 1: Clinical placements and primary care modules at the three University of Otago campuses during 2016.

<table>
<thead>
<tr>
<th>Campus area</th>
<th>Curricular weeks*</th>
<th>Clinical half days*</th>
<th>Curricular weeks</th>
<th>Clinical half days*</th>
<th>Curricular weeks</th>
<th>Clinical whole weeks*</th>
<th>Total curricular weeks</th>
<th>Total (clinical placement) weeks</th>
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<tr>
<td>Wellington</td>
<td>5 weeks</td>
<td>12 half days</td>
<td>2 weeks</td>
<td>0 half days</td>
<td>7 weeks</td>
<td>7 weeks (70 half-days)</td>
<td>14</td>
<td>7+1.2=8.2</td>
</tr>
<tr>
<td>Christchurch</td>
<td>8</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4 weeks (40 half-days)</td>
<td>12</td>
<td>4+2.4=6.4</td>
</tr>
<tr>
<td>Dunedin</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>40</td>
<td>3</td>
<td>3 weeks (30 half-days)</td>
<td>15</td>
<td>3+5=8.2</td>
</tr>
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</table>

*contracted time in general practices, seeing patients with clinicians.
*weeks dedicated to primary care in curriculum, designed, taught, assessed by experienced primary care health professionals.

Stocktake
For the purpose of this stocktake of general practice training capacity across the Otago study region, the Wellington campus area was deemed to cover the Tairāwhiti, Hawkes Bay, Midcentral, Whanganui, Wairarapa, Hutt and Capital & Coast District Health Board (DHB) geographical areas. The wider Christchurch campus area covered Nelson-Marlborough, Canterbury and South Canterbury DHB areas, and the Dunedin campus area covered the Southern and West Coast DHB areas.

Practices were identified via several means—primary health organisations of various types (including GPNZ and RNZCGP), university department lists as well as publicly available web-based information. Practices and PHOs were contacted to ensure accuracy of practice names, phone numbers and other contact details. Practices were initially informed of the training capacity survey and the intent of the stocktake exercise via general information channels (websites, PHOs etc.), and open letters were circulated as widely as possible. Endorsement was provided from GPNZ, HWNZ, DHBs and RNZCGP.

The stocktake was undertaken via a web-based/telephone/faxed survey directed to practice managers and/or senior clinicians if a practice manager was unavailable. A structured questionnaire was developed by University of Otago and University of Auckland researchers, asking about practice demographics, recent experience of having...
trainees (undergraduate medical students, junior doctors, GP registrars and other health professional students) in the practice, as well as future intentions and capability for each of these groups. Other questions covered size and nature of the practice, current staffing levels and other services/clinics that were available to the practice, and limitations to taking more trainees in practices. Partway through the data collection, some questions were omitted, as they proved difficult for practice staff to answer, eg, year group of undergraduate medical student was changed to ‘any undergraduate medical student’. The final shortened survey is attached (Appendix).

Invitations to participate with an electronic survey link were sent to all Otago study area practices followed by a reminder phone call and, if required, subsequent email. A further final phone call to the non-responding practices was undertaken in April 2015 with shortened survey faxed as a word document.

Data were cleaned and checked for accuracy. Where practices completed the online survey several times the most recent survey was used. Some practices did not fully complete the survey but any data they had completed was included. Responses were more likely to be incomplete with regard to questions about different types and levels of trainees. Response denominators are therefore given for each question. Percentages were calculated depending on the response denominator for each question. All responses regarding undergraduate medical students were amalgamated, as practice responders were often not able to reliably distinguish between different levels of medical students.

The responses regarding limitations to and incentives for expanding teaching were grouped (0–1: no limitation/importance, 2–3: some limitation/importance, 4–5: significant limitation/importance.

No further statistical analyses were considered appropriate in view of the self-reported nature of the data, the variable nature of responses and the apparent lack of reliable information at practices about past involvement in training.

Results

Participation

In the Otago study region, 463 currently operating primary care practices were identified, including small rural hospitals. For consistency, satellite clinics (a peripheral site where patients are seen intermittently) were considered part of their parent practice if they would not be able to consistently fully host a trainee themselves.

During the process of identifying practices, several clinics were found to be amalgamating with other practices, building rooms or closing. Between regions, similar types of clinic varied in their ability to take health professional trainees due to differences in availability of supervisors, for example after-hours clinics. There were several ‘specialised’ clinics identified, eg, men’s health clinic, skin clinics. These were not included unless it was clear that they could fully host a trainee for a clinical attachment.

Non-responding practices

Despite all practices being contacted by letter, fax, email and at least once by phone, 183 failed to answer the survey in the six-month study time frame despite stated intention to do so. Of the 183 non-responding practices, 82 (45%) are nevertheless known to one or other of the university departments, as they currently take, or have recently taken, medical students. The other 101 may or may not take trainees, but are unlikely to do so.

Responding practices

Responses were received from 60% (280/463) of practices. The response rate was highest from practices in the Dunedin campus area. Overall survey response rates were: Wellington campus area 57% (105/185), Christchurch campus area 60% (107/179) and Dunedin campus area 69% (68/99), respectively. One hundred and ninety self-identified as urban, 66 rural and 24 regional.

Consistent with the population demographics and spread in the lower South Island, the highest proportion of rural practices was in the Dunedin campus area; 41%. Of the 280 responses, 139 practices returned electronic surveys, 75 returned phone surveys and 66 returned hand-written faxed surveys.
Number of consulting rooms at practices was used as a proxy for practice size, as trainees in practices affect consulting room use. The most common type of practice by size has 5–7 consulting rooms. Nearly three-quarters (201/280; 72%) of all responding practices have seven or fewer consulting rooms. The Christchurch campus area had more very small practices (1–2 consulting rooms) and the Wellington campus area more very large practices (>10 room practices) than the other regions. Other characteristics of responding practices are shown in Table 2.

Teaching and learning—health professional trainees in practices

Of all the responding practices, 93% (261/280) were involved in taking health professional trainees in the last five years, with 86% (241/280) taking at least one type of medical trainee; only 14% (39/280) indicated otherwise. When the known teaching practices from the non-responding group (82/183) are added it is reasonable to assume that 323/463 (70%) of Otago study region practices are involved in medical trainee teaching. As shown in Table 3, undergraduate medical trainees and nursing trainees were the commonest type of student. Overall, 199/280 took an undergraduate medical trainee, with 158/275 taking nursing trainees. Of the 14% of responding practices who have not had any type of medical trainee, half (20/39; 51%) nevertheless take other trainees (nursing, social work, pharmacy, dietitian, etc.).

Table 2: Characteristics of responding general practices across the Otago study region by campus area in the study period.

<table>
<thead>
<tr>
<th>General practices in the Otago study region (includes rural hospitals (11) in Otago study region)</th>
<th>Otago study region</th>
<th>Wellington campus area</th>
<th>Christchurch campus area</th>
<th>Dunedin campus area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responding practices</td>
<td>280/463 (60%)</td>
<td>105/185 (57%)</td>
<td>107/179 (60%)</td>
<td>68/99 (69%)</td>
</tr>
<tr>
<td>Size of practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1–2 rooms</td>
<td>n=276</td>
<td>24 (9%)</td>
<td>7 (7%)</td>
<td>14 (13%)</td>
</tr>
<tr>
<td>• 3–4 rooms</td>
<td>78 (28%)</td>
<td>31 (30%)</td>
<td>10 (10%)</td>
<td>9 (8%)</td>
</tr>
<tr>
<td>• 5–7 rooms</td>
<td>100 (36%)</td>
<td>41 (38%)</td>
<td>8 (7%)</td>
<td>7 (10%)</td>
</tr>
<tr>
<td>• 8–10 rooms</td>
<td>31 (11%)</td>
<td>8 (7%)</td>
<td>10 (10%)</td>
<td>27 (26%)</td>
</tr>
<tr>
<td>• &gt;10 rooms</td>
<td>43 (16%)</td>
<td>43 (16%)</td>
<td>31 (31%)</td>
<td>31 (31%)</td>
</tr>
<tr>
<td>Practices identifying as rural</td>
<td>66 (24%)</td>
<td>10/105 (9%)</td>
<td>28/107 (26%)</td>
<td>28/68 (41%)</td>
</tr>
<tr>
<td>No. practices with satellite clinics</td>
<td>23 (8%)</td>
<td>49 (104)</td>
<td>29 (107)</td>
<td>24 (68)</td>
</tr>
<tr>
<td>Satellite clinics and other available clinics*</td>
<td>102 (279)</td>
<td>49 (104)</td>
<td>29 (107)</td>
<td>24 (68)</td>
</tr>
<tr>
<td>Total number of consulting rooms available at any one time</td>
<td>1,837</td>
<td>806</td>
<td>571</td>
<td>460</td>
</tr>
<tr>
<td>No. FTE doctors</td>
<td>852</td>
<td>359</td>
<td>267</td>
<td>226</td>
</tr>
<tr>
<td>No. FTE nurses</td>
<td>860</td>
<td>387</td>
<td>255</td>
<td>218</td>
</tr>
</tbody>
</table>

*includes Marae, rest home, school clinics, prison and other.
Future intentions

Overall, practices indicate they will continue to teach medical trainees. A small number of practices (17/280) had taken medical trainees in the past (12/17; 70%, undergraduate trainee only) but indicated they were not intending to take them in the future. A few of these (5/17) indicated they could possibly take a trainee part-time if other options were available during the week.

Across the Otago study region, 59% (162/276) of practices indicated that they would take undergraduate medical students in future. Nearly a third (79/275; 29%), indicate willingness to take future junior doctor trainees and 52% (142/275) would take GP registrars. Over half of all practices indicated willingness to take nurse trainees (155/277; 56%) and 16% (45/277) indicated willingness to take other health professional trainees in future. A majority of responding practices (67%; 175/262) reported they would consider accommodating a trainee (who required a room) part of the week if there were options for the other days.

Differences between current practice and future intentions

Overall, responding practices across the Otago study region report an intention to slightly increase total numbers of trainees, as compared in Figure 1. However, responding practices indicate that overall, less of them will take undergraduate medical students than they have in the past (199 practices down to 162 practices), but more will take junior doctors (42 up to 79) and GP registrars (129 practices up to 142) in future. Across the Otago study region those figures represent a 14% drop in the number who say they will take undergraduate medical trainees.
Practice limitations and incentives

The majority of practices responded to questions about limitations on the practice in taking students and to questions about incentives to increase teaching capacity. Interest in teaching was high, with less than 3% (8/265) of responding practices considering ‘lack of interest’ to be a significant limitation. Practices reported that lack of supervising staff (69%, 184/265 [75 said a ‘significant limitation’]) was the most limiting factor. Christchurch campus area practices tended on average to have fewer consulting rooms, and also reported physical infrastructure as being a significant limitation more so than the other two regions. Other reported limitations are shown in Table 4.

Practices responded to questions on incentives to develop teaching capacity, as shown in Table 5. Assistance with converting, building or equipping teaching room(s) was recorded as a key incentive by 70/262 (27%).

The overall impression from the survey across the Otago study region (lower North Island and all the South Island) is that practices are willing but stretched, as a respondent concluded:

“Our patients are very tolerant and positive about our teaching role but I would not want to saturate this, or exhaust our enthusiasm as teachers.” (GP respondent)

Table 4: Factors reported as limiting practices in Otago study region, by campus area, in their ability to take more trainees.

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Otago study region n=265</th>
<th>Wellington campus area n=102</th>
<th>Christchurch campus area n=99</th>
<th>Dunedin campus area n=64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure (rooms)</td>
<td>Total* (157 (59%))</td>
<td>Some limitation (71 (27%))</td>
<td>Significant limitation (86 (32%))</td>
<td>Significant (26 (25%))</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Significant limitation (26 (25%))</td>
<td>Significant (44 (44%))</td>
<td>Significant (16 (25%))</td>
</tr>
<tr>
<td>Supervising staff</td>
<td>184 (69%)</td>
<td>109 (41%)</td>
<td>75 (28%)</td>
<td>23 (23%)</td>
</tr>
<tr>
<td>Money</td>
<td>124 (47%)</td>
<td>87 (33%)</td>
<td>38 (14%)</td>
<td>16 (16%)</td>
</tr>
<tr>
<td>Lack of Interest</td>
<td>54 (20%)</td>
<td>46 (18%)</td>
<td>8 (3%)</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

*responses shown in order questions were asked.
*total of some and significant limitation.

Responses to the question ‘How would you rate the following as a limitation for your practice to taking medical students?’

Figure 1: Comparison of previous and future teaching—number of responding practices in the Otago study region, by campus area, reporting previous teaching and intention to take trainees in future.
**Discussion**

This is the most comprehensive survey of general practices in the Otago study region (lower North Island and South Island) undertaken with respect to clinical teaching capability and capacity in primary care to date. When considered together with the Auckland-based survey concurrently undertaken in the upper North Island it provides a nationwide 2016 snapshot of current and intended clinical teaching capability for health professionals in the community at practice level.

Survey results in this study indicate that most general practices in the study region are already involved in medical, nursing training and other health professional teaching, and most are willing to continue their overall involvement in training at current levels. This is an impressive commitment compared to the results from a limited number of other studies, even if all non-responding practices were considered not to teach. Overall, practices consider they are limited in taking more trainees per practice by: too few supervisors at the practice, inadequate physical space and infrastructure (especially smaller practices) and currently fragmented accreditation processes. Present levels of remuneration will limit expansion of teaching. Critically, although practices report intention to continue taking about the same number of nursing placements, over time practices consider they will take fewer undergraduate medical students in favour of more GP registrars and junior doctor placements.

**Strengths and limitations**

Although the response rate (60% overall) could have been higher, this rate compares favourably with other online, postal and telephone surveys in general practice. Nevertheless, available information about non-responding practices shows that at least 40% of these practices in the Otago study region are taking medical trainees of some sort, and although we have no information about their future intentions, it seems reasonable to assume that at least 70% of the region’s practices are involved in some teaching of health professional trainees.

The survey was directed initially at practice managers, but a number reported having to check information with others (e.g., GPs, practice nurses) at the practice before they felt able to complete the questionnaire. Many found it difficult to distinguish between different types of medical trainees, and some questions about types of medical student were subsequently...
dropped from the survey to make it easier for practices to participate.

While a few practices had previously had junior doctors in their practices, in the now discontinued postgraduate general practice placement (PGGP) scheme administered by the RNZCGP, very few CBA placements had occurred in the study region at the time the data was collected.

Comparison with the upper North Island area study, and other studies

Unlike the findings reported in this current paper, the upper North Island study conducted by our Auckland colleagues has identified around half of practices in their study region as currently not involved in any type of health professional training. There are not many nation- or region-wide studies of general practice training capability and capacity anywhere, but a broadly comparable UK study showed a similar result—less than half of all British general practices being involved in undergraduate teaching, with investment in extra support and training being required to increase capacity further.

Why there is such a large difference in this respect between the two New Zealand study areas is not entirely clear, but we do know that there are far more corporate and/or larger practices in the Auckland metropolitan area than elsewhere, and this may have influenced the upper North Island results overall. In contrast, both surveys identified very similar responses about practice factors that would limit more teaching. Concerns about physical infrastructure and difficulties providing appropriate supervision at multiple training levels within a practice were especially common.

In Australia, with a comparable training system, cost benefit analysis has shown that even with some payment, all trainees represent a cost to practices. Costs to practices in New Zealand are likely to be more, since amounts paid to practices for taking undergraduate students and GP registrars are considerably less than in Australia.

Implications

In future, given present restraints, practices indicate a willingness to only slightly increase overall trainee health professional numbers. Assuming half the national estimates (since approximately half the nation’s population live in the lower North Island and South Island), currently there are 259 trainee interns, approximately 30 PGYs and 108 registrars requiring general practice placements in the Otago study region. By 2020 this is set to increase to approximately 300 trainee interns, 300 PGYs and 150 registrars. In addition, more 4th and 5th year medical students, nurses and other allied health professionals will continue to require general practice placements. Results imply that unless total capacity is increased to collectively accommodate all health professional undergraduates, junior doctors and GP registrars, medical students may not gain adequate and essential clinical experience in general practice by the time they graduate. This has critical implications for medical undergraduate placements and the influence on students considering choosing general practice as a career.

It is clear there is limited training ‘headroom’ with regard to new teaching practices across the entire region. Among the small number of practices not currently teaching, some will not be suitable and others would need substantial investment in creating effective learning environments.

What can best be done to enable existing teaching practices to systematically provide for more trainees? Responses from the study show that practice capability for teaching and learning could be most effectively increased by firstly increasing numbers of supervisors, by instigating additional training and support (as widely advocated by others), and secondly providing assistance for physical infrastructure improvements. Other practice support measures include sharing of trainee placements where necessary, a standard combined practice accreditation process and formal recognition of teaching practices as having additional status.

As described in comparable jurisdictions, investment in strategic capacity building is needed. There needs to be prompt attention to a coordinated collaborative placement system, introduction of team teaching and learning models, and the creation of all-of-practice learning environments where all staff can be part of a teaching team. There is also considerable but largely unrealised potential for inter- and intra-professional learning to be fostered at practices, with
students from different health professions and at multiple levels often being present at practices concurrently. Students can learn with and from each other if safely facilitated to do so, taking some pressure off teaching time for senior staff.

As key health system providers, general practices are changing—evolving work roles, workloads, skill mix, premises, business models, system and consumer expectation all make for a dynamic, fluid primary care environment. Our study revealed that there are many practices which have amalgamated, built new premises, closed, opened or changed. Having a view of practices as much as practitioners is essential to knowing how and where to place trainees. For this to happen, agencies requiring trainees to spend time within the general practice setting need to work together to support these practices to build capability and capacity.
Appendix

Welcome to the Department of General Practice & Primary Health Care primary care training practice capacity survey

This survey is led by the University of Auckland, and is also being conducted on behalf of the University of Otago, the RNZCGP and Health Workforce NZ, with the support of GPNZ, the NZ Rural GP Network and the NZMA.

We appreciate your participation. This will enable us to accurately map the current general practice and primary care training landscape, and conduct modelling of possible scenarios which might increase capacity.

Today we will be gaining your thoughts and opinions in order to better serve you in the future. Be assured that all answers you provide will be kept in the strictest confidence.

1. Please fill in the following details.

<table>
<thead>
<tr>
<th>Practice Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Your Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Email address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

2. How many General Practitioners (full time & part time) are employed by the practice?

   ➢ How many full time equivalent GPs are employed by the practice?

3. How many Practice Nurses are employed by the practice?

   ➢ How many full time equivalent Practice Nurses are employed by the practice?
4. How many Consulting Rooms are available at one time for the practice in total? 

5. Are there other clinics available to your practice for teaching purposes? (That you are currently using or can make use of in future eg. satellite, school, marae, rest-home, prison) 
   Yes ☐ No ☐

6. Last year (2015), did your practice take any of the following trainees and if so, how many?

<table>
<thead>
<tr>
<th>Trainee Type</th>
<th>Jan - Dec 2015</th>
<th>How many</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate medical students (Years 2 – 6)</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>PGY (house surgeon / junior doctor)</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Selective medical students</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Elective medical students - Domestic</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Elective medical students - International</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>GPEP (GP registrar)</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Nursing students</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Other (eg. pharmacy and social work)</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>

7. In the previous years, from 2010 to 2014, did your practice take any of the following trainees?

<table>
<thead>
<tr>
<th>Trainee Type</th>
<th>2010 - 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate medical students (Years 2 – 6)</td>
<td>☐</td>
</tr>
<tr>
<td>PGY (house surgeon / junior doctor)</td>
<td>☐</td>
</tr>
<tr>
<td>Selective medical students</td>
<td>☐</td>
</tr>
<tr>
<td>Elective medical students - Domestic</td>
<td>☐</td>
</tr>
<tr>
<td>Elective medical students - International</td>
<td>☐</td>
</tr>
<tr>
<td>GPEP (GP registrar)</td>
<td>☐</td>
</tr>
<tr>
<td>Nursing students</td>
<td>☐</td>
</tr>
<tr>
<td>Other (eg. pharmacy and social work)</td>
<td>☐</td>
</tr>
</tbody>
</table>
8. For this year (2016), with your current circumstances, could your practice take any of the following trainees and how many? (This is purely for practice scoping and not a recruiting exercise).

<table>
<thead>
<tr>
<th>Trainee Category</th>
<th>2016</th>
<th>How many (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate medical students (Years 2 – 6)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>PGY (house surgeon / junior doctor)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Selective medical students</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Elective medical students - Domestic</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Elective medical students - International</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>GPEP (GP registrar)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Nursing students</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (eg, pharmacy and social work)</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

9. For how many months of the year (0-12) would your practice prefer to have the following types of trainees?

<table>
<thead>
<tr>
<th>Trainee Category</th>
<th>Preferred Number of months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate medical students (Years 2 – 6)</td>
<td></td>
</tr>
<tr>
<td>PGY (house surgeon / junior doctor)</td>
<td></td>
</tr>
<tr>
<td>GPEP (GP registrar)</td>
<td></td>
</tr>
<tr>
<td>Nursing students</td>
<td></td>
</tr>
<tr>
<td>Other (eg, pharmacy and social work)</td>
<td></td>
</tr>
</tbody>
</table>

10. Would your practice be able to take a trainee for part of a week if there were other options for the remaining days of the week? Yes ☐ No ☐

11. Are there any restrictions for your practice accepting trainees depending on the time of year? [eg seasonal variations / school holidays] Yes ☐ No ☐
12. How would you rate the following factor(s) as a limitation for your practice in taking medical trainees? (Undergraduate/PGY/GP registrars)

<table>
<thead>
<tr>
<th></th>
<th>Not a limitation</th>
<th>Some limitation</th>
<th>Significant limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure (no available rooms)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Supervising staff</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Money</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Lack of interest</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

13. How important are these factors in incentivising your practice to develop its teaching capacity?

<table>
<thead>
<tr>
<th></th>
<th>Not Important</th>
<th>Somewhat Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>University, College &amp; DHB endorsed wall plaque</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Additional status awarded to a teaching practice</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Combined accreditation as a teaching practice</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ability to access additional investigations for patients</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Assistance with converting, building, or equipping teaching room(s)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Do you have any other comments, questions or concerns?

We thank you for your time spent taking this survey, this is very much appreciated.

Please scan and e-mail the completed survey to GPClinicalplacements@otago.ac.nz

or you can fax to 04 385 5539
Competing interests:
Both authors work for University of Otago, Wellington.

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URL:

REFERENCES:


Qualitative study: the experience and impact of living with Behcet’s syndrome
Vicky Tai, Karen Lindsay, Joanne Sims, Fiona McQueen

ABSTRACT

AIM: Behcet’s syndrome is a rare chronic multisystemic vasculitis of unknown aetiology, is unpredictable and can cause life-threatening complications. This qualitative study aims to explore the experiences of patients living with Behcet’s syndrome in New Zealand.

METHODS: Eight English-speaking patients participated in in-depth semi-structured interviews about their experiences of living with Behcet’s syndrome. Interviews were recorded and transcribed. Data were analysed using a general inductive thematic approach.

RESULTS: Five themes related to the experience of Behcet’s syndrome emerged from the interviews: diagnosis (diagnostic challenge and closure), impact of disease (pain, fatigue, reduced vision, fear and uncertainty), loneliness and isolation (lack of support and information, invisible illness), acquiring resilience (coping, gaining sense of control, support group) and ongoing interactions with health system (specialist care, primary care, need for multidisciplinary care, doctor-patient relationship).

CONCLUSIONS: Behcet’s syndrome patients experience difficulties in obtaining a timely and correct diagnosis and contend numerous physical and emotional challenges, often experiencing loneliness and isolation. Establishing trusting doctor-patient relationships, allowing timely access to specialist care and recruiting psychosocial supports will help patients better cope with their illness. Diagnosis and management of Behcet’s syndrome requires close collaboration and communication among specialists and general practitioners and improved education on Behcet’s syndrome.

Behcet’s syndrome is a rare, chronic, multisystem vasculitic disorder of unknown etiology. Patients are commonly affected by recurrent oral and genital ulcers, skin lesions, thrombophlebitis and arthritis. In addition, they may develop sight-threatening uveitis and organ-threatening complications from gastrointestinal, vascular or neurologic disease. Onset of Behcet’s syndrome is usually in the third decade, with both sexes being equally affected, and the disease runs a course with unpredictable exacerbation and remission periods.1,2

Behcet’s syndrome patients in New Zealand contend with the rarity and chronicity of their disease, and significant challenges may arise due to unfamiliarity among clinicians. At their 2014 meeting, the Outcome Measures in Rheumatology (OMERACT) vasculitis working group emphasized the importance of incorporating the perspectives, concerns and ideas of Behcet’s syndrome patients into outcome measure development for future Behcet’s syndrome research.3 This qualitative study sought to explore the experiences and challenges faced by patients living with Behcet’s syndrome, and to identify potential management strategies to enhance resilience.

Methods

Study participants
Patients with a physician diagnosis of Behcet’s syndrome, who attended Auckland District Health Board for review, were invited to participate in this study. Eligible participants were enrolled after providing written informed consent.
Study design

One-on-one, 90-minute, in-depth semi-structured interviews with open-ended questions were conducted, audio-recorded and transcribed by the principal investigator (VT), and transcripts were then verified by the participants. Interview questions were developed following consultation with experienced clinicians involved in the management of Behçet’s syndrome (KL, FM, JS), and explored personal experiences of receiving the diagnosis, ongoing disease management, symptoms/flare-ups and the impact on quality of life.

Data analysis

Transcripts were uploaded onto NVivo 10 software and analysed to extract themes by a general inductive thematic approach. Two investigators (VT, KL) independently reviewed the responses and grouped them into common ideas or patterns, before collectively agreeing on the development of themes and subthemes.4 Hospital clinical records were also examined to triangulate data collected during the interviews, and collate data on ethnicity, disease onset and progression, medication history and comorbidities.

Ethical committee approval

This study was approved by the University of Auckland Human Participants Ethics Committee (reference number 011604).

Results

Patients

Demographics

Eight patients (six female, two male) with a median (range) age of 51 (24–67) years were recruited. The ethnic breakdown included four New Zealand European, one South African European, one Māori, one Armenian and one Korean patient.

Disease course/symptomatology

A summary of the disease course of patients is presented in Table 1. The median (range) age of disease onset was 32 (14–49) years, and the median (range) disease duration was 16.5 (1–32) years. All patients suffered from mouth and genital ulceration and 7/8 patients had experienced at least one episode of uveitis. There were, however, considerable variation in the range of symptoms experienced and the frequency and severity of flares. For most patients, a severe acute flare (of uveitis, gastrointestinal bleed, pustular skin rash) initiated investigations which led to diagnosis. However, many patients identified, retrospectively, that their first manifestation of the disease was mouth or genital ulceration, which preceded the acute flare by weeks to years.

Themes

Five main themes emerged from this study: Diagnosis, Impact of Disease, Loneliness and Isolation, Acquiring Resilience and Ongoing Interactions with Health System (Figure 1). Each of these themes were further categorised into subthemes.

Diagnosis

Diagnostic challenge

For five of the eight patients interviewed, getting a diagnosis was a long and difficult journey. The multiplicity of symptoms caused patients to see many specialists and undergo numerous investigations prior to diagnosis. Some even required a period of hospitalisation for investigation. Life revolved around specialist appointments. The difficult diagnostic process created frustration for patients and tension with the medical profession. Two patients described encounters with doctors who didn’t believe them and criticised them.

“I felt like I wasn’t getting anywhere with the medical profession. They seemed to think I thought I was sick and I wasn’t really... even when I came up to Hospital X they put me under a psychiatrist because they thought it was all in my head. They told me, ‘You know there is nothing wrong with you, you know you aren’t sick, just get on with life!’” (Patient 6)

One patient also felt diagnosis was hindered by doctors who failed to listen or inquire about symptoms outside their specialty.

“I got frustrated because I know very well that ulcers in the mouth and ulcers down below have nothing to do with the eye. But if you have a patient saying to you I also have this and during coming to the eye clinic, I also had the swelling of the arm... I mean something’s going on but they were like, ‘Oh that’s not our department.’” (Patient 1)
**Table 1:** Disease course of patients.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Age at onset (years)</th>
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<sup>a</sup>Patients’ first clinical manifestation of Behcet’s syndrome.

<sup>b</sup>Patients’ first severe acute flare.
On the other hand, diagnosis was facilitated by doctors who wanted to “know about everything” and "listened to see what else is actually going on." Patients also felt that there was a lack of inter-disciplinary communication. This resulted in patients receiving multiple, incorrect diagnoses. For some patients, the difficulty in getting a diagnosis led to anxiety, 'breakdowns' and depression.

"It (the long diagnostic process) did eventually get me quite depressed... everything was just so long and hard." (Patient 4)

**Importance of diagnostic closure**

A diagnosis came as a relief for some patients as it provided an explanation for their suffering and validated their symptoms. These patients felt that a diagnosis helped them to be believed and allowed them to “get into the (medical) system” to access appropriate care to control the illness. Diagnostic closure allowed patients to move on and learn to deal with the disease.

