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This Issue in the Journal

Challenges of the New Zealand healthcare disaster preparedness prior to the Canterbury earthquakes: a qualitative analysis
Sultan Al-Shaqsi, Robin Gauld, Sarah Lovell, David McBride, Ammar Al-Kashmiri, Abdullah Al-Harthy

Prior to the Canterbury earthquakes, healthcare disaster preparedness faced multiple challenges. Despite these challenges, New Zealand’s healthcare response was adequate. Future preparedness has to take lessons learnt from the 2011 earthquakes to improve health care disaster planning in New Zealand.

Disgust sensitivity and the ‘non-rational’ aspects of a career choice in surgery
Nathan S Consedine, Tzu-Chieh Yu, Andrew G Hill, John A Windsor

Fitting trainee physicians to career paths remains an ongoing challenge in an increasingly fluid health workforce environment. Prior studies examining interest in surgical careers have examined career and lifestyle values but neglected emotional proclivities; we examined whether disgust sensitivity may help explain low surgical interest and the tendency for female students to avoid surgical careers. As expected, greater disgust sensitivity predicted lower surgical career intention even when controlling traditional career values and the effect indexing low female interest in surgical careers was eliminated once disgust sensitivity was added. Disgust sensitivity is a novel (but powerful) predictor of career intention and may help us understand the decision to specialize in surgical versus non-surgical disciplines, particularly among women who are typically less well-represented.

Factors related to postgraduate retention of medical graduates in New Zealand
William Shelker, Peter Herbison, Alison Belton, Paul Glue

By 10 years after graduating, about one-third of NZ medical graduates leave NZ to work overseas. Analysis of medical graduate data from 1999–2010 suggests that the pathway by which medical students enter medical school may influence retention, with higher rates in students who are older, work experienced, or have completed an undergraduate degree. These factors should be considered when evaluating doctor workforce planning strategies.
New Zealand’s 2005 ‘no-fault’ compensation reforms and medical professional accountability for harm
Katharine Wallis

In 2005 the compensation of medical injury in New Zealand was changed: the prior ‘medical error’ and ‘rare and severe’ eligibility criteria were waived and eligibility was extended to all treatment injuries. Under the reforms ACC’s prior duty to report all findings of medical error to the Medical Council was also waived and replaced with a new duty to report ‘risk of harm to the public’ to the ‘authorities responsible for patient safety’. These changes have improved access to compensation for patients who are injured by treatment, and have also resulted in ACC reporting fewer doctors to the Medical Council. Decreased ACC reporting to the Medical Council has contributed to an overall downward trend in New Zealand’s accountability processes. Comparing the five years before and after the 2005 compensation reforms, there have been fewer referrals to the Medical Council overall, the Medical Council has conducted fewer performance reviews, the Health and Disability Commissioner (HDC) has investigated fewer complaints, and both the Medical Council and the HDC office have brought fewer disciplinary charges against doctors.

A workforce survey of New Zealand medical oncologists
Simon Bidwell, Andrew Simpson, Richard Sullivan, Bridget Robinson, Wendy Thomas, Christopher Jackson, Garry Forgeson, Michael Jameson, Trish Clarke

Cancer workload increasing due to changing population demographics and treatment opportunities. Current Medical Oncology Senior Medical Officer workforce currently report heavy workload. Workforce demographics changing with an increasing female and part-time workforce. Need to look at future models of care to take these factors into account to provide sustainable service

The New Zealand Vocational Trainee 2011 Survey: a national snapshot of vocational training
Jonathon Foo, James Blackett, Jesse Gale, Maria Poynter

We surveyed New Zealand vocational trainees using an online questionnaire. Trainees expressed a high level of satisfaction with most aspects of their training, and results compare favourably with Australia. Access to training in the private sector, and value for money emerged as areas of concern, but also highlight the importance of reimbursed costs in the satisfaction of New Zealand trainees. Work life balance is of increasing importance to young doctors, and an unmet desire for extended leave from medical practice may present an issue for workforce capacity and training flexibility in years to come. This survey provides a snapshot, a baseline and useful demographic data for future comparisons.
Demography of medical students at the University of Otago, 2004-2008: a changing spectrum?
David Perez, Alison Belton

Using a questionnaire we reviewed the demography of University of Otago Year 2 medical students for 2004–2008 to see whether our graduates reflect the changing demography of New Zealand society. The demographic spectrum of the University of Otago Medical School Year 2 students does not show a general shift towards the demography of the New Zealand community. However, there have been specific positive changes for entrants with a rural background and the proportion of students who are New Zealand citizens. Of concern Māori and Pacific Island students and students from families with lower socioeconomic and educational status are under-represented in the reported period although there has been more recent improvement. In addition the proportion of students with a parent as a doctor has risen compared to the 1987–2000 cohort. In conclusion further initiatives are needed to improve the numbers of Māori and Pacific Island students and students from lower socioeconomic backgrounds.

Kids in the cold: outcomes for New Zealand households with children using prepayment metering for electricity
Kimberley C O'Sullivan, Philippa L Howden-Chapman, James Stanley, Simon Hales

Results from two postal survey datasets, the Electricity Prepayment Meter Users’ Survey undertaken in late 2010 and the follow-up survey undertaken in 2011 found that households with children experience greater levels of hardship. Households with children were more likely to cut back on grocery spending, and indicated greater financial hardship than other households. About three out of five households with children using prepayment have one or two children and two in five have three or more children living at home. Most prepayment metering households already report cold homes, and there were no significant differences in reporting indicators of low indoor temperatures. Households with children were more likely to report seeing their breath condensing indoors on at least one occasion during the winter. Based on the most recent figures, about 28,000 households with children are estimated to use prepayment metering for electricity. No official statistics about prepayment metering are collected, and there are no government requirements about the kinds of meters used, the information they display, or fees and prices charged. More should be done to protect children from the disadvantages of using prepayment metering.
The proof of the pudding is in the eating—health system preparedness for the February 2011 Canterbury Earthquake

Mike Ardagh

At lunchtime on a Tuesday in 2011 a large earthquake hit Christchurch City. It measured 6.3 magnitude on the Richter scale but its epicentre was close and shallow. It killed nearly 200 people, injured at least 7000 more, and profoundly damaged the structure and function of the city.¹

Prior to this, Al-Shaqsi and colleagues had conducted a study in which they interviewed a number of emergency planners from our District Health Boards to gauge their opinions regarding how well prepared our health system would be if faced with a hypothetical disaster of this sort. The results of this study are presented in this issue of the Journal.²

Understandably the interviewees were worried that the health system might struggle, particularly because clinicians weren’t taking disaster-preparedness seriously enough; there were concerns communication would fail; and that we didn’t have the surge capacity in our systems to accommodate large numbers of injured people. While these concerns, and others listed in their paper, remain valid, we are now in a post-Christchurch earthquake era. Rather than ask ‘are we prepared?’ we have the dubious good fortune of being able to answer ‘were we prepared?’

Were we?

First, let’s put the Christchurch earthquake into perspective. In 2005 Ramirez and Peek-Asa from California³ identified the features of earthquakes associated with a higher incidence of injuries and death. Not surprisingly they found that these three things were important: the intensity of the earthquake, the time of the day, and the quality of the buildings.

The intensity of the earthquake isn’t the same as the magnitude. The magnitude is how much energy is released at the site of the earthquake. The intensity is more about how much the earth moves. Peak ground accelerations are one way of describing intensity and are highly predictive of fatal and non-fatal injury. On 22 February 2011, peak ground accelerations in Christchurch were measured as high as 2.2g (1g = 9.81m/s²). These, I understand, are among the highest ever recorded and are the highest vertical peak ground accelerations (the earth moving up and down) ever.

The second association with injury is the time of the day the earthquake hits. If you are home in bed, as was the case for most Canterbury people in the 4 September 2010 earthquake, then you are more likely to be OK. If you are in the city you are more likely to be injured or killed. Lunchtime on a weekday is a bad time to have an earthquake.

So, Christchurch had a high intensity earthquake (peak ground accelerations up to 2.2g) at the worst possible time (the middle of a working day), 185 people were killed and about 7000 were injured.
In contrast, Kobe, Japan, in 1995 had an earthquake with peak ground accelerations no higher than 0.82g, at 5.46am on a Tuesday. The number killed was 5488 and over 36,000 were injured. Of course, they had a greater population exposed to the quake—about 1.5 million. However, while their population was only a little over three times the population of Christchurch, the death rate was nearly 30 times higher, and this is despite the earthquake being of lower intensity and at a better time of the day.

In Bam, in Iran in 2003, a 0.98g earthquake struck just before 5.30am in the morning and killed 26,000 people out of a total urban population of 97,000. In Haiti in 2010, a 1.24g quake struck just before 5pm and killed 230,000.

Of course, our buildings are likely to be of better quality than Bam and Haiti, but even in Los Angeles in 1994, 72 people were killed and about 5000 injured although the earthquake struck at 4.30am in the morning and the peak ground accelerations were no higher than 1.78g.

The Christchurch earthquake was a disaster of significant proportions. The Canterbury health system was part of it, with its people affected and its facilities damaged. Despite this, relatively few people died. While the quality of the buildings had a lot to do with this, I like to think the initial and ongoing response from the health system contributed.

Unbeknown to us, in the Emergency Department of Christchurch Hospital on the afternoon of 22 February 2011, David Tolley, the President of the Royal College of Surgeons of Edinburgh, was there with his injured wife. Later he wrote of his experience in ‘The President Writes’ editorial of *The Surgeons’ News*, the magazine of his College. The full article is a fascinating commentary on his experiences, but I will quote just a few paragraphs describing his time in the Emergency Department:

‘…a reception area had been established outside, where patients were triaged. The contrast between the ordered calm there, and the disarray just half a mile away, was striking. Ten minutes later, now inside the Emergency Department and with the bleeding from a large scalp laceration controlled with the aid of a large dressing and Presidential pressure, the assessment was thorough, compassionate and rapid. I listened to the unruffled voice … over the PA, leading the assembled team. This was a virtuoso performance by an expert in complete control of the situation; speaking calmly and quietly, she directed resources where they were most needed. The list of injuries which she called in the first 10 minutes alone was sufficient to fill a trauma textbook: a second volume followed rapidly. The direction over the PA continued—updates on availability of imaging, instructions on patient disposal—all the time comprehensively appraising all of the current situation while anticipating the next requirements. I am in little doubt that many more people would have died in the hospital that day without the skill and leadership displayed in the Emergency Department.’

While this single observation cannot answer the question of our preparedness, it is an unsolicited, expert, first hand, observation of a reluctant but grateful, secret shopper. Furthermore, it is concordant with other observations, although some less independent.