"The diagnosis meant that I would finally get the help that I so needed... I now have a better quality of life and could then go on to study as a teacher." (Patient 6)

On the other hand, receiving the diagnosis was difficult for some patients. They struggled to accept they had an incurable illness.

"Once you have diagnosis, it’s some relief but at the same time it can be more depressing because you do know that at this point, there is no such a thing which can make you completely healthy..." (Patient 5)

**Impact of disease**

**Pain**

All patients experienced pain from mouth ulcers, genital ulcers, joint inflammation or headaches, with considerable variation in severity and degree of debility. Pain from mouth ulcers ranged from being ‘annoying’ to very severe where the patient could not eat, drink, talk or socialise.
“Well if I get the mouth ulcers, especially if I get two on each side of the mouth, they're not just tiny ulcers, they're quite big and vicious and last a week or more and you know eating food or just putting anything in the mouth, it hurts! They're painful. To talk is painful! When I had given up smoking and I had that many in my mouth I was dribbling, constantly. Had to have my tissue when I spoke to somebody... I couldn't move my mouth, it was so sore!” (Patient 1)

Patient 1 experienced a major flare-up of her mouth ulcers a few months after smoking cessation. These mouth ulcers were refractory to medical treatment. Eventually, the unbearable pain caused her to recommence smoking, which she reports helped keep the ulcers under control.

For another patient, pain from genital ulcers made it difficult to walk and urinate and caused her to take a lot of time off school. Joint pains, described by one patient as “having somebody with a hammer and chisel hitting a piece of wood”, reduced patients’ ability to engage in exercise. Pain became a part of everyday life and patients learnt to endure their pain through taking pain relief and “just getting on”. Two patients required pain management education to help them cope.

Fatigue
Patients spoke of becoming fatigued easily and having to adjust and re-pace their lives. Some felt that fatigue limited their engagement in household responsibilities and work, and one patient ceased contribution to the workforce.

Reduced vision
Patients who suffered uveitis were left with permanent partial loss of vision. Reduced vision limited patients’ ability to read for long periods and caused challenges including being unable to drive.

Fear and uncertainty
The unpredictable, remitting-relapsing course of Behcet’s syndrome meant that patients lived in uncertainty of when they would suffer another flare and what system this flare would affect. Patients were particularly fearful of sight-threatening uveitis and life-threatening neurological complications.

“I don’t really know what would happen tomorrow. I’ve looked on the internet and people have died from it. There’s been things where people have suffered from Behcet's and they've had so much swelling and stuff that they've died!... So it's just a bit of a fear thing. Like what if I had another episode (uveitis) like I did? What if they can't stop it? Stop the eyes from swelling... What if I've got swelling in the brain and what if...” (Patient 1)

The constant anticipation about the possible onset of flares meant patients felt perpetually worried.

Loneliness and isolation
Rare disease: lack of support and information
Patients spoke about the challenges of acquiring support and information for their rare illness. Many did not know anyone else with the disease and were not aware of a support group. They reported that most doctors had little knowledge on Behcet's syndrome and perceived that some were not interested in learning about it as it was a rare disease. This meant patients had to do their own research on the illness. They were ‘alone’.

“There were so few people who had it and there was no support group. Like for a lot of people, if you have a stroke, there’s a support group. There was nobody to talk to.” (Patient 4)

“They (doctors) are not interested in looking it up! I used to be very angry about it and I guess underneath I still am very angry about it. But there are a lot of other diseases in the world and we are the rare ones, the minority.” (Patient 2)

Invisible illness
Many of the symptoms of Behcet’s syndrome (mouth/genital ulcers, musculoskeletal pain, headaches, uveitis) were not visible to those around the patient. The invisibility of symptoms made the illness difficult to explain to others and difficult for others to understand.

“Like people looked at you and you weren’t sick. Like if I came out of the hospital with my leg in plaster or if I’d had a stroke like that... There was no support system.” (Patient 4)

Patients were also determined to lead a ‘normal’ life. Most carried on their usual activities and did not dwell on or talk about their illness, which perpetuated the invisibility of their disease.
“To be honest with you, if you saw my daily life you’d think that she can’t have any joint pain, she does that. I just do it. Yea, it really hurts to pick the baby up but I’m his mother so I’ve got to pick him up.” (Patient 1)

Awareness of the illness was often confined to the patients’ immediate family.

Illness trivialisation
The invisibility of Behcet’s syndrome symptoms and the complex disease course meant that often, patients’ family members, friends and treating physicians lacked understanding of their disease experience. They labelled patients as hypochondriacs or psychologically impaired and accused them of feigning symptoms.

“They (family) think it’s hocus pocus. If you have a stroke, they understand that, if you have a heart attack, they understand that. It’s too technical for them. So I don’t bother to talk about it…” (Patient 4)

The perceived trivialisation of their symptoms caused patients to doubt their own perception of suffering and increased their sense of isolation as they felt they could not talk to others about their illness.

“I try not to talk to people about it because do you know if you talk to people about being sick they think you’re a hypochondriac. So you can’t, you really can’t… I am petrified of becoming a hypochondriac!” (Patient 2)

Acquiring resilience
Coping with the illness
Patients coped with Behcet’s syndrome by accepting and adjusting to the restrictions posed by their illness and developing positive mental attitudes. Emotional and physical support offered by family members and clinicians encouraged them to persevere and maintain a positive outlook. For some patients, religious connection and prayer gave them hope for a better future. Others sought counselling to help them cope emotionally with the challenges of Behcet’s syndrome. Many patients engaged in therapeutic hobbies such as exercise, painting, gardening, meditation and kept active in their work and in the community to ‘escape’ from their illness. Many were strong-willed and strived to lead a ‘normal life’.

“It’s not something which should stop me to be who I am.” (Patient 5)

Gaining sense of control
For all patients, keeping their Behcet’s syndrome in remission was a top priority. Patients adjusted their lives to prevent triggering flares. This included pacing their life, limiting stress, “listening to what the body wants” and making lifestyle changes such as stopping smoking, reducing alcohol consumption and adopting a healthier diet. Patients reported high adherence to medications despite unpleasant side effects and most believed their medications were working well to keep the disease under control.

Support group
Two patients with longstanding Behcet’s syndrome founded a support group in the early 2000s in conjunction with a rheumatologist. The support group offered an environment where patients could share their experiences and coping strategies and receive encouragement. For some, the support group was the only place where they could talk about their illness and receive mutual understanding. Patients who were not aware of the local Behcet’s syndrome support group joined international support groups online.

Ongoing interactions with health system
Specialist care
Behcet’s syndrome patients were often under the care of multiple specialists. Specialist appointments tend to be infrequent, occurring every three to six months, or yearly. Patients stressed the importance of being managed by a specialist who is knowledgeable or interested in the disease and willing to learn about it. Many had to ‘navigate specialists’ in order to find appropriate help. Patients were reliant on their specialists to make the important decisions regarding their care (acute flare management and medication changes) and felt that a good specialist enabled them to “get on with life”. Patients also emphasised the importance of being able to access timely specialist care during a flare-up. For one patient, this was facilitated through a
priority card for the eye clinic and being given the contact number for the rheumatology department.

**Primary care**
Between specialist appointments, patients sought care from their general practitioners (GPs) for ongoing symptom management and medication prescriptions. In addition, GPs were often the first point of contact when flare-ups occurred or when new symptoms appeared, and provided the link to accessing specialist care. Patients had varied experiences of primary care. Some patients reported excellent care under GPs who researched the disease, communicated with specialists and worked closely with them.

“I was spoilt by my first GP, because when I’d come up with the symptoms he’d always had his books and computer out and he was always checking on it and he worked in conjunction with the specialists.” (Patient 2)

On the other hand, some patients struggled to get appropriate help from GPs who were not interested in the illness, too busy and reluctant to contact specialists for the patient, even when they were experiencing flares.

“The specialist I’m seeing now says the GP just needs to fax or ring him if I’ve said I’m having a flare but the GP won’t always do that, he’ll say, ‘Oh no we can deal with it.’ And that’s a big thing... Because I think people with Behcet’s know themselves when they’re having a flare more than the doctor.” (Patient 4)

These patients felt they had to become their own doctor.

**Need for multidisciplinary care: communication and collaboration among doctors**
Patients felt that their diagnosis could have been sped up if the various doctors they saw had come together to discuss their case. Patients also felt that lack of collaboration between doctors caused disagreement on the management plan, which manifested in their medications being constantly changed. This had led to some patients being criticised by subsequent doctors for not following instructions and left feeling confused and frustrated.

“You go to one doctor and they say, ‘Oh why are you taking that medication?’ And then you go back to the other one and stop taking it and they say, ‘Why did you stop taking that medication?’ But that one said to not... And they didn’t treat it as a whole. Everybody was treating their little bit but not coming together.” (Patient 4)

One patient had been given a letter from her rheumatologist, which explained that she had Behcet’s syndrome, outlined the flares she experiences and her medications, and provided advice on how to manage her flares. This helped the patient receive appropriate care when she saw new doctors in the emergency setting.

**Doctor-patient relationship**
Patients valued doctors who listened to their complaints, believed them and acknowledged their difficult journey. Acknowledgement of their struggles helped patients feel understood, which was emotionally therapeutic and enabled them to trust the doctor.

“The absolute best thing is when a doctor acknowledges what you are going through. Yesterday a GP said to me he has read my file and I must be a very strong-minded woman to deal with this disease as well as my back and not crawl into surgery feeling sorry for myself. I actually felt as if he had given me a medal because he acknowledged what I was going through.” (Patient 2)

Patients also felt empowered by doctors who encouraged them to “ask questions” and involved them in decision-making regarding medication and treatment options. They appreciated honesty regarding doctor’s knowledge level and their prognosis and valued clear communication on the management plan.

**Discussion**
This qualitative study on patient experiences of Behcet’s syndrome has uncovered many challenges of living with this rare, chronic, multisystem disease.

The challenges experienced by Behcet’s syndrome patients are both physical and emotional.

Behcet’s syndrome patients contend daily with pervasive pain, fatigue, loss of vision and organ failure, which cause physical and social limitations. Patients live with considerable anxiety due to the unpredictable course of their illness. In addition,
they experience isolation due to the invisibility of many symptoms and consequent trivialisation of their condition. These experiences share similarities with those of other chronic rheumatologic conditions, including systemic lupus erythematosus (SLE). However, the rarity of Behcet’s syndrome means that the isolation experienced by patients is more profound. Behcet’s syndrome patients experience a lack of 'priority' for them in the health system. They may feel alone as doctors lack knowledge and interest in the disease and support networks are not readily available.

The difficulty in obtaining a correct diagnosis is another challenge experienced by many patients. This study revealed that there is considerable delay between disease onset and correct diagnosis, by which time the patient has consulted numerous specialists and received various incorrect and sometimes psychiatric diagnoses before being diagnosed with Behcet's syndrome. Several factors may contribute to this. The lack of pathognomonic signs, or specific laboratory, radiologic or histologic findings for Behcet's syndrome means that the diagnosis relies heavily on clinical assessment. Moreover, the disease is episodic, with long intervals between initial onset and secondary manifestations. Finally, the rarity of the condition means that many physicians are not familiar with Behcet's syndrome and its presentations. Delayed diagnosis causes distress for patients and tension with the medical profession. In patients with rare diseases, delayed diagnosis can lead to deleterious consequences such as delayed appropriate treatment, with consequent worsening disease state and possibly death, psychological distress and loss of confidence in the healthcare system.

Despite facing numerous challenges, Behcet's syndrome patients in our study were determined to limit the negative impact of their illness. Efforts should thus be placed on helping Behcet's syndrome patients acquire resilience to cope with the condition. Building a trusting doctor-patient relationship, fostered through listening, empathy, acknowledgement and involving patients in treatment decision-making may be therapeutic, and the first step to enhancing capacity of patients to cope with Behcet's syndrome. Facilitating access to appropriate care during acute flare-ups may also help patients feel in greater control of their illness and reduce anxiety levels. This may be achieved through giving patients priority access to eye clinics and rheumatology departments, and an official document explaining their condition and management plan to other health professionals. One patient in our study experienced complete resolution of mouth ulcers on recommencing smoking. Similar cases have been reported in the literature and it has been suggested that nicotine-replacement therapy may be useful for treating aphthous ulceration in Behcet's syndrome. Interventions such as counselling, stress management programmes and cognitive behavioural therapy have been shown to improve anxiety, depression, stress and disease activity in SLE, and may have similar benefits in Behcet's syndrome. Support groups have also been shown to improve patients' perceived quality of life in other chronic rheumatologic conditions such as rheumatoid arthritis. Support groups have also been shown to improve patients' perceived quality of life in other chronic rheumatologic conditions such as rheumatoid arthritis. Efforts should be made to raise awareness of Behcet's syndrome support groups and to organise regular meetings and education sessions for patients, families and doctors via such groups. Better understanding of the illness by family and doctors may also increase the support they are able to provide patients.

This study also provides insight into the complexity of interactions Behcet's syndrome patients have with the health system. As Behcet's syndrome attacks multiple organs, ongoing management may require input from many health professionals. Providing consistent quality care for Behcet's syndrome patients requires collaboration and clear communication between the various members of the multidisciplinary team. In some European countries, this has been facilitated through the establishment of Centres of Expertise for Rare Diseases, where patients with rare conditions such as Behcet's syndrome can be followed for medical advice, treatment, tests and check-ups by various specialists who work in close proximity and cooperate with one another. While such centres are not widely found, collaborative care for Behcet's syndrome patients may be promoted through regular multidisciplinary meetings, ideally involving GPs, to discuss patients or through holding...
combined specialist clinics to evaluate patients. A combined ophthalmology and immunology clinic is held at our centre and has facilitated swifter diagnosis and medication adjustments among Behcet's syndrome patients with ocular manifestations.

Delays in diagnosis remain a challenge to be addressed for Behcet's syndrome. Providing more education on Behcet's syndrome to primary care providers and specialists who are more likely to encounter Behcet's syndrome patients (rheumatologists, ophthalmologists, dermatologists, neurologists, sexual health physicians, gastroenterologists) may prompt better recognition of the disease and earlier referral to a rheumatology specialist. Increasing education during medical training may also be of benefit.

Our study is not without limitations. The rarity of Behcet's syndrome in New Zealand is acknowledged to limit the sample size. Nevertheless, the use of semi-structured interviews and qualitative analysis allowed an in-depth exploration of patient experiences. Furthermore, our study strived to minimise interviewer bias, a limitation inherent to qualitative studies, through the use of consensus groups to formulate research questions and to review the themes uncovered in the analytic process.

In summary, this qualitative study highlighted the numerous challenges faced by Behcet's syndrome patients, and identified strategies to improve diagnosis and disease management. Future qualitative studies conducted on patients' families and health professionals are required to explore the impact of Behcet's syndrome on family members and to further characterise and understand the barriers to diagnosis and effective medical management.

Competing interests:
Nil.

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New Zealand women have suboptimal intakes of long chain omega-3 polyunsaturated fatty acids during pregnancy—a cross sectional study

Michele Eickstaedt, Kathryn L Beck, Cathryn A Conlon

ABSTRACT
AIM: To investigate dietary intakes and food sources of polyunsaturated fatty acids in New Zealand pregnant women.

METHOD: Women (n=596) 16 years plus in trimester three of pregnancy completed an online food frequency questionnaire validated for omega-3 and omega-6 polyunsaturated fatty acids.

RESULTS: Estimated median [25th, 75th percentile] intakes of omega-3 polyunsaturated fatty acids were: 1,300 [790, 2,120] mg/d alpha-linolenic acid (adequate intake 1,000mg/d); 220 [120, 520] mg/d total long chain omega-3 polyunsaturated fatty acids (adequate intake 115mg/d); and 110 [50, 250] mg/d docosahexaenoic acid (recommended 200mg/d). Only 30.9% of participants consumed more than 200mg/d docosahexaenoic acid. Participants taking omega-3 supplements (19.6%) were 16.5 times more likely to meet recommendations for docosahexaenoic acid. Fish and seafood were the main contributors to docosahexaenoic acid (84.8%) intakes, yet only 21.7% of women consumed fish at least twice per week. Intakes of omega-6 polyunsaturated fatty acids were 11,580 [8,840, 15,760] mg/d linoleic acid (adequate intake 10,000mg/d) and 90 [60, 110] mg/d arachidonic acid (upper limit 800mg/d).

CONCLUSION: Most participants did not meet recommended intakes for docosahexaenoic acid, which may be partly due to low intakes of fish, seafood and omega-3 supplements.

Adequate dietary intakes of long chain polyunsaturated fatty acids (LCPUFAs) are required during pregnancy to support both the mother and foetus.\(^1,2\) Omega-3 (n-3) PUFAs include alpha-linolenic acid (ALA: 18:3n-3) and the LCPUFAs docosahexaenoic acid (DHA: 22:6n-3), eicosapentaenoic acid (EPA: 20:5n-3) and docosapentaenoic acid (DPA: 22:5n-3). Omega-6 (n-6) PUFAs include linoleic acid (LA: 18:2n-6) and the LPCUFA arachidonic acid (AA: 20:4n-6). Both ALA and LA are unable to be synthesised by the human body, so must be obtained from the diet.\(^3\) These essential fatty acids (EFA) are required for the synthesis of LC-PUFAs, which are important for normal growth, development and physiological functions in the foetus.\(^4\) DHA is critical during the time when the neural tube closes\(^5\) and throughout pregnancy as it accumulates in the foetal brain and retinal tissues.\(^6\) The amount of DHA accumulated by the foetus occurs mainly in the third trimester of pregnancy,\(^7\) and is influenced by the maternal diet.\(^8\)

It is important that women meet recommendations for LC-PUFA intakes, in particular DHA, to ensure a healthy pregnancy and optimal foetal development.\(^2\) In New Zealand and Australia, the National Health and Medical Research Council (NHMRC) have set adequate intakes (AIs) of 115mg/d for combined DHA, EPA and DPA for pregnant women, with a suggested
dietary target (SDT) of 430mg/d for women.\(^9\) Several international organisations recommend pregnant women should aim to achieve at least 200mg of DHA per day,\(^{10,11}\) with recommended intakes for combined DHA plus EPA set at 300mg/d.\(^{11}\)

Fish and seafood are rich sources of n-3 LC-PUFAs.\(^{11}\) However, during pregnancy women may decrease their intakes of fish and seafood due to concerns regarding food safety and foetotoxic effects of environmental contaminants such as mercury.\(^{12}\) Although including fish and seafood in the diet may contribute substantially to meeting DHA recommendations, many pregnant women assume that avoiding fish and seafood is a safer option.\(^{12}\) In New Zealand, fish and seafood are a relatively available food source, however, there is limited information regarding n-3 and n-6 PUFA intakes in pregnant women. The aim of this study was to determine dietary intakes and sources of n-3 and n-6 PUFAs in pregnant women living in New Zealand, and whether dietary recommendations are being met.

**Methods**

**Participants and study design**

This cross-sectional study recruited women aged over 16 years old, in their third trimester of pregnancy (≥28 weeks’ gestation) from all regions in New Zealand. There were no exclusion criteria. A sample size of 450 pregnant women was determined as appropriate to determine the mean value of DHA to within ±20mg based on a 5% significance level. Participants were recruited using convenience and snowball sampling techniques, which included the distribution of informative material (eg, email invitations, flyers and posters) to district health boards and health professionals caring for pregnant women. Community strategies included targeting workplaces, press releases and social networking media. Pregnant women were invited to take part in this anonymous study by accessing a link to an online survey. The survey gathered information on participants’ socio-demographic characteristics, medical history, health during pregnancy and dietary intake. Eligibility was confirmed at the start of the online survey, and all participants then provided consent. This project was reviewed and approved by the Massey University Human Ethics Committee (MUHEC): Northern, Application 14/027.

**Assessment of dietary polyunsaturated fatty acids**

Dietary assessment was conducted using a validated New Zealand semi-quantitative PUFA FFQ (NZ-PUFA FFQ).\(^{13}\) The NZ-PUFA FFQ is a reasonably short (~15 minutes) self-administered online tool designed and validated to capture the usual intake of PUFAs in healthy adults in New Zealand. Thirty-six New Zealand-specific items that provide ≥0.1g PUFA/100g are included and are grouped as meats, sausage/delicatessen meats, fish/seafood, eggs, fats/oils/spreads, vegetables, breads, cereals, nuts, desserts, takeaway foods and PUFA containing supplements. The NZ-PUFA FFQ calculates respondents’ intakes of each individual PUFA (LA, ALA, AA, EPA, DPA and DHA) based on New Zealand food composition data. Average PUFA intakes are calculated in grams (g) per day according to the selection of predefined portion sizes and frequency intakes available for each item in the FFQ, with the frequency intakes ranging from ‘never’ to ‘daily intakes’ over the past three months. The FFQ also takes into account infrequent use of PUFA supplements, such as once or twice per week. In addition, open-ended questions are available to allow the identification of items not included in the FFQ, such as specific brands and types of foods, n-3 fortified products and PUFA supplements. Further information regarding the development and validation of the NZ-PUFA FFQ and the food composition database used are described elsewhere.\(^{13}\)

To determine the contribution of different foods to the total intake and individual PUFAs, main food sources resulting from the FFQ responses were combined into nine main food groups according to their similarities in nutritional composition. These food groups included delicatessen meats and sausages, takeaway foods, snacks and desserts, milk, fish and seafood, vegetables, meat, poultry and eggs, fats and oils, nuts and seeds, and cereals.

**Statistical analysis**

Variables were tested for normality using the Shapiro-Wilk and Kolmogorov-Smirnov tests as well as visual inspection of normality plots. Descriptive statistics for participants’ characteristics are presented using mean ± SD or median (25\(^{th}\), 75\(^{th}\) percentiles) for continuous data and frequency summary statistics for categorical data. Participants
were divided into subgroups for statistical analysis, according to consumption of n-3 supplements. Frequency tests were performed to determine the proportion of participants meeting the recommended intakes for PUFAs and the contributions of food sources to total and individual PUFA intakes. In addition, the Chi-square test and odds ratio were used to determine the likelihood of achieving recommended DHA intakes during pregnancy. A P value of <0.05 was considered statistically significant. All statistical analysis was performed using SPSS statistical software package for Windows (version 21.0, IBM Incorporation, New York, USA).

Results

Characteristics of participants

The characteristics of the 596 participants who completed the study are shown in Table 1. The majority of women (37.4%) were from the largest urban city in New Zealand (Auckland), were of New Zealand European ethnicity (74.3%) and were between 28 and 32 weeks gestation (50.8%). Most had planned their pregnancy (75.9%) and were pregnant for the first time (37.2%).

Most of the participants followed an omnivorous diet (96.1%). The majority of participants (75.3%) reported excluding higher risk foods from their diets during pregnancy, including fish and seafood (19%).

Table 1: Participant characteristics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N=596</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>31 [28, 35]</td>
</tr>
<tr>
<td>Ethnicity n (%)</td>
<td></td>
</tr>
<tr>
<td>New Zealand European</td>
<td>442 (74.3)</td>
</tr>
<tr>
<td>Māori</td>
<td>56 (9.4)</td>
</tr>
<tr>
<td>Pacific Island</td>
<td>20 (3.4)</td>
</tr>
<tr>
<td>Other</td>
<td>77 (12.9)</td>
</tr>
<tr>
<td>Country of birth n (%)</td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td>460 (77.2)</td>
</tr>
<tr>
<td>Other</td>
<td>136 (22.8)</td>
</tr>
<tr>
<td>Length of time in New Zealand n (%)</td>
<td></td>
</tr>
<tr>
<td>Less than 5 years</td>
<td>27 (20.1)</td>
</tr>
<tr>
<td>5–9 years</td>
<td>35 (26.1)</td>
</tr>
<tr>
<td>10–19 years</td>
<td>42 (31.3)</td>
</tr>
<tr>
<td>20 years plus</td>
<td>30 (22.4)</td>
</tr>
<tr>
<td>Highest educational level n (%)</td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>3 (0.5)</td>
</tr>
<tr>
<td>Secondary school</td>
<td>157 (26.3)</td>
</tr>
<tr>
<td>University degree</td>
<td>268 (45.0)</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>120 (20.1)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>13 (2.2)</td>
</tr>
<tr>
<td>Other</td>
<td>31 (5.2)</td>
</tr>
<tr>
<td>None</td>
<td>4 (0.7)</td>
</tr>
<tr>
<td>Gestational age n (%)</td>
<td></td>
</tr>
<tr>
<td>Between 28–32 weeks</td>
<td>303 (50.8)</td>
</tr>
<tr>
<td>Between 33–37 weeks</td>
<td>214 (35.9)</td>
</tr>
<tr>
<td>Between 38–40 weeks</td>
<td>65 (10.9)</td>
</tr>
<tr>
<td>40 weeks and over</td>
<td>14 (2.3)</td>
</tr>
<tr>
<td>Current pregnancy planned n (%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>448 (75.9)</td>
</tr>
<tr>
<td>No</td>
<td>142 (24.1)</td>
</tr>
<tr>
<td>Number of pregnancies including current pregnancy n (%)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>222 (37.2)</td>
</tr>
<tr>
<td>2</td>
<td>180 (30.5)</td>
</tr>
<tr>
<td>3</td>
<td>104 (17.6)</td>
</tr>
<tr>
<td>4 or more</td>
<td>84 (14.3)</td>
</tr>
</tbody>
</table>

*Median [25th, 75th percentile]; †Missing data for two participants; ‡n = 134 (missing data for two participants); §Missing data for six participants.
Table 2: Polyunsaturated fatty acid intakes compared to international dietary recommendations for fatty acids.

<table>
<thead>
<tr>
<th></th>
<th>International dietary recommendations (mg/d)</th>
<th>Daily intakes (mg/d)</th>
<th>Daily intakes (mg/d)</th>
<th>n (%) meeting reference values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Median [25th, 75th percentile]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All participants (n=596)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALA NHMRC</td>
<td>AI - 1,000</td>
<td>1,620 [1,130]</td>
<td>1,300 [790, 2,120]</td>
<td>383 (64.3)</td>
</tr>
<tr>
<td>DHA Perinatal Lipid Intake Working Group FAO &amp; WHO</td>
<td>200</td>
<td>200 [250]</td>
<td>110 [50, 250]</td>
<td>184 (30.9)</td>
</tr>
<tr>
<td>Total n-3 LC-PUFA (EPA+DPA+DHA) NHMRC</td>
<td>AI - 115 &lt;sup&gt;a&lt;/sup&gt; SDT - 430 UL - 3,000</td>
<td>410 [530]</td>
<td>220 [120, 520]</td>
<td>457 (76.7) 178 (29.9) 591 (99.2)</td>
</tr>
<tr>
<td>Total EPA+DHA FAO &amp; WHO</td>
<td>300</td>
<td>360 [510]</td>
<td>180 [90, 460]</td>
<td>208 (34.9)</td>
</tr>
<tr>
<td>LA NHMRC</td>
<td>AI - 10,000</td>
<td>13,240 [6,890]</td>
<td>11,580 [8,840, 15,760]</td>
<td>384 (64.4)</td>
</tr>
<tr>
<td>AA FAO &amp; WHO</td>
<td>UL - 800</td>
<td>90 [50]</td>
<td>90 [60, 110]</td>
<td>596 (100)</td>
</tr>
<tr>
<td>Participants taking n-3 supplements (n=117)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALA NHMRC</td>
<td>AI - 1,000</td>
<td>1,570 [1,110]</td>
<td>1,260 [770, 2,130]</td>
<td>71 (60.7)</td>
</tr>
<tr>
<td>DHA Perinatal Lipid Intake Working Group FAO &amp; WHO</td>
<td>200</td>
<td>430 [310]</td>
<td>370 [210, 530]</td>
<td>93 (79.5)</td>
</tr>
<tr>
<td>Total n-3 LC-PUFA (EPA+DPA+DHA) NHMRC</td>
<td>AI - 115 SDT - 430 UL - 3,000</td>
<td>920 [700]</td>
<td>770 [480, 1,140]</td>
<td>116 (99.1) 95 (81.2) 114 (97.4)</td>
</tr>
<tr>
<td>Total EPA + DHA FAO &amp; WHO</td>
<td>300</td>
<td>870 [680]</td>
<td>680 [440, 1,090]</td>
<td>105 (89.7)</td>
</tr>
<tr>
<td>LA NHMRC</td>
<td>AI - 10,000</td>
<td>14,450 [6,800]</td>
<td>13,040 [9,900, 17,880]</td>
<td>88 (75.2)</td>
</tr>
<tr>
<td>AA FAO &amp; WHO</td>
<td>UL - 800</td>
<td>90 [50]</td>
<td>90 [70, 120]</td>
<td>117 (100)</td>
</tr>
<tr>
<td>Participants not taking n-3 supplements (n=479)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALA NHMRC</td>
<td>AI - 1,000</td>
<td>1,630 [1,130]</td>
<td>1,310 [810, 2,130]</td>
<td>312 (65.1)</td>
</tr>
<tr>
<td>Total n-3 LC-PUFA (EPA+DPA+DHA) NHMRC</td>
<td>AI - 115 SDT - 430 UL - 3,000</td>
<td>280 [380]</td>
<td>180 [100, 300]</td>
<td>341 (71.2) 83 (17.3) 477 (99.6)</td>
</tr>
<tr>
<td>Total EPA + DHA FAO &amp; WHO</td>
<td>300</td>
<td>230 [340]</td>
<td>140 [70, 240]</td>
<td>103 (21.5)</td>
</tr>
<tr>
<td>LA NHMRC</td>
<td>AI - 10,000</td>
<td>12,940 [6,840]</td>
<td>11,330 [8,650, 15,290]</td>
<td>296 (61.8)</td>
</tr>
<tr>
<td>AA FAO &amp; WHO</td>
<td>UL - 800</td>
<td>90 [40]</td>
<td>90 [60, 110]</td>
<td>479 (100)</td>
</tr>
</tbody>
</table>

<sup>a</sup>AI for pregnant women aged 19–50 years.

Al, adequate intake; AA, arachidonic acid; ALA, alpha-linolenic acid; DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; LA, linoleic acid; PUFA, polyunsaturated fatty acid; SDT, suggested dietary target; UL, upper limit.

Definitions of Nutrient Reference Values.<sup>1</sup>

Adequate intake—the average daily nutrient level based on observed or experimentally-determined approximations or estimated of nutrient intake by a group (or groups) of apparently healthy people that are assumed to be adequate.

Upper level of intake—the highest average daily nutrient intake level likely to pose no adverse health effects to almost all individuals in the general population. As intake increases above the UL, the potential risk of adverse effects increases.

Suggested dietary target—a daily average intake from food and beverages for certain nutrients that may help in prevention of chronic disease.
Dietary intakes of PUFAs

The median [25th, 75th percentile] and mean ± SD dietary intakes of total and individual PUFAs for the study population and by n-3 supplement use are shown in Table 2. The data, particularly for the n-3 LC-PUFAs intakes, is skewed, with visually large differences between the mean and median values. Thus, results are reported using medians [25th, 75th percentile].

Intakes of omega-3 PUFAs

The majority of the pregnant women were meeting the National Health and Medical Research Council (NHMRC) Nutrient Reference Values (NRVs) for ALA (64.3%). Although most women (76.7%) met the NHMRC NRV for combined DHA/EPA/DPA intakes (115mg/d), only one-third of the whole group were meeting the NHMRC SDT of 430mg/day (29.9%), and international recommendations for DHA of 200mg/day (30.9%), and for total EPA plus DHA of 300mg/day (34.9%) (Table 2). Median intakes of DHA were 110 [50, 250] mg/d. Only 117 participants (19.7%) reported taking supplements containing n-3 LC-PUFAs and the majority of these participants met the NHMRC NRVs for total and individual n-3 LC-PUFAs. Nearly 80% of participants taking n-3 supplements met DHA recommendations compared to only 19% of the participants not taking n-3 supplements. In addition, participants taking n-3 supplements were 16.5 times more likely to meet DHA recommendations compared to participants not taking supplements (P<0.001). Further statistical analysis revealed that approximately 33% of all participants had DHA intakes below 70mg/day.

The NHMRC recommend an UL of 3,000mg/d for total n-3 LC-PUFAs. Three participants taking PUFA supplements and two participants not taking PUFA supplements exceeded the upper limit.

Intakes of omega-6 PUFAs

The majority of participants were meeting the NHMRC NRV for LA (64.4%). All participants had AA intakes below the recommended UL of 800mg/d with a median intake of 90 [60, 110] mg/d (Table 2).

Food sources of PUFAs

The major food sources contributing to total polyunsaturated fatty acid intakes were fats and oils, including vegetable oils, butter, lard and margarine. This food group was the main contributor towards LA (43.2%) and ALA (55.7%) intakes. Meat, poultry and eggs were the main contributor to AA (60.0%) intakes. The main contributor to DHA intake was fish and seafood (84.8%), which included all fresh, frozen and canned fish as well as shellfish and fish paste. Fish and seafood were also the main contributor to EPA (82.1%) and DPA (46.2%) intakes. Only minor contributions (less than 4.0%) to individual PUFA intakes were observed for takeaway foods, snacks and desserts, milk, nuts and seeds, and vegetables (see Figure 1).

Figure 1: Contributions (%) of food groups to estimated mean daily intakes of individual PUFAs within study population (n=596).

AA, arachidonic acid; ALA, alpha-linolenic acid; DPA, docosapentaenoic acid; LA, linoleic acid; DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; PUFA, polyunsaturated fatty acid.
Consumption of fish, seafood and meat

A large proportion of participants indicated ‘never’ or ‘less than once per month’ for intakes of fresh/frozen fish (26.4%), canned fish (54.7%) and shellfish/seafood (82.7%). Less than 15% of participants reported consuming fresh/frozen fish (12.3%), canned fish (9.5%) and shellfish/seafood (1.5%) at least twice per week. Over half of participants reported consuming chicken (63.1%) and beef (60.8%) at least twice per week.

Discussion

The majority of pregnant women in this study were not meeting international recommendations for omega-3 polyunsaturated fatty acids including DHA intake. The FFQ was completed during the last trimester of pregnancy when eating habits are likely to be firmly established and are indicative of DHA supply to the foetus.

Intakes of omega-3 PUFAs

DHA accumulated in the brain peaks during the third trimester of pregnancy and first year of life, which corresponds with a period of rapid brain growth and development. Although metabolic adaptations during pregnancy may upregulate the maternal ability to convert ALA into DHA and there is a priority use of DHA stored in adipose tissue, it is not clear whether these mechanisms are adequate to meet increased foetal growth and development demands. Most participants (76.7%) had a higher intake than the NHMRC AI of 115mg/d for total n-3 LC-PUFAs (EPA, DHA plus DPA). The AI is the average nutrient level assumed to be adequate based on estimates of nutrient intakes in healthy individuals. However, the SDT (average nutrient intake, which may help in the prevention of chronic disease) of 430mg/d was met by only 29.9% of women, and the majority of pregnant women (69.1%) were not meeting international recommendations for DHA of 200mg/d. Nearly one-third (33%) had DHA intakes below 70mg/d (the amount of n-3 fatty acids (predominantly DHA) accumulated in the foetus per day during trimester three). Similar results were observed in Australian pregnant women (n=94), with median intakes of 75mg/d DHA with just 9% of participants meeting the daily 200mg consensus recommendation. Other studies in Western countries have observed similar inadequate intakes of DHA in pregnant women.

Although n-3 supplements are not recommended by current nutrition guidelines for pregnant women in New Zealand, approximately one-fifth (n=117) of participants took n-3 supplements. These participants were 16.5 times more likely to meet DHA recommendations than participants not taking n-3 supplements. Similarly, a Canadian study in 600 pregnant women also found participants taking n-3 supplements (30%) were over 10 times more likely to meet DHA recommendations compared to participants not taking supplements. Three participants taking n-3 supplements exceeded the UL of 3,000mg/day.

Intakes of omega-6 PUFAs

Total PUFA intakes comprised 86.7% n-6 PUFAs (99.3% LA and <1% AA), with most pregnant women meeting the NHMRC NRVs for n-6 PUFAs. Mean dietary intakes were 13,240±6,890mg/d of LA and 90±50mg/d of AA, which are consistent with the levels observed in pregnant women in Canada and the US. Dietary intakes of LA that exceed recommended intakes may decrease the synthesis of n-3 LC-PUFAs as well as their incorporation into tissues, because both PUFA families share the same metabolic pathway and compete for the same enzymes. Although AA is required for normal foetal growth and development, it is a precursor of pro-inflammatory eicosanoids, which may be unfavourable during gestation. Pregnant women in this study were consuming well below the upper limits for AA; however, as intakes of LA were above recommended levels, they may benefit from reducing intakes of LA, the majority of which came from fats and oils.

Food sources of PUFAs

Despite fish and seafood being the primary source of DHA (84.8%), EPA (82.1%) and DPA (46.2%) intakes, the majority of participants were not meeting the suggested intakes of two to three 150g servings of most fish types (low mercury) per week. This finding is similar to that of pregnant women in other countries. This may be
due to concerns regarding mercury contamination, with a decrease in fish consumption observed among pregnant women in the US following a national mercury advisory. The consumption of fish and seafood during pregnancy provides benefits such as the provision of other nutrients, lays the foundation for improved lifelong dietary habits and reduces the risks of toxicity that may occur with supplementation as well as providing omega-3 PUFAs.

**Study strengths and limitations**

The validated FFQ to assess PUFA intakes was an important strength of this study. The online structure allowed the collection of nationwide data from a large number of participants (n=596). In addition, the NZ-PUFA FFQ asked about dietary intakes over the past three months, thereby increasing the likelihood of detecting foods not typically eaten on a daily basis, such as fish and seafood.

The NZ-PUFA FFQ has been validated in New Zealand adults. Although not validated specifically in pregnant women, findings from this study are comparable to findings from other studies using FFQs to assess PUFA intakes in pregnant women. In addition, other studies have shown that FFQs are a valid way to assess dietary intakes of DHA in pregnant women. However, FFQs are dependent on participants’ memory and interpretation of portion sizes, and have a requirement for a minimal level of literacy. Regardless of how omega-3 and omega-6 dietary intakes are assessed, analysis is dependent on the availability of an accurate and complete food composition database. The majority of foods (86%) in the database considered to be major dietary contributors to n-3 LCPUFA intake were derived from New Zealand-specific analytical data.

The use of snowballing recruitment techniques and a volunteer convenience sample may have attracted participants who were generally more health conscious and interested in their dietary intake. Therefore, it is not possible to exclude the risk of selection bias in this study and therefore findings are unlikely to be representative of all pregnant women living in New Zealand.

**Conclusion**

In conclusion, the majority of pregnant women in this study had low intakes of n-3 LC-PUFA including DHA and did not meet international consensus recommended intakes. The low intake of fish and seafood in this study population contributed to women not meeting these recommendations. Future research should investigate dietary intakes and biomarkers of n-3 LCPUFAs intakes in a representative sample of pregnant women in New Zealand. Further studies and interventions should focus on ways to promote optimal intakes of long-chain omega-3 fatty acids during pregnancy. Strategies to overcome barriers to the consumption of fish and seafood during pregnancy should be explored.

**Competing interests:**

Nil.

**Acknowledgements:**

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REFERENCES:


Family planning unmet need and access among iTaukei women in New Zealand and Fiji
Radilaite Cammock, Peter Herbison, Sarah Lovell, Patricia Priest

ABSTRACT

AIM: The aim of the study was to identify unmet need and family planning access among indigenous Fijian or iTaukei women living in New Zealand and Fiji.

METHOD: A cross-sectional survey was undertaken between 2012–2013 in five major cities in New Zealand: Auckland, Hamilton, Wellington, Christchurch and Dunedin; and in three suburbs in Fiji. Women who did not want any (more) children but were not using any form of contraception were defined as having an unmet need. Access experiences involving cost and health provider interactions were assessed.

RESULTS: Unmet need in New Zealand was 26% and similar to the unmet need found in Fiji (25%). Cost and concern over not being seen by a female provider were the most problematic access factors for women.

CONCLUSION: There is a need for better monitoring and targeting of family planning services among minority Pacific groups, as the unmet need found in New Zealand was three times the national estimate overall and similar to the rate found in Fiji. Cost remains a problem among women trying to access family planning services. Gendered traditional roles in sexual and reproductive health maybe an area from which more understanding into cultural sensitivities and challenges may be achieved.

Family planning is considered an important tool in averting maternal deaths and ensuring women’s reproductive needs are met.1 The need for family planning is supported by data which shows that an estimated 35% of all maternal deaths could be avoided if unintended births were prevented. Specifically, the WHO recommends that no unmet need for family planning should exist, meaning that women who do not wish to have any (more) children are able to access family planning methods.2 Reasons for non-use of modern contraceptive methods have been stated to be largely due to access issues.3,4 This view argues that if family planning methods were made more accessible then unmet need would decrease.

Access to family planning is considered a human rights issue.5 Along with health and wellbeing, lack of access to family planning has social and economic ramifications. Ensuring family planning accessibility warrants individuals with the opportunity to be in control of when to have or limit the number and timing of children, giving them the autonomy and self-preservation that is needed for the maintenance of good health. Given the financial challenges associated with supporting a growing family, being able to control family size can contribute to greater financial stability.6,7

Although access to family planning is considered more problematic in developing countries where resources are low, minority groups in developed countries experience disproportionately lower uptake of family planning services.6,9 Among Pacific populations in New Zealand, this is the case. In New Zealand, high teenage pregnancy and low use of contraception characterise Pacific reproductive behaviour.10,11 Despite these outcomes, little is known about Pacific women’s family planning unmet need and access. High national contraceptive prevalence estimates of 72.4% do not seem to reflect the Pacific experience.12 Furthermore,
unmet need in New Zealand is reported to be 8.8%, low in comparison to other countries in the developed world.12

Thus, there seems to be a disconnect between the overall patterns of contraceptive use and unmet need and the reported experience of Pacific populations in New Zealand. The effects of teenage pregnancy and lack of contraceptive use found among Pacific groups can lead to long-term disability as a result of pregnancy and labour, and socio-economic deprivation as a result of teenage pregnancy.13,14 Therefore, lack of access and uptake of family planning not only has implications on the individual but on future generations.

Most studies in New Zealand of Pacific women's reproductive health behaviour highlight the need for more understanding into social and cultural barriers to reproductive services, as most found cultural sensitivities and taboos to be barriers to access.15,16 Paterson's study of a group of Pacific mothers found that due to cultural taboos and sensitivities, most women who did not plan their pregnancy were not aware of family planning and did not like discussing the topic.17

Given these findings, little has been done to try to capture behaviour involved with reproductive intentions and family planning use. Unmet need investigations give us that link and quantifies the proportion of women whose family planning needs are not being met. Furthermore, although previous studies of reproductive behaviour highlight the need for more understanding of socio-cultural factors associated with uptake, more research is needed to identify what these factors entail and how cultural barriers might change within the New Zealand context.

This study investigates the unmet need of a group of Pacific women, iTaukei or indigenous Fijian and the main barriers to health services. The study draws on the experience of iTaukei women in Fiji to provide insight into unmet need and access changes that might occur among iTaukei in New Zealand.

Methods

Design setting

Between 2012 and 2013, a cross-sectional survey of women's family planning knowledge, attitudes and practice (KAP), unmet need and access was carried out in Fiji and New Zealand to investigate iTaukei women's family planning behaviour. The data presented in this paper focuses on the unmet need and access data from the KAP study. Women who identified as being iTaukei and living in the five major cities of New Zealand—Auckland, Hamilton, Wellington, Christchurch and Dunedin, and in three suburbs in Suva—Samabula, Valelevu and Cunningham, were invited to participate in the study. Only women 18 years and above were included in the survey. If women were under the age of 18 or did not identify as being iTaukei, ie, they were Indian or another ethnic group, they were not included in the survey.

Sample

The sample size goal for the survey was 200 women in each country. This number was needed in order to obtain at least 163 completed questionnaires (ie, approximately 80% response rate) in each country which would allow the study 80% power to detect a statistically significant (p<0.05) difference of 15% between countries in the proportion of women who have used family planning, if this proportion was up to 40% in Fiji and higher in New Zealand.12,18 Multistage cluster sampling carried out in Fiji was based on household income and to ensure representativeness. Given the challenges with generating representative samples among minority groups and hard to reach groups in New Zealand, snowball sampling techniques were employed in New Zealand to get as many women involved in the study as we could. Women in New Zealand were recruited through community networks, social media and Pacific organisations.

Ethics

Ethical approval was granted by the Fiji National Health Research Council and the Human Ethics Committee of the University of Otago. Approval for working in communities in the Suva area was also granted by the Ministry of iTaukei affairs. Participants were provided with information sheets prior to filling in surveys. Questionnaires were self-administered to ensure privacy and confidentiality. Cultural protocols and sensitivities were observed with data collected by iTaukei researchers.
Survey questionnaire

To identify unmet need in the samples, the definition presented by Bradley et al (2012) was used to inform survey questions. These included women’s family planning use, pregnancy intentions and fecundity. Demographic, sexual and reproductive health surveys in the Pacific were also used to inform questions in the survey. To ascertain women’s experience with access, women were asked to indicate whether they found particular access factors, eg, cost, travel, spousal communication and health provider characteristics, to be problematic. The survey questionnaire was available in both the English and Fijian languages.

Analysis

Analysis of the survey data was carried out using Stata 13 statistical software. Data from each country was analysed separately to identify unmet need and access and then comparatively between countries to see if there were any differences in unmet need and access patterns. The Bradley et al (2012) definition was used as a framework to analyse unmet need in each country. Women who were not using family planning methods were classified as having an unmet need for spacing if they did not wish to have any (more) children in the next two years, while those who did not wish to have any more children in the future were classified as having an unmet need for limiting. Unmet need was only assessed among married women or women in a relationship.

Women were asked to indicate whether the following access factors were problematic when accessing medical advice or treatment: knowing where to go, getting money to go, not having a facility nearby, having to find transport, not wanting to go alone, concern there may not be a female provider, talking to your husband/partner about it. Chi-square tests of statistical significance were used for comparison of unmet need and access factors between countries.

Results

Overall, 352 women filled in a survey questionnaire. A higher response rate was observed in Fiji as 212 women (out of the 220 approached) or 96% filled in a survey, while 140 (out of the 235 approached) or 60% filled a questionnaire in New Zealand. Overall, 249 (70%) women were either married or in a relationship and eligible to be included in the unmet need analysis. The mean age of women in New Zealand was 39 while in Fiji the average age of women was 36 years. Fifty-one percent of women in New Zealand had used a family planning method at the time of the survey. In Fiji, 58% of women had used a method. Among currently married women (or women in a relationship) in New Zealand, 26% had an unmet need for family planning. Of these, 25% had an unmet need for spacing while 75% for limiting (Table 1). In Fiji, 25% of women had an unmet need for family planning. Of these, a higher proportion had an unmet need for limiting (86%) compared with spacing (14%) (Table 1).

<table>
<thead>
<tr>
<th>Unmet need in Fiji and New Zealand among currently married women; n (%).*</th>
<th>Fiji N=153</th>
<th>NZ N=96</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmet need</td>
<td>39 (25)</td>
<td>25 (26)</td>
<td>0.608</td>
</tr>
<tr>
<td>No unmet need</td>
<td>114 (75)</td>
<td>71 (74)</td>
<td>0.132</td>
</tr>
<tr>
<td>Unmet need N=37†</td>
<td>32 (86)</td>
<td>18 (75)</td>
<td>0.132</td>
</tr>
<tr>
<td>Unmet need for spacing</td>
<td>5 (14)</td>
<td>6 (25)</td>
<td>0.132</td>
</tr>
</tbody>
</table>

* n is the number of women with an unmet need; % uses the total number of currently married women, including women in a relationship as the denominator.
† Missing information for limiting and spacing Fiji n=2, NZ n=1.
Note: p values were calculated using the Pearson chi-squared test.
Unmet need characteristics

One fifth of the currently married women with a primary and/secondary qualification in New Zealand had an unmet need while about a third in Fiji with a primary or secondary school qualification had an unmet need for family planning (Table 2). Conversely, a higher proportion of women with a tertiary qualification in New Zealand had an unmet need (30%) compared with Fiji (18%). This difference however, was not statistically significant. The in-country differences between primary/secondary and tertiary qualification should be noted as well. In Fiji, more women with a primary/secondary qualification had an unmet need for family planning (31%) compared with women who had achieved a tertiary qualification (18%). In New Zealand, more women with a tertiary qualification had an unmet need (30%) compared to those who had a primary and/or secondary qualification (21%) (Table 2).

Main barriers to accessing family planning services

Table 3 presents the findings from analyses involving access among women in both countries. About half of the women in Fiji found getting money to attend a health facility and concern there may not be a female provider to be problematic. Similarly in New Zealand, almost half of the women identified financial barriers to attending a health facility a problem (49%). The next most problematic factor appeared to be concern there may not be a female provider (36%). The proportion of women not having a health facility nearby was significantly different between countries. More women in Fiji (39%) had a problem with having facilities nearby compared to those in New Zealand (22%) (p=0.002) (Table 3). Similarly, more women in Fiji reported having problems with concerns about not having female providers compared with New Zealand (p=0.010). The number of women

Table 2: Unmet need by characteristics in Fiji and New Zealand; n (%).*

<table>
<thead>
<tr>
<th></th>
<th>Fiji n (%)</th>
<th>New Zealand n (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15–24</td>
<td>2 (18)</td>
<td>2 (50)</td>
<td>0.218</td>
</tr>
<tr>
<td>25–34</td>
<td>16 (28)</td>
<td>7 (27)</td>
<td>0.950</td>
</tr>
<tr>
<td>35–44</td>
<td>14 (27)</td>
<td>13 (34)</td>
<td>0.456</td>
</tr>
<tr>
<td>45–54</td>
<td>7 (29)</td>
<td>2 (13)</td>
<td>0.216</td>
</tr>
<tr>
<td>55+</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td><strong>Education qualification</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary/secondary</td>
<td>25 (31)</td>
<td>5 (21)</td>
<td>0.356</td>
</tr>
<tr>
<td>Tertiary</td>
<td>8 (18)</td>
<td>15 (30)</td>
<td>0.165</td>
</tr>
<tr>
<td>Other</td>
<td>5 (31)</td>
<td>5 (36)</td>
<td>0.796</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below average</td>
<td>21 (27)</td>
<td>14 (26)</td>
<td>0.401</td>
</tr>
<tr>
<td>Above average</td>
<td>17 (26)</td>
<td>7 (25)</td>
<td>0.939</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>10 (23)</td>
<td>16 (27)</td>
<td>0.694</td>
</tr>
<tr>
<td>Unemployed</td>
<td>24 (27)</td>
<td>7 (33)</td>
<td>0.540</td>
</tr>
<tr>
<td>Other</td>
<td>4 (40)</td>
<td>1 (20)</td>
<td>0.439</td>
</tr>
</tbody>
</table>

*n is the number of women with an unmet need; % uses the total number of currently married women, including women in a relationship as the denominator in each categorical grouping.

Notes: P values calculated without missing numbers; calculations were carried out using Pearson chi-squared test.
reporting having problems with talking to husbands about health issues was higher among women living in Fiji (31%) compared with New Zealand (16%) (p=0.004) (Table 3).

### Discussion

#### Unmet need

The unmet need among iTaukei women in New Zealand was 26%, about three times the national estimate of 8.8%. The difference between national figures and the figures found in the current study reflect the need for further investigation into minority Pacific groups in New Zealand and reflect similar patterns in other developed countries. In the US, minority women have been found to have lower contraceptive use rates compared to the national figures. In a study investigating ethnic variations in sexual activity and contraceptive use from a national cross-sectional survey in Britain, minority ethnic groups were found to have significantly lower contraceptive use rates compared to Caucasian women.

Calculations in the current study referred to any family planning method that women might be using, therefore unmet need calculations accounted for traditional methods as well as modern contraceptive methods. Thus, unmet need for modern contraception may be greater among this population and given the low reliability of traditional methods, total unmet need may be higher as well. This is important to consider given how young the Pacific population is in New Zealand and the high rates of teenage pregnancy.

### Table 3: Factors affecting women’s access to health services.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Fiji</th>
<th>NZ</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing where to go</td>
<td>N=169</td>
<td>N=123</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>56 (33)</td>
<td>28 (23)</td>
<td>0.053</td>
</tr>
<tr>
<td>No problem</td>
<td>113 (67)</td>
<td>95 (77)</td>
<td></td>
</tr>
<tr>
<td>Getting money to go</td>
<td>N=172</td>
<td>N=118</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>87 (51)</td>
<td>46 (49)</td>
<td>0.052</td>
</tr>
<tr>
<td>No problem</td>
<td>85 (49)</td>
<td>72 (61)</td>
<td></td>
</tr>
<tr>
<td>Not having health facility nearby</td>
<td>N=168</td>
<td>N=118</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>66 (39)</td>
<td>26 (22)</td>
<td>0.002</td>
</tr>
<tr>
<td>No problem</td>
<td>102 (61)</td>
<td>92 (78)</td>
<td></td>
</tr>
<tr>
<td>Having to find transport</td>
<td>N=168</td>
<td>N=118</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>61 (36)</td>
<td>33 (28)</td>
<td>0.139</td>
</tr>
<tr>
<td>No problem</td>
<td>107 (64)</td>
<td>85 (72)</td>
<td></td>
</tr>
<tr>
<td>Not wanting to go alone</td>
<td>N=167</td>
<td>N=116</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>61 (36)</td>
<td>35 (30)</td>
<td>0.267</td>
</tr>
<tr>
<td>No problem</td>
<td>106 (64)</td>
<td>81 (70)</td>
<td></td>
</tr>
<tr>
<td>Concern there may not be a female provider</td>
<td>N=167</td>
<td>N=118</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>85 (51)</td>
<td>42 (36)</td>
<td>0.010</td>
</tr>
<tr>
<td>No problem</td>
<td>82 (49)</td>
<td>76 (64)</td>
<td></td>
</tr>
<tr>
<td>Talking to husband/partner about it</td>
<td>N=168</td>
<td>N=118</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>52 (31)</td>
<td>19 (16)</td>
<td>0.004</td>
</tr>
<tr>
<td>No problem</td>
<td>116 (69)</td>
<td>99 (84)</td>
<td></td>
</tr>
</tbody>
</table>

Note: p values were calculated using a Pearson chi-squared test, n (%).
Comparatively unmet need among iTaukei women in New Zealand was similar to proportions found in Fiji. This is important to consider in light of the different level of resources available in each country and their specific economic contexts. The unmet need in both countries was similar to those found in West Africa and higher than estimates in the developing world (12.8%).

Most of the unmet need found in this study referred to limiting the number of children rather than spacing and is supported by other research which found women preferred to use family planning to limit rather than for spacing. The higher unmet need associated with limiting may be due to the age structures of the samples. Studies have found that as age increases and women have more children, unmet need for spacing decreases while unmet need for limiting increases. In the current study, given the older age structures of the sample, it is likely that women may have reached their ideal family size and did not want any more children.

The finding that unmet need among primary/secondary qualified women is higher compared with those with tertiary education is supported by the literature. Therefore, the higher unmet need found in New Zealand among those with tertiary education is interesting and reflects similar findings to those found in the Democratic Republic of Congo, Guinea, Mali and Niger, where unmet need was found to increase with women's education. In these countries, researchers found that women with higher education were more likely to live in urban areas and were found to have similar levels of unmet need, compared with those who live in rural areas. It is likely that, in the current study, because women were recruited from the major urban cities, higher unmet need among this group may be due to work commitments and costs associated with a higher standard of living in urban areas. Therefore, the extra costs of raising children and career commitments may be motivators for women to desire to limit having children. Access barriers such as cost and inconvenience (time) may further add to unmet need among this group.

Health service access
Cost and concern that there may not be a female provider were problematic among most women in both countries. For women in developing countries like Fiji, studies show cost to be a significant barrier. Given that over one third of the participants in Fiji found not having transport to be a problem, having facilities far away would provide further challenges for access. The longer the distance to the health facility, the higher the cost of travel, further burdening women and limiting their likelihood of accessing family planning services. Although transport and distances were not as problematic for New Zealand participants, costs of GP visit and commodities may be a burden for iTaukei women living in New Zealand. Research in New Zealand among Pacific populations have found cost to be a significant barrier in accessing health services. Given the relative availability of resources in New Zealand, questions regarding effectiveness and targeting of services is warranted. Accessing subsidised services, eg, family planning clinics, needs to be effectively promoted among those who may find seeing a primary health provider, eg, general practitioner, too expensive.

Concern there may not be a female provider is an important finding as it highlights sensitivities around privacy and cultural values and belief systems. These concerns show that women are likely to feel more comfortable having female providers over male providers, especially when it comes to reproduction and sexuality. This finding reiterates the concerns highlighted by other Pacific research around the need for more understanding into the cultural barriers associated with accessing health services and further highlights the relevance of traditional gender roles within the reproductive patient-provider relationship in New Zealand.

Perhaps ensuring that primary health care practitioners are trained in providing services that are culturally sensitive and inclusive of the respect and sacredness that sexual and reproductive issues require may be needed to improve cultural awareness and competencies in service delivery.
Jameson and colleagues (1999) found that Pacific women’s barriers to cervical screening included being apprehensive about cultural backgrounds, embarrassment and confidentiality. The study highlighted the lack of discussion of such topics in the family and the effect that this might have on health. For women to discuss family planning intentions or experiences, women need to be able to feel comfortable and trust their health practitioner. Understanding traditional gendered roles and the effect that this might have on women’s perception of male providers is important to consider among Pacific women and their ability to access services. Improving community education about the importance of such concerns to health practitioners and the steps the health system is taking to ensure women’s matters are respected and remain confidential will help improve relationships and trust with health providers, leading to greater accessibility of these services among Pacific women.

The findings in this study should be considered in light of its limitations. Unmet need was measured among married women or women in long-term relationships, and so therefore, did not account for the unmet need among women who may be single and sexually active. It is likely that the rate of unmet need maybe an underestimation of the true unmet need in this population. Furthermore, given that the sampling strategy employed in New Zealand was a snowball sample, the findings are limited to older women and may not reflect younger women’s unmet need. Therefore, further research is needed to investigate the unmet need and access barriers among younger women in both countries.