What Mr Tolley didn’t witness was all the work preceding the earthquake (planning, practising, activating—including during the September 2010 earthquake) providing a solid platform for a response; the dedication on the day of many different professional groups in the hospital, in other hospitals, and in the community; national collaboration which saw (for example) patients transferred to Intensive Care Units around New Zealand; the miraculous public health efforts which prevented gastroenteritis despite
weeks of no running water nor sewerage; the health system’s continual provision of a high quality of health care in a very different environment; and so on.

The paper by Al-Shaqsi and colleagues, in this issue of the Journal, illustrates some areas of concern regarding preparedness and our own experience confirms we need to take these concerns very seriously. However, when we were tested by an event of immense proportions the health system responded remarkably.

While the ingredients and recipe are important the proof of the pudding is in the eating.

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References:
Challenges of the New Zealand healthcare disaster preparedness prior to the Canterbury earthquakes: a qualitative analysis

Sultan Al-Shaqsi, Robin Gauld, Sarah Lovell, David McBride, Ammar Al-Kashmiri, Abdullah Al-Harthy

Abstract

**Background** Disasters are a growing global phenomenon. New Zealand has suffered several major disasters in recent times. The state of healthcare disaster preparedness in New Zealand prior to the Canterbury earthquakes is not well documented.

**Objective** To investigate the challenges of the New Zealand healthcare disaster preparedness prior to the Canterbury earthquakes.

**Method** Semi-structured interviews with emergency planners in all the District Health Boards (DHBs) in New Zealand in the period between January and March 2010. The interview protocol revolved around the domains of emergency planning adopted by the World Health Organization.

**Results** Seventeen interviews were conducted. The main themes included disinterest of clinical personnel in emergency planning, the need for communication backup, the integration of private services in disaster preparedness, the value of volunteers, the requirement for regular disaster training, and the need to enhance surge capability of the New Zealand healthcare system to respond to disasters.

**Conclusion** Prior to the Canterbury earthquakes, healthcare disaster preparedness faced multiple challenges. Despite these challenges, New Zealand’s healthcare response was adequate. Future preparedness has to consider the lessons learnt from the 2011 earthquakes to improve healthcare disaster planning in New Zealand.

Disasters are part of human lives. Global disasters are increasing in frequency, severity and damage. In the last 50 years, more than 10,000 disasters have been reported that collectively affected more than five billion humans.¹

According to the Center for Research Epidemiology of Disasters (CRED) and the United States Office of Foreign Disaster Assistance (OFDA) database, the death toll from disasters in the last 50 years is estimated to be in excess of 12 million people.² This pattern is multifactorial and is mainly due to three global changes that are connected: global over-population, urbanisation and industrialisation, and climate changes.³

Disasters are a direct function of hazard and vulnerability.³ The impact of disasters is inversely related to the preparedness level of the affected community.³ Disaster preparedness is the ability of a community to effectively respond to and meet the unexpected demands created by the emergency. A robust healthcare system prepared to meet the healthcare needs arising from a disaster is integral to minimising the human impacts of such events.
Healthcare disaster preparedness operates at two main levels: strategic and operational. The strategic level oversees the process of disaster preparedness and its activities from a wider perspective such as formulating generic emergency plans, securing funds for disaster preparedness, controlling emergency communication and training. Moreover, strategic planning draws on national guidelines and frameworks for emergency response and is usually carried out by emergency planners (EPs).

On the other hand, the operational arm of disaster preparedness focuses primarily on the actual disaster response measures such as command and control, triage and clinical management of victims. Hence, all emergency response agencies constitute the operational sector of disaster planning. This includes pre-hospital healthcare services such as ambulance services and hospital-based services such as trauma services. In short, the core function of the operational arm is to execute strategic planning in the provision of disaster health care.

Most District Health Boards (DHBs) in New Zealand have a designated EP, or equivalent, with a primary role of strategic disaster preparedness planning that integrates the overall Coordinated Incident Management System (CIMS) which is the national framework for disaster planning. Several regional emergency advisors who are appointed by the Ministry of Health support the DHB emergency planners in their roles.

Information on the state of healthcare disaster planning in New Zealand is scarce and fragmented. The value of healthcare disaster preparedness was highlighted by the Canterbury earthquakes. The earthquake injured 6657 and killed 182 in the first 24 hours. The majority of injuries were minor musculoskeletal which did not require hospital-level care. Ardhag and colleagues highlighted the lessons learned from the initial response to the event.

One of the key massages in their paper was that rehearsed preparedness plans have helped to reduce the mortality and morbidity from the Canterbury earthquakes. Unfortunately, the 2012 Royal Commission of Inquiry into the Canterbury Earthquakes did not address the overall healthcare response.

This article assesses the challenges of healthcare disaster preparedness that exist in New Zealand prior to the Canterbury earthquakes. Such challenges influenced the New Zealand healthcare care preparedness before the Canterbury earthquakes.

Methods:

Qualitative key informant interviews were undertaken to assess the challenges facing healthcare disaster preparedness in New Zealand. Such a method has been widely used and validated in disaster medicine research. The interview protocol addressed the main components of healthcare emergency preparedness as described by the World Health Organization which includes: planning and policies, communication, collaboration and coordination, training, volunteers and the public, and surge capability.

These domains are internationally regarded as the core pillars for emergency preparedness. The key informants were EPs from the 21 District Health Boards (DHBs) in New Zealand. All EPs were mailed the interview protocol and an invitation letter to participate in a phone interview to discuss the state of healthcare emergency preparedness. A follow up email was sent to all non-responders 2 weeks after the initial invitation. Sixteen DHBs (including Canterbury District Health Board) agreed to participate in the research. The participating DHB represent 79.9% of the New Zealand population. Eleven phone interviews were conducted between January and March 2010.
Five DHBs responded to the interview questions in writing. An additional interview was conducted with a pre-hospital provider. Interview transcripts were sent back to interviewees for approval and editing. Participants were encouraged to add their comments after editing the transcripts. The average length of the phone interviews was 31:04 minutes (range: 19:34 min–55:34 min). The total free text used in this paper was 66 pages of transcripts and comments.

The Ministry of Health multi-region ethics committee approved the study. Individual written consents were obtained from all interviewees prior to the interviews.

The analysis of the qualitative data collected followed an inductive and interpretive process in order to understand the state and challenges of strategic emergency preparedness. Inductive and interpretive methods are validated approaches in disaster literature and appropriate in determining the experiences of participants about a particular issue in this case, strategic healthcare emergency preparedness. The six core domains were the axial framework for this study and the analysis aimed to extract the issues stemming from each domain. Ideas emerging from each domain were considered themes after three rounds of data analysis in which saturation was believed to have been reached. The analysis was conducted with the aid of the qualitative data analysis package NVivo 8© (for Microsoft XP, QSR International Pty Ltd, USA).

Results and discussion

The World Health Organization’s domains of healthcare emergency preparedness provide a valuable framework for investigating the challenges of New Zealand disaster preparedness. This section presents the main challenges of New Zealand emergency preparedness as identified by emergency planners in each of the emergency preparedness domains described by the WHO.

Planning and policies

Struggle to ensure clinical “buy-in”—One of the changes in healthcare system in the 1990s is the establishment of the “Emergency Planner” as a separate job under the Emergency Enhancement Fund. This has led clinicians and frontline personnel to disengage in healthcare preparedness activities. Participants felt that the majority of healthcare providers view the emergency planning process as being “someone else’s job” rather than part of their clinical duty. EPs come from a variety of clinical and non-clinical backgrounds including, medicine, nursing, economics, marketing, and civil defence.

Interviewees reported a silo attitude among healthcare providers who resist participating in clinical emergency planning activities run by EPs who—in most cases—have no clinical background. This culture is enforced by the nature of individualized healthcare provision. The medical disaster response requires a shift to population-focused healthcare provision.

One of the biggest challenges expressed by EPs in New Zealand is getting the “mind-shift” among healthcare providers that disaster situations are unique. EPs felt that the silo culture in many health services undermine disaster preparedness. For instance, EPs observed that many doctors feel frustrated at not being the commanders during a disaster response.

Furthermore, they felt that most healthcare services operate in fragmented “silos” during normal operation; hence, it is hard to imagine this culture will change during a disaster response.

Two emergency managers reflected on this:
“We don’t really have much buy-in from clinicians and they have a lot of resistance to what we do simply because we are not viewed as part of a clinical team and they are not interested, have too much to do, or can’t be bothered to play silly games”. (NZEM.1)

“I think there is a bit of a dilemma in health, where I think doctors and nurses believe they should be running everything during an emergency when in fact they are not well positioned to do that. They are positioned and skilled in looking after patients and should focus on that.” (NZEM.12)

“I think, traditionally, doctors have ruled the roost, and they find it hard to let go. And in a crisis, thinking an administrator might have to be the incident controller is a bit foreign to them. That is not demeaning them at all; I think it is a fact of life you know. So what we are trying to do here is effectively initiate a bit of culture change.” (NZEM.10)

Attracting frontline healthcare providers to participate in the process of emergency preparedness is a struggle for emergency planners in New Zealand. Furthermore, attitudes of clinical providers about disaster preparedness appear to be a barrier to emergency planning.

**Beyond the response phase**—Disasters vary considerably and some can be protracted. A living example is the Christchurch earthquake situation that started in September 2010 and the devastation is still affecting individuals today. Emergency Planners felt that healthcare emergency planning lacks the foresight for the long-term impacts of disasters especially the psychological effects. An EP reflected:

“To be honest, long term effects of emergencies are badly dealt with in our current planning. We tend to focus on the first three days and then it seems that we are scared to think what will happen beyond. Disasters go on for long time and we need more work on this aspect.” (NZEM.1)

Disaster response is the phase of the emergency that attracts the media most and therefore the public attention focuses on the initial phase more than the recovery phase. It is important to ensure that disaster planning covers all phases of the emergency from prevention to recovery.

**Communication:**

Lessons from international disasters have shown that communication is often the single point of failure. Communication errors can be categorized into failure to pass information, failure to confirm information, or failure to coordinate information. An example of a failure to pass information was demonstrated during attacks of 9/11 when the command centre failed to pass on critical information to receiving hospitals and the first indication of a disaster was initiated by the arrival of wounded victims to multiple emergency departments.

New Zealand’s EPs felt that, at a national level, there was a good emphasis on disaster communication. They reported that the current national communication structure is robust and reliable. The MoH provides senior DHB managers with special training on risk and disaster communication.

Furthermore, the MoH has provided each DHB with several satellite-based communication devices to only be used during mass emergencies and when traditional telephone-based communication fails. Nevertheless, EPs expressed a concern about the availability of backup facilities available when such communication methods fail.
Emergency managers also believed that the over-reliance on an almost fully computerized Information Technology (IT) system has the potential to create problems during disasters, as one emergency planner elaborated:

“In disaster situations, if you over-rely on technology you could create a disaster. That is why we have paper records as backups to our digital records so if the power or IT system is out, we can easily go back to paper records and keep going.” (NZEM.9)

Many emergency planners felt that the ability to revert back to paper based-records is essential and DHBs should run a dual system of electronic and paper-based medical records. Therefore, communication is a pressing challenge to healthcare disaster preparedness in New Zealand.