In conclusion, the study shows that in New Zealand, unmet need among iTaukei Pacific women is more prevalent than existing data show and has implications on other minority Pacific groups. Regardless of whether women lived in Fiji or New Zealand, financial and cultural barriers challenged women’s access to services. In New Zealand, better targeting of services is needed to ensure that minority groups like the iTaukei benefit from the greater availability of resources. Furthermore, addressing the financial and cultural barriers may lead to greater access of services and lower unmet need.

Competing interests:
Dr Cammock and Dr Priest report grants from New Zealand Health Research Council during the conduct of the study.

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URL:

REFERENCES:
3. Casterline J, Sathar Z, ul Haque M. Obstacles to contraceptive use in


Cutaneous melanoma: an audit of management timeliness against New Zealand guidelines

Tess Brian, Brandon Adams, Michael Jameson

ABSTRACT

AIM: The New Zealand Ministry of Health’s “Faster Cancer Treatment” programme aims for timely care for patients with cancer, including melanoma. Melanoma care guidelines detail investigation and treatment timeliness standards. This audit assesses compliance with these.

METHOD: Patients admitted to Waikato Hospital for melanoma surgery during the year ending February 2016 were retrospectively identified. Time intervals between care events were calculated. Demographic, lesion, surgical and histopathological characteristics were analysed.

RESULTS: For patients referred with skin lesions suspicious for melanoma, referral to first treatment (Standard 2.1), referral to diagnostic skin biopsy (Standards 2.2, 2.3), biopsy histology report to first treatment (Standard 2.4), referral to first treatment (Standards 2.2, 2.3, 2.4, 4.4) and biopsy to first treatment (Standards 2.4, 4.4) compliance was 0%, 17.6%, 21.7%, 9.3% and 21.7%, respectively. For patients referred with biopsy-confirmed melanomas, referral to first treatment (Standards 2.2, 2.4) and skin biopsy to first treatment (Standards 2.2, 2.4, 4.4) compliance was 42.2% and 42.9%, respectively.

CONCLUSIONS: Compliance was low. Attention to logistical constraints in the department reviewed may improve this. Recommendation inconsistencies within and between suspicious-lesion and confirmed-diagnosis referral pathways suggest the investigation and treatment events selected and intervals mandated by the guidelines may usefully be reconsidered.

Cutaneous malignant melanoma is a significant public health problem in New Zealand.1,2 There were 2,366 new cases in 2013, being the fourth most commonly diagnosed cancer during that year with 10.7% of new cancer registrations.2 Although the cost of melanoma care, currently without immunological or specific pharmaceutical modalities, is low per case when compared with other cancers, it is still an important contributor to the total cost of cancer care in New Zealand (2.1% in 2010–2011).3

The New Zealand Ministry of Health’s “Faster Cancer Treatment” programme aims to ensure timely clinical care for patients with cancer, including melanoma. By promoting nationally coordinated and consistent standards of service provision, the expectation is efficient, sustainable best-practice management of tumours, providing equitable access and care across New Zealand.4

Ten clusters of standards for melanoma care are contained in the “Standards of Service Provision for Melanoma Patients in New Zealand – Provisional”.4 A cluster concerning “investigation, diagnosis and staging” includes a standard detailing timeliness of histopathological reporting on biopsy specimens of cutaneous lesions suspicious for melanoma (Table 1). Another cluster deals with “timely access to services” by patients (Table 1).

Using data from a New Zealand tertiary hospital, this paper presents an audit of timeliness of melanoma management by the Department of Plastic and Reconstructive Surgery, assesses compliance with New Zealand standards and examines possible influences on that compliance.
Methods

Discharge coding and histopathology records were used to retrospectively identify all patients who were admitted to Waikato Hospital, Hamilton, for melanoma surgery during the year ending 16 February 2016. The dates of receipt of referrals to the Department of Plastic and Reconstructive Surgery, histopathological reports and diagnostic biopsies (suspicious skin lesions) and surgical treatments (wide local excision and complete regional lymph node dissection) were retrieved from histopathology and other hospital databases.

Demographic, referral, surgical and histopathological data were entered into PASW/SPSS Statistics 18.0 software (SPSS Inc, Chicago, IL), and analysis of time intervals between elements of care performed. Differences in categorical variables and means of two and three or more independent quantitative variables were assessed using chi square (or Fisher’s exact/Mid-P test if any cell frequency was less than five), t-test and ANOVA, respectively. Significance was accepted at two-sided p<0.05.

The Health and Disability Ethics Committees of the New Zealand Ministry of Health do not require ethical approval of this low-risk observational activity.

Results

There were 143 unique patients admitted to Waikato Hospital for melanoma surgery during the year reviewed (Table 2).

A. Patients referred for skin lesion suspicious of melanoma, with diagnostic biopsy in hospital

Fifty-four patients were referred for a suspicious skin lesion which, on biopsy in the hospital, proved to be either in-situ or invasive melanoma. The referrers of these patients and the clinicians who performed the diagnostic biopsies must have considered these lesions to be “highly suspicious” of melanoma (Table 1), because of history, size and/or appearance.4

1. Standard 2.1

The service standard for patients with a skin lesion suspicious for melanoma is 62 days from receipt of referral to first treatment (Table 1). First treatment is not the initial excision biopsy (a procedure to secure a specimen to establish diagnosis and provide information [Breslow thickness] to determine definitive excision margin), but is wide local excision, or when this is not performed, completion lymph node dissection.

Of the 54 patients who were biopsied in hospital, eleven were excluded from

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Table 1: Standards of service provision for melanoma patients in New Zealand.4

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Clinical standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timely access to services</td>
<td>Standard 2.1 Patients referred with a high suspicion of melanoma receive their first cancer treatment within 62 days of receipt of referral.</td>
</tr>
<tr>
<td></td>
<td>Standard 2.2 Patients referred urgently with a biopsy-confirmed or high suspicion of melanoma (including locally recurrent and metastatic melanoma and excluding melanoma in-situ) have their first specialist assessment within 14 days of receipt of referral.</td>
</tr>
<tr>
<td></td>
<td>Standard 2.3 Urgent diagnostic excision for lesions suspicious for melanoma occurs within 14 days of specialist assessment or image-based triage. Image-guided core or fine needle aspiration biopsy of suspected tumour occurs within 14 days of the request being received.</td>
</tr>
<tr>
<td>Investigation, diagnosis and staging</td>
<td>Standard 2.4 Patients with a confirmed diagnosis of melanoma (including locally recurrent or metastatic melanoma and excluding melanoma in-situ) receive their first cancer treatment within 31 days of the decision to treat.</td>
</tr>
<tr>
<td></td>
<td>Standard 4.4 A histopathological diagnosis of melanoma is reported within five working days in 80 percent of cases, and all cases are reported in 10 working days.</td>
</tr>
</tbody>
</table>
One patient had been the subject of ongoing surveillance since referral in January 2014, and did not have an excision biopsy until August 2015, followed by wide local excision in October (635 days after referral). Another two patients were biopsied by dermatologists before transfer to plastic surgeons. And a further eight patients did not go on to wide local excision or completion lymph node dissection for various reasons, including the presence of metastatic disease beyond the lymph system. For the remaining 43 patients (Table 3), including one who did not have wide local excision but underwent completion lymph node dissection, the mean interval from referral-receipt to first treatment was 139.7 days (standard deviation [SD] 67.4 days), with a median of 114 days. Although the Ministry of Health’s “Faster Cancer Treatment” programme currently benchmarks compliance with this standard at 85%, no patient received first treatment within 62 days (range 63–320 days).

**Table 3:** Demographic, lesion and surgery characteristics of 143 patients admitted to Waikato Hospital for cutaneous melanoma surgery.

<table>
<thead>
<tr>
<th>Ethnicity (N=143)</th>
<th>European N (%)</th>
<th>136 (95.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Māori</td>
<td>2 (1.4)</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>5 (3.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender (N=143)</th>
<th>Male N (%)</th>
<th>84 (58.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>59 (41.3)</td>
</tr>
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<table>
<thead>
<tr>
<th>Age at initial skin biopsy (N=137)</th>
<th>Years</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>68.4 (12.9)</td>
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<table>
<thead>
<tr>
<th>Initial skin lesion site (N=143)</th>
<th>Head/neck N (%)</th>
<th>21 (14.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trunk</td>
<td>49 (34.3)</td>
</tr>
<tr>
<td></td>
<td>Limb</td>
<td>73 (51.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial skin biopsy performed (N=143)</th>
<th>Hospital N (%)</th>
<th>54 (37.8)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Other location</td>
<td>89 (62.2)</td>
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<table>
<thead>
<tr>
<th>Type of initial skin biopsy (N=143)</th>
<th>Excision N (%)</th>
<th>140 (97.9)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Punch</td>
<td>2 (1.4)</td>
</tr>
<tr>
<td></td>
<td>Incision</td>
<td>1 (0.7)</td>
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</table>

<table>
<thead>
<tr>
<th>Tumour stage (N=141)</th>
<th>In-situ N (%)</th>
<th>4 (2.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>57 (40.4)</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>28 (19.9)</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>32 (22.7)</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>20 (14.2)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Wide local excision (N=143)</th>
<th>Yes N (%)</th>
<th>132 (92.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>11 (7.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sentinel node biopsy (N=143)</th>
<th>Yes N (%)</th>
<th>66 (46.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>77 (53.8)</td>
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</table>

<table>
<thead>
<tr>
<th>Completion lymph node dissection (N=143)</th>
<th>Yes N (%)</th>
<th>11 (7.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>132 (92.3)</td>
</tr>
</tbody>
</table>

1Number.
2Standard deviation.
Table 3: Timeliness of melanoma care and association with patient and tumour characteristics for patients referred for a skin lesion suspicious of melanoma, with diagnostic biopsy in hospital.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Standard</th>
<th>≤62 days (N=0 (0%))</th>
<th>&gt;62 days (N=43 (100%))</th>
<th>≤28 days (N=9 (17.6%))</th>
<th>&gt;28 days (N=42 (82.4%))</th>
<th>≤31 days (N=10 (21.7%))</th>
<th>&gt;31 days (N=36 (78.3%))</th>
<th>≤73 days (N=4 (9.3%))</th>
<th>&gt;73 days (N=39 (90.7%))</th>
<th>≤45 days (N=10 (21.7%))</th>
<th>&gt;45 days (N=36 (78.3%))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Mean (SD)</td>
<td>-</td>
<td>6.4 (14.2)</td>
<td>65.9 (11.7)</td>
<td>69.4 (14.4)</td>
<td>62.5 (13.3)</td>
<td>69.1 (13.9)</td>
<td>62.5 (27.7)</td>
<td>67.9 (12.7)</td>
<td>67.9 (17.7)</td>
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<td>P-value</td>
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<td>-</td>
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<td>0.2</td>
<td>0.5</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site of primary lesion (N)</td>
<td>Head/neck</td>
<td>-</td>
<td>6</td>
<td>1</td>
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<td>7</td>
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<tr>
<td>Trunk</td>
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<td>17</td>
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<td>12</td>
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<td>15</td>
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<td>13</td>
<td></td>
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<td>20</td>
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<td>17</td>
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<td>0.4</td>
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</tr>
<tr>
<td>Initial skin biopsy horizontal clearance (mm)</td>
<td>Mean (SD)</td>
<td>-</td>
<td>4.1 (2.6)</td>
<td>-</td>
<td>-</td>
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<td>4.9 (0.3)</td>
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<td>P-value</td>
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<td>-</td>
<td>-</td>
<td>0.2</td>
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<td>0.7</td>
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<td></td>
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<tr>
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<td>-</td>
<td>4</td>
<td>9</td>
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<td>11</td>
<td>3</td>
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<tr>
<td>&gt;2.0mm</td>
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<td>32</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>27</td>
<td>4</td>
<td>28</td>
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<td>0.9</td>
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<td></td>
<td></td>
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<tr>
<td>Initial skin biopsy deep clearance (mm)</td>
<td>Mean (SD)</td>
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<td>6.4 (2.5)</td>
<td>-</td>
<td>-</td>
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<td>6.6 (2.5)</td>
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<td>6.4 (2.4)</td>
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<tr>
<td>Breslow thickness (mm)</td>
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<td>-</td>
<td>-</td>
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<td>1.8 (1.6)</td>
<td>1.8 (1.6)</td>
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<td>9</td>
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<tr>
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<tr>
<td>Presence of primary satellite lesion (N)</td>
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<td>-</td>
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<td>0.9</td>
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</tr>
<tr>
<td>Presence of primary in-transit lesion (N)</td>
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<td>-</td>
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<td>0.8</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meets criterion for consideration of sentinel node biopsy (N)</td>
<td>Yes (Stage ≥T1b)</td>
<td>-</td>
<td>33</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>27</td>
<td>3</td>
<td>30</td>
<td>8</td>
<td>27</td>
</tr>
<tr>
<td>No (Stage T1a)</td>
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<td>10</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td>2</td>
<td>9</td>
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</tr>
<tr>
<td>P-value</td>
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<td>-</td>
<td>0.8</td>
<td>0.9</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Number.
2 Standard deviation.
2. Standards 2.2 and 2.3

Patients referred urgently with a high suspicion of melanoma should have their first specialist assessment within 14 days of receipt of referral (Standard 2.2; Table 1). Then, urgent diagnostic excision of these lesions should occur within 14 days of that specialist assessment (Standard 2.3; Table 1). The interval from referral-receipt to cutaneous biopsy in hospital should therefore be ≤28 days.

Of the 54 patients referred who had cutaneous melanoma diagnosed by biopsy performed in hospital, one had been under long-term surveillance by the plastics department, and two were biopsied by dermatologists before referral to plastics. These three patients were excluded from analysis.

For the remaining 51 patients (Table 3), the mean interval from referral-receipt to skin biopsy was 69.2 days (SD 56.2 days; range 0–287 days), with a median of 51 days. Nine (17.6%) patients had biopsy within 28 days of referral.

Fifteen (29.4%) and 13 (25.5%) patients were referred during the October-December and January-March quarters, respectively, with seven (13.7%) during December. There was no difference (p=0.8) in month of referral for those biopsied ≤28 or >28 days from referral.

3. Standard 2.4

For patients who have cutaneous biopsy in the hospital, if it is assumed that a melanoma diagnosis for a skin biopsy would immediately trigger a booking for wide local excision treatment (or completion lymph node dissection if no wide local excision), then first cancer treatment should occur within 31 days of the histopathology report (Table 1).

Of the 54 patients who had skin melanoma diagnosed by a biopsy performed in hospital, eight did not proceed to wide local excision or completion lymph node dissection, and were excluded from analysis.

For the remaining 46 patients (Table 3), including one who did not have wide local excision but underwent completion lymph node dissection, the mean interval from histopathology report to first treatment was 53.3 days (SD 36.5 days), with a median of 43 days and range 8–223 days. Ten patients (21.7%) had first cancer treatment within 31 days of reporting of skin biopsy histopathology.

4. Standards 2.2, 2.3, 2.4 and 4.4

From referral for a suspicious skin lesion, through specialist assessment (Standard 2.2; Table 1), biopsy (Standard 2.3; Table 1) and histopathology reporting (Standard 4.4; Table 1), without any delay on decision to proceed to wide local excision, first treatment (Standard 2.4; Table 1) should occur ≤73 days.

Although this timeframe is inconsistent with that recommended in Standard 2.1 (Table 1), if it is accepted, four (9.3%) of the eligible 43 patients received timely treatment (Table 3).

5. Standards 2.4 and 4.4

For patients who have cutaneous biopsy in the hospital, a melanoma diagnosis should be confirmed within 14 days (being the 10 working days stipulated by Standard 4.4; Table 1). If this immediately activates a booking for wide local excision treatment, then first cancer treatment within 31 days of the decision to treat (Standard 2.4; Table 1) should occur ≤45 days of the diagnostic biopsy.

For the 54 patients who had skin biopsy in hospital, the mean interval from biopsy to histopathological report was 14.9 days (SD 9.5 days; range 2–46 days). The 25, 50 and 75 percentiles were 8.0, 14.0 and 18.3 days, respectively.

Of these patients, 46 had subsequent wide local excision or completion lymph node dissection (Table 3). No patient had melanoma in-situ. The mean interval from biopsy to first treatment was 68.1 days (SD 36.4 days; range 27–238 days), with a median of 61 days. Ten (21.7%) patients had first treatment within 45 days.

B. Patients who had diagnostic biopsy outside hospital, with referral for confirmed cutaneous melanoma

1. Standards 2.2 and 2.4

Within 14 days of receipt of referral, patients with a biopsy-confirmed melanoma (including locally recurrent and metastatic melanoma, but excluding melanoma in-situ) should have their first specialist
Table 4: Timeliness of melanoma care and association with patient and tumour characteristics for patients who had diagnostic biopsy of a skin lesion outside hospital, with referral for confirmed melanoma.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Standard</th>
<th>≤45 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standards 2.2 and 2.4: referral of confirmed melanoma—wide local excision (or completion lymph node dissection if no wide local excision) treatment</td>
<td>N=35 (42.2%)</td>
</tr>
<tr>
<td></td>
<td>Standards 2.2, 2.4 and 4.4: diagnostic biopsy outside hospital—wide local excision (or completion lymph node dissection if no wide local excision) treatment</td>
<td>N=48 (57.8%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Mean (SD)</td>
<td>66.6 (14.6)</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0.4</td>
</tr>
<tr>
<td>Site of primary lesion (N)</td>
<td>Head/neck</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Trunk</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Limb</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0.4</td>
</tr>
<tr>
<td>Initial skin biopsy horizontal clearance* (mm)</td>
<td>Mean (SD)</td>
<td>2.5 (1.7)</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0.2</td>
</tr>
<tr>
<td>Initial skin biopsy horizontal clearance threshold 2.0mm* (N)^</td>
<td>≤2.0mm</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>&gt;2.0mm</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0.7</td>
</tr>
<tr>
<td>Initial skin biopsy deep clearance** (mm)</td>
<td>Mean (SD)</td>
<td>2.8 (2.0)</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
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<tr>
<td>Breslow thickness** (mm)</td>
<td>Mean (SD)</td>
<td>2.4 (2.1)</td>
</tr>
<tr>
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<td>P-value</td>
<td>0.3</td>
</tr>
<tr>
<td>Clark’s level of invasion** (N)</td>
<td>II</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
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</tr>
<tr>
<td>Presence of primary satellite lesion*** (N)</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0.4</td>
</tr>
<tr>
<td>Presence of primary in-transit lesion*** (N)</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>-</td>
</tr>
<tr>
<td>Meets criterion for consideration of sentinel node biopsy*** (N)^</td>
<td>Yes (Stage ≥T1b)</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>No (Stage T1a)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0.2</td>
</tr>
</tbody>
</table>

1Number.
2Standard deviation.
3Data incomplete for Standards 2.2 and 2.4 cut at 45 days: initial skin biopsy horizontal clearance (N=68), initial skin biopsy horizontal clearance threshold 2.0mm (N=68), initial skin biopsy deep clearance (N=68), Breslow thickness (N=82), Clark’s level of invasion (N=66), presence of primary satellite lesion (N=66), presence of primary in-transit lesion (N=65) and meets criterion for consideration of sentinel node biopsy (N=80).
4Data incomplete for Standards 2.2, 2.4 and 4.4 cut at 59 days: initial skin biopsy horizontal clearance (N=67), initial skin biopsy horizontal clearance threshold 2.0mm (N=67), initial skin biopsy deep clearance (N=67), Breslow thickness (N=76), Clark’s level of invasion (N=62), presence of primary satellite lesion (N=64), presence of primary in-transit lesion (N=63) and meets criterion for consideration of sentinel node biopsy (N=74).
assessment (Standard 2.2; Table 1), at which a decision to treat will be made. Their first cancer treatment should follow within 31 days (Standard 2.4; Table 1), being ≤45 days since referral.

Of the 89 patients who were biopsied outside the hospital, three had melanoma in-situ, two did not have wide local excision or completion lymph node dissection, and one had been the subject of long-term surveillance before treatment (581 days after referral). These six patients were excluded from analysis.

For the remaining 83 patients (Table 4), the mean interval from referral-receipt to first treatment was 73.0 days (SD 57.3 days; range 16–282 days), with a median of 54 days. Thirty-five (42.2%) patients underwent wide lesion excision within 45 days.

Thirty (36.1%) and 20 (24.1%) patients were referred during the October-December and January-March quarters, respectively, with 13 (15.7%) during each of March and November. There was no difference (p=0.6) in month of referral for those first treated ≤45 or >45 days from referral.

2. Standards 2.2, 2.4 and 4.4

Patients biopsied outside hospital should have a histopathological diagnosis within 14 days (Standard 4.4; Table 1), and expect that this would generate an electronic referral. The referral would be received by the hospital on the same day as the histopathological report was issued. Then, with a specialist appointment and decision to treat within 14 days (Standard 2.2; Table 1), first treatment should occur within a further 31 days (Standard 2.4; Table 1). Therefore, biopsy to wide local excision should be within 59 days.

Date of biopsy was unknown for six of the 89 patients who were biopsied outside the hospital. Three patients had melanoma in-situ and another two did not have wide local excision or completion lymph node dissection. One patient had been the subject of long-term surveillance before treatment (685 days after biopsy). These 12 patients were excluded from analysis.

For the remaining 77 patients (Table 4), the mean interval from skin biopsy to first treatment was 69.5 days (SD 34.7 days; range 5–241 days), with a median of 63 days. Thirty-three (42.9%) patients underwent wide lesion excision within 59 days.

Discussion

This practice audit evaluated the timeliness of melanoma management for patients referred to a New Zealand tertiary hospital plastic surgery department, and compared this with investigation and treatment times suggested by New Zealand guidelines. We found that compliance with recommended time intervals was poor for patients referred with skin lesions suspicious for melanoma (Table 3): from referral to first treatment (Standard 2.1), compliance was 0%; from referral to diagnostic skin biopsy (Standards 2.2 and 2.3 combined), compliance was 17.6%; from histology report of diagnostic skin biopsy to first treatment (Standard 2.4), compliance was 21.7%; from referral to first treatment (Standards 2.2, 2.3, 2.4 and 4.4 combined), compliance was 9.3%; and, from skin biopsy to first treatment (Standards 2.4 and 4.4 combined), compliance was 21.7%. Patients referred with biopsy-confirmed cutaneous melanomas received more timely intervention, but compliance was still low (Table 4): from referral to first treatment (Standards 2.2 and 2.4 combined), compliance was 42.2%; and, from skin biopsy to first treatment (Standards 2.2, 2.4 and 4.4 combined), compliance was 42.9%.

Demographic (age), lesion (site), surgical (horizontal and deep skin biopsy specimen margins, tumour criterion for consideration of sentinel node biopsy) and histopathological (Breslow thickness, Clark's level of invasion, satellite and in-transit lesions) characteristics of patients and their melanomas that may influence timeliness of interventions were examined. For patients referred with skin lesions suspicious for melanoma, the distribution of these characteristics across patients managed within and outside guideline times was such that no characteristic was likely to have influenced management (Table 3). The same is likely true for patients referred with biopsy-confirmed melanomas (Table 4), although greater skin specimen deep clearance margin was associated with waiting longer from referral to first treatment (p=0.001).

The determinants of timeliness of care are therefore likely to be non-clinical. Although there was some seasonal variation in referrals, with a slight preponderance over the reduced-service months of summer,
no association of timing of referral with compliance-failure was noted. However, administrative and ongoing systemic logistical constraints such as staff shortages may well offer explanation for much of the failure to comply. More rapid histopathological reporting of skin biopsy specimens would also improve timeliness of care for those biopsied in the hospital.

There are internal inconsistencies generated by the timeliness standards. For example, for patients referred with skin lesions suspicious for melanoma, Standard 2.1 suggests from receipt of referral to first treatment should not exceed 62 days (Table 1). However, applying Standards 2.2, 2.3, 2.4 and 4.4 gives up to 73 days for this to occur (Table 1), which raises the compliance rate from 0% to 9.3% (Table 3). So, because such differences likely have little or no effect on patient mortality or morbidity, perhaps with the exception of mental health, the appropriateness of time intervals specified could be reviewed, and recommendation consistency established.

Despite the recommendations aiming for equity in care, there are expectation inconsistencies for patients, depending on their pathway of investigation and treatment. For example, for patients referred with a suspicious lesion, diagnostic skin biopsy to first treatment (Table 1: Standards 2.4 and 4.4 combined) should be completed within 45 days (Table 3). However, for patients referred with biopsy-confirmed melanoma, diagnostic skin biopsy to treatment is afforded 59 days (Tables 1 and 5: Standards 2.2, 2.4 and 4.4 combined). Allowable intervals between events should be equal for, and independent of, different pathways of care if equity is to be attained.

This audit revealed poor compliance with timeliness recommendations. However, it is unlikely, as a group, that the patients for whom management was audited suffered any consequent deleterious effects. This, with the timing inconsistencies within and between the suspicious-lesion and confirmed-diagnosis referral pathways, suggest the investigation and treatment events selected and intervals mandated between may usefully be reconsidered. Then, given the apparent lack of influence of demographic, lesion, surgical and histopathological factors on timeliness, perhaps attention to logistical constraints in the surgical department reviewed may improve compliance and care.

Competing interests: Nil.

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REFERENCES:
Assessment and modelling of general practice and community setting capacity for medical trainees in northern New Zealand

Felicity Goodyear-Smith, Abbas Al-Murrani

ABSTRACT

AIMS: To estimate the capacity of general practice to accommodate undergraduate and postgraduate medical trainees, and model efficient ways to utilise identified capacity and increase capacity.

METHODS: We conducted an online survey, with phone follow-up to non-responders, of all general practices in the northern half of New Zealand. The main outcome measures were current placements and future intentions for taking medical trainees; factors influencing decisions and possible incentives to take trainees.

RESULTS: Sixty percent of existing practices take no medical trainees. On average, practices take trainees for 50% of available cycles per year. Postgraduate trainees displace undergraduate student placements due to space limitations. Only 1.9% practices demonstrate current capacity for full vertical training by taking all three types of trainee (undergraduate, PGY, registrar). Modelling on current use means 69 additional practices will be needed to be recruited by 2020.

CONCLUSIONS: A number of strategies are presented aimed at increasing short-term undergraduate teaching practice capacity in New Zealand, but also relevant to Australia and elsewhere. In the long-term, establishment of the proposed School of Rural Health would enable integrated vertical teaching and address the GP training capacity issues.

New Zealand needs more general practitioners (GPs). There is an ageing workforce,1–3 two decades where few GPs trained,4 more part-time GPs,4–8 plus increasing demands for GP services. Training is complex, with universities, district health boards (DHBs) and the Royal New Zealand College of General Practitioners (RNZCGP) independently recruiting and accrediting training general practices, and allocating medical students, postgraduate year (PGY) doctors and registrars to practices respectively.

All medical students at Auckland and Otago Universities need general practice placements throughout their training to qualify. Auckland places students in the eight northernmost DHBs, with all remaining DHBs in Otago’s ‘catchment’.

Doctors employed by DHBs during their two prevocational intern years now also complete a three month community-based attachment, mostly in general practice.9 GP registrars undergoing vocational training by the RNZCGP have two six-month practice attachments, followed by two years as senior registrars working in practices. The number of government-funded medical students has increased annually, reaching a cap of 600 (300 per university) entering Year 2 in 2016. Steady state will be achieved in 2019. At the same time, PGY and registrar numbers are also increasing, placing pressure on available teaching practices.

Not all practices can or will train. Reasons include lack of consulting rooms with computer and software licences; insufficient patient workload in small solo
practices; no vocationally trained doctor to supervise; choice not to train due to increased workload, insufficient time or cost-effectiveness issue; or practices deemed unsuitable following accreditation visits or negative feedback from trainees. When capacity issues force practices to choose between undergraduate students or postgraduate registered doctors who can take clinical responsibility, including independent prescribing, whose salary is paid by the DHBs and who can generate practice income, many choose the latter. Auckland University now has insufficient good quality attachments for medical students, with practices preferentially taking PGY and registrars, while student numbers continue to rise. Lack of coordination between universities, DHBs and RNZCGP impinges on the ability of the system to meet these multiple training requirements. This project aims to estimate the capacity of general practice to accommodate undergraduate and postgraduate medical trainees in the University of Auckland catchment area, and to model efficient ways to utilise identified capacity and to increase capacity.

Results

From the 590 general practices identified in the University of Auckland catchment region, 432 responded (73% response rate) (Figure 1). Twenty-one percent of responding, compared with 9% of non-responding practices had hosted medical students, and 28% and 7% respectively had hosted GP registrars in 2015. Thirty-five percent of responding practices reported also hosting non-medical students, predominantly nursing. Of the 40% of responding practices that took trainees, 12% took UG students, 17% took GPEP and 7% took a UG plus either a PGY or GPEP, with only 1.9% demonstrating current capacity for full vertical training by taking all three types of trainee (Figure 2). Practices took on average medical students for 3/6, PGY for 1/4 and registrars for 1/2 cycles.