Collaboration and coordination:

Interviewees reported that the level of collaboration between public healthcare services in New Zealand is adequate. Despite strong collaboration between DHBs several participants reported that the collaboration of public healthcare services with private services is lagging behind.

Few DHBs have signed MoUs with private health or non-health services. All emergency managers interviewed expressed the need to collaborate more with private healthcare services such as pharmacies as they have valuable human and physical resources that can be utilized for disasters. An EP explained:

“Our relationship with the private sector is not as (strong) as we would like (it to be). Our goals for this year are to establish a number of contracts sort of Service Level Agreements with the private sector that will support health care in our community during an incident or disaster.” (NZEM.8)

Interviewees reported that one of the drawbacks of the current CIMS structure is the lack of explicit private services representation in disaster preparedness. An EP stated:

“I think the private sector, health or otherwise must be represented in the overall CIMS structure. They can contribute a lot to disaster response. I give you an example, if our hospital is munted in a disaster the only self-sustaining place we can locate to is the local airport. That is why we should collaborate with airport authorities and other private authorities. This has to be stated in the CIMS structure.” (NZEM.12)

Collaboration in a disaster response can augment resources and avoid duplication of roles of all public and private agencies. Hurricane Katrina was a scenario in which the private agencies contributed immensely to the disaster response. It was estimated that the pharmaceutical companies provided about US $25 million in funds for nutritional and medicinal products.19

Early reports indicate that the private sector has contributed almost NZ $100 million for Christchurch rebuilds.20 Therefore, the private sector has the capability to provide valuable resources during disasters. Emergency planners should always consider private agencies and their role in emergencies should be clearly stated in the national framework.

Disaster training

The current New Zealand MoH funding for DHBs covers training workshops for all healthcare providers. The training is nationally consistent and revolves around
teaching different levels of the CIMS structure. The training also includes regular drills and exercises.

The frequency and extent of such exercises varies between DHBs from one tabletop exercise every two years to a couple of victim-simulated drills per year. In addition, civil defence and fire services run several drills every year and some hospital services participate in such exercises, especially emergency departments.

As discussed earlier, the buy-in from healthcare providers for disaster planning was felt to be limited. Interviewees reported that some medical personnel view training for disasters as “playing silly games.”

Participants felt that one method of attracting healthcare providers to actively participate in disaster planning is to use modern simulation programs that are more “fun” and educational at the same time. One widely available program in New Zealand is Emergo Train® which all DHBs have trained some staff and senior managers to use as a teaching tool. An EP stated:

“I guess education is the other thing, which is a key to everything really. The more you get out there, the more you share the plans, and talk about them. So making education more attractive because it can be a bit unsexy and boring. It is a matter of finding how to excite people and talk about the things that interest them. And if you can do that then, they tend to actually retain stuff. We have tried Emergo and clinical staff enjoyed the experience” (NZEM.16)

Internationally, the number of disaster training programs available for health providers increased substantially since 11 September 2001. The multitude of programs raises the question of how effective such training activities are in enhancing disaster preparedness of healthcare providers.

A systematic review by Williams and colleagues in 2008 concluded that there was no sufficient scientific evidence to determine whether training interventions for healthcare providers are effective in enhancing knowledge and skills in disaster response. This is a reflection of the lack of rigorous evaluation programs and the heterogeneity of the modalities used in disaster training.

The majority of disaster training value is based on “lessons learned” from international disasters rather than evidence-based.

Volunteers and the public

The interviewees believed that there is a need to focus on the wellbeing of emergency responders. Many EPs felt that there was little written down on how to look after “own warriors” and the welfare of emergency responders is critical in any successful response. An EP said:

“This area needs a lot of work. At present, we rely on staff themselves to make appropriate arrangements that their families are looked after before responding. At the moment the disaster response equation, sadly, does not really factor in staff-wellbeing issues.” (NZEM.13)

Furthermore, volunteerism provides the community with a sense of involvement and ownership of the disaster response. Yet, a clinical risk manager highlighted New Zealand’s lack of preparedness to harness volunteers:

“Currently, we have no clear lines on how to utilise healthcare volunteers and as per this DHB we don’t ask non-employees to assist. If this was to happen we will have to figure out a credentialing guideline and process.” (NZEM.11)
Therefore, volunteers are a part of any disaster response and they require advanced planning in order to hardness their full potential.

**Surge capability**

Emergency Planners felt that it is essential when responding to a surge from a disaster to ensure the basics of health needs such as to availability of clean water, appropriate sanitation measures, enough food, and safe shelter. EPs were concerned that the current understanding of healthcare surge capability still focuses on the excess of beds that can be freed up and the extra ventilators available during a disaster rather than the basics. An EP admitted:

“We largely use surge capability and beds availability interchangeably. In our DHB we can usually, quickly free up 80 beds in .......... hospital to accommodate casualties. Our chief medical officer thinks that in a serious event that number may be closer to 200 beds.”

(NZEM.12)

EPs in NZ recognized that “staffing” is the main limiting component in medical surge capability. Two emergency managers discussed staffing in surge capability:

“Staffing is the key factor in surge. I mean you can lay people wherever you like but you need someone to look after them.” (NZEM.2)

“We had a recent mass casualty exercise and to the surprise of all of us we could manage to have 100 beds where patients can be put in, but we just realised that we don’t have the human resources to look after those 100 patients. So to be honest, you would be able to make do with fewer beds but you can’t do with less staff in a disaster.” (NZEM.8)

The recommendation from the international task force for mass critical care summit set the benchmark of surge capacity to be at 300% of the average patient load. Such high expectations seem unrealistic in the New Zealand context because such patient loads requires physical and manpower resources that simply are not available.\(^\text{24}\)

The Australasian Surge Strategy Working group produced 22 domains of surge capacity in emergency departments that are relevant to the Australasian context.\(^\text{25}\)

Such documents are essential in planning and preparedness. It is important to appreciate that surge for infrastructure is critical in order to provide a safe and capable environment for disaster responders to work in.

Strategies such as halting or reducing elective surgeries and outpatient clinics are essential in healthcare disaster response surge capacity. District Health Boards have to develop advanced plans on how to execute such measures to ensure that the health needs of disaster victims and regular patients are not compromised.

**Conclusion**

New Zealand healthcare disaster preparedness was tested by the Canterbury earthquakes. This research showed that disaster preparedness in New Zealand faces several challenges prior to the Canterbury earthquakes. Several of challenges presented in this paper were also identified by Ardagh and colleagues in their review of the initial response to the February Canterbury earthquake.\(^\text{10}\)

For example, they identified that backup systems for life-line services such as water, communication and electricity were significant challenges during the initial response.\(^\text{10}\)
They emphasized the need for integrated planning of hospital and community-based healthcare facilities to ensure that appropriate response to the influx of injured people is unified. The review also found that management of volunteering was a challenge during the initial response and future emergency plans in New Zealand should clarify such issues. The review by Ardagh and colleagues focuses on the initial response only.

The limited involvement of clinical staff in emergency preparedness is a significant challenge reported by emergency planners in this study. Clinical staff are the frontline providers that execute any emergency plans during a disaster response. Clinical providers have to be involved in emergency preparedness in order to familiarize themselves with the process of disaster response so execution of such plans during a disaster response becomes a drill. One way of involving clinical providers in emergency preparedness is for the Ministry of Health to provide extensive and comprehensive training opportunities to all healthcare services in New Zealand.

Furthermore, incentive programs for clinical personnel to actively participate in disaster preparedness activities would be helpful. Until clinical providers take ownership and get involved in disaster preparedness then there will always be a gap between emergency planning and disaster response execution.

Volunteering is another issue reported by emergency planners and appeared to be a challenge during the response to the February Canterbury Earthquake. When disasters strike, a large number of people arrive at the scene to offer assistance and help. This phenomenon is usually referred to as “convergence”. Reports from international disasters showed that between 10% and 70% of disaster responders are volunteers not accounted for during disaster planning process. For example, following the 9/11 attacks there were 40,000 volunteers who reported to Ground Zero within days of the disaster. There were multiple great examples of volunteering during the recent Canterbury earthquakes such as the Student Army and the Farmy Army. There were about 9000 students (including medical students) who contributed to the disaster response and recovery in Christchurch.

Medical students participated in the initial hours of the response. They carried out essential tasks such as preparing intravenous fluid packs for crush syndrome victims and dressing simple wounds. Their role was greatly appreciated by clinical personnel who had more time to look after the very sick victims when simple tasks were done by medical students.

Volunteers can be a valuable asset that provides a timely workforce and expertise. This can only be achieved if volunteers are utilised and channelled appropriately, especially during the initial hours of the emergency in which the main response relies heavily on local personnel to provide search and rescue.

Disaster preparedness experts have argued that the economic advantage of having volunteers in a disaster response alone could justify planning for volunteers to be part of the overall disaster preparedness plan.

There are several strengths and limitations of this paper. First, 5 of 21 DHBs declined to participate in this study. The 16 participating DHBs represented a wide range of
geographic areas. Thematic saturation was reached when analyzing the data suggesting additional interviews would have yielded little or no new information.

This study is the first to address the issue of strategic DHB level healthcare emergency preparedness in New Zealand. The study is limited by its focus on strategic disaster preparedness and the challenges presented might not reflect operational matters such the perception of clinicians about the role of emergency planners.

This paper does not examine how these challenges have played out during the response to the Canterbury Earthquakes because (at the time of writing this paper) the lessons from the Canterbury earthquake medical response were limited. For future research, it will be interesting to investigate how the challenges reported in this paper reflect the response during the Canterbury earthquakes.

In conclusion, disaster preparedness in New Zealand has faced several challenges that may have shaped the country’s response to the devastating Canterbury Earthquakes.

Competing interests: Nil.

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References:

Disgust sensitivity and the ‘non-rational’ aspects of a career choice in surgery

Nathan S Consedine, Tzu-Chieh Yu, Andrew G Hill, John A Windsor

Abstract

**Aim** Fitting trainee physicians to career paths remains an ongoing challenge in a highly fluid health workforce environment. Studies attempting to explain low interest in surgical careers have typically examined the relative impact of career and lifestyle values. The current work argues that emotional proclivities are potentially more important and that disgust sensitivity may help explain both low surgical interest as well as the tendency for female students to avoid surgical careers.

**Method** 216 medical students attending a required course in human behaviour completed measures of career intention, traditional predictors of career intention and dispositional disgust sensitivity.