Fifty-eight percent (249) practices showed interest in sharing supervision with another practice, and 11% indicated interest in assistance in adding on or converting a room into an additional consulting room for training purposes. Many practices had additional consultation sites in their communities that they regularly visited. Of the 432 practices, 53 reported using a satellite practice and 129 ran clinics in a variety of other sites: 39 school-based, 28 marae-based and seven prison-based clinics, 100 rest homes and 33 not otherwise specified. Availability of such sites increases potential capacity for trainees.

In order to forecast future student/trainee numbers, current and projected undergraduate student numbers were provided by the University of Auckland for 2016–2020. Projected PGY numbers for the eight DHBs were provided by the MCNZ. Because no numbers were available from RNZCGP on estimated GPEP numbers for 2016 and onwards, figures were estimated using straight line growth through to 2020. Overall numbers of placements rise from 1,094 in 2015 to 1,507 by 2020 (38% increase). This equates to an additional 69 practices required to take trainees full-time in 2020. The numbers of medical students and PYG and should not vary significantly from these estimates. However, because the number of registrars (both government-funded and self-funded) each year is unknown, these estimated numbers could change and would need to be remodelled accordingly.

Methods

A questionnaire was developed with input from the New Zealand Medical Association (NZMA), General Practice New Zealand (GPNZ), the Rural GP Network, RNZCGP and HWFNZ. The University of Auckland Human Participants Ethics Committee approved the study (Ref. 015962). Datasets identifying New Zealand general practices provided by universities, RNZCGP, Rural GP Network, GPNZ and information from the internet were merged. Practices were invited to complete an online questionnaire, with non-responders followed up by phone. The University of Auckland surveyed practices in the eight DHBs in which we place students, and the University of Otago conducted a similar survey for the southern half of the country. We used University of Auckland and RNZCGP datasets on actual practice placements of medical students and GPEPs in 2015, but location of PGY placements was unavailable. The final dataset was cleaned and checked for accuracy, including removal of duplicate practices, with descriptive and modelling analyses conducted.
Figure 1: Flowchart of practice responses.

Figure 2: Percentage of practices taking one, two or three types of trainees (total n=432).
The extra number of teaching practices needed was modelled based on the assumption that each practice can take six medical students, two PGY or one GPEP per year. Table 1 summarises practice number forecasts. The best-case scenario is modelled on only 66% of PGY being in general practice attachments (based on current figures), and the current proportions of practices that take combinations of two types of trainees or all three types. The worst case scenario is based on the assumption that the current proportion of cycles that practices take trainees continues.

Table 1: Projected increased numbers of teaching practices needed 2016, 2017 and 2020.

<table>
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<tr>
<th></th>
<th>Year 5</th>
<th>Year 6</th>
<th>PGY</th>
<th>GPEP</th>
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<td>96.9</td>
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<tr>
<td>Adjust for mean PGY &amp; GPEP actually taken†</td>
<td>63.9</td>
<td>96.9</td>
<td>58.8</td>
<td>166</td>
<td>385.6</td>
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</tbody>
</table>

*Assume six medical students, four PGY or one GPEP.
**Assume that 8.8% of practices that take UG; 4.4% of practices that take PGY & 9.9% of practices that take GPEP, also take other types of trainees (based on 2015 figures).
†In 2015, practice took mean 4.4 Year 5 & 2.9 Year 6 out of maximum of six students per year.
‡In 2016, practices took mean 2.6 PGY out of maximum four, and in 2015 practices took mean 0.7 GPEP out of maximum one (ie, some practices took GPEP for only six months of the year).
This model does not allow for the fact that after GPEP1, practices may host registrars at GPEP2 and GPEP3 (i.e., for a further two years) and therefore may significantly overestimate capacity. A practice hosting a registrar may have no capacity to host medical students or other trainees for three years, whereas our model only accounts for one year.

The questionnaire sought to identify important factors for decision making when selecting a student/trainee and possible incentives to increase practices’ willingness and ability to undertake supervision responsibilities. The factors for decision making and incentives based on ‘degree of importance’ (derived from survey) and ‘ease of implementation’ (derived anecdotally) are summarised (Figure 3). The green zone represents opportunities that are both easy to implement and have a high impact; options here are the most desirable. Alternatively, the red zone represents opportunities that are difficult to implement and have low impact. The two yellow zones represent trade-off opportunities between ease of implementation and impact.

![Figure 3: Factors for decision making and incentives with respect to degree of importance and ease of implementation.](image)

Strategies that might increase the status of being a teaching practice, including an endorsed plaque or notice for the wall, non-fiscal advantages such as honorary academic status with the Department of General Practice & Primary Health Care and companying access to University of Auckland databases, subsidised postgraduate education and the ability to earn Maintenance of Professional Standards continuing medical education and peer group credits for RNZCGP Fellowship accreditation were not ranked highly by participants in the survey as incentives to take on teaching. A combined accreditation process, instead of the University of Auckland, the RNZCGP and the MCNZ all conducting their own accreditation of practices for teaching purposes, was also seen as reducing a barrier to teaching. Assistance with increasing numbers of available teaching rooms ranked as important. Practices rated highly the funding they receive from trainees and available space as important considerations, as well as the intrinsic value of having trainees in the practice, and their possible contribution to future succession planning.
Discussion

The response rate was 73%. Non-responding practices were less likely to host trainees than non-responding practices. Only 40% hosted any type of trainee, with only 7% taking both undergraduate and postgraduate trainees, and <2% providing full vertical training (taking UG, PGY and registrars). On average, practices hosted trainees for only half the year. Many practices consulted in additional community-based sites, increasing potential training capacity. Funding received for having trainees was important. Available teaching space also rated highly, and financial aid to achieve this might increase capacity.

Once a practice has taken a trainee they may have no additional available room, regardless of size. The trend over the past decade has been for several smaller practices to amalgamate into a new centre with other services (e.g., laboratory, radiology, community pharmacy, other co-located allied health and social services). Our data supports anecdotal evidence that this may reduce training capacity. Whereas individual smaller practices each hosted medical students, the new enlarged practice takes one student for the entire group.

There is insufficient capacity to accommodate the increasing number of medical trainees over the next five years. A 2007 New Zealand study warning that the capacity issue should be addressed prior general practice rotations made compulsory for all PGYs was not heeded. In Australia it was identified in 2008 that general practice lacked the resources, infrastructure, including consulting rooms and collegiality required to accommodate PGY training, with associated income losses to the practice, and recommended support to fund additional consulting rooms.

We are attempting to implement a number of strategies to assist in increasing training capacity suggested by our findings. These generic solutions may assist other regions in augmenting medical training capacity.

Strategies to increase capacity

- Increase capacity for vertical training: Coordination between the universities, MCNZ and RNZCGP could facilitate development of a vertical curriculum. Registrars are routinely involved in undergraduate teaching in hospitals, and GP registrars in Australia have this role. The need to increase and upgrade infrastructure, including consulting rooms and information technology, to accommodate rising numbers of trainees has long been identified.

- Some practices have the ability to convert a pre-existing room (such as one used for paper files) or build on an additional consulting room. In 2009, the UK allocated £100m to assist up to 600 practices to upgrade to teaching premises. The Australian government provided funds to upgrade and/or extend the existing regional or rural general practice premises by adding additional consultation rooms for medical training.

- Increase capacity by engaging with non-training practices. All practices have been mapped and allocated to specific academic and administrative staff to contact and recruit where appropriate, as well as liaising with Primary Health Organisation practice networks for assistance. A preferred provider status has been introduced for practices taking students for the entire year, including bonus payment, which has the potential to double capacity.

- A model of teaching has been developed offering an alternative to the requirement for a consulting room, while still maintaining good engagement with community-based patients. Dissemination of this strategy is via face-to-face presentations to practices, written documentation and a Youtube video.

- Students may engage with patients at satellite, school, prison, rest-home, occupational and other clinics, freeing up space at the main centre.

- Until the capacity issue has been resolved, PGY community-based attachments should be restricted to non-general practice settings (e.g., hospice, urgent care, community-
devolved specialist services such as mental health) unless the site also takes medical students, to prevent their displacement by PGY.

- Two neighbouring practices share trainees, each hosting for two or three days per week.
- Postgraduate education in teaching and learning can assist GPs and other practice staff supervise trainees. In the UK, universities have training programmes for teaching GPs who get maintenance of professional standards credits and in most cases are also paid to attend. Some universities offer free enrolment in postgraduate courses, certificate or diplomas in medical education to assist practice-based staff to upskill. The Australian model of funding academic registrar posts means they start general practice with educational competencies.  

- New Zealand universities pay a small access fee to practices for hosting medical students, but it is insufficient to cover time and resources required to supervise. Postgraduate trainees can generate the practice some income from consultation fees. An Australian study demonstrated that taking medical students represents a net cost higher than taking PGYs or registrars, in a comparable system. A realistic teaching infrastructure payment fund for general practices would ensure that practices are not out of pocket when they take students. Both Australia and UK governments fund practices to incentivise and facilitate training opportunities. In Australia this is part of the Practice Incentives Programme, with practices paid $200 per three-hour session for teaching medical students.  

- A cultural transformation is required for the value of teaching practices to be recognised in New Zealand. Practice staff need to recognise the many intrinsic advantages of teaching, which include increasing job satisfaction; fostering reflective practice; benefiting patients from increased attention and involvement in their care; students contributing to the practice knowledge base, and possible succession planning. Strategies include educating practices at conferences and face-to-face visits, providing certificates and wall plaques, and offering honorary university lectureships to teaching staff. In the UK, patients afford teaching hospitals and practices special status as places providing high-quality services and hence desirable to attend for health care. Promoting public awareness and appreciation of teaching practices in New Zealand would further assist.

The GP workforce shortage is far more pronounced in rural areas. The University of Auckland and University of Otago, in partnership with the RNZCGP and the New Zealand Rural General Practice Network, are proposing the creation of a national School of Rural Health to address the country's chronic shortage of rural health professionals. This will require new government money invested in rural communities, including academic positions and teaching spaces to enable both horizontally (inter-disciplinary) and vertically integrated training, whereby medical students, PGY and GP registrars learn together, alongside nurses and other health professionals. A coordinated rural pathway, with repeated and prolonged exposure to the rural context, is more likely to deliver the desired increase in the health workforce. Establishing this school with the necessary investment will be a long-term solution to GP training capacity issues.

### Conclusion

Rising numbers of medical students and displacement by PGY and registrars means the University of Auckland has insufficient teaching practices for general practice attachments. In the long-term, a whole of system change is needed, addressing issues of general practice resourcing, funding and service delivery, to ensure teaching capacity across the learning continuum. In the short-term, we suggest strategies to address the shortfall in medical student placements. This study modelled the increasing number required to accommodate all medical trainees and offers strategies to increase capacity. Time will tell whether these actions will be sufficiently timely and effective to address the problem.
Competing interests:
Dr Goodyear-Smith is the Head of the Department of General Practice & Primary Health Care, University of Auckland, and has the responsibility of all University of Auckland medical students completing their required general practice attachments.

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URL:

REFERENCES:
16. Greenstone Family Clinic. Growing Doctors in the Community. Secondary Growing Doctors in the


Seasonal influenza and vaccination strategies—is a paradigm shift needed?
A synopsis of the 3rd New Zealand Influenza Symposium, November 2016

Nadia A Charania, Diana Murfitt, Nikki Turner

ABSTRACT

Influenza continues to be a global public health problem despite the availability of preventive vaccines and public health vaccination programmes. This paper presents a synopsis of the 3rd New Zealand Influenza Symposium (NZiS) that was hosted by the Immunisation Advisory Centre (IMAC) in November 2016. Experts and service providers convened to discuss current issues in the prevention and management of influenza. One of the key topics discussed was the use of novel vaccines, such as adjuvanted and high-dose vaccines, and antiviral prophylaxis to protect young children and the elderly. Another area of focus was on paradigms of seasonal influenza vaccination strategies that reduce community transmission and provide individual protection to reduce the burden of influenza. The need for better influenza surveillance and country-specific data to guide policy makers and healthcare providers was highlighted in order to improve population health outcomes.
virus subtypes based on data reported from national influenza centres and other influenza laboratories around the world.\textsuperscript{4} FluID, a web-based tool, complements FluNet by compiling regional influenza epidemiological data into a global dataset.\textsuperscript{5} The surveillance information collected at the global level is reported in various formats to help nations strengthen their influenza control programmes.

In New Zealand, influenza surveillance is comprised of sentinel general practice surveillance and non-sentinel laboratory-based surveillance. The Southern Hemisphere Influenza Vaccine Effectiveness Research and Surveillance (SHIVERS) project (2012–2016), which was funded by the Centers for Disease Control and Prevention (CDC) and lead by the Institute of Environmental Science and Research (ESR), has provided a valuable national platform for seasonal influenza control and pandemic preparedness. To date, the study has improved sentinel influenza surveillance capabilities, thereby allowing for a better understanding of influenza disease burden. These findings have had various global and national public health impacts, such as informing vaccination policy and guiding vaccine development for improved health outcomes. For instance, low vaccine coverage and high influenza-associated hospitalisation rates were noted among young children in New Zealand. This finding informed a vaccination policy change so that New Zealand children aged six months to five years old who have been hospitalised or have a history of significant respiratory illness are now eligible for free influenza vaccination.\textsuperscript{6,7} Results from SHIVERS have also influenced a revision of the WHO’s case definition for severe acute respiratory infection (SARI); the Global Epidemiological Surveillance Standards for Influenza now state that symptom onset is within the past 10 days instead of seven.\textsuperscript{7} Moreover, the SHIVERS studies on vaccine effectiveness (VE) have helped inform the WHO’s annual vaccine strain selection.\textsuperscript{8–11} The SHIVERS study is also contributing to the WHO-led Pandemic Influenza Severity Assessment (PISA), a pilot project aimed at supporting influenza risk assessment to inform better response decisions during a pandemic.\textsuperscript{12}

Influenza vaccines and antivirals for vulnerable groups

More effective influenza vaccines for young children and the elderly

Influenza disproportionately affects young children (aged between six months and five years) and the elderly (aged more than 65 years); these vulnerable groups typically experience more severe complications.\textsuperscript{13} Vaccination prevents influenza-related illness and complications and is routinely recommended for everyone aged six months and older who do not have a contraindication, particularly those who are at high risk.\textsuperscript{13} The live attenuated influenza vaccine (LAIV) and the inactivated influenza vaccine (IIV) are the two currently internationally licensed and most commonly used seasonal influenza vaccines. Although young children and the elderly experience the greatest influenza disease burden, research shows that the seasonal influenza vaccines can be less effective among these populations.\textsuperscript{14} Given the findings from recent VE studies and the development of novel vaccines, there is ongoing debate concerning which type of vaccine should be recommended for these vulnerable groups to confer optimal protection.

Among young children, there has been a long-standing recommendation for the use of LAIV due to its similar or superior vaccine efficacy and effectiveness compared to that of IIV.\textsuperscript{15–17} However, recent evidence from the US revealed that the quadrivalent LAIV had low effectiveness, particularly against the influenza A(H1N1) virus (A[H1N1] pdm09).\textsuperscript{18,19} Accordingly, the CDC’s Advisory Committee on Immunisation Practices (ACIP) made an interim recommendation that LAIV should not be used during the 2016–17 influenza season.\textsuperscript{20,21} Conversely, data from Europe reported reasonable VE of the quadrivalent LAIV that conferred moderate to good levels of protection among young children.\textsuperscript{22–23} These data support the continued use of LAIV for young children as part of routine paediatric vaccination programmes in Finland and the UK.\textsuperscript{24} Given the sub-optimal efficacy of IIV and LAIV reported by some studies, adjuvanted trivalent IIV (ATIV) is increasingly being considered for use among young children as
adjuvants enhance one’s immune response to vaccines. Studies have revealed that ATIV is more efficacious compared to trivalent IIV and elicits a stronger, more persistent immune response thus supporting the use of ATIV for influenza vaccination in young children despite concerns of increased reactogenicity.\(^{25,26}\)

The conventional trivalent IIV is less immunogenic and efficacious among the elderly compared to young adults, owing to the effects of immunosenescence; thereby, only a modest level of protection is conferred in the elderly population.\(^{27-28}\) Supporting this, pooled SHIVERS data from 2013–2015 suggests that effectiveness for the elderly may be lower with a point estimate for VE of 40% (95% confidence interval [CI] 14–58%) compared to 55% (95% CI 38–68%) for those under 17 years old.\(^{8-11}\) The development of novel vaccines is one of the various strategies used to improve vaccine-induced protection and improve clinical outcomes against influenza among the elderly.\(^{28}\) A recent review and meta-analysis showed that ATIV had superior efficacy compared to non-adjuvanted vaccines in reducing influenza-related illness and complications among the elderly.\(^{29}\) Moreover, data suggest that ATIV results in higher antibody titres for A(H3N2), the subtype of most concern for the elderly, and confers increased serological protection against drifted strains compared to non-adjuvanted vaccines.\(^{30}\) High-dose (HD) vaccines containing four times the amount of hemagglutinin (HA) versus the standard dose (SD) vaccine have also been designed to elicit a greater antibody response among the elderly.\(^{30}\) Data from large multicentre, randomised control trials suggest that the HD trivalent IIV is safe, well tolerated and elicits a superior immune response compared to the SD vaccine among the elderly for all included vaccine strains.\(^{31-33}\)

**Antiviral prophylaxis among the elderly**

Elderly who reside in long-term care facilities (LTCFs) are particularly vulnerable to influenza outbreaks due to their advanced age, underlying heath conditions, congregated living situations and contact with multiple caregivers.\(^{34,35}\) Various non-pharmaceutical (eg, social distancing, hand hygiene) and pharmaceutical (eg, vaccines, antivirals) measures are used to mitigate influenza outbreaks in LTCFs.\(^{36}\) Annual seasonal influenza vaccination of residents and staff remains a key strategy to prevent influenza illness; however, the effectiveness of this strategy in these settings can be negatively impacted by suboptimal uptake rates and low vaccine efficacy in the elderly.\(^{36-37}\) Antivirals reduce viral shedding when administered within 48 hours of symptom onset. Antivirals may also be prescribed for prophylactic purposes and antiviral prophylaxis may be one of the most effective influenza control strategies for the elderly residing in LTCFs where vaccine efficacy is reduced.\(^{36}\) Research has indicated that offering antivirals prophylactically to all asymptomatic residents during an influenza outbreak can shorten the duration of an outbreak.\(^{36-39}\) These findings support the prompt detection of an influenza outbreak and administration of antiviral prophylaxis among residents and staff in LTCFs, despite prior vaccination, to control an outbreak.

**Seasonal influenza immunisation programme in New Zealand**

**National strategy and communications**

The national strategy is focused on improving influenza immunisation coverage for high-risk groups, including pregnant women, the elderly and those with certain medical conditions. The Ministry of Health (MOH) is working on its infrastructure to support broadening access. These efforts align with recent data collected from the National Immunisation Register (NIR) suggesting that certain ethnic minority groups and pregnant women have particularly low rates of influenza vaccination. Recent research commissioned by the MOH to understand the knowledge and attitudes about influenza vaccination among pregnant women revealed that the most significant barriers were lack of accessible information and experiencing structural barriers for accessing immunisation services.\(^{40}\)

The MOH recommends that all influenza vaccinations administered are appropriately recorded on the NIR to enable the collection of accurate data. Previous issues affecting coverage data included the inability of vaccinating pharmacists to enter data on the NIR. To improve data accuracy, the MOH has developed a web-based application called “ImmuniseNow” to be implemented in 2017 that will enable pharmacist vaccinators to
record immunisations on the NIR. Another step to supporting priority health professional groups was the addition of two new members to the National Influenza Strategy Group (NISG) to represent the views of pharmacists and midwives.

The ‘blue dust’ branding was used again for the 2016 seasonal influenza immunisation campaign that uses blue powder imagery to visually symbolise the spread of influenza. There was an increased focus on improving access to online resources for primary care and district health boards (DHBs), along with using various media outlets (eg, radio and television advertisements) to raise public awareness about the campaign. DHB-specific resources were created to increase the effectiveness of the messaging and cater to the local population. These efforts resulted in a successful campaign that achieved the MOH’s target of distributing 1.2 million doses. In 2016, according to the NIR, about 50% of influenza vaccinations were recorded. For the elderly population during the 2016 influenza season, a total of 705,655 doses were administered and 56% were recorded on the NIR as having received an influenza vaccination.

Moving forward, the focus of the 2017 campaign will be on raising public awareness about the burden of asymptomatic influenza, using animated infographics as a communication strategy, translating campaign resources into multiple languages to improve accessibility, increasing interaction with primary care and supporting DHBs to share innovative ideas. Some challenges that the campaign will continue to address include how to make system improvements to enable data entry on the NIR, improve immunisation coverage for health care workers and how to deal with the changing media landscape.

District health board strategy

At the DHB level, challenges identified during the immunisation campaign included not having adequate vaccinators, lack of vaccination champions and the need to overcome anti-vaccination sentiments and misconceptions about the influenza vaccine. Low influenza immunisation coverage rates among some DHB staff members was identified as a high priority. Tairawhiti DHB reported the highest workplace influenza immunisation coverage rate and primarily attributed this to hosting a designated ‘flu week’ for staff vaccinations. Waikato DHB successfully continued the implementation of its mandatory influenza vaccination policy for staff and noted that employee contracts for new hires now state this requirement. Other DHBs shared helpful strategies to improve staff immunisation rates, including promotion by senior leaders in charge, clear communication to staff from senior management and using an influenza-specific trolley containing the equipment required to deliver vaccinations.

Key issues regarding service delivery

Various healthcare planners and providers shared their perspectives on the delivery of the influenza immunisation campaign. Practice nurses highlighted the importance of opportunistic vaccinations (ie, offering vaccination at every contact point with health services) and offering short appointments specifically for patients to obtain their influenza vaccination. Registered nurses working in occupational health play an important role in administering influenza vaccines to healthy adults at numerous workplaces. While they are not yet able to record the vaccines they administer on the NIR, the potential for occupational health vaccinators to use “ImmuniseNow” was discussed to enable the collection of more accurate data. Midwives promote and deliver the vaccine to pregnant women at ante-natal clinics. Midwives reported providing information sheets specific for pregnant women to raise awareness about the influenza vaccine and used labels in women’s files to prompt practitioners to ask about vaccinations.

In 2012, following a national policy change to reclassify the influenza vaccine by the Medicines Classification Committee, pharmacists began to administer the influenza vaccine. This has increased the access and convenience of obtaining an influenza vaccination, along with alleviating some pressure off primary care. Some barriers were noted by pharmacists delivering the influenza vaccine, including the costs associated with training pharmacists to vaccinate, only being approved to deliver the unfunded influenza vaccine, and lack of public awareness that pharmacists can vaccinate.
Alternative paradigms for influenza vaccination strategies

Despite reasonably good influenza vaccine uptake rates and efforts to broaden access and improve infrastructure in New Zealand, room for improvement remains regarding the implementation of vaccine policies that will maximise public health benefits and efficiently use resources. In New Zealand, the main focus of the existing seasonal influenza campaign is on individual protection and specifically targets high-risk groups. An alternative strategy that appears to be effective is to focus on limiting community-level transmission (i.e., a herd immunity approach), which would involve universal childhood vaccination. Evidence suggests that children are the main drivers of influenza transmission; thus, vaccinating healthy children can potentially provide direct protection to the child and indirect protection to the rest of the population due to the benefits of herd immunity. Modelling and economic evaluation studies suggest that adding children to existing influenza programmes would be cost-effective and reduce transmission and morbidity and mortality rates.

In the UK, the Joint Committee on Vaccination and Immunisation (JCVI) made a recommendation in 2012 to extend the annual influenza vaccination programme to all healthy children aged 2–16 years old using the LAIV. Since the 2013–2014 season, the UK has been rolling out this childhood programme to complement the existing individual-protection strategy based on age and risk-based policy. Given the considerable operational and resource challenges associated with implementing a general practitioner office and school-based LAIV programme, it was rolled out as a pilot programme in primary schools with phased extensions occurring yearly.

The programme has been implemented successfully, resulting in an overall coverage rate of 52.5% in the initial pilot areas. Research to date indicates that the childhood LAIV programme has resulted in an overall reduction in cumulative influenza-like illness incidence and influenza positivity in pilot areas versus control areas. Given this success, the JCVI plans to continue the roll-out of this programme and strengthen surveillance to monitor the associated impact. This evidence may prompt other countries to adopt a similar vaccination policy to reduce the burden of paediatric influenza.

Conclusion

The third NZiS brought together various experts and providers in the field of influenza prevention and management. The presentations at the symposium summarised key issues and experiences, along with stimulating interesting discussions about future improvements. Given that young children and the elderly are disproportionately impacted by influenza, continued focus is warranted regarding the optimal use of novel vaccines and antivirals for these vulnerable groups. Moreover, as some countries shift away from traditional influenza vaccination strategies and include extensions for certain sub-groups, much debate remains regarding which strategy is best to provide optimal population protection and not just individual protection. To make informed decisions, policy makers and programme planners will require country-specific data by age group on disease burden, transmission dynamics and cost-effectiveness. These suggested areas of future work are underscored by the need for more timely and accurate influenza surveillance data to better inform response decisions and vaccination programmes for improved population health outcomes.
Competing interests:
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REFERENCES:
10. Bissielo A, Pierse N, Quang QS, et al. Effectiveness of...


Stimulating the clinical academics of tomorrow: a survey of research opportunities for medical students in New Zealand

Ibrahim S Al-Busaidi, Cameron Wells

ABSTRACT
Developing the clinical academic workforce of the future is a priority of international relevance. Despite a number of measures implemented to address this challenge, a small proportion of medical students engage in research. Lack of knowledge of available research opportunities, and difficulty finding projects and suitable mentors are key barriers to undergraduate medical research. To date, there is no consolidated source of information on undergraduate research training opportunities and their outcomes available to medical students in New Zealand. Based on a comprehensive review of the published and grey literature and the authors’ personal experiences of research training activities as medical students, this article presents an overview of the research training opportunities available to medical students in New Zealand. Challenges facing medical student research involvement are discussed and current knowledge gaps in the literature are highlighted. The article concludes with suggested strategies to help promote research training opportunities and support students through their research experience.

Clinical academics are medical doctors who also undertake research and other academic activities alongside their clinical responsibilities. They typically make substantial contributions to patient care, but also to medical research, undergraduate and postgraduate teaching, and university administration. Furthermore, clinical academics play a pivotal role in bridging the gap between bench and bedside, with their work spanning from basic science to translational, clinical and population health research. Given their unique combined experiences in research and patient care, clinical academics are well positioned to identify unanswered questions, conduct basic and clinical research and translate their findings into practical bedside applications.

Unfortunately, the contribution of this unique group may be dwindling. Recent international trends from the US, the UK, Europe and Australasia indicate the proportion of clinical academics is declining relative to the rest of the medical workforce. To reverse this trend, systematic and concerted efforts have been put forth at the undergraduate and postgraduate levels. Studies have shown that early exposure to research increases undergraduate medical students’ subsequent interest in academic medicine as a career. For this reason, a number of measures have been implemented to engage medical students in research across the globe.

In addition to the development of interpersonal and research-specific skills, early student participation in scholarly activities is associated with improved short- and long-term academic productivity. Numerous studies have demonstrated that medical student research activities can regularly result in publications in peer-reviewed medical and scientific journals. Furthermore, early exposure to research enhances medical students’ confidence in conducting research and improves their...
critical thinking and literature appraisal skills,13 qualities essential for the practice of evidence-based medicine.

Despite the importance and benefits of undergraduate research, relatively few students participate in scholarly and research activities.8,10,15 In New Zealand, only one-quarter of students are involved in research during their time at medical school.17 International studies exploring perceived barriers to undergraduate research involvement have identified a number of potentially ameliorable factors. As well as time and financial constraints, lack of awareness of available research opportunities and how to get involved in research projects were some of the main barriers cited by medical students.8,15,20

To date, there is no consolidated source of information on undergraduate research training opportunities and their outcomes available to medical students in New Zealand apart from individual university medical school websites.

Aim

The aim of this review was to present an overview of the research training opportunities, formal and informal, offered at New Zealand medical schools. Based on a comprehensive review of the literature, and the authors' personal experiences of research as medical students, challenges facing medical student research involvement are discussed and recommendations are presented in order to promote research opportunities and support students through their research experiences.

Methods

A comprehensive search of the published literature was performed using the MEDLINE® database to identify articles relevant to medical student research opportunities in New Zealand. MEDLINE® searches were carried out via PubMed® in March 2017. The following terms were used alone or in combination: medical student, undergraduate, physician-scientist, academic medicine, intercalated degree, research, publication, New Zealand. The reference lists of identified articles were scanned for additional relevant publications. The websites of the Universities of Auckland and Otago were also searched to identify grey literature sources. Both universities were contacted to attempt to obtain quantitative data about the uptake of student research opportunities where this was not available from previously published literature.

Results

Available research opportunities

A broad array of research and scholarly activities are available to medical students.7,11 These include curricular (ie, mandatory research modules) and extracurricular (ie, intercalated research degrees and summer studentships) research training opportunities. A summary is provided in Table 1.