**Results** As predicted, logistic regression showed that greater disgust sensitivity predicted lower surgical career intention even when controlling for traditional career values (OR=0.45, 95%CI=0.21–0.95). Additionally, the gender effect indexing low female interest in surgical careers was no longer significant once disgust sensitivity was added to the model.

**Conclusion** The impact of disgust sensitivity on surgical interest was substantial and on par with established predictors of career intention. Disgust sensitivity may represent a potentially modifiable factor impacting surgical career choice, particularly among female students who are typically more disgust sensitive.

Mismatches between the needs of public health systems and student interests have led to a renewed study of the factors predicting career specializations among medical students. There is evidence of a misdistribution across specialties¹ and a mismatch between the needs of public health systems and patterns of student interest/intention². Studies suggest shortages in several key areas, notably in “procedural” disciplines such as emergency medicine/trauma surgery³ and general surgery,⁴ as well as surgical disciplines more generally.⁵ Understanding the origins of the decision to specialize has become increasingly important.

Specialisation decisions are influenced by an array of demographic,⁶ institutional,⁷ and outcome-expectancy type variables.⁸ Reports on medical students’ career choices suggest that lifestyle considerations influence the specialisation decisions, perhaps particularly for women.⁹

In one study, 55% of the variance in the change in student preferences from 1996 to 2002 was accounted for by a preference for controllable lifestyles⁹ and it may be that the comparative shortage of females making surgical career choices results from the differential importance of lifestyle considerations such as childbearing/rearing¹⁰ or exposure to gender discrimination and harassment during training.¹¹
As the proportion of female medical students become equal or exceeds that of male students, some fear that the shortage of surgeons may worsen.

There appears to be some variation in the relevance of particular factors to specific career choices. Individuals interested in subspecialities tend to value teaching, research, and technical skills while generalists emphasise lifestyle and personal/financial issues.

Students choosing primary care appear to be strongly influenced by “working with people” and the opportunity to provide longitudinal care, while those choosing non-primary care specialties are more influenced by monetary rewards, perceptions of lifestyle, and prestige. Similarly, students choosing procedural specialties appear to be more motivated by income, prestige and research opportunities.

Students considering a surgical career appear to be motivated by role models, career, and academic opportunities and less discouraged from surgery because of lifestyle, time commitment, call schedules, or residency length.

Although study of such factors has the potential to inform recruitment, training, and health workforce planning, they are limited in some important regards. The implicit model of career-decision research is highly “rational” and tends to suggest that choices are predominantly made on the basis of consciously evaluated considerations.

In the current report, we suggest that career choices, particularly in surgery, are also influenced by emotional sensitivities and predispositions. Specifically, we hypothesize that the tendency to be disgusted—disgust sensitivity—is a significant and hitherto unexamined factor in the decision to choose a career in surgery compared with other specialties.

Disgust is a “primary” or “basic” emotion that is thought to have evolved to promote the active or passive behavioural avoidance of possible contaminants. Prototypically, people feel disgusted following exposure to stimuli that carry a risk of pathogen transmission, but disgust also frequently arises in response to poor hygiene, bodily products (e.g. faeces, mucus, semen), and violations of the body envelope (i.e. wounds, gore, surgery).

Importantly, there are stable individual differences in the tendency to feel disgust, creating the possibility that people who are dispositionally more sensitive to disgust-eliciting stimuli are less likely to show an interest in surgically-oriented careers.

Further, it is well-known that females are less likely to opt for surgical careers, a difference that has typically been ascribed to the differential importance of lifestyle motivations. However, women are also reliably more disgust prone and we hypothesise that disgust sensitivity may help explain gender differences in surgical career interest.

Method

Participants

Participants for the current study were drawn from a pool of 335 first and second year pharmacy, nursing, and medical students attending a required course in human behaviour. Given our focus on career influences among medical students, we restricted the current analyses to the portion of students indicating an intended major in medicine (n=216).
On average, students were 21.4 years old and approximately 85% were single. Around 50% were New Zealand European, 25% Asian, and the remainder either Maori/Polynesian (10%), or Other (15%) (Table 1).

Table 1. Means and standard deviations of study variables as a function of participant gender

<table>
<thead>
<tr>
<th>Variables</th>
<th>Females</th>
<th>Males</th>
<th>Univariate F or ( \chi^2 ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>21.1 (3.2)</td>
<td>21.7 (3.7)</td>
<td>1.52</td>
</tr>
<tr>
<td>% indicating 1+ surgical career interests</td>
<td>44</td>
<td>66</td>
<td>9.91**</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% New Zealand European</td>
<td>43.8</td>
<td>50.7</td>
<td>2.42</td>
</tr>
<tr>
<td>% Asian</td>
<td>27.3</td>
<td>25.3</td>
<td></td>
</tr>
<tr>
<td>% NZ Maori/Pacific</td>
<td>13.3</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>% Other/Multiple</td>
<td>15.6</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>AAMC career determinants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectations regarding high income</td>
<td>4.06 (1.60)</td>
<td>4.35 (1.52)</td>
<td>1.64</td>
</tr>
<tr>
<td>Desire to help others</td>
<td>6.33 (0.91)</td>
<td>5.95 (1.24)</td>
<td>6.68**</td>
</tr>
<tr>
<td>Desire to use latest technology</td>
<td>3.60 (1.71)</td>
<td>4.36 (1.68)</td>
<td>9.68**</td>
</tr>
<tr>
<td>Duration of specialty training</td>
<td>4.51 (1.68)</td>
<td>4.09 (1.94)</td>
<td>2.88</td>
</tr>
<tr>
<td>Fit with personality/interests</td>
<td>6.35 (0.78)</td>
<td>6.14 (1.08)</td>
<td>2.69</td>
</tr>
<tr>
<td>Future family plans/considerations</td>
<td>5.76 (1.49)</td>
<td>5.42 (1.22)</td>
<td>2.85</td>
</tr>
<tr>
<td>Minimisation of educational debt</td>
<td>3.84 (1.83)</td>
<td>3.12 (1.85)</td>
<td>7.32**</td>
</tr>
<tr>
<td>Desire to use technical skills</td>
<td>4.42 (1.46)</td>
<td>5.12 (1.21)</td>
<td>12.83**</td>
</tr>
<tr>
<td>Family pressure/expectations</td>
<td>2.97 (1.81)</td>
<td>2.71 (1.88)</td>
<td>0.96</td>
</tr>
<tr>
<td>Influence from role models</td>
<td>4.50 (1.67)</td>
<td>4.08 (1.75)</td>
<td>3.03</td>
</tr>
<tr>
<td>Competitiveness/exclusivity</td>
<td>3.80 (1.77)</td>
<td>3.74 (1.76)</td>
<td>0.05</td>
</tr>
<tr>
<td>Participation in clinical rotations</td>
<td>4.66 (1.62)</td>
<td>4.10 (2.10)</td>
<td>4.74*</td>
</tr>
<tr>
<td>Work/life balance</td>
<td>6.10 (1.25)</td>
<td>5.83 (1.17)</td>
<td>1.04</td>
</tr>
<tr>
<td>Content of speciality</td>
<td>5.76 (1.16)</td>
<td>5.58 (1.34)</td>
<td>2.32</td>
</tr>
<tr>
<td>Recognition/prestige of speciality</td>
<td>3.69 (1.78)</td>
<td>4.05 (1.67)</td>
<td>2.20</td>
</tr>
<tr>
<td>Options for fellowship training</td>
<td>4.24 (1.71)</td>
<td>3.90 (1.87)</td>
<td>1.87</td>
</tr>
<tr>
<td>Disgust sensitivity characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal reminder disgust</td>
<td>2.10 (0.48)</td>
<td>1.93 (0.50)</td>
<td>5.76*</td>
</tr>
</tbody>
</table>

Note: * \( p <0.05 \), ** \( p <0.01 \).

Procedure

Ethical permission to conduct the study was granted by the University of Auckland Human Ethics Committee. Participants had the study explained to them before completing a questionnaire assessing background characteristics (e.g., age, gender, educational level, ethnicity), career intentions/interests, determinants of career intention/interest, and dispositional disgust sensitivity.

Measures

Surgical career intentions/interest—Based on recent descriptions of vocational scopes of practice for the healthcare training context in which data collection occurred, participants were provided with a list of 43 medical specialties and asked to rank the three they were most likely to specialise in. In several instances, participants simply provided three check marks. Consequently, each specialty was coded by the authors as being either “surgically oriented” or “non surgically-oriented,” the scores aggregated, and participants scored as indicating either “none” or 1+ (one or more) surgical” choices.

Influences on career intentions/interest—Established predictors of career interest/intention were taken from the Association of American Medical Colleges’ (AAMC) 2009 Medical Student Graduation...
Questionnaire, a widely used instrument. In tailoring the instrument to the New Zealand context, we (a) removed questions regarding US- or AAMC-specific factors, (b) slightly rephrased some items to reflect New Zealand terminologies, and (c) added three additional items assessing the importance of the desire to help others, using the latest technology, and using technical skills. The final scale included 16 items that were scored on a 1 “Not important” to 7 “Very important” metric.

Disgust sensitivity—Participants completed the Disgust Scale, a widely used 32 item measure of dispositional disgust sensitivity. The measure is well-validated in experimental studies of disgust, has high internal reliability, is stable (r=0.79) over time, and predicts avoidance of eliciting stimuli. Given this is the first time it has been used in studies of career intention, we initially considered using the three separate subscales assessing core disgust (elicited by rotten foods, bodily waste, and pests), “animal” disgust (elicited by reminders of mortality and our biological nature) and contamination-based disgust. Ultimately, however, we elected to concentrate on the form of disgust most closely linked to content in the surgical domain; animal disgust sensitivity (α=0.68) has previously been shown to predict gaze aversion (looking away) in response to surgical videos.

Analytic strategy—Given the dual nature of our foci on disgust sensitivity and questions of gender, we tested our hypotheses using logistic regression. In this approach, we first entered the gender variable, added the 16 AAMC career determinant variables in Step 2, and disgust sensitivity in Step 3. We use Nagelkerke R² as a measure of explained variance and the Hosmer-Lemshow test as an indication of model fit. This approach had the advantage of allowing us to directly demonstrate that disgust sensitivity predicts surgical interest even when controlling for an array of traditional predictors, although it is worth noting that a forward-entry logistic regression (in which predictors were sequentially added to the model, tested, and only retained if they were significant predictors) produced an identical pattern of significant predictors.

Results

The logistic regression used to predict interest in surgical careers was significant (Table 2) and explained a reasonable proportion of the categorization variance, Nagelkerke R²=0.34; the Hosmer-Lemshow test indicated that the proportion of surgical preferences were not different from those predicted by the model, X² (8, n=216)=11.10, p=0.20.

Being female at Step 1 predicted reduced odds of indicating surgical career interest (OR=.40, 95%CI=.22-.71) and remained significant when the 16 AAMC career predictors were added to the model (OR=.46, 95%CI=.22-.96). At this step, greater interest in surgery was predicted by reduced importance of family plans/considerations or family pressure but by a greater desire to use technical skills and a greater valuation on the competitiveness or exclusivity of specialties (see Table 2).

Important in terms of our hypotheses, were two key findings at Step 3. First, adding disgust sensitivity in Step 3 showed that even after controlling for traditional career factors and gender, greater disgust sensitivity predicted reduced odds of indicating interest in a surgical career (OR=.45, 95%CI=.21-.95); the pattern of career predictors from Step 2 remained identical, suggesting that disgust is not acting as a proxy for these variables but is adding something unique. Second, while the gender effect indicating greater male surgical preference remained significant at Step 2, introducing disgust sensitivity reduced this effect to non-significance perhaps implying that gender differences in surgical career interest may be explained by differences in disgust sensitivity.
Table 2. Odds ratios and 95% confidence intervals for three steps of a logistic regression predicting surgical career interest

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Step 1 Gender only model</th>
<th>Step 2 Gender plus AAMC variables</th>
<th>Step 3 Gender, AAMC variables, and disgust sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds ratio</td>
<td>95% CI</td>
<td>Odds ratio</td>
</tr>
<tr>
<td>Gender</td>
<td>.40**</td>
<td>.22-.71</td>
<td>.46*</td>
</tr>
<tr>
<td>AAMC career factors</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Expectations for high income</td>
<td>–</td>
<td>–</td>
<td>.88</td>
</tr>
<tr>
<td>Desire to help others</td>
<td>–</td>
<td>–</td>
<td>1.16</td>
</tr>
<tr>
<td>Duration of specialty training</td>
<td>–</td>
<td>–</td>
<td>.99</td>
</tr>
<tr>
<td>Fit with personality/interests</td>
<td>–</td>
<td>–</td>
<td>1.00</td>
</tr>
<tr>
<td>Future family plans/considerations</td>
<td>–</td>
<td>–</td>
<td>.77</td>
</tr>
<tr>
<td>Minimisation of educational debt</td>
<td>–</td>
<td>–</td>
<td>.64**</td>
</tr>
<tr>
<td>Desire to use technical skills</td>
<td>–</td>
<td>–</td>
<td>1.12</td>
</tr>
<tr>
<td>Family pressure/expectations</td>
<td>–</td>
<td>–</td>
<td>1.58**</td>
</tr>
<tr>
<td>Influence from role models</td>
<td>–</td>
<td>–</td>
<td>.63**</td>
</tr>
<tr>
<td>Competitiveness/exclusivity</td>
<td>–</td>
<td>–</td>
<td>1.36*</td>
</tr>
<tr>
<td>Participation in clinical rotations</td>
<td>–</td>
<td>–</td>
<td>1.11</td>
</tr>
<tr>
<td>Work/life balance</td>
<td>–</td>
<td>–</td>
<td>1.01</td>
</tr>
<tr>
<td>Content of specialty</td>
<td>–</td>
<td>–</td>
<td>1.36</td>
</tr>
<tr>
<td>Recognition/prestige of specialty</td>
<td>–</td>
<td>–</td>
<td>1.03</td>
</tr>
<tr>
<td>Options for fellowship training</td>
<td>–</td>
<td>–</td>
<td>.90</td>
</tr>
<tr>
<td>Animal reminder disgust</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Constant</td>
<td>1.96</td>
<td>–</td>
<td>.96</td>
</tr>
</tbody>
</table>

Note: * p < .05, ** p < .01; Odds ratios greater than 1 indicate greater odds of indicating interest in surgical careers

Discussion

Findings from the current study permit two key observations. First, these data provide evidence suggesting that the factors influencing surgery-related career interests/intentions extend well beyond established factors. As predicted, persons with greater animal reminder disgust sensitivity were less likely to report interest in surgically-oriented career pathways even when controlling for established predictors. Second, in addition to confirming that women show less interest in surgical careers,²⁶ we also uncovered preliminary evidence suggested that lower female interest in surgery may be the result of greater disgust sensitivity.

To our knowledge, the finding that an emotional disposition—disgust sensitivity—is able to predict procedural versus non-procedural career intentions is unique and worthy of comment. In theory, animal-reminder disgust is elicited by reminders of mortality and our biological nature – preserved human body parts, viscera, dead bodies, and the like.

Our findings are consistent with the idea that some emotions promote the avoidance of specific stimuli.³² They are also in line with prior data showing that disgust sensitivity statistically explains gender differences in specific medical phobias³³ and that animal-reminder (versus core or contamination-based) disgust uniquely predicts gaze aversion in response to a video depicting surgery³¹.
Consistent with prior work\textsuperscript{13} we found that males were more likely to choose surgery, at least prior to adding disgust sensitivity to the model. Earlier research has suggested that the comparative shortage of females making surgical career choices,\textsuperscript{26} may result from the differential importance of career considerations such as childbearing/rearing\textsuperscript{10} or exposure to gender discrimination and harassment.\textsuperscript{11} However, it is also known that women are more disgust prone\textsuperscript{23,27} and our analyses suggest that gender differences in disgust sensitivity may help explain the widely documented gender difference in surgical career interest and intentions.

Overall, these data suggest that studies examining the factors predicting surgical career interest would benefit by examining additional variables. While the traditional factors of family pressure, the desire to employ technical skills, perceptions of exclusivity, and future family plans predicted surgical career interest, disgust sensitivity contributed unique additional prediction even once these factors were controlled. Furthermore, the OR associated with disgust sensitivity indicated a larger effect than for any other variable; the OR of .45 indicates substantially reduced interest in surgical versus non-surgical careers among more disgust sensitive persons.

More broadly, studying variables that represent “values” is important, but the link with decisional outcomes will vary across national, cultural, and health care provision environments. By contrast, the fundamental nature of the disgust response suggests that persons who are disgusted by reminders of mortality will typically shy away from surgery, context notwithstanding.

Although they offer unique insight into the influences on surgical career choice, these data are not without their limitations. First, they must be interpreted in light of the fact that we assessed intentions/interests rather than decisions. While interests do predict ultimate selections\textsuperscript{34}, the distinction is important nonetheless. Second, these data represent a moderately sized, cross-sectional sample of New Zealand medical students; generalizing results to other populations and healthcare provision contexts requires caution. Three, these are early stage students with little experience and career decision-making is an ongoing process.

Disgust sensitivities may decline across medical training and it is likely that medical students are less disgust sensitive than the rest of the population\textsuperscript{35}. As in other areas of behaviour, it may be that the variables predicting the “initiation” of a pathway do not predict its maintenance. Prior work has found that only 6% of students indicated early interest in surgical careers but this increased to 14% after clerkships\textsuperscript{36}.

Overall, it may be that disgust sensitivity represents a potentially modifiable factor that impacts career choice. Because of their aversion to death, viscera, and reminders of our biological nature, students showing high disgust sensitivity may make decisions from an early stage that reduces the likelihood of them ultimately choosing surgery.

This study suggests the need for more studies to allow a deeper understanding of the ‘non-rational’ aspects of career choice, how they might be measured, and used to help prospective surgeon make appropriate and secure career choices.
Competing interests: Nil.

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References:


Factors related to postgraduate retention of medical graduates in New Zealand

William Shelker, Peter Herbison, Alison Belton, Paul Glue

Abstract

Aims To examine the influence of a number of variables, including age and medical school entrance category, on postgraduate retention of New Zealand (NZ) medical graduates.

Methods An anonymised database was created of all graduates from the Otago School of Medicine (1999-2010), with demographic and entry category data. The NZ Medical Register was checked in January 2012 to identify which graduates remained in NZ. Risk Differences (RD) were calculated to compare retention between medical school entrance categories by year of graduation using the random effects Mantel-Haenszel method. The influence of covariates on remaining on the New Zealand Medical Register was evaluated using logistic regression.

Results The odds of remaining on the NZ Medical Register increased by 7% for each additional year of age at graduation (Odds Ratio=1.070, 95%CI 1.038–1.113, p<0.001). Compared with students who entered medical school after a competitive first year exam, retention of students who entered after completion of a bachelor’s degree was 7% higher, and 20% higher for “Other Category” (older, work experienced) students. Multiple logistic regression identified medical school entry category as the only significant predictor of higher retention.

Conclusions Admission policies favouring graduate entry and “Other Category” students could contribute to increased retention of NZ medical graduates.

There are three pathways to admission to the University of Otago Medical School. Approximately 75% of students gain entry via a competitive first year examination—the Health Sciences First Year (HSFY) pathway. Another ~20% gain entry immediately after completion of a Bachelor’s degree (Competitive Graduate Entry [CGE]).

The remaining ~5% of students, termed “Other Category”, comprise older applicants with a diverse range of backgrounds. These may include individuals who have completed a second or higher degree, or have completed a degree at an overseas university, in both cases at least 3 years prior to their application. Also included are graduates from any health-related profession (e.g. nursing, physiotherapy or pharmacy backgrounds) who have professional work experience.

Selection of Other Category students is by interview—and academic ability, interview performance and life experience are all considered in candidate selection.¹

An important issue for medical workforce planning in New Zealand is graduate retention.³ Ten years after graduating, ~35–40% of medical graduates are not
registered with the New Zealand (NZ) Medical Council, and presumably are working overseas. 

Earlier research has shown Other Category students enrolled at the University of Otago Medical School to have a 14% greater retention in NZ over the 10 years postgraduation when compared to all other NZ medical graduates. 

The Auckland Medical School and most medical schools in Australia and the United Kingdom now admit some students from a competitive graduate entry (CGE) category. A CGE entrance category has previously been shown to increase medical class diversity and add a more even socioeconomic distribution to a medical class. 

However there is no information on whether this admission category might be associated with increased postgraduate retention or migration. 

The objective of this research was to examine the influence of a number of variables, including age and medical school entrance category, on postgraduate retention on NZ medical graduates. 

**Methods**

Approval for this project was given by the Otago University Ethics Committee. Names of students graduating from Otago Medical School, along with their entrance categories, were provided by the Health Sciences Administration Group and the Admissions Committee. Data regarding the year of birth, gender and year of graduation were obtained from the University of Otago database, under the supervision of an authorised staff member. 

The NZ Medical Register was accessed in January 2012 to identify which graduates were registered, along with postgraduate information (e.g. medical specialisation or training program), and geographical location within NZ. Sponsored foreign students were not included in the database. Data were anonymised and analysed using summary statistics. 

The influence of age at graduation, year of graduation and entry category on remaining on the New Zealand Medical Register were evaluated using logistic regression (Stata version 11 software). As the relationship between variables was unlikely to be linear it was further explored using the fracpoly command, to determine the best non-linear model fit. Risk Differences (RD) were calculated to compare retention between entry categories by year of graduation using the random effects Mantel-Haenszel method (Review Manager 5.0). 