Intercalated research degrees

Undertaking an intercalated degree is the most focused formal research training opportunity offered by medical schools in New Zealand, Australia, the UK and North America.21–24 Depending on the combined degree, students are often required to take time away from the medical programme to complete a full-time research-based degree. The aim of research-based intercalated degrees is to “provide an opportunity for medical students to obtain research experience in preparation for an academic or research career”.23

A variety of intercalated degrees are offered worldwide; these include Honours, Master’s and Doctorate degrees. In New Zealand, Honours and Doctorate degrees are the two degrees awarded to intercalating medical undergraduates.11

Currently, two intercalated research programmes are available to interested medical students in New Zealand; the Bachelor of Medical Sciences with Honours (BMedSc(Hons)) and the Doctor of Philosophy (PhD) degrees. Financial support for students undertaking such programmes may be provided by medical schools, local trusts and other funding bodies in the form of scholarships and awards.

While only offered to students following completion of their third or fifth year at the University of Otago,25 the BMedSc(Hons) degree is available to medical students at any stage after satisfactorily completing the third year of the MBChB programme at the University of Auckland.26
A PhD degree is widely regarded as an essential component in the training of physician-scientists. Exceptional undergraduates who have a clear vocational direction and are committed to a career in academic medicine may consider pursuing a dual MBChB/PhD degree. The University of Otago offers medical students with an exceptional academic record and research experience a unique opportunity to simultaneously intercalate their medical programme with a PhD degree (MBChB/PhD programme). After completing three years of preclinical medicine, students spend two years undertaking full-time research, then complete three years of clinical training while completing their theses to graduate with a joint MBChB/PhD degree.

There is a paucity of literature investigating New Zealand medical students’ attitudes towards, interest and involvement in, and outcomes related to intercalated research degrees. Available research suggests that the uptake of intercalated degrees in New Zealand is low when compared to the UK and Australia. Reasons for the low interest in intercalated research degrees in New Zealand have not been extensively scrutinised. However, a recent survey of intercalating medical graduates from the University of Auckland reported 80% of students encountered ameliorable difficulties while intercalating, which include heavy workload, poor academic mentorship, financial constraints and prolonged time to graduation. Not surprisingly, these challenges are similar to those identified by intercalating students in Australia and the UK.

Research output is the most commonly reported outcome measure to evaluate the success of undergraduate research programmes. A review of the literature revealed only one study which investigated the outcomes of intercalated research degrees in New Zealand. Al-Busaidi et al found the number of students enrolled in the intercalated MBChB/BMedSc(Hons) programme at the University of Otago steadily increased from 1995 to 2014. Furthermore, research output from BMedSc(Hons) theses was found to be relatively high when compared to international studies, with nearly one-third of theses resulting in at least one peer-reviewed publication. However, the outcomes of the intercalated MBChB/PhD programme at the University of Otago have yet to be reported.

**Required research experience**

One of the methods used by medical schools to engage prospective medical doctors in research is the integration of compulsory research training activities into

### Table 1: Summary of currently available research opportunities for medical students in New Zealand.

<table>
<thead>
<tr>
<th>Research opportunities</th>
<th>Duration</th>
<th>Auckland</th>
<th>Otago</th>
<th>Uptake*</th>
<th>Research outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercalated degrees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMedSc(Hons)</td>
<td>1 year</td>
<td>✓</td>
<td>✓</td>
<td>O: 12.6/year⁶</td>
<td>O: Publication rate 33%¹¹</td>
</tr>
<tr>
<td>PhD</td>
<td>2–3 years</td>
<td>X</td>
<td>✓</td>
<td>O: 1.2/year⁶</td>
<td>NA</td>
</tr>
<tr>
<td>Required/compulsory research experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public health module</td>
<td>6 weeks</td>
<td>X</td>
<td>✓</td>
<td>All trainee interns</td>
<td>O: Publication rate 8.4%</td>
</tr>
<tr>
<td>Clinical audit</td>
<td>4–6 weeks</td>
<td>✓</td>
<td>X</td>
<td>All trainee interns</td>
<td>NA</td>
</tr>
<tr>
<td>Formal extracurricular opportunities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer research studentships</td>
<td>10 weeks</td>
<td>✓</td>
<td>✓</td>
<td>O: 120/year⁵</td>
<td>A: 87/year¹⁹</td>
</tr>
<tr>
<td>Research electives</td>
<td>2–3 months</td>
<td>✓</td>
<td>✓</td>
<td>O: 4/year⁶</td>
<td>NA</td>
</tr>
<tr>
<td>Clinical audits</td>
<td>Variable</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Informal extracurricular projects</td>
<td>Variable</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

A: Auckland; O: Otago; NA: Not available. *Average number of students from last five years of available data. Data obtained from personal correspondence with university.
the medical curriculum. The format and requirements of these research training programmes vary greatly between medical schools. In New Zealand medical schools, students receive teaching on research methods and design in the preclinical years, which is reinforced by participation in mandatory research projects during the clinical years of the MBChB programme, often as part of the public health module at the University of Otago, or required clinical audits during the paediatrics and obstetrics & gynaecology attachments at the University of Auckland (discussed below).

The Trainee Intern Health Care Evaluation module offered at the Dunedin School of Medicine, University of Otago is an example of a curricular research training opportunity. Under the supervision of faculty staff members and over a period of six weeks, final year medical students (trainee interns) work in groups to conduct a study, from design to data interpretation. Student groups are required to present their findings in a forum and submit a written report of the study. Although students are not required to publish their project findings, mandatory medical school research training experiences can result in publications in peer-reviewed journals, and presentation at local and international conferences (Al-Busaidi & Tarr, unpublished). The tangible research outputs from these curricular training modules attests to their value for students and medical schools in New Zealand, though their effect on long-term engagement in research remains unknown.

Extracurricular research opportunities

Despite perceived lack of time being one of the most commonly reported barriers to undergraduate medical research, students continue to participate in extracurricular scholarly activities. These include taking part in formal (ie, summer studentships) or informal (ie, research during spare time) research opportunities.

Formal opportunities

Summer research studentships

Summer studentships are supervised research projects, supported financially by grants/scholarships, available to medical students over a 10-week period during the summer vacation. It is commonly accepted that well-structured and mentored summer projects provide students with the basic research knowledge and skills, and spark their interest in a future career in academic medicine while mitigating the barriers associated with intercalating and other long-term research endeavours.

Summer studentship programmes are the most common form of medical student research involvement in New Zealand. Furthermore, recently published data indicate summer studentships appear to be increasing in popularity among New Zealand medical students as a short-term research activity. Wells et al identified the number of students undertaking summer studentship projects at the University of Auckland has at least tripled since the early 2000’s. Financial incentives, an interest in research and CV development are reported to be the main motivating factors for medical students to undertake a summer studentship, while most students hope to develop skills in critical thinking, research methods, interpretation of results and academic writing (Wells, Wallace, Alexander, McLaughlin & Shelling, unpublished). Notably, three-quarters of students stated they were more likely to be involved with research again in the future because of their summer studentship experience.

Long-term follow up of summer research students at the University of Auckland from 2001 to 2013 has shown 32% have published at least one article with their studentship supervisor, a comparable publication rate to students undertaking intercalated BMedSc(Hons) degrees.

Research electives

Electives are a potentially valuable opportunity for students to obtain an in-depth experience in medical research. Similar to summer studentships, research electives provide medical students with a protected period of time to build upon existing research skills, free from curricular assignments and other clinical commitments. Students may acquire new research skills, build valuable connections and improve their research productivity during a period even as short as 4–9 weeks (depending on the student’s ability, commitment and available resources). In addition to
boosting institutional research performance, electives might represent an opportunity for medical schools where research-oriented students could be identified and directed towards an academic career pathway. A mandatory Canadian undergraduate research elective significantly increased medical students’ interest in pursuing a career in medical research.\textsuperscript{31}

As part of the final year of the University of Otago and University of Auckland six-year undergraduate medical curriculum, students are required to complete an elective attachment (usually for 8–12 weeks), in clinical or non-clinical medical-related disciplines (eg, medical education, journalism or research) in New Zealand or at an institution abroad. Furthermore, the University of Otago, Christchurch School of Medicine, offers its final year medical students a supervised four-week selective period where students elect to join a specialty of their choice to pursue further clinical and/or research training, sometimes culminating in peer-reviewed publications.\textsuperscript{33} A review of the literature revealed no published data on the uptake and outcomes of research electives by New Zealand medical students, though correspondence with the University of Otago found only 1–2% of students undertake this option during their elective placement.

**Clinical audits**

Medical students on clinical attachments may be presented with opportunities to participate in clinical audits or other quality improvement projects, either voluntarily or as part of the required assessment for the attachment. These projects are usually small and based on retrospective chart reviews from a single clinical department. The results of these audits may be published, contribute to larger research projects or inform quality improvement strategies within the clinical department. While these projects are often limited in scope, they may present a valuable opportunity for medical students to gain initial experiences and skills in research. However, no published data was identified evaluating the outcomes from clinical audits undertaken by medical students in New Zealand.

**Informal opportunities**

**Extracurricular/independent research**

Medical students may also contribute to research projects during their personal time during the academic year, often under the supervision of clinical staff or university faculty members.\textsuperscript{17,18,34} These projects make up a minority of the research experience of New Zealand medical students,\textsuperscript{17} but may be more common among motivated clinical students who have fewer opportunities to undertake summer studentships due to their shorter vacation periods.\textsuperscript{16}

Reinders et al showed that medical students who participate in extracurricular research opportunities have significantly greater research outputs both prior to and following graduation.\textsuperscript{18} To date, very little attention has been paid to the study of the prevalence and impact of independent/extracurricular medical student research in New Zealand.\textsuperscript{17}

**Student-led initiatives**

1. **Medical student journals**

Students involved in medical research are often confronted with challenges when attempting to publish their findings in mainstream journals.\textsuperscript{35} Such challenges at an early stage in undergraduate research involvement can erode students’ confidence and discourage them from pursuing future participation in academic medicine.

Medical student journals (MSJs) may play a critical role in promoting medical student research involvement. MSJs provide a friendly medium where students share their research findings, develop research-related skills and navigate through the peer-review and publication processes. However, no published data was found evaluating the effectiveness of MSJs in stimulating interest in research or promoting academic careers.

The New Zealand Medical Student Journal was established in 2004, and has since published over 250 articles. It aims to support medical students as they transition from writing medical school assignments to publishing research in peer-reviewed journals.
However, mainstream medical journals are also common outlets for the dissemination of medical student research. In a recent analysis by Wells et al, the New Zealand Medical Journal (NZMJ) was found to be the most common journal for published studentship research projects. Furthermore, in a recent large review of the NZMJ (1999–2013), medical students were found to have authored or co-authored around 9% of the total articles published and their contributions to the NZMJ have more than quadrupled since 2000.

2. Student research conferences
The HealtheX Conference at the University of Auckland provides an opportunity for undergraduates and postgraduates from across the Faculty of Medical and Health Sciences to present their research, whereas students at the University of Otago may present their work at the meetings of the Otago Medical School Research Society. Medical students frequently present their work from summer studentships or other research projects at these meetings. However, no data exist assessing the impact of presentations at these meetings on subsequent publication, engagement with research or development of clinical academics.

3. Academic medicine societies
Student-run academic medicine societies have been established at several overseas universities in response to the declining interest in research careers. These groups have successfully run events such as lectures, student research symposiums and nationwide student research conferences, and have shown positive impacts on student interest in academic careers. To the authors’ knowledge, similar student-led academic medicine societies do not currently exist in New Zealand.

4. Student-led collaborations
Student-led collaborative initiatives such as STARSurg have been notably successful in the UK, publishing multi-centre observational studies with close to 8,000 patients from more than 160 centres. These initiatives are based on a successful surgical trainee collaborative model, and have been adapted for medical students to gain experience in data collection, processing and research methods. Notably, all students who participate are PubMed-indexed authors on the final manuscript, which is published under the authorship of the collaborative group. No similar collaborative initiatives currently exist in New Zealand.

Challenges and solutions
Perceived barriers to performing research during medical school are well-described in the literature. Lack of knowledge of available research opportunities, difficulty finding projects and suitable mentors, and time and financial constraints may serve as early deterrents for medical students interested in research careers.

Various strategies to promote research opportunities and support students through their research experience have been implemented with great success. Recently-established programmes to advertise research opportunities and help students identify academic mentors, such as university-administered student research offices have succeeded in increasing interest and involvement in research. Furthermore, a web-based “Medical Student Research Portal” has recently been introduced at the University of Queensland, linking medical students interested in research with clinical and academic supervisors. Most studies identified in two recent meta-analyses examining medical student research activities (including experience, perceived barriers and outcomes) emanated from North America and Europe. Comparatively few published studies have examined the state of medical student research in New Zealand.

Findings from these studies should be used to optimise medical students’ research experience and design programmes that provide productive, rewarding research experiences that ultimately inspire and encourage students to pursue medical research following graduation. More research is required to formally assess undergraduate medical research training opportunities currently offered in New Zealand. Furthermore, the state of the clinical academic workforce in New Zealand should be evaluated by future research. Trends in the number of academic positions, research funding, remuneration and postgraduate research opportunities...
should be assessed, given these factors are likely to affect long-term engagement in academia. Review of the pertinent literature identified a number of recommendations to improve New Zealand medical student engagement in research. Providing students with early positive experiences in research is essential to attract high-achieving students to careers as clinical academics. Creating more compulsory research projects for medical students is unlikely to be successful, given students may not be interested, and the projects are usually brief or limited in scope. Ideally, research projects should be meaningful and interesting; poor-quality projects are unlikely to motivate students to continue their involvement in research. Supervisors of undergraduate medical students should aim to involve and support students in all aspects of the research process from study design to publication.

Mentorship of young researchers by established scientists is crucial, and has been shown to predict future scholarly productivity. Academic staff and clinical teachers should be encouraged to supervise projects by undergraduate medical students, and be equipped with information about the availability of medical student research training activities. The establishment of formal academic mentoring programmes for motivated students may facilitate the development of relationships between medical students and clinical academics, and may lead to an increased uptake of available research opportunities.

Medical schools should develop a process by which currently offered undergraduate research training opportunities are regularly evaluated and deficiencies are identified and rectified if possible. Furthermore, universities should work with academic staff to create more opportunities for medical students to engage with research, and promote these to interested students.

We recommend establishing a university-based student research office to support student engagement in research, reduce barriers for those interested in pursuing research projects, help students find suitable academic mentors and encourage students to disseminate their findings through peer-reviewed publication or presentation at scientific and medical conferences. Furthermore, students with a particular interest in research and academic medicine should be encouraged to pursue further training in postgraduate research (eg, enrolling in higher academic degrees, including Masters and PhD programmes).

Finally, the establishment of collaborative research networks for trainees and medical students in Australasia may enhance the generation of high-quality research, provide medical students with meaningful opportunities to contribute to research and promote the development of clinical academics in New Zealand.

Conclusion

This report is the first consolidated source of information on undergraduate research training opportunities available to medical students in New Zealand. Medical educators should use this review to familiarise their students with the available research opportunities. At the medical school level, additional measures to facilitate students’ involvement in undergraduate research activities should be implemented.

The literature evaluating New Zealand medical student research involvement and opportunities, although slowly growing, is generally lacking. Future research should focus primarily on examining the prevalence of, and barriers to medical student research involvement, and evaluating the outcomes of currently offered undergraduate research training activities.
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REFERENCES:
17. Park SJ, McGhee CN, Sherwin T. Medical students’ attitudes towards research and a career in...


Local and regional smokefree and tobacco-free action in New Zealand: highlights and directions

George Thomson, Nick Wilson

ABSTRACT
In this viewpoint we highlight and discuss some recent local and regional level advances in tobacco control in Aotearoa/New Zealand. In this country a wide range of local actors are helping drive smokefree and tobacco-free policies, with an increasing presence of businesses in this field. There has been progress in the areas of smokefree dining, large outdoor worksites and ski fields, and parts of downtown areas such as squares and streets. In 2015 and 2016, three councils (Palmerston North, Napier and Hastings) have used pavement lease policies and bylaws to start introducing an element of requirement into smokefree outdoor dining. Elsewhere (eg, Rotorua, Ashburton, Westland and Christchurch) significant smokefree outdoor dining moves have been made by, or in conjunction with, local councils. Tobacco-free retailing continues to expand, particularly in Northland.

In the absence of meaningful central government action on smokefree places in the last decade (despite the Smokefree 2025 goal), local activity is leading the way. It is particularly important in providing models for smokefree outdoor hospitality areas, where smoking normalisation and relapse are significant health risks. Nevertheless, there is a need for the local smokefree and tobacco-free activity to be nationally evaluated, particularly for assessing the prevalence of smoking in areas covered by ‘smokefree’ policies. Action by central government could help local actors by providing a more definite legislative basis for bylaws, by minimum outdoor smokefree laws and by the funding of effective tobacco control mass media.

This article explores some of the local and regional developments during 2012–2016 in tobacco control in Aotearoa. The focus is on new activities and policies to provide better conditions for populations to quit and stay quit, and to not start smoking. It does not cover work to support individuals to quit smoking.

New Zealand local government authorities have wide duties and powers to ‘improve, promote and protect public health’ under the Health Act 1956 and the Local Government Act 2002. Section 23 of the Health Act states:

“It shall be the duty of every local authority to improve, promote and protect public health within its district, and for that purpose every local authority is hereby empowered and directed... (e) to make bylaws under and for the purposes of this Act... for the protection of public health.” These duties and powers are reinforced by the requirement in the Local Government Act (Section 11), where the “role of a local authority is to,—... (b)... perform the duties, and exercise the rights, conferred on it by or under this Act and any other enactment.”

The reference to “any other enactment’ clearly includes the Health Act and specifically Section 23.

However, local authorities have been reluctant to use bylaws for such things as smokefree outdoor policies, in the absence of specific legislation as is available for alcohol-free outdoor areas. Section 147 of the Local Government Act gives local authorities the specific ability to make bylaws for regulating alcohol use or possession.
in an outdoor area. Nevertheless, local authorities’ wish for change was reflected in the adoption of a remit at the 2015 Local Government New Zealand conference to ask Central Government to develop and implement “legislation to prohibit smoking outside cafés, restaurants and bars”. The remit was largely driven by the Palmerston North City Council.

Currently, the only central government legislation for smokefree outdoor areas is for school and pre-school grounds. Work vehicles and those carrying the public are required to be smokefree, but there is no law on smoking in private vehicles. The legislation on tobacco retailing covers product displays, the distribution of samples, point-of-sale health warnings, co-packaging with other products, vending machines and supply to those under 18 years of age. There are no laws on who can sell tobacco or where, on any safety or security provisions for retail tobacco product storage, or on the licensing of sales outlets. Despite its goal of New Zealand being ‘smokefree’ by 2025, Central Government in May 2017 had no plans for decreasing or restricting the number or location of tobacco retail outlets. This is despite the 2010 recommendations of the Māori Affairs Select Committee, and calls in 2012 and 2015 by the National Smokefree Working Group. The lack of action on smokefree outdoor areas is despite the Ministry of Health-commissioned 2014 Review of Tobacco Control Services reporting that:

“Population level interventions such as expanding smokefree environments and providing strong messaging will both assist cessation and prevent uptake.”

Below, we touch on various types of activity, on some local and regional actions, and then discuss some key aspects of our findings.

Regional smokefree and tobacco-free initiatives

This local action has been driven by NGOs, district health boards (DHBs), iwi authorities, local marae, local government authorities (city and district councils) and businesses. These local developments were until recently largely for smokefree greenspaces (playgrounds, parks) and sometimes for council events. The activities have included medium-term plans by councils, smokefree council housing and innovative approaches for new types of smokefree outdoor areas and events. Local or regional work in other tobacco-related interventions has been increasing, particularly with tobacco-free retailing. The local actions include changes in some of the more remote parts of New Zealand, including South Westland and Northland. In many areas, local groups provide awards to businesses with smokefree outdoor or tobacco-free policies.

New Zealand local authority smokefree policies in 2016 have been mapped by MidCentral DHB staff.

Smokefree dining

In the absence of Central Government action on smokefree outdoor dining and drinking, local authorities and their partners in Rotorua, Hawkes Bay, Palmerston North, Christchurch, Ashburton and Westland have been moving towards smokefree policies and bylaws. The Palmerston North City Council have used the innovative approach of changing their Signs and use of Public Places bylaw to require the approximately 50 hospitality businesses using sidewalk seating to have smokefree signs and to not provide ashtrays. During 2016, cafés, bars and restaurants with a pavement permit were required to fill out new permit forms and were given smokefree signage.

Napier City and Hastings District Councils have adopted (late 2015, with effect in July 2016) a joint smokefree policy, for footpath areas set up primarily for café and dining purposes. As permits are renewed or issued for footpath dining, the permit conditions will include being smokefree. The Hastings Mayor has said that “businesses not wanting to comply with the policy would not get the permits to use the footpaths.”

The Westland District Council in April 2016 extended its smokefree policy to include outdoor dining areas on Council-controlled land. The policy explicitly requires: “Appropriate signage will be displayed. Ashtrays will not be provided.”

In November 2016, the Cancer Society Canterbury West Coast, in partnership with Canterbury District Health Board and supported by Christchurch Council,
launched the *Fresh Air Project*.\(^\text{10}\) This appears to be New Zealand’s first evaluated pilot project for voluntary smokefree outdoor dining policies. Twenty hospitality venues in Christchurch are being supported to promote their outdoor dining areas as smokefree. The pilot project is designed to capture the first-hand experiences from businesses and patrons of moving to and operating totally smokefree outdoor venues. In the initial December 2016 evaluation, a common challenge was found to be the communication of the new smokefree policy to customers. Common benefits included positive customer comments, better air quality and “no ashtrays or smoking litter to clean up”.\(^\text{11}\) A May 2017 report found that 72% of the venue patrons that responded to a survey said they were “more likely to visit the venue again because [the] outdoor area was smokefree.”\(^\text{12}\) The 20 pilot venues joined at least eight other venues, which have already been operating as totally smokefree. The project has its own website (http://freshairproject.org.nz/) and Facebook page (see Figure 1).

Ashburton now has at least eight cafés that have adopted smokefree outdoor dining, and there is the prospect of all the town’s 10 café venues being totally smokefree. The Ashburton District Council has put out a draft smokefree alfresco footpath dining policy for consultation. This policy involves a licence to use the footpath, no ashtrays and negotiated signage. The policy is intended to be ‘self-policing’—“There will be no active enforcement of [the smokefree policy] but it is up to the [holder of the] licence to occupy the footpath holder to abide by the conditions as per the licence agreement.” For those businesses not complying, the license can be revoked.\(^\text{14}\)

In Marlborough, on World Smokefree Day in May 2016, a local campaign #smokefreeallday was able to get 29 of 31 cafés and restaurants in Blenheim to go smokefree outdoors for the day. By November 2016, there were 12 smokefree outdoor premises in the province, including cafés and winery restaurants.

Elsewhere in Aotearoa, by November 2016 there were at least nine smokefree outdoor cafés in Otago (seven in Wanaka and Queenstown) and 16 in Northland. A notable Otago advance is for a smokefree pub outside area—at the Bannockburn Pub Garden Bar. Rotorua City Council intends to have smokefree outdoor paved eating places by early 2018, including the 14 bars and restaurants of Eat Street.\(^\text{15}\)

Local efforts to provide information to the public and the hospitality industry on smokefree dining have helped the Health Promotion Agency (HPA) efforts at a national level. The local work includes the great ‘Smokefree conversations’ sheet from a partnership by the Nelson Marlborough Public Health Service and the Marlborough
Cancer Society, which suggests ways that café managers can help their staff in introducing smokefree outdoor policies. Another resource, the ‘Smokefree outdoor dining: A guide for cafés, restaurants and licensed premises’ has been produced by the Auckland Cancer Society. The HPA resources include smokefree signs, such as the downloadable ones for smokefree dining and for smokefree workplaces (See Figure 2).

Smokefree outdoor commercial areas
The outdoor dining at the Remarkables ski field has been smokefree since 2012 or before, and the whole ski field has been smokefree since 2013. The company New Zealand Ski has required all its 1,200 staff to be smokefree while at its three ski fields (Remarkables, Coronet Peak and Mt Hutt) from the start of the season in 2013. At Treble Cone (Wanaka) the chairlifts and lift queuing areas have been smokefree since 2014.

In Otago the work sites of Breen Construction Ltd have been smokefree since 2015, and the OceanaGold Macraes Flat goldmining site has been smokefree since 2014. There are over 400 workers at Macraes Flat. Other major smokefree work sites include Port Taranaki and Brancott Estate. Port Taranaki appears to be the first New Zealand port to go completely smokefree outdoors, in July 2016. The policy also includes all company vehicles on or offsite. The Brancott Estate winery and vineyards in Marlborough is one of the larger agricultural worksites to aim to be entirely smokefree. Tour bus operators are informed before they bring groups, and if necessary tourist smokers are ferried offsite.

Iwi-driven policies
In 2015, an alcohol and smokefree policy was approved for 14 Tūpuna Maunga (the volcanic cones such as Mt Eden) in Auckland—Tūpuna Maunga o Tāmaki Makaurau. The maunga are governed by the Maunga Authority, made up of the 13 iwi and hapu (Ngā Mana Whenua), Auckland Council and the New Zealand Government. In Hawkes Bay, the Ngati Kahungunu iwi is a leader in holding smokefree and tobacco-free events. These include the Matariki, Pā Sports and Waitangi Days. For instance, the Waitangi Day events, besides having entrance screening to advise and remind those entering of the tobacco-free status of the event, have a Hauora Village that includes smokefree advisors. The Ngati
Kahungunu tobacco strategy aims to “significantly reduce tobacco prevalence and consumption rates prior to elimination of tobacco from Ngāti Kahungunu as an iwi” and to “eliminate all tobacco from significant places: wāhi tapu, urupā, maunga and awa within the Ngāti Kahungunu rohe”.26

Smokefree campuses

DHBs have some of the strongest outdoor smokefree policies for large non-commercial areas in New Zealand, with a 2016 review noting:

“All DHBs cover buildings, grounds and vehicles, owned, occupied or leased, in their smokefree policies... Several DHBs prohibit tobacco use at DHB business and social events. Three DHBs prohibit or discourage tobacco use in private vehicles on DHB property.”27

DHBs are required to have tobacco control plans. However, work by DHBs is constrained by the nature of national tobacco control targets, which are focused on individual cessation.28 One positive local avenue for them is to fund the population health efforts of primary health organisations (PHOs). Another is to advocate to local government authorities for effective outdoor smokefree policies.

Most New Zealand tertiary education campuses have some form of smokefree outdoors policy, although in 2015 only nine out of 29 (31%) were found to be 100% smokefree for the whole campus.29

Smokefree vehicles

Local and regional health promotion efforts since 2013 have included work in South Canterbury, Wainuiomata and Northland. The South Canterbury campaign in May 2013 surveyed over 900 people, and distributed smokefree car stickers at early childhood centres and supermarkets. The campaign also held demonstrations outside local supermarkets using a dry-ice smoke machine in a car, to help show the effects of smoking.

In Wainuiomata, a 2013 local campaign That’s How We Roll worked with sports clubs, schools, Regional Public Health and other local organisations to promote smokefree cars. The campaign used “local role models, a webpage, billboards, posters, radio advertising, community newsletters, signage at school drop-off zones, logo and branding at community and school events, smokefree car information packs and a smokefree car story competition.”30,31 The campaign launch in February 2013 gained national television coverage. Local smoking in vehicles appeared to reduce faster than previously during 2011–13.31

In Northland, the health provider Te Hiku Hauora helped lead a smokefree cars campaign during 2014–15. A petition was presented to Parliament, and in May 2016 the Health Select Committee of Parliament held hearings on the petition. The Committee recommended a smokefree vehicles law for those carrying children under the age of 18, but in April 2017 the Government rejected this recommendation.32

Smokefree events

Besides the iwi events described above, a number of other significant events in New Zealand have become smokefree outside. For instance, the Golden Shears event in Masterton organised wardens to make the area in front of the stadium smokefree, after complaints about smoke drifting inside from the entrance area.33 The Cancer Society has a detailed toolkit for planning and implementing smokefree events.34

Because of smokefree stadia policies, many major events with outdoor seating in Auckland City and elsewhere are smokefree. However, the implementation of the policies appears to vary, with two Auckland events at Eden Park and Western Springs in February 2017 having very different attitudes to the smokefree policy from staff and management.

Tobacco-free retailing

Health promotion staff from DHBs and NGOs across Aotearoa have been working with tobacco retailers for a number of years to help them move to be tobacco-free. The activity has largely been with local dairies and stores. By November 2016, the Northland region had 22 and the MidCentral region had 12 tobacco-free retailers. A website, Tobacco Free Retailers (http://www.smokefreeshops.co.nz/) provides news, a toolkit for health promoters and communities, and related research.
Regional, city and local highlights

Northland is a model for ‘across-government’ smokefree action, going beyond the health sector. The Northland Intersectoral Forum (NIF) comprised of local and central government agencies, have signed a Smokefree 2025 Statement of Intent. Under this Statement of Intent, NIF agencies will support the smokefree vision, develop and implement individual agency plans identifying specific actions within the relevant organisations to progress the Smokefree 2025 agenda, work collaboratively with the Northland DHB Smokefree team to develop these plans as required, and support the Smokefree 2025 initiatives of other NIF partners.