**Results**

Between 1999 and 2010, a total of 2065 students graduated from the University of Otago Medical School. Of these 2065 students, 1612 (78%) had entered under the HSFY category, 341 (17%) entered under the CGE category and 112 (5%) under the Other Category (Table 1).

Mean age at graduation was youngest for HSFY entrants, and was greater for CGE and Other Category entrants (Table 1). A frequency plot of age at graduation for the three entrance categories is provided in Figure 1.
Table 1. Demographics of the three medical school entrance categories

<table>
<thead>
<tr>
<th>Entrance category</th>
<th>n</th>
<th>% of total</th>
<th>Mean age at graduation [SD] (range)</th>
<th>% male</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSFY</td>
<td>1612</td>
<td>78%</td>
<td>24.2 [2.1] (19–47)</td>
<td>48</td>
</tr>
<tr>
<td>CGE</td>
<td>341</td>
<td>17%</td>
<td>27.1 [3.1] (23–50)</td>
<td>44</td>
</tr>
<tr>
<td>Other</td>
<td>112</td>
<td>5%</td>
<td>33.6 [4.6] (24–51)</td>
<td>46</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2065</td>
<td></td>
<td><strong>25</strong></td>
<td>47</td>
</tr>
</tbody>
</table>

HSFY=Health Sciences First Year; CGE=Competitive Graduate Entry.

Year of graduation was found to be significantly associated with remaining on the New Zealand Medical Register (OR=1.170, 95%CI 1.136–1.205, p<0.001). Entrance category was found to have a significant effect on retention. Figure 2A shows the proportion of graduates remaining in New Zealand over 10 years by entry category.

The greatest decline in retention was for HSFY entrants, the smallest decline was for Other Category students, with CGE entrants having an intermediate profile. A significantly higher retention rate was found in CGE versus HSFY (Risk Difference [RD]: 0.07, 95%CI 0.02–0.13, p=0.005).

Other Category entrants were found to have a higher retention rate when compared to CGE (RD: 0.13, 95%CI 0.06–0.20, p=0.0002) and HSFY (RD: 0.20, 95%CI 0.12–0.28, p<0.00001).

Figure 1. Age at graduation by medical school entrance category

Note: The y-axis is in logarithmic scale.
Students’ age at graduation was also found to be significantly associated with remaining on the New Zealand Medical Register (OR=1.070, 95%CI 1.038, 1.113, p<0.001). Figure 2B shows retention rates over 10 years by age cluster at graduation. Because of the unusual data distribution (e.g. 40% of all students graduated at age 24), four age clusters were chosen (see Figure 2B for details).

Only the >27 years age cluster appeared to have a slower decline in retention compared with the other three age clusters. The >27 year age cluster had the smallest number of subjects (n=200) and it was not possible to further evaluate age/retention trends with smaller subgroups.

Because age at graduation differs by entry category (e.g. Table 1, Figure 1), the influence of both variables on retention was assessed using multiple logistic regression. This showed a significant overall effect (p<0.001), with the relationship described by the formula Logit P = -0.0822 + (0.455 * entrancecat) + (0.0188 * agegrad).

Assessment of individual variables identified Entrance Category as statistically significant (OR 1.58, 95%CI 1.22, 2.04; p<0.001), however age at graduation was not (OR 1.02, 95%CI 0.98, 1.06; p=0.375).

Type of postgraduate specialisation or choice of training programme was not significantly different between each entrance category (data not shown), nor was the proportion of doctors practicing in a rural area (data not shown). The gender of students was not associated with retention in NZ (data not shown).

**Figures 2A & 2B. Retention of Otago Medical School graduates on the NZ Medical Register over 10 year postgraduation by (2A) category of entry, and (2B) age cluster at graduation**

**Note:** Values are 3-year rolling averages.
Discussion

This study identified three factors related to retention of medical graduates in New Zealand: time elapsed after graduating, age at graduation, and category of entrance to medical school.

The NZ Medical Council has tracked graduate retention from medical school classes since 1995, and reported progressive attrition in the proportion of graduates remaining in NZ until ~8 years after graduation.² Our finding, that time elapsed since graduation is associated with retention is consistent with the Medical Council observations. Two other factors may influence this trend, namely age at graduation and Entrance Category.

Our analysis demonstrated that the odds of remaining in NZ increases by 7% for each additional year of age at graduation. However it should be noted that this relationship was non-linear, with the best statistical fit being a cubic polynomial (for example, note the shape of the >27 year age category retention-time curve in Figure 2B). Entrance Category was also significantly associated with retention. Compared with HSFY entrants, retention of CGE entrants was 7% higher, and was 20% higher for Other Category entrants (Figure 2A).

Because Entrance Categories have different age profiles (Table 1, Figure 1), it is possible that the above findings are not independent, and may be due to one or the other variable. We assessed this using multiple logistic regression, which showed a significant overall effect for both age and entry category combined. Subsequent assessment of individual variables showed that the Entrance Category was statistically significant, and that age at graduation was not.

The finding that Entrance Category but not age at graduation was associated with higher retention over the 10 years after graduating was unexpected. As a group, Other Category students are older than HSFY and CGE students, and in an earlier paper we had speculated that age alone might be an important reason for their higher retention.¹ However all three groups have wide range of ages (Table 1, Figure 1), and compared with HSFY entrants, increased retention is seen in CGE entrants as well as Other Category entrants.

There may be other personal qualities or experiences associated with completion of a degree or attainment of life experience that contribute to increased medical graduate retention. For example, Other Category candidates are interviewed, but HSFY and CGE candidates are not; it is possible that the interview process may select candidates with greater levels of commitment to practice in New Zealand.

Other relevant variables might include (e.g.) marriage status, number and age of children, student loan status, and/or employment satisfaction. Data to explore these possibilities were not collected in this research project.

Our findings suggest that medical school admission policies favouring graduate entry and Other Category entry students may contribute to increased retention of local medical graduates.
Competing interests: Nil.

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References:

New Zealand’s 2005 ‘no-fault’ compensation reforms and medical professional accountability for harm

Katharine Wallis

Abstract


Methods Data for the 5 years before and after the 2005 reforms were compared including compensation claims to the Accident Compensation Corporation (ACC), ACC reporting to the authorities, patient complaints to the Health and Disability Commissioner and outcomes, referrals to the Medical Council and outcomes, and disciplinary proceedings and outcomes.

Results Following the 2005 compensation reforms, claims for compensation increased, ACC reporting overall increased but ACC reporting to the Medical Council decreased; patient complaints increased but the Health and Disability Commissioner investigated fewer complaints and referred fewer doctors for discipline while maintaining steady referrals to the Medical Council; referrals to the Medical Council decreased, and the Medical Council conducted fewer performance reviews and referred fewer doctors for discipline; disciplinary proceedings decreased but more hearings ended in guilty findings.

Conclusions Accountability via compensation decreased following the 2005 ‘no-fault’ compensation reforms, contributing to an overall decrease in medical professional accountability for harm.

In New Zealand, instead of the more usual tort-based malpractice system, we have a taxpayer funded accident compensation scheme to provide compensation for medical injury. The compensation scheme bars suing for compensatory damages for injuries covered under the scheme. As a consequence, there is no culture of suing in New Zealand and doctors pay comparatively low medical indemnity fees.

Despite the absence of suing and the near-absence of medical manslaughter in New Zealand, doctors do not practise in a void of accountability. There are separate processes to hold doctors to account. These include the Health and Disability Commissioner (HDC) patient complaints system, the Medical Council’s competence and fitness to practise processes, the Health Practitioners’ Disciplinary Tribunal disciplinary process. There are also in-house hospital and clinic accountability processes.

Under New Zealand’s regulatory system, in contrast to malpractice systems, compensation is determined according to outcome and may be awarded irrespective of fault or negligence, while doctors are judged (under the HDC patient complaints
system) according to process of care and may be held to account irrespective of injury.

New Zealand’s compensation scheme was introduced in 1974 following recommendations from the Woodhouse report. The scheme is based on the founding principles of community responsibility, comprehensive entitlement, complete rehabilitation, real compensation, and administrative efficiency. Medical injury has always been covered under the scheme although the eligibility criteria were not specifically defined until 1992. Then, in response to the perceived spiralling cost of medical injury compensation, compensable medical injury was defined as “medical misadventure”, which was either “medical mishap” (a rare and severe adverse event) or “medical error” (in effect negligence). The 1992 reforms (unfairly) restricted access to compensation for those suffering medical injury as opposed to general injury. The restrictive definition also increased the possibility of litigation from those not covered under the scheme.

The 1992 reforms also introduced fault (medical error) into the otherwise no-fault scheme and, as ACC was obliged to report all findings of medical error to the Medical Council, the compensation claims process could result in discipline for doctors. This made some doctors (and patients) unwilling to participate in the compensation claims process. It also led some doctors to contest findings of medical error, further restricting and/or delaying access to compensation for injured patients. This situation was reversed in 2005 under the ‘no-fault’ compensation reforms. The 2005 reforms waived the prior anomaly of medical error and extended eligibility to all treatment injuries regardless of error or injury rarity and severity. The 2005 changes gave New Zealand’s scheme some of the most liberal eligibility criteria in the world, and brought the compensation of medical injury into line with the overall ‘no-fault’ scheme. The changes also shifted the focus of the scheme away from identifying error (or fault) to providing assistance with treatment and rehabilitation.

ACC’s prior duty to report to the Medical Council all findings of medical error was also waived under the 2005 reforms and replaced with a new duty to report “risk of harm to the public” to the “authorities responsible for patient safety”. This change was expected to reduce ACC reporting to the Medical Council, and thus to reduce accountability via compensation, but as ACC retained the power to report doctors to the Medical Council (as the Medical Council is an ‘authority responsible for patient safety’) the compensation claims process may yet result in discipline for doctors.

This study set out to discover the effect of New Zealand’s 2005 no-fault compensation reforms on medical professional accountability for harm in the context of overall trends in New Zealand’s medical professional accountability processes. Accountability, according to Webster’s dictionary, implies “imminence of retribution for unfulfilled trust or violated obligation”. Accountability may be individual or collective. The purpose of New Zealand’s compensation scheme was never to provide accountability, but rather to minimise both the incidence and impact of injury. There are separate processes in place to provide medical professional accountability. Decreased accountability via compensation may not matter, but given the extent of medical harm, the cost of medical injury compensation, and the importance of trust...
in health care, it is prudent to be cognisant of the effect of the no-fault reforms on medical professional accountability.

Figure 1. Interactions between New Zealand’s accident compensation scheme and professional accountability processes

Methods
Data for the 5 years before and after the 2005 compensation reforms (2001–2010) were compared including claims for medical injury compensation, ACC reporting of claims, patient complaints to the HDC, HDC investigations and referrals, competence and fitness to practise referrals to the Medical Council, Medical Council performance reviews and referrals for discipline, and disciplinary proceedings before the Health Practitioners Disciplinary Tribunal and their outcome.

Results
Treatment injury claims—Claims for medical misadventure compensation were increasing prior to the 2005 reforms, and claims for treatment injury compensation
increased further following the 2005 reforms before decreasing slightly in 2010 (Table 1).

Table 1. New claims registered with ACC and ACC reporting (ACC data)

<table>
<thead>
<tr>
<th>Year to 30 June</th>
<th>New claims</th>
<th>Claims reported by ACC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>To Medical Council (% claims)</td>
</tr>
<tr>
<td>2001</td>
<td>204</td>
<td>N/A</td>
</tr>
<tr>
<td>2002</td>
<td>192</td>
<td>42 (22)</td>
</tr>
<tr>
<td>2003</td>
<td>682</td>
<td>63 (9)</td>
</tr>
<tr>
<td>2004</td>
<td>1250</td>
<td>53 (4)</td>
</tr>
<tr>
<td>2005</td>
<td>1434</td>
<td>50 (4)</td>
</tr>
<tr>
<td>2006</td>
<td>2846</td>
<td>27 (&lt;1)</td>
</tr>
<tr>
<td>2007</td>
<td>3964</td>
<td>9 (&lt;1)</td>
</tr>
<tr>
<td>2008</td>
<td>5073</td>
<td>8 (&lt;1)</td>
</tr>
<tr>
<td>2009</td>
<td>5472</td>
<td>5 (&lt;1)</td>
</tr>
<tr>
<td>2010</td>
<td>5210</td>
<td>5 (&lt;1)</td>
</tr>
</tbody>
</table>

Note: Legislation came into effect 1 July 2005: 2001–2005 medical misadventure claims and reported medical error, 2006-2010 treatment injury claims and reported risk of harm to the public

N/A = Figure not available

Most new treatment injury claims (both accepted and declined) were assessed by ACC as having minor potential consequences (68%); 25% were assessed as major, 4% as serious, and 3% as sentinel. Medication was the leading cause of treatment injury. See Box 1 for ACC definition of claims’ potential consequences.

Box 1. ACC definition of claims potential consequences

<table>
<thead>
<tr>
<th>Potential consequences</th>
<th>ACC definition™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
<td>results in minimal lessening of bodily function</td>
</tr>
<tr>
<td>Major</td>
<td>likely to result in short to medium term lessening of bodily function</td>
</tr>
<tr>
<td>Serious</td>
<td>has the potential to result in death or major permanent loss of function</td>
</tr>
<tr>
<td>Sentinel</td>
<td>resulted in death or major permanent loss of function</td>
</tr>
</tbody>
</table>

ACC reporting—ACC has responded to the new reporting duties by reporting to the Director General of Health all sentinel claims and those serious claims considered by ACC to have a high or moderate likelihood of recurrence. ACC also reports some of these claims to Medsafe and/or the registration authorities (such as the Medical Council).

ACC reporting overall increased following the reforms. ACC reporting increased from on average 53 doctors per year to the Medical Council prior to the reforms, to 365 events per year to the Director General of Health after the reforms – in addition to reporting some of these events to Medsafe (about one-third of reported events) and/or the Medical Council (about twelve doctors per year) (Table 1).

ACC reporting to the Medical Council decreased following the 2005 reforms, as expected (Table 1 and Table 2). Comparing the 5 years before and after the reforms,
ACC data show ACC referrals decreasing from 53 to 12 doctors per year on average.\textsuperscript{10}

Table 2. ACC referrals to the Medical Council: comparing data from ACC and the Medical Council’s annual reports

<table>
<thead>
<tr>
<th>Year</th>
<th>ACC referrals to the Medical Council</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACC data (year to 30 June)</td>
</tr>
<tr>
<td>2002 (Medical error)</td>
<td>42</td>
</tr>
<tr>
<td>2003</td>
<td>63</td>
</tr>
<tr>
<td>2004</td>
<td>53</td>
</tr>
<tr>
<td>2005</td>
<td>50</td>
</tr>
<tr>
<td>2006 (Risk of harm)</td>
<td>27</td>
</tr>
<tr>
<td>2007</td>
<td>9</td>
</tr>
<tr>
<td>2008</td>
<td>8</td>
</tr>
<tr>
<td>2009</td>
<td>5</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
</tr>
</tbody>
</table>

Medical Council data show ACC referrals decreased from 10 to 1 doctor per year on average.\textsuperscript{10} The discrepancy between the ACC and Medical Council data is explained by the Medical Council’s filtering processes: the competence data reported in the Medical Council’s annual reports represent only the competence and fitness to practise referrals that Council forwards to its competence section.\textsuperscript{14}

The Director General has responded to ACC reported ‘risk of harm to the public’ by seeking feedback from providers about the ACC reported events. As no funding followed the 2005 legislative change, the Director General has had to resource action to remedy the ACC identified risk from within existing budgets. Medsafe has responded to the ACC reports by issuing warnings about medicines, and sometimes referring reported events to the Centre for Adverse Reactions to Medicines and/or the Medicines Adverse Reactions Committee.

The Medical Council may review a doctor’s performance or take disciplinary proceedings in response to an ACC referral. However, to date, ACC referrals have seldom prompted a performance review (about one per year) and no ACC referral has yet resulted in the Medical Council taking disciplinary action against a doctor. According to Medical Council personnel, most ACC referrals result in the doctor being sent an ‘educational’ letter (effectively a warning letter) usually recommending that the doctor revise his or her practice and undertake further education.
Patient complaints to the Health and Disability Commissioner—Comparing the 5 years before and after the 2005 compensation reforms, patient complaints against all types of providers increased from 1206 to 1318 per year on average (Table 3).21 Despite the increase in complaints, HDC investigations decreased (Table 3).

In line with declining investigations, the Commissioner referred fewer providers (of any type) to the Director of Proceedings for possible discipline (from 21 to 16 per year on average) while maintaining steady referrals to the Medical Council (about 24 doctors each year) (Table 3).

Table 3. Patient complaints to the Health and Disability Commissioner*

<table>
<thead>
<tr>
<th>Year</th>
<th>New complaints</th>
<th>HDC investigations (% complaints)</th>
<th>HDC referral for possible performance review (% complaints)</th>
<th>HDC referral for possible discipline (% complaints)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1397</td>
<td>538 (39)</td>
<td>27 (2)</td>
<td>26 (2)</td>
</tr>
<tr>
<td>2002</td>
<td>1211</td>
<td>234 (19)</td>
<td>26 (2)</td>
<td>28 (2)</td>
</tr>
<tr>
<td>2003</td>
<td>1159</td>
<td>345 (30)</td>
<td>32 (3)</td>
<td>27 (2)</td>
</tr>
<tr>
<td>2004</td>
<td>1142</td>
<td>178 (16)</td>
<td>18 (2)</td>
<td>18 (2)</td>
</tr>
<tr>
<td>2005</td>
<td>1124</td>
<td>172 (15)</td>
<td>14 (1)</td>
<td>14 (1)</td>
</tr>
<tr>
<td>2006</td>
<td>1076</td>
<td>116 (11)</td>
<td>18 (2)</td>
<td>19 (2)</td>
</tr>
<tr>
<td>2007</td>
<td>1289</td>
<td>89 (7)</td>
<td>20 (2)</td>
<td>19 (1)</td>
</tr>
<tr>
<td>2008</td>
<td>1292</td>
<td>100 (8)</td>
<td>36 (3)</td>
<td>22 (2)</td>
</tr>
<tr>
<td>2009</td>
<td>1360</td>
<td>112 (8)</td>
<td>23 (2)</td>
<td>15 (1)</td>
</tr>
<tr>
<td>2010</td>
<td>1573</td>
<td>51 (3)</td>
<td>22 (1)</td>
<td>5 (&lt;1)</td>
</tr>
</tbody>
</table>

*Data from HDC annual reports, all types of providers.21

Referrals to the Medical Council—Comparing the 5 years before and after the compensation reforms, Medical Council data reveal that referrals to the Medical Council decreased from 61 to 44 doctors per year on average (Table 4).22 The decrease was mainly due to declining referrals from ACC (Table 2).

Prior to the 2005 compensation reforms ACC accounted for 19% of all referrals but this decreased after the compensation reforms to only 4%.22 The Health and Disability Commissioner was the dominant source of competence referrals, accounting for about half of all referrals to Council. Referrals from peers and employers remained steady at
less than 10 referrals each per year. College recertification programmes gave rise to few referrals.

In line with decreased referrals, the Medical Council conducted fewer performance reviews (from 35 to 26 per year on average) and referred fewer doctors to its professional conduct committee for possible discipline (Table 4).  

**Disciplinary proceedings**—Comparing the 5 years before and after the compensation reforms, both the HDC office (via the Director of Proceedings) and the Medical Council (via a Professional Conduct Committee (PCC)) brought fewer disciplinary charges against doctors before the Health Practitioners Disciplinary Tribunal (Table 4).  

Charges brought by the Director of Proceedings decreased from six to three per year on average, and charges by the PCC decreased from seven to five per year on average. More disciplinary hearings ended in guilty findings (from 65% to 83%) but overall fewer doctors were found guilty of professional misconduct (Table 4).

In comparison to the number of complaints and compensation claims lodged each year, very few doctors faced either a performance review or a disciplinary charge (Figure 4). Comparing the 5 years before and after the 2005 compensation reforms, fewer doctors were held to account by either the performance review process or the disciplinary process (Figure 3).

Table 4. Referrals to the Medical Council* and doctors’ disciplinary proceedings**

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical Council</th>
<th>Health Practitioners Disciplinary Tribunal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total referrals</td>
<td>Performance review (% referrals)</td>
</tr>
<tr>
<td>2001</td>
<td>82</td>
<td>37 (45)</td>
</tr>
<tr>
<td>2002</td>
<td>73</td>
<td>37 (51)</td>
</tr>
<tr>
<td>2003</td>
<td>50</td>
<td>58 (100)</td>
</tr>
<tr>
<td>2004</td>
<td>60</td>
<td>23 (38)</td>
</tr>
<tr>
<td>2005</td>
<td>41</td>
<td>20 (49)</td>
</tr>
<tr>
<td>2006</td>
<td>35</td>
<td>19 (54)</td>
</tr>
<tr>
<td>2007</td>
<td>38</td>
<td>18 (47)</td>
</tr>
<tr>
<td>2008</td>
<td>62</td>
<td>42 (68)</td>
</tr>
<tr>
<td>2009</td>
<td>42</td>
<td>29 (69)</td>
</tr>
<tr>
<td>2010</td>
<td>43</td>
<td>21 (49)</td>
</tr>
</tbody>
</table>

*Data from MCNZ annual reports

**Data from Disciplinary Tribunal website
Figure 3. Doctors facing either a performance review or a disciplinary charge per year

![Bar chart showing the number of doctors facing performance reviews and disciplinary proceedings over the years.](chart1)

Figure 4: Comparing compensation claims and patient complaints (all providers) with performance reviews and disciplinary proceedings (doctors only)

![Bar chart comparing compensation claims, patient complaints, performance reviews, and disciplinary proceedings.](chart2)

(ACC data and HDC data is for all providers year to 30 June, MCNZ data is doctors only year to 31 March, HPDT data is doctors only year to 31 Dec.)