During 2012–14 the Whangarei District Council made key city outdoor spaces smokefree, including bus shelters, the Aquatic Centre, Te Manawa The Hub, Central City Car Park, Clapham’s Clocks, Quarry Gardens and Kiwi North, the Library Courtyard, the Canopy Bridge, all cemeteries and walkways, the Botanica Gardens, car parks and all council events.

In 2016, Christchurch City’s smokefree policies were extended from green spaces to “principal entrances and exits of Council buildings and facilities as well as Council bus passenger shelters”. In the city rebuild, the new ‘Bus Exchange’ has been designated smokefree and there is strong support for the Health Precinct as well as the Justice and Emergency Precincts to be smokefree when they are completed. Since 2014, the Christchurch City Council has had a smokefree social housing policy that designates all new or refurbished units as smokefree. Any new tenancy agreements issued require tenants not to smoke indoors. A partnership with Community and Public Health provides smoking cessation support for tenants where required. Although management of the Council’s housing stock has now passed to an independent trust, there has been no change in this commitment.

In 2013, Auckland City Council adopted one of the most comprehensive and long-term smokefree outdoors plan so far in New Zealand. This included for 2013: all outdoor Council facilities (including pools, zoo and stadia), all playgrounds and skate-parks, all sports fields (including associated spectator areas), all regional and local parks and reserves, the public outdoor areas associated with Auckland Council service centres, offices, libraries, halls, museums, recreation and arts centres, and all transport areas, including train stations, train platforms, bus stations, bus shelters and ferry terminals. However, a 2014 survey found low or very low awareness of the policies, with only 17% aware of the policy for parks and reserves.

In 2016, a further survey found that only 8% of those surveyed thought that all parks and reserves were smokefree. There appears to have been no evaluation of the outcome of smoking prevalence at any of these types of areas (or studies of butt litter or other indicators of tobacco use). In August 2016, this City Council resolved to “commence the statutory process for investigating a draft smokefree bylaw”. Auckland Council planning is also special in aiming to have a smoking prevalence for South Auckland of under 3% by 2025.

Rotorua Lakes Council has a smokefree forest, and in 2015 adopted smokefree zones around some major facilities. They include the Council’s Civic Centre, the Sir Howard Morrison Performing Arts Centre, the Council’s carpark on Arawa Street and the band rotunda and Te Rununga Tearooms in the nearby Government Gardens. The zones include footpaths. In February 2017, the policy extended to bus stops and the Rotorua Stadium.

Palmerston North City Council is further along than most in adopting smokefree policies since 2013 for some centre city streets, and for the seating on those streets. The policy also included bus stops, council events and the outdoor spaces at Council-owned venues. The Horowhenua District Council adopted an innovative Smokefree Environments policy in June 2015, which included the footpath directly in front of the property boundary, and all associated public outdoor areas, of early childhood centres, primary and secondary schools.
In 2014, the Whanganui District Council adopted a smokefree policy for the “central commercial zone” including the main street and Majestic Square; the riverfront zone, including the “River Traders” and Farmers Market; and the “Arts and Commerce Zone” (some streets back from the river). This total smokefree area is the largest proportion of the downtown of any New Zealand city that we know of. The policy process was unusual, in that the business organisation Mainstreet Whanganui was a major partner with health groups in driving the adoption.

Survey data on public support

The above examples and future activity around New Zealand are being helped by the investment of time, people and resources from NGOs (eg, Cancer Society, Heart Foundation), DHBs and local authorities. In particular, large surveys of public and/or business attitudes to smokefree outdoor policies have been commissioned in Auckland, Hawke’s Bay, Wellington and Christchurch (eg).

These surveys suggest public support of over 80% for smokefree entrances to buildings that the public use, over 70% for transport waiting areas and 65–80% for venues with outdoor dining. A feature of the results of these surveys is the low public awareness of the smokefree outdoor policies that they found, suggesting that sufficient investment in the communication of the policies may be essential for effective outcomes. Local authorities vary widely in this investment, and in the quality and number of the smokefree signs they use.

Discussion

Local population level action in New Zealand is largely driven by the lack of action at a central government level. Instead of being able to support national interventions on tobacco supply and smokefree outdoor areas, and to provide local add-ons to mass media campaigns, local work is providing much of the progress in the last 10 years on tobacco supply and smokefree areas. No new national regulation of tobacco retailing has occurred since 2012, with the removal of tobacco displays, and no new national regulation of indoor and outdoor smokefree places since 2004. The success of the New Zealand smokefree school ground law, and of outdoor smokefree laws such as in Queensland (Australia), along with the high public support indicates that national smokefree outdoor legislation is likely to be practical.

Such legislation, for instance for hospitality areas, would provide much needed help for accelerating progress towards the Government’s Smokefree 2025 goal. Leadership from Government could avoid the inconsistencies involved when 67 local authorities act separately, and would provide a clear national level playing field. The leadership could include effective investment in smokefree mass media campaigns.

We suggest that central government amends the Smoke-Free Environments Act to require a wide range of new types of smokefree outdoor areas, including playgrounds, building entrances used by the public, transport waiting areas and outdoor hospitality areas. Government also needs to amend the Local Government Act to enable local authorities to create bylaws for smokefree outdoor areas (in a similar way to the current provision for alcohol-free areas). Legislation is needed to provide a minimum standard for the types of places and events covered, and the buffer zones required. Buffer zones are “distances around types of places (eg, entrances, outdoor queues, school entrances) that must be smokefree.” Local authorities could then provide, through bylaws, for policies for places where local needs are not met, such as some non-patrolled beaches and some large pedestrian or inner city areas.

The advances in outdoor smokefree dining and drinking policies are particularly important, due to the role that smoking in public outdoor hospitality areas has in normalising smoking and providing cues to smoke. Smokefree policies for the outside areas of bars, restaurants and cafés help those quitting and decreases smoking uptake, as well as protecting those inside and outside from secondhand smoke. A number of studies indicate that outdoor social areas where smoking is allowed and alcohol is served increase relapse to smoking. In Ontario (Canada), those exposed to smoking on bar/restaurant patios were less likely to have tried to quit and over twice as likely to relapse “than those who visited a patio but were not exposed to...
smoking”. In the US, smokefree bar policies (inside and outdoor) have been found to significantly reduce the proportion of people starting smoking, and reduce smoking relapse into daily and heavy smoking.58

Even moderate alcohol consumption appears to play a role in contributing to smoking relapse.59 In a 2014 New Zealand survey of late-onset smokers aged 18 to 28 years, 85% agreed to the statement: “in the last two weeks, there has been an occasion where I smoked because I was drinking”. The NZ Health Promotion Agency authors concluded that: “strong links between smoking and drinking... may act as barriers to successful cessation among young late-onset smokers”.60 The reasons for the powerful health-positive effect of smokefree policies include the way alcohol use affects cognition and decision-making.61 Even those intent on quitting and staying smokefree may find it very difficult to resist offers of cigarettes in social situations such as bars and cafés.62

Changes to tobacco retailing is another area where legislation appears to be needed urgently, to reduce cues to smoke, to decrease the convenience of buying tobacco products and to help decrease the theft of those products.63 While local and regional groups have done great work highlighting the marginal value of tobacco retailing for dairies, national policy seems necessary to get major changes to tobacco supply.

Because of the lack of standardised (or any) research across New Zealand, we have relatively little idea of how much smoking there is in designated ‘smokefree’ outdoor areas. Very few of the New Zealand outdoor smokefree policies have been evaluated in any way, and virtually none have had observations for the prevalence of smoking in the areas concerned.

The exceptions include observations in Wellington City for downtown squares, parks and playgrounds,64,65 in Kapiti,66 and planned observations in Palmerston North. Apart from the Christchurch Fresh Air Project, we know of no evaluations available of smokefree dining initiatives in New Zealand. Evaluations of the effects of the smokefree dining bylaws in Palmerston North, Hawkes Bay, Westland and elsewhere will help the design and promotion of such initiatives elsewhere.

Some research possibilities for the future include on the rate of increase of tobacco-retailing free areas, the observation of smoking in vehicles across disparate areas of cities31 and the perceived legal and other obstacles to local authority bylaws on smokefree areas and tobacco retailing. The perceived obstacles that could be investigated include financial costs and staff commitments, the social exclusion of smokers, the issues for vulnerable populations and the gap between the approval of policies and their effective implementation.54 Particular research areas include: (i) how to make smokefree and tobacco-free policies a continued priority for local authorities, including investment commitments; (ii) the gap between the wide varieties of attitudes to and experiences of smokefree outdoor areas across the hospitality industry, and the rhetoric of industry spokespeople; and (iii) the design and installation of appropriate and effective smokefree signage.68,69 This latter area has wide international significance, due to the need to move to positive communication that helps smokers see the benefits for their communities, families and themselves.53 National awards for local smokefree and tobacco-free efforts would help recognise and reward such work across Aotearoa.
REFERENCES:


59. Kahler CW, Spillane NS, Metrik J. Alcohol use and initial smoking lapses among heavy drinkers in smoking cessation treatment. Nicotine Tob Res. 2010; 12:781–5.


Leptospirosis in three workers on a dairy farm with unvaccinated cattle

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ABSTRACT

AIM: We report a one-health investigation of three cases of leptospirosis on a dairy farm with unvaccinated cattle in New Zealand. The cases are discussed in the context of diagnostics, risk factors, persistence of symptoms and outbreak mitigation measures.

METHOD: Clinical and laboratory records from the human cases were reviewed and serological and molecular investigations were conducted into the Leptospira status of cattle and pigs on the farm.

RESULTS: Cases presented early in their illness and all three were confirmed within seven days of onset of symptoms by urine PCR and within 18 days by convalescent MAT (two Hardjo, one Pomona). Cattle and pigs had serological evidence of recent infection with Hardjo/Pomona and Pomona/Copenhageni respectively. Pigs were slaughtered and cattle were vaccinated. Post-exposure prophylaxis was given to staff in-contact with the milking herd until the herd had antibiotic treatment at drying-off (approximately four months after the initial case).

CONCLUSION: The utility of PCR testing for Leptospira DNA as both an early and rapid test for leptospirosis was demonstrated. Two of three cases reported persistence of symptoms at least six months after the acute episode and one of these remains unable to work. Risk mitigation measures such as post-exposure prophylaxis, animal vaccination, heightened clinical suspicion of leptospirosis and recognition of context specific risk factors (eg, effluent spreading) demonstrate the value of medical and veterinary experts working together.

Leptospirosis is a zoonotic illness caused by spirochaetes of the genus Leptospira. The organism is carried by animals with chronic renal infection, which excrete the organism in urine. Human infection is by direct or indirect contact with infected animal urine, and this can include contact with damp soil and water. In New Zealand, maintenance hosts include both domestic (eg, cattle, sheep, deer and pigs) and wild (eg, possums, hedgehogs and rodents) species. Six serovars have been isolated from New Zealand animals with Leptospira interrogans serovar Pomona (Pomona) and Leptospira borgpetersenii serovars Hardjo and Ballum responsible for most human cases. Different serovars are associated with one or more maintenance hosts that have persistent renal carriage of leptospires and generally little or no signs of infection. Humans are an accidental host for leptospires. Since domestic farmed species play an important role in transmission to humans in New Zealand, livestock vaccination is a mainstay for the control of human leptospirosis particularly in systems where there is regular and close contact between animals and people. Approximately 95% of dairy herds are vaccinated and all commercial pig producers are mandated to do so.

The clinical illness in humans is typically biphasic. The early phase (5–7 days) is characterised by flu-like symptoms of fever, muscle aches and headache. The late phase (4–30 days) is characterised by prolonged fever and a range of possible systemic complications, including jaundice, renal failure, respiratory insufficiency and confusion. Up to 30% of those with acute disease suffer long-term effects such as depression and chronic fatigue.
there were 63 notified cases of leptospirosis in New Zealand. Of these, 36 were farmers or farm workers, nine worked in the meat processing industry and five others worked in close contact with animals. These numbers are likely a significant underestimate of true incidence as leptospirosis is under-ascertained both in New Zealand and internationally due to the non-specific clinical signs and the fact that the disease may be self-limiting. Additionally there may be a lack of awareness or suspicion by the doctor, and diagnostic tests are frequently not requested or the type of test selected is not optimal for the stage of the disease. In this report we describe a one-health investigation of three cases of leptospirosis among workers on a dairy farm with unvaccinated cattle in New Zealand.

Case history
The affected individuals were employed on a 130 hectare dairy farm in the North Island of New Zealand. This was a seasonal calving (planned start of calving 20 July) herd milking 230 adult cows through a rotary milking shed (Herd 1). One of the workers periodically raised a small number of pigs near the milking shed and there were four pigs present at the time of the disease outbreak. The farm owners also had an adjacent dairy farm covering 190 hectares and were milking 400 cows through a herring bone shed (Herd 2). The heifer replacements (approximately 160 in total each year) for both farms were reared together on nearby grazing blocks. None of the livestock on either of the farms had been vaccinated against leptospirosis and this had been the farm policy for at least 20 years. There had been no evidence of disease due to leptospirosis among livestock on the farms.

Three human cases of leptospirosis were notified to Whanganui Public Health between January and March 2015. All were employed to work only on one of the dairy farms (Herd 1) and their work involved milking and general farm duties. They had no contact with cows from the adjacent farm (Herd 2). The individual cases were followed up by phone interview using standard report forms by one of the co-authors (MT). In addition to the formal notification to health authorities, a co-author (JB) was notified in March 2015 by the local veterinarian attending the herd about two of the human cases. Serological testing of the cattle and pigs was organised through this veterinarian’s practice and the Institute of Veterinary Animal and Biomedical Sciences, Massey University (Massey University Animal Ethics Committee Approval No. 15/57). This case study has been recorded on the Low Risk Database, which is reported in the Annual Report of the Massey University Human Ethics Committee.

Clinical findings
Case A became acutely unwell while tramping on 25 January 2015 (day one), with sweats and chills, back and loin pain, and dry retching. He was transported to hospital by helicopter on day two and was treated with ceftriaxone. His condition was further complicated by hypotension, reduced renal function, pulmonary oedema and coagulopathy. On day six he was transferred to his local hospital, then discharged on day nine. Case A has continued to be unwell with severe lethargy, headaches and visual disturbances. He has not returned to full-time work.

Case B became unwell on 25 February 2015 with chills and sweats, shaking and polyuria. He was seen by a general practitioner on day two and commenced treatment with oral antimicrobials (doxycycline). After initial improvement he felt worse two days later and was admitted to hospital on day four. He responded well to IV ceftriaxone and was discharged on day seven. He was soon able to return to work with no ongoing problems.

Case C became unwell on 14 March 2015 with headache, and later that day muscle cramps and a high fever. He was seen at a local emergency clinic on day two, blood samples were collected and oral antibiotics (doxycycline) given. The headache worsened and he was seen at a hospital emergency department on day three. A CSF sample was taken and no abnormalities were detected. He was not admitted at this time but his clinical signs did not improve and he was admitted to hospital on day five. He was treated with IV fluids and oral doxycycline, and was discharged on day six. He recovered gradually over the next three months before returning to work full-time. He reports ongoing photosensitivity and alcohol intolerance.
Table 1 reports the diagnostic test results. In each case initial samples were taken for an ELISA screen and a microscopic agglutination test (MAT: reference antigen panel Hardjo, Pomona, Ballum, Tarassovi, Copenhageni, Canicola, Grippotyphosa and Australis) within 48 hours of the onset of symptoms. In all three cases the first Leptospira ELISA screen test and two of three initial MATs were negative. Leptospira DNA was detected as early as four days after the onset of symptoms.

Investigation of human cases

Case A was notified on 30 January 2015 and interviewed 9 February 2015 on return home from Hawkes Bay Hospital. Potential exposures included regular contact with cattle in dairy shed, being urinated on while in shed, having nicks and cuts on arms that were uncovered, contact with effluent and the recent shearing of sheep on lifestyle block.

Case B was notified on 4 March 2015 and interviewed 9 March 2015. He was the relief milker for Case A. Potential exposures included frequent contact with urine in the dairy shed, uncovered cuts on hands, splashes of urine in face, splashes of urine-contaminated water in face when washing down shed, exposed to blocked effluent pipe, which he repaired and he did not wash hands for some time afterwards, and exposure to pigs on the dairy farm.

Case C was notified on 16 March 2015 and interviewed 19 March 2015. He reported regular contact with cattle in dairy shed and that he was usually vigilant about wearing PPE in shed (apron, gumboots, gloves, eye protection). He owned cattle at his home block that were sourced from the employer’s farm.

Table 1: Summary of diagnostic tests performed on three cases of leptospirosis.

<table>
<thead>
<tr>
<th>Case</th>
<th>Leptospira IgM ELISA* screen</th>
<th>Leptospira DNA</th>
<th>Serology (microscopic agglutination test)</th>
<th>serovar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Sample</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Sample</td>
<td>Sample</td>
<td>Result</td>
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<tr>
<td>A</td>
<td>neg(2)</td>
<td>pos(13)</td>
<td>urine&lt;sup&gt;1&lt;/sup&gt;(4)</td>
<td>detected</td>
</tr>
<tr>
<td>B</td>
<td>neg(2)</td>
<td>pos(15)</td>
<td>urine&lt;sup&gt;1&lt;/sup&gt;(7)</td>
<td>detected</td>
</tr>
<tr>
<td>C</td>
<td>neg(2)</td>
<td>pos(18)</td>
<td>plasma&lt;sup&gt;2&lt;/sup&gt;(4)</td>
<td>detected</td>
</tr>
</tbody>
</table>

Numbers in parentheses and italics refer to the days post onset of symptoms.

*Bioline Leptospira IgM, Standard Diagnostics, Gyeonggi-do, Republic of Korea.

<sup>1</sup>PCR performed at Canterbury Health Laboratories (primers based on Merien et al.)<sup>9</sup> and at a regional hospital laboratory (primers based on Smythe et al.)<sup>10</sup> respectively. The MATs were performed at ESR using MoH funding.

Investigation of cattle and pigs

Eighteen to 30% of the adult milking cows from Herd 1 had blood convenience sampled on two occasions, 12 days apart, in early March 2015 to determine infection status. Blood was also collected once from each of the four pigs. At first sampling (6 March), 41/230 cattle (18%) were sampled, while at second sampling (18 March) a further 68 cattle (30%), including some of the previously sampled animals, were sampled. Serum was tested using the MAT against *Leptospira borgpetersenii* serovars Hardjo and Ballum and *Leptospira interrogans* serovars Copenhageni (Copenhageni) and Pomona. Urine was also collected from 33 cattle at the second sampling from Herd 1 to detect shedding of leptospires by real-time PCR targeting the *gyrB* gene. Cows from Herd 2 were also blood and urine sampled on the same dates and in similar proportions (10–22%). Testing was performed at the Molecular Epidemiology and Public Health Laboratory (EpiLab), Massey University.

In both herds on first sampling there were many high titres (≥384) to Pomona and Hardjo. On second sampling there was a rise in the proportion of seropositive animals with higher titres, suggesting recent infections with Pomona and Hardjo. This was more pronounced in Herd 1 where 35 (51%) of 68 had titres to Pomona at the second sampling with 21 of these 35 (60%) ranging from 384 to 3,072; the pattern was similar for Hardjo. In both herds there were cattle with titres to Ballum and Copenhageni but the number of positives and titre values were much lower and mostly seen in cows with high positive Hardjo and or Pomona titres, suggesting cross-reaction. For example in Herd 1, 19 (28%) of 68 had...
Ballum titres ranging from 24 to 96, and 18 (95%) of these 19 also had high titres to either Hardjo or Pomona. Seven of 33 urine samples (21%) taken from cows in Herd 1 were real-time PCR positive.

All four pigs had titres to Pomona (1 at 3,072 and 3 at 1,536) and Copenhageni (1 at each of 192, 384, 1,536 and two at 1,536).

Follow-up

Farm staff and other visitors to the farm who were likely to come into contact with urine from the cows (eg, veterinarians) were advised to use personal protective equipment (aprons, gloves, visors and boots), pay attention to personal hygiene (eg, wash hands, no eating in the shed), be cautious around effluent and stop drinking raw milk. In addition, all farm staff in contact with the cows took oral doxycycline 200mg weekly and this continued until the end of the milking season (mid-May 2015).

All cattle (milking and non-milking) received a sensitising vaccine dose for Pomona and Hardjo on 17 March 2015 with a bivalent bovine leptospirosis vaccine (Leptoshield, Pfizer Animal Health, West Ryde, NSW, Australia). They received a booster one month later and at dry off, all milking cows were treated with long-acting amoxicillin (15mg/kg, IM, Betamox LA, Noorbook, VIC, Australia). The whole herd is now on annual vaccination with calves receiving sensitising and booster doses at approximately three and four months of age.

The pigs were immediately slaughtered and were not processed for consumption. A rodent control programme was implemented as there were reports of mice infesting the cattle feed (palm kernel expeller). An investigation into rodent Leptospira carriage on the farm is in progress.\(^{11}\)

Discussion

Leptospirosis is usually sporadic in New Zealand but outbreaks have previously occurred. There were four leptospirosis outbreaks reported in 2008 and two in 2010 involving 20 and five cases, respectively. The outbreaks were all from farm or abattoir settings with exposure to infected animals or carcasses either confirmed or suspected as the source of infection. Not all outbreaks are identified as such, for example in the 2008/2009 season, a small upper North Island abattoir experienced three human leptospirosis cases among 20 staff, of which two were hospitalised. Symptoms included fever, headache, diarrhoea and meningitis. Two of the cases were associated with serovar Pomona.\(^{12}\) No stock slaughtered at the small upper North Island abattoir had been vaccinated. In August and September 2010 three cases were reported by clinicians to the local public health service in Wairarapa. All three individuals had worked on the same dairy farm during their incubation period, where there was an inadequate herd vaccination programme. Two cases were hospitalised with serovar Hardjo infection.\(^{13}\) In October 2015, four meat workers from an eastern North Island meat plant that slaughters multiple livestock species were hospitalised with leptospirosis. Two are still suffering from post-leptospirosis symptoms—at the time of writing one is on shortened hours and the other unable to return to work. The outbreak at the eastern North Island meat plant was brought to the author’s (JB) attention by health and safety personnel at the plant. The vaccination status of livestock at this plant was unknown.

For the outbreak described in this case series, all three individuals reported direct contact with cattle urine in the milking shed. A further risk factor was the spray irrigation of dairy shed effluent, and all reported contact with effluent while moving the irrigation equipment. Case A reported being “drenched” with effluent. It was also noted that there were pigs on the farm, and at the rural residence of one of the cases.

There is debate about antibiotic treatment for leptospirosis,\(^{14}\) but there is a consensus that early treatment is better than delayed as it improves the prognosis. Although the cases here presented early in the clinical course (day 2) and were given antibiotics, all were hospitalised. There is also debate about the use of post-exposure prophylaxis,\(^{15}\) which was given to staff in-contact with the milking herd until the herd had antibiotic treatment at drying-off. This was also combined with ensuring that all people on the farm were aware of the risk factors for infection and understood the measures that should be taken to avoid infection such as good hygiene and use of personal protective equipment.
equipment to cover mouth, eyes, nose and skin-breaks, when in contact with the cattle or their effluent. Prophylactic doxycycline has been used after leptospirosis outbreaks following severe flooding. The cases presented here illustrate the complexities when using laboratory test results for timely diagnosis and the advantages of using a suite of tests rather than a single diagnostic test. In all cases, an initial screen for *Leptospira* IgM was negative—it is estimated that the median time from onset of symptoms to a positive test result is 7–14 days. PCR testing for *Leptospira* DNA is both an early (positive from four days post-onset) and rapid (the current turn-around time for this test when sent from a regional centre to a reference laboratory is about two days) test for leptospirosis. Most advice on management stresses the importance of a high level of suspicion for leptospirosis leading to clinical diagnosis and empirical treatment. Given the large proportion of cases in New Zealand among workers on farms and in the meat industry, occupational enquiry is an essential aspect of the clinical assessment.

In the current outbreak, two of three cases reported persistence of symptoms at least six months after the acute episode. Overseas work suggests up to 30% of those initially affected with leptospirosis suffer with symptoms long after they were first unwell. A pilot case series conducted by some of the co-authors (summer 2015/16) studied post-leptospirosis symptoms in six men, who had independently contacted researchers at Massey University due to the persistence of symptoms after their acute episode. Persistence was defined as six months after diagnosis of the acute episode. These men reported loss of employment, disruption of community involvement and high emotional and financial demand on their immediate families. Of the six interviewed, only two had returned to full-time employment. A common theme was the delay to diagnosis of the acute disease episode and reluctance of support workers to consider whether any persistent symptoms might be linked to the previous acute episode. The focus of leptospirosis research has been almost exclusively on the acute episode, a critical unanswered question is to describe and quantify post-leptospirosis symptoms so as to fully understand the burden leptospirosis places on rural New Zealanders, their immediate families and the community as a whole.

One unexpected finding with this outbreak of disease among workers on a dairy farm was the lack of evidence of clinical disease among the cattle. The majority of the cows on both farms would have been pregnant (1–6 months gestation at the time the farm workers became ill) and abortion is usually a common sequela to infection, particularly with Pomona. Other common signs of leptospirosis in cattle (reduced milk production, inappetance, fever, mastitis, haemolytic anaemia, haemoglobinuria, jaundice, death) were not detected in either of the herds or among the younger cattle from these herds which were grazing nearby. Although we do not have definitive evidence, this adds weight to current discussions on the role of cattle in the epidemiology of Pomona infection; cattle may well be becoming a maintenance host for Pomona in New Zealand. Speciation of the *Leptospira* by sequencing the PCR positives would add support to this discussion but this was not attempted as in the outbreak situation the interest was in shedding *per se* rather than source attribution.

The New Zealand Veterinary Association developed a risk management programme (*Leptosure™*) in 2002 that was aimed specifically at dairy farms to protect farm staff and other farm visitors from leptospirosis. While vaccination of domestic animals is considered a mainstay of disease control, other factors should also be taken into account in case of a vaccine breakdown. Waterways should be fenced off to prevent livestock contaminating them as well as these being a source of infection. Rodents and other wildlife need to be controlled particularly around stored feed, as they can be a source of *Leptospira* serovars not included in the usual livestock vaccines, eg, Ballum. Pigs should not be kept on cattle farms as they are the main source of Pomona infection, which can cause serious disease in cattle. Good personal hygiene when working around livestock and use of personal protective equipment are recommended. People should not be allowed to eat, drink or smoke when working around cattle or in a potentially contaminated environment. All staff should wear heavy-duty plastic aprons, rubber boots
and gloves when milking cows to deflect urine splash. Gloves should be used for handling aborted material and people should cover cuts if they are going to be milking cows. Effluent requires careful disposal and should be sprayed onto paddocks well in advance of the next planned grazing. All cattle on the farm should be vaccinated from as early an age as possible; this includes beef cattle and breeding bulls, which are usually brought in for just a few months. Similarly, other species including deer, sheep, and dogs should be vaccinated against leptospirosis.

In summary, this outbreak of leptospirosis is likely to have occurred because dairy farm workers were exposed to unvaccinated dairy cattle and pigs. Combining PCR testing for *Leptospira* DNA with MAT serology provided an early test result and epidemiological information. During an outbreak, having an early definitive diagnosis will raise suspicion of leptospirosis in subsequent outbreak cases. Follow-up investigations on this farm as part of a project on leptospirosis at the wildlife-domestic species interface has shown Ballum infection, PCR-positive kidneys in 22 (96%) of 23 field mice captured in October 2016, and sero-positivity in 26 (12.8%) of 203 mixed-aged cattle sampled in April 2017. Thus, an integrated approach to control must continue to include vaccination of stock, use of personal protective equipment, personal hygiene, rodent control and shared awareness of risks. To date there have been no further human cases of leptospirosis associated with this herd.

1. Marshall RB, Manktelow BW. Fifty years

**Competing interests:**
Nil.

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REFERENCES:

Impact of ethnicity on outcomes after pulmonary embolism: an observational study in South Auckland

Chinthaka B Samaranayake, Elaine Yap

The impact of ethnicity on incidence and outcomes in pulmonary embolism (PE) in the New Zealand population has not been investigated previously. Due to the significant variations in ethnicity make-up of different countries, the currently available international literature is not very applicable to the New Zealand population. Given the significant ethnic disparities among Māori and Pacific Island populations in New Zealand in important cardiovascular conditions, we felt that it was possible that such a variation could also exist in PE. Our objective was to review the incidence and outcomes of patients who were diagnosed with a PE in the ethnically diverse South Auckland population.

Consecutive series of patients confirmed to have had an acute PE on a computed tomography pulmonary artery (CTPA) or a ventilation-perfusion (VQ) scan at our institution over a five-year period from January 2008 to December 2012 were retrospectively identified from electronic records. The demographic and clinical data were collected from electronic patient databases. The rate of all cause 30-day and one-year mortality following PE, bleeding complications, re-admissions and recurrence of venous thromboembolisms (VTE) within 12 months were calculated. The routine anticoagulation protocol for PE used in our institution during the time of the study was low molecular weight heparin (LMWH) at a dose of 1mg/kg twice a day with warfarin initiation. The LMWH heparin was given until the INR is >2.0 on two consecutive days.

Incidence per 100,000 population was calculated using the Counties Manukau Health Board-specific Census 2013 data. Estimated frequencies and proportions for the variables were calculated in descriptive analysis. Multivariate logistic regression analysis was performed to identify predictors of outcomes. The 95% confidence intervals (95% CI) were calculated for rates, and the differences were significant at p value <0.05. Ethical approval for this study was granted by the New Zealand Health and Disability Ethics Committee (13/NTB/199).

A total of 606 patients with a mean age of 61.5 years (SD 16.5) were confirmed to have had a PE on a CTPA or VQ scan. The ethnicity composition of the study population was: 59 (9.2%) Māori, 442 (72.9%) New Zealand European (NZE), 57 (9.5%) Pacific Island, 13 (2.1%) Asian, 14 (2.3%) Indian, 8 (1.3%) other and 16 (2.6%) undisclosed. The incidence of PE per 100,000 population per year for the hospital’s catchment were 16.5 for Māori, 41.1 for NZE, 10.9 for Pacific Island and 5.3 for Asian. The relative risk of PE per year for the NZE population compared to Māori, Pacific Island and Asian populations were 2.5 (95% CI 1.3–4.6), 3.8 (95% CI 2.0–7.0) and 7.7 (95% CI 3.2–18.2) respectively. The relative risk of PE in the Māori population compared to Pacific Island population was 1.5 (95% CI 0.7–3.5). The rate of 30-day and one-year mortality following PE was 11.2% (95% CI 9.0–14.0) and 22.9% (95% CI 19.8–26.5) respectively for the total group, with no significant difference observed between the ethnic groups (p=0.12). Ethnicity was not an independent predictor of mortality in regression analysis. A total of 58 (9.6%) patients had bleeding complications secondary to treatment for PE; 26 (4.3%) had major bleeding as per International Society of Thrombosis and Haemostasis criteria. There was no statistically significant difference in the rate of bleeding complications (major or minor) between
the ethnicity groups. Māori patients had a significantly higher length of hospital stay (mean 14.1 days, SD 18.4) following their PE compared to other ethnicity groups (p=0.04). Additionally, Māori and Pacific Island patients had a significantly higher rate of 30-day re-admission rate compared to NZE, Asian and Indian patients (p=0.03). Table 1 summarises the outcome data for different ethnicity groups.

In summary, this is the first study describing both incidence and outcomes after PE in a large ethnically diverse population in New Zealand. New Zealand Europeans had a significantly higher incidence of PE compared to other ethnicities but this did not translate to worse outcomes. One possible explanation of this observed difference is the variation in the incidence of the two most common genetic causes contributing to DVT and PE; mutations in Factor V Leiden and Prothrombin genes. Abnormalities in coagulation, including protein C, protein S and antithrombin deficiency are also at least partially heritable, but their role in differences in thromboembolic rates are less well-defined. Genetic polymorphisms in endothelial cell nitric oxide synthase gene and the platelet GPIIIa PLA1/A2 glycoprotein genes, which results in pathological alterations in platelet aggregation, has also been described in different ethnicity groups with associated variations in rates of venous thromboembolism. Our findings are similar to Liao et al who found significantly higher rates of VTE in New Zealand Europeans compared to other ethnicities in North Auckland where the ethnicity make-up is quite different from the South. In that study, the reported overall rate of VTE was 81.6 per 100,000 population, with a significantly higher relative risk in Europeans compared to Māori, Pacific and Asian patients (1.98 (95% CI 1.63–2.41), 3.22 (95% CI 2.60–3.99) and 4.02 (95% CI 3.34–4.84) respectively).

Ethnicity was not found to impact on mortality following PE in our study. This is an encouraging finding as Māori and Pacific Island populations are shown to have inferior health outcomes in a number of cardiovascular conditions in New Zealand. Māori patients however did have a higher average length of hospital stay, which we hypothesise to be due to higher rates of comorbidities, as there were no differences in complication rates or PE recurrence in these groups. Similarly, the higher rate

### Table 1: Outcomes following pulmonary embolisms in different ethnicity groups.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Ethnicity groups</th>
<th></th>
<th>Total group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Māori n=56 (9.2%)</td>
<td>NZE n=442 (72.9%)</td>
<td>Pacific n=57 (9.4%)</td>
<td>Asian and Indian n=27 (4.5%)</td>
</tr>
<tr>
<td>30-day mortality/n (%)</td>
<td>4 (7.1)</td>
<td>52 (11.8)</td>
<td>9 (15.8)</td>
<td>1 (3.7)</td>
</tr>
<tr>
<td>One-year mortality/n (%)</td>
<td>12 (21.4)</td>
<td>99 (22.4)</td>
<td>18 (31.6)</td>
<td>4 (18.8)</td>
</tr>
<tr>
<td>Bleeding complications/n (%)</td>
<td>4 (7.1)</td>
<td>43 (9.7)</td>
<td>8 (14.0)</td>
<td>3 (11.1)</td>
</tr>
<tr>
<td>Mean length of stay/ days (SD)</td>
<td>14.1 (18.4)*</td>
<td>10.1 (13.9)</td>
<td>10.9 (14.8)</td>
<td>11.1 (10.3)</td>
</tr>
<tr>
<td>30-day re-admission rate/n (%)</td>
<td>16 (28.6)*</td>
<td>94 (21.3)</td>
<td>19 (33.3)*</td>
<td>4 (18.8)</td>
</tr>
<tr>
<td>Recurrence within one year/n (%)</td>
<td>2 (3.6)</td>
<td>18 (4.1)</td>
<td>3 (5.3)</td>
<td>1 (3.7)</td>
</tr>
</tbody>
</table>

NZE = New Zealand European.
Pacific = Pacific Island.
* Denotes a statistically significant difference (p<0.05).
of re-admissions to hospital in these two groups were not directly related to the PE or potential complications from the PE.

Our data is limited by the retrospective data collection where it was difficult to ascertain which patients deteriorated after admission to hospital and required escalation of treatment. Despite the large study population, the low numbers in some of the outcome measures meant that there was insufficient power to detect clinically meaningful differences in some of the outcomes. We were only able to calculate the rate of all-cause mortality as it was difficult to accurately determine the causes of death, including mortality related to bleeding complications. Despite these limitations, the described findings are encouraging and provides some relevant information required for better understanding of this important issue in the New Zealand population.

Competing interests:
Nil.

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REFERENCES:
Authors’ response: Legionnaires’ disease following the Christchurch earthquakes
Frances Graham, David Harte

We thank David Murdoch1 for his views on our recent research paper on Legionella in this Journal,2 although we think his criticisms are unjustified, for the reasons set out below.

First, Professor Murdoch contends that the primary reason for the observed increase in Legionnaires’ disease notifications around the time of the earthquakes was due to the change in the diagnostic testing algorithm to include the more sensitive PCR method to specifically detect Legionella DNA.3 We agree this may be correct, although at the time our study was conceived and undertaken (November 2011) this was not proven. We had no intention of implying otherwise in our paper, since the rationale for our environmentally-focused epidemiological study was to establish if there was a direct causal link between the observed increase in legionellosis cases and the widespread presence of liquefaction material in Christchurch following the earthquakes. We regret any misunderstanding this may have caused.

We made no claims about the influence of PCR testing on Legionnaires’ disease, although it is common sense that a more sensitive test should lead to an increase in case detections, other things being equal. Because the change in testing algorithm coincided with the devastating earthquakes, we considered it important to obtain microbiological evidence to ascertain if the liquefaction events were directly contributing to the increased case numbers. For reasons of cost, there was no period during which old and new testing regimes ran in parallel, rendering it impossible to determine the extent to which the increased Legionnaires’ disease notifications might be at least partly real rather than artefactual. Murdoch himself stated:

“Of particular note were the earthquake centres around Christchurch from September 2010. It is possible that the major disturbances arising from this seismic activity may have altered the local ecology of Legionella.”

Our main conclusion was that “no causal link between exposure to liquefaction-affected soils/silt and legionellosis was established since no legionellae were isolated from any environmental samples tested and Legionella was shown not to survive in the seeded silt.” Our findings support rather than detract from the observation claimed by Professor Murdoch that the change in the testing algorithm with the introduction of Legionella PCR testing was contributing to the artefactual increase in legionellosis case numbers as opposed to it being influenced directly by exposure to liquefaction material.

Second, Professor Murdoch suggests that we cannot justify any claim that “…liquefaction-affected soil does not support the growth and survival of legionellae...”. Our experimental data showed exactly that, with no legionellae isolated from any of the 30 liquefaction field samples, nor the persistence of L.bozemanae in the seeded samples. While it is recognised that the majority of Legionella cases over the study period were caused by L. longbeachae, the justification for using L. bozemanae for our seeding experiments (as explained in our methodology) was because we used a Legionella species that auto-fluoresced under black light illumination. This was a deliberate decision in the experimental design to make colony counting on plate culture both easier and more accurate. In addition, L. bozemanae is a well-documented soil inhabitant that has been shown to cohabit with L. longbeachae. Unreported experimental results for a single small pilot study showed that L. longbeachae
behaved in the same way as L. bozemanae in the liquefaction soil with rapid die off, but proved difficult to accurately count, making the choice for using L. bozemanae in the seeding experiments more logical.

Finally, Professor Murdoch claims that the culture method of testing soil for Legionella was not sensitive. We agree and while the detection of Legionella from environmental sources is challenging, culture is currently the method of choice for determining the presence of viable and culturable organisms that are more likely to contribute to an infection risk. Again, it was because of these challenges that we choose L. bozemanae in the persistence experiment in order to improve test sensitivity by being able to more accurately determine the presence of and count the test organism on the culture medium. The use of culture-based methods at the time was justifiable since reliable PCR detection from potting mix and soils is inaccurate. It is also difficult to interpret standard PCR detection methods for any matrix, as these do not distinguish between live and dead bacteria. Because of this limitation, culture isolation is still regarded as the reference standard method for risk analysis determinations. Figure 3A of our study demonstrates that culture was sufficiently sensitive to detect Legionella in commercial compost.

Competing interests:
Nil.

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REFERENCES:
2. Graham F, Harte D. Survival of Legionella in earthquake-induced soil disturbance (liquefaction) in residential area,
Policy brief: a sugary drink tax for New Zealand and 10,000-strong petition snubbed by Minister of Health and National Government

Gerhard Sundborn, Simon Thornley, Rob Beaglehole, Niki Bezzant

On Tuesday 8 August, the New Zealand Beverage Guidance Panel (NZBGP) with Niki Bezzant presented a policy brief titled: A Sugary Drink Tax for New Zealand and a petition calling for a sugary drink tax to parliamentary representatives.1

The policy brief outlined i) the rationale for a sugary drink tax in New Zealand, ii) a list of options on how the sugary drink tax could be structured, iii) an estimate on the amount of revenue it could generate, and iv) suggestions on how revenue could be used to prevent childhood obesity and dental caries.2

Recommendations from the policy brief were:

<table>
<thead>
<tr>
<th>Who should pay?</th>
<th>Targeted at manufacturers and importers</th>
</tr>
</thead>
<tbody>
<tr>
<td>What beverages should be taxed?</td>
<td>All beverages with a sugar content of &gt;5g per 100ml</td>
</tr>
<tr>
<td>What type of a tax should it be?</td>
<td>'per unit' tax</td>
</tr>
<tr>
<td>What should the tax rate be?</td>
<td>Options - $1 per litre, or - $0.5 per litre, or - tiered at $0.32/L for beverages with sugar content from 5 to 8g/100ml and $0.42/L that have sugar content &gt;8g/100ml</td>
</tr>
<tr>
<td>How much revenue could be raised?</td>
<td>$65–$100 million per year (estimated using the $0.5 per litre tax option)</td>
</tr>
<tr>
<td>What should revenue be used for?</td>
<td>Programmes to address childhood obesity and make water more readily available</td>
</tr>
</tbody>
</table>

Also presented was an online petition3 organised by journalist Niki Bezzant that called for parliament to tax sugary drinks to reduce the burden of obesity, type 2 diabetes and dental caries in New Zealand. This was signed by approximately 10,000 New Zealanders and was supported by the New Zealand Dental Association, the National Heart Foundation, Diabetes New Zealand and Dietitians New Zealand. This petition included a clause that the revenue generated from the tax be used to promote health and nutrition education in this country.

In the lead-up to this event (July 2017), a UMR Research Poll found majority support for a sugary drink tax that used revenue...
to fund childhood obesity prevention programmes. This was maintained at 67%, and opposition had dropped from 29% to 26% compared to a similar poll conducted in April 2016. Further, participants in the lowest annual income bracket of <$50,000 were most supportive of a sugary drinks tax (69% support) compared to middle- and high-income earners. ($50–$99k=63%, ≥$100k=68% respectively). This contradicts the suggestion that a sugary drink tax is opposed by poorer segments of the community.4

The Policy Brief: A Sugary Drink Tax for New Zealand and the 10,000-strong petition calling for a sugary drink tax were received by the Honourable Marama Fox (co-leader, Māori Party), Julie Anne Genter (health spokesperson, Green Party) and Geoff Simmons (deputy-leader, The Opportunities Party).1

The National Government declined the invitation to receive this document and the 10,000-strong petition, which is consistent with their decision to not receive an earlier policy brief authored by the NZBGP in June 2014 titled—Policy Brief: Options to reduce sugar sweetened beverage consumption in New Zealand. Further, the National Government and Minister of Health declined invitations to participate in panel discussions at research symposiums that considered the evidence linking sugar and sugary drinks to obesity, type 2 diabetes and dental caries, and solutions to address high sugar intake in 2014, 2015, 2016 and 2017.4

Some positive steps, however, have been made to address the issue of sugary drinks on this government’s watch: removing them from hospitals and encouraging schools to do the same. However, the health minister, Dr Jonathan Coleman, has repeatedly dismissed the most effective means of addressing this issue: a sugary drinks tax.

In contrast to their lack of interest in addressing the issue of excess sugar intake in the diet of New Zealanders, the National Government was keen to attend functions held by Coca-Cola. In 2011, then prime minister John Key and Gerry Brownlee visited a new Coca-Cola Amatil factory, and the party again visited in 2016, with Minister for Economic Development Stephen Joyce attending a function at a plant in Auckland.5,6

It seems our current government and Minister of Health value the interests of the sugary drink industry over those of 10,000 New Zealanders and the many voices from senior leaders from the health and community sectors that contributed to the tax policy brief.

We urge the incoming government to focus on how this measure will prevent unnecessary pain and suffering of New Zealand children. We also urge readers to consider this information when it comes time to vote on election day.

Competing interests:
Nil.

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REFERENCES:
Dr Campbell Munro Hockin

19 October 1920–15 July 2017

Campbell Hockin was born in Rotorua where his father Dr Munro Hockin worked at King Edward Memorial Hospital. He was educated initially at Kaponga School then Southwell School in Hamilton when his father became medical superintendent of Waikato Hospital in 1928. Campbell’s secondary schooling was at Wanganui Collegiate where he excelled at cricket and rugby.

After graduating from Otago Medical School in 1947, Campbell returned to Waikato Hospital as a house surgeon where he met and married registered nurse, Audrey Eaddy and joined his friend Dick Langley in Winton, Southland in general practice. Cam and Audrey’s honeymoon was the trip south to begin married life together and meet the demands of a busy rural practice.

In his time in Winton, Campbell developed the reputation of a dedicated, talented, compassionate practitioner, earning the respect of both his patients and his colleagues. The post-war years saw a huge increase in the numbers of babies being born and Campbell developed his obstetric skills over these busy years, delivering over 2,000 babies. Winton had its own small maternity hospital and Campbell fondly recalled his experiences there and the wonderful professional support of Sister Thompson who was in charge. In 1956, Campbell was awarded the Doris Gordon Scholarship and took his growing family to Auckland for a year where he further honed his obstetric skills (under the guidance of Harvey Carey) and took his considerable experience back to Winton.

MB, ChB University of Otago 1947
After the departure of Dick to Napier, Campbell was joined in practice by John O’Hagan and in later years, Lindsay Quennell, Terry Wilson and Jim Devane. These doctors acknowledge the importance of Campbell’s teachings, his wisdom and ability in their own continuing medical education. The Winton practice also became a training centre for students wishing to become GPs and a meeting place for other rural doctors who were able to exchange ideas and experiences. Medical referrals were to Kew Hospital in Invercargill 30km away, and Campbell often drove patients there himself if the occasion warranted it. It also gave him the excuse to drive very fast and indulge his love of cars. At this time, he also earned his private pilot’s licence. He had inherited a love of flying from his father who also held a licence—a love he has passed on to his son and grandson.

In 1972, after a coronary, Campbell relocated to Rotorua to become senior casualty officer there. After triple bypass surgery in 1976, Campbell’s health settled and indeed he often wondered if he was the longest surviving patient of such a procedure. His practical nature, his skill and general love of medicine were always evident and he thrived on the demands of a busy emergency department. He always acknowledged the support and skills of those he worked with and many young doctors and nurses sought his wise counsel and accordingly acknowledged the role he played in their medical education. After retiring in the 1980s, Campbell continued to work as a GP locum in Rotorua and enjoyed the contact with patients into his seventies.

Campbell was a very modest man, without ego or artifice. He was old-fashioned in the best possible way. He valued good manners and he was a compassionate doctor who treated everyone with respect and dignity. He retained his love and interest in sport and was a member of the Otago University Light Blues Association. He retained a quick, agile mind to the end and continued to enjoy the company of friends and family after the death of his beloved wife Audrey in 2014. He was a devoted family man and was enormously proud of all their achievements.

He is survived by his four children—Rosemary, Christine, Munro and Penelope, 14 grand-children and four great-grandchildren.

Author information:
Christine Revell, BA, DipTchg, Dr Hockin’s daughter.

Peter Calder Durward
27 August 1925–10 July 2017

Peter Calder Durward, born in Lawrence, New Zealand, on 27 August 1925, passed away at his home in Rotorua on 10 July 2017. For 64 years he was the faithful and loving husband of Lois Elizabeth Margaret Durward, née Spencer, and beloved father of Quentin Durward (MD Otago), Jill Davis RN, Callum Durward (BDS Otago), Kirsty Gerlach (MA), Laurie Badrick and Rowan Grimwood (MB ChB Otago).

Peter and his younger brother Alan were extraordinarily close friends and confidants. Alan (a retired RAF fighter pilot and Qantas 747 captain) encapsulated the essence of Peter when he penned:

“My best memories of Peter will always be of his sense of humour and selflessness. To me he was the very epitome of what a big brother should be. From the days in Tokaanu when he and Barbie (sister) would give us a ride home on their bikes after the weekly visit to the Tokaanu baths, to the days when puberty struck me and his advice was: ‘be good and if you can’t be good be careful.’”

Alan continues, “He was a bloke who had what most men would wish for—a satisfying career, a loving wife and a superb family.”

Peter was the grandson of a Scottish Presbyterian minister, Rev. Peter Calder Durward, who migrated to Lawrence with his three sons and two daughters. One of the sons, John Durward, Peter’s father, married a teacher from Lawrence, Williamina Hay, whose family includes a number of illustrious New Zealanders. Brothers James and Earnest, nephews David and Hamish were all recipients of knighthoods.

The family moved to Tokaanu, on Lake Taupo where Peter was raised in a largely Māori district. Theirs was in fact part of only two Pakeha families in the district. John and Williamina were devout Christians, and their faith was very formative of Peter’s moral convictions.
Peter loved books and reading, and from an early age his kids had the enthralling treat of sitting at his knee on Sunday night as he would read to them, in an American southern drawl, the tales of Uncle Remus and Brer Rabbit, or he’d be hissing like a snake and growling like a tiger as he recounted stories of Mowgli and Sheer Khan from Rudyard Kipling's Jungle Book. As he grew old and his sight diminished, he would love to scour, in the company of his grandchildren, the massive library he had accumulated, to give away that particular book he felt would most enthral each of them.

Peter and Lois Durward started their life together in New Plymouth where Peter was a house surgeon (1953–54) heading towards a career in general practice. For many doctors, then as now, medicine is a very demanding mistress; so it was with Peter. And Lois, to her credit, assumed her additional role of total support in the great mission that was Peter’s career.

His first practice was as a GP in Te Puke (1955–60), and boy did he relish and inhale that job. He worked every day, not a day off for the first two years. Only the onset of hearing loss from otosclerosis led to his decision to specialise as a radiologist. He moved the family to Auckland (1961–1963) and undertook the registrar training to obtain his membership in the radiology college.

Peter was passionate about work. Teddy Roosevelt, the 26th American President, and one of the four enshrined on Mt Rushmore, South Dakota said: “Far and away the best prize that life has to offer is the chance to work hard at work worth doing.” Peter said stuff like that often, along with other dictums: “Quentin, choose a career where you can be your own boss,” and “Always be 10 minutes early for every appointment and commitment.”

His father and uncles, the generation who filled the army ranks in WW1, were Peter’s real-life heroes and mentors throughout his life. He so admired and venerated them for taking the actions and doing the hard work their country and duty demanded. His father, John Wright Durward, a cavalryman in the British Army, served in Greece and Mesopotamia, and survived. In addition to being a teacher in the Māori school system in Tokaanu, he was the headmaster, was made a Justice of the Peace, earned the trust and friendship of Māori, being so honoured as to be made a Chief, and Māori buried him on the Tuwharatoa Pa at Taupo. John’s brother, Archie, was an academic doctor, receiving the MD (Otago) for research on the comparison between the human and tuatara brain, and became the Professor of Anatomy in Leeds, England. The third brother was Peter's namesake “Pat”, the beloved uncle, who fought in all three Battles of the Somme (1916–18) over two years, was awarded the Military Medal for bravery in action in the field, and died from a belly wound, his company in the van outside Fleurs in the last month of the war. His other hero was his mother’s brother Gordon Hay, a telegraph operator for the Post Office in Wellington, killed one day after landing on Gallipoli in the assault on Chanukah Bair, body never recovered.

I visualise Peter Durward in his youth as a real man’s man. People might say now he was a stud, ripped, strong, tough. He hunted and fished, he laboured in the freezing works and wool sheds around Wellington, and made the grade to be selected for pilot training in the New Zealand Air Force, preparing for the campaign to invade Japan in WW2. The news of the atomic bombing of Hiroshima and Nagasaki was bittersweet for Peter and most of those young men; the joy that the war was over was mixed with the loss of opportunity to do his part when the call came, as his father and uncles had done.

Getting into medical school after the war was highly competitive for Peter because he hadn’t served time overseas, and the returning servicemen had preferential positions for entrance at university, and justly so. But perseverance, intelligence and that ferocious work ethic saw him get in, and the course of his life was made anew.

His first job after specialist training in radiology was in Whangarei. He was the only radiologist they had been able to recruit, so he was the only radiologist north of Auckland. Now, many people have a view that radiologists have it pretty easy as doctors, 9–5 office hours, five days a week, occasional call—but not Peter. Northland was very underserved, and someone, Peter, had to step up.

He was salaried by the public system, and from an observer’s viewpoint that system

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just flogged and abused him. It took this man, called to be a doctor, a healer, motivated by a deeply held righteous code and his Christian faith to minister to the sick and those in need, and they worked him hard. Not only was he the only radiologist in Whangarei, the base hospital, on Monday, on Tuesday he was off to Dargaville, Wednesday up to Kaikohe and Rawhene, and Thursday/Friday for the overnight trip to Kaitaia and Kaeo. Catch up in Whangarei for the weekend—year after year, for six years.

But he would, once a year, take his family on vacation. He'd pack them up and drive the 18 miles to Ocean Beach at the Whangarei Heads where they stayed at a rented bach. But it wasn't much of a break for poor Peter or Lois. There was no locum radiologist ever recruited to help him, so he drove back into Whangarei every morning to work. The man never complained.

After six years, Dr Graeme Beale (MB ChB Otago) saved him by bringing him into his practice in Rotorua, and that was a wonderful move for Peter and Lois. Not only was the professional burden now shared but Graeme gave Peter the opportunity to secure his and Lois’ financial wellbeing. Some time later, Whangarei did finally get its full complement of radiologists—five!—to do the job Peter did alone.

Another quote from President Teddy Roosevelt does justice to the intensity of Peter's drive: “It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who neither know victory nor defeat.”

At 66, Peter gave up his private practice, but continued working in the public hospitals in Rotorua and Whakatane until the retirement age of 70. With trepidation, he took up golf, took long walks, read libraries of books, but fundamentally he was bored. About six months into retirement, Rotorua hospital, chronically short of radiologists, phoned. They were desperate for help. They could get a special dispensation for him to come back, half a day a week. He was thrilled to be called to duty once again. The news got around the Bay of Plenty. “Dr. Durward's back”. Taupo phoned—they needed help—"You can count on me" said Peter. Then Whakatane. And more. By the time he was 79, he was working full time again! But the fundamental rule every honourable doctor lives by, “First Do No Harm”, concerned him. In the month he turned 80, never having had a complaint leveled against him and never having been disciplined, he sent his license back to the medical council. He couldn't have lived with himself if an error he caused through ageing would ever have harmed a patient.

Even in his 80's, as the attrition of his sight, hearing and bearing set in, Peter relished the tales of medicine's triumphs and tragedies. We'd discuss around the dinner table the surgical battles I had, life clutched from the jaws of death, devastation arrested through urgent decisive action, the purity of medicine conquering illness and injury. We both agreed. Medical practice was so personally fulfilling we'd do it gratis, without remuneration, if only the realities of life would allow it.

Several years ago I read a New York Times op-ed article by journalist Roger Cohen. He had lost and was grieving for a beloved and highly accomplished uncle, and wrote this beautiful epitaph. “Now he lives in me. The living are the custodians of the souls of the dead, those stealthy migrants. Love bequeaths this responsibility”. Peter Durward lives now in all who knew and loved him.

Author information:
Quentin Durward, MBChB, MD, Dr Durward's son.

URL:
**Impact of total knee replacement practice**

What effect does total knee replacement have on quality of life and what are the differences in lifetime economic outcomes if use of total knee replacement depends on level of symptoms?

This study from the US investigates the relationship between the quality of life improvement after total knee replacement and the cost effectiveness of this procedure.

The conclusions reached were that the current practice of total knee replacement had small health effects at the group level and was found to be economically unattractive. If surgery were restricted to more severely affected patients, total knee replacement could be considered cost effective.

*BMJ* 2017; 356:j1131

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**Intraoperative ketamine for prevention of postoperative delirium or pain after major surgery in older adults**

Delirium is a common and serious postoperative complication. Subanaesthetic ketamine is often administered intraoperatively for postoperative analgesia, and some evidence suggests that ketamine prevents delirium.

This international trial was designed to elucidate this issue: 672 patients older than 60 years who were to have major cardiac or non-cardiac surgery were included. After anaesthetic induction and before surgical incision, one-third were given placebo (normal saline), another third were given low-dose ketamine and the other third high-dose ketamine.

The researchers report that a single subanaesthetic dose of ketamine did not decrease delirium in older adults after major surgery, and might cause harm by inducing negative experiences. The latter included postoperative hallucinations and nightmares.

*Lancet* 2017; 390:267–75

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**Follow-up of prostatectomy versus observation for early prostate cancer**

This research group has previously reported that there were no significant differences in mortality between men who underwent surgery for localised prostate cancer and those who were treated with observation only. Uncertainty persists regarding non-fatal health outcomes and long-term mortality.

The study began in 1994 and involved 731 men with localised prostate cancer who were randomised to be treated by radical prostatectomy or observation.

After 19.5 years of follow-up (median 12.7 years), the researchers concluded that surgery was not associated with significantly lower all-cause or prostate cancer mortality than observation. Surgery was associated with a higher frequency of adverse events than observation but a lower frequency of treatment for disease progression, mostly for asymptomatic, local or biochemical progression.


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**URL:**

Alcohol Injection in Obstinate Pruritus Ani

August 1917

The technique of injection is simple. The area of itching is carefully noted from the patient's description. Under general or local anaesthesia the injection is made so that this whole area is anaesthetised. In nearly all cases a local anaesthetic, usually novocain (1 per cent.) or quinine and urea hydrochloride (1 per cent.), was used. This form of anaesthesia has proved satisfactory. The syringe is filled with alcohol (95 per cent.) and the usual fine hypodermic needle used for the injection. The needle is carried entirely through the skin vertically, and then is inclined sharply so that it lies nearly parallel to the surface. When the needle is properly inserted in the subcutaneous fat, it can be moved fairly freely from side to side under the skin and can be felt moving with the finger placed over it. If this freedom of movement is lacking, the needle is probably engaged in the corium, and if injections are thus made, sloughs may result. With the needle properly placed the whole area involved is injected, enough alcohol being used to underlay the area thoroughly. The injection may be carried up to the margin of the anus, but the writer has never injected the anal canal itself, nor has he reason to believe that this would have improved the results. Of course, before any injection is made, the skin is cleansed as for any other operation procedure.

This method accomplishes practically the same thing as the operative treatment for pruritus, and is indicated in those cases of great intensity in which the usual measures have failed. It has advantages over operative procedures. It is safer—there is no undermined skin with impaired circulation, and a potential dead space under it, in an area impossible to keep clean. It entails no dressings, stitches, or other trouble.—John Hopkins, “Hospital Bulletin,” p. 242.