**Discussion**

In the years following the 2005 'no-fault' compensation reforms, claiming for medical injury compensation increased, ACC reporting overall increased but ACC reporting to the Medical Council decreased. The reforms thus increased the barrier between the
compensation scheme and the Medical Council, and decreased accountability via compensation.

Doctors have responded to the no-fault compensation reforms by assisting more patients to lodge claims for compensation (reflected in increased claiming) and by contesting fewer claims decisions now that claims acceptance no longer implies wrong-doing or fault on the part of the doctor (reflected in the decreased claims decision time - from an average of 5 months to 13 days).  

The reforms have, therefore, improved both access to compensation for medical injury and the efficiency of the compensation scheme. The reforms have also increased the cost of medical injury compensation. This may yet result in further reform, given the vulnerability of the ACC legislation to change with political whim.

While decreased ACC reporting to the Medical Council has freed doctors to engage in the compensation claims process with little fear of disciplinary repercussions, decreased ACC reporting risks leaving poorly performing doctors in practice unchecked. Patient safety is not likely to be greatly compromised by this, however, because ACC reporting seldom identified poorly performing doctors.

Furthermore, the greatest threat to patient safety comes not from the few poorly performing doctors but rather from all doctors, the majority of whom are competent, fit to practise, and well-intentioned.  

ACC reporting to the Medical Council was never likely to have been an effective strategy for protecting patient safety. The decrease in ACC reporting to the Medical Council is offset by an increase in ACC reporting to the “authorities responsible for patient safety” overall. The increased reporting has provided the authorities with new opportunities to remedy “risk of harm to the public” and to improve patient safety.

Patient complaints to the Health and Disability Commissioner increased in the years following the compensation reforms, suggesting an increase in demand for accountability. This is not likely due to the reforms which, if anything, by improving access to compensation might have been expected to reduce patient dissatisfaction following an adverse event and thus to have reduced the demand for personal accountability via complaint.

Despite the increase in complaints, the Commissioner investigated fewer complaints and referred fewer providers for discipline while maintaining steady referrals to the Medical Council. The decrease in investigations is likely due, in part, to the HDC amendment Act 2003, which gave the Commissioner new (non-investigative) options in handling complaints, such as referring complaints to the Medical Council or back to provider without investigation. The decrease in investigations also likely reflects Commissioner Paterson’s efforts to catch up on a backlog of complaints from previous years when he took office in 2000, and his stated preference for early resolution: “early resolution is usually considered in the best interests of both complainant and provider, [and so] fewer cases are concluded by formal investigation.”

Decreased ACC reporting to the Medical Council contributed to an overall decrease in referrals to the Medical Council. The Medical Council responded by conducting fewer performance reviews and referring fewer doctors for discipline. The Medical
Council’s power to take a rehabilitative response to referrals as an alternative to discipline was introduced in the mid-1990s and continues today under the Health Practitioners Competence Assurance Act.\textsuperscript{30}

The reforms of the 1990s resulted in a decrease in disciplinary proceedings and a corresponding increase in performance reviews and educational programmes, reflecting a change in accountability as more doctors were held to account via the performance review process rather than the disciplinary process.\textsuperscript{31} In the years after the 2005 compensation reforms, however, both performance reviews and disciplinary proceedings decreased, reflecting an overall decrease in accountability (Figure 3).

Both the Medical Council and the HDC office brought fewer disciplinary charges against doctors before the Disciplinary Tribunal. It is not clear why this was so. The at times exorbitant cost of proceedings may be a factor. The scarcity of disciplinary proceedings means that Tribunal members have little opportunity to debate and determine professional standards and little opportunity to gain experience in the role.

In the years following the 2005 compensation reforms, then, there has been a decrease in ACC referrals to the Medical Council, referrals to the Medical Council overall, Medical Council performance reviews, HDC investigations, and medical disciplinary proceedings. These changes reflect decreased medical professional accountability.

Overall, very few poorly performing doctors are identified and dealt with in New Zealand each year, suggesting that either there are very few poorly performing doctors in New Zealand or that the current processes to identify and deal with them are ineffective. The previous Commissioner Paterson believes the latter and has called for change.\textsuperscript{32}

It is not possible to conclude from this study whether there is too much or too little individual accountability in New Zealand, or whether a different form of accountability is needed. Nevertheless, the trend for decreasing medical professional accountability in New Zealand’s raises the question of whether doctors are adequately held to account under New Zealand’s current regulatory system. However, since most harm stems from care that is well-intentioned and delivered by professionals who are competent and fit to practise, rather than (or in addition to) increasing individual accountability, we may do well to explore alternative models of collective or institutional responsibility.\textsuperscript{33}

In conclusion, accountability via compensation decreased following the 2005 ‘no-fault’ compensation reforms, contributing to an overall decrease in New Zealand’s medical professional accountability processes. There is no evidence that the trade-off in accountability has increased openness and learning about error and injury, or improved patient safety, but nor is there evidence to suggest that the change has led to worse patient care.

Further research is needed to understand the effect of the no-fault compensation system on health care ethics and practice, and to explore models of collective responsibility and incentives to reduce (unintentional) injury.

Further work is also needed and to learn from ACC reported “risk of harm to the public” and the provider feedback about ACC reported events to improve patient safety.
Competing interests: Nil.

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References:

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A workforce survey of New Zealand medical oncologists

Simon Bidwell, Andrew Simpson, Richard Sullivan, Bridget Robinson, Wendy Thomas, Christopher Jackson, Garry Forgeson, Michael Jameson, Trish Clarke

Abstract

Aim There is wide recognition that the challenge of providing health care into the future requires planning for a sustainable workforce particularly in the context of increasing service demand. The Medical Oncology Work Group (MOWG) undertook a survey of vocationally registered medical oncologists which aimed to support future workforce planning and the development of models of care.

Methods The survey was developed and carried out by the MOWG in conjunction with the Ministry of Health during 2009. Medical oncologists were sent the survey and forwarded unnamed completed responses to one of the authors (SB).

Results A total of 33 out of 40 practising medical oncologists completed the survey, representing an 82% response rate. The survey found that there is an emerging movement from a male-dominated workforce largely working full time, to a workforce with a higher proportion of females and part-time workers. The median full-time medical oncologist in New Zealand was responsible for 220 first specialist assessments (FSAs) per annum, 40 more than the number considered reasonable by the surveyed practitioners.

In qualitative responses, medical oncologists expressed frustration with lack of resources and high workloads that constrained their ability to appropriately deploy their skills and undertake teaching and research. Positive aspects included collegial collaboration and patient contact. Prominent suggestions for improving job satisfaction included use of skilled administrative staff or nurse specialists to free up time for oncologists to better use their skills.

Conclusion The survey highlights high clinical workload and frustration within the medical oncology workforce. In addition there is increasing service demand. This survey has formed the basis of work to develop new models of care in medical oncology.

There is wide recognition that the challenge of providing health care into the future requires planning for a sustainable workforce. In New Zealand, particular attention needs to be given to small and potentially vulnerable specialist workforces. This includes medical oncology, a specialty which is evolving rapidly due to technological and therapeutics innovation at the same time as cancer service demand increases because of demographic change and longer survival.1, 2

Projections of the incidence of cancer from 2006–2016 suggest an increase of 29% for males and 11% for females.1

Within New Zealand, workforce pressures have been highlighted for more than a decade. The Ministry of Health’s 2001 report Improving Non-surgical Cancer
Treatment Services in New Zealand described issues for the specialist workforce in medical oncology as well as radiation oncology and haematology. The New Zealand Cancer Control Strategy and Cancer Control Strategy Action Plan identified improved workforce information and national workforce planning as vital to achieving the Strategy goals of reducing the incidence and impact of cancer and reducing cancer inequalities.

In 2007, the Cancer Workforce Stocktake and Needs Assessment identified a range of issues for the different specialist and generalist workforces involved in cancer control. It reported that although there had been significant workforce growth since 2001, there were still insufficient medical oncologists to meet either workload or population-based benchmarks. The Workforce Stocktake recommended that more detailed investigation be undertaken, particularly of issues affecting medical oncologist recruitment and retention.

Medical Oncology Working Group

The Medical Oncology Working Group has been active since 1999, when it was convened as an expert advisory group to the (then) New Zealand Cancer Treatment Working Party. In 2008, the Working Group was reconstituted as an advisory group to the New Zealand Cancer Treatment Advisory Group, which provides expert clinical advice to the joint Ministry of Health / DHB National Cancer Programme.

The Working Group is largely made up of medical oncologists with representation from cancer nursing, pharmacy and service management. It includes representatives from all six cancer centre DHBs as well as representation from practitioners working in peripheral DHBs.

In 2009, the Working Group decided to undertake a survey of practising medical oncologists in New Zealand in order to better understand current issues and to assist future workforce planning and the development of models of care. The small and centralized nature of the workforce made it feasible to survey all practitioners, thus minimizing issues with sample bias.

Method

The specific purposes of the survey were to collect information on the demographic makeup and distribution of the medical oncologist workforce and to quantify issues relating to medical oncologists’ workload. The survey was also intended to allow medical oncologists to contribute their perspectives on working in the New Zealand public health system, and the factors that have an impact on their level of job satisfaction.

The survey was jointly designed by the Ministry of Health and members of the Medical Oncology Working Group. It was circulated to all vocationally registered medical oncologists on 25 August 2009. The majority of vocationally registered medical oncologists are based in the six regional cancer centres and in 2009 there were an additional three based at peripheral centres (Nelson and Tauranga).

Working Group representatives issued several reminders about the survey to individual medical oncologists within their department. By 20 November 2009, a total of 33 competed surveys had been received by the Ministry of Health. Based on a head count by Working Group members from each centre, this represented 82.5% of the 40 individual medical oncologists that were practising in New Zealand at that time.
Results

Demographics—The survey results suggest that overall, the New Zealand medical oncology workforce is in a demographically healthy state, with 23 out of the 33 respondents under the age of 50 at the time of survey (Table 1). Two-thirds of respondents (22 out of 33) were male, and two-thirds (22 out of 33) worked full time. However, when reviewed in more detail, the results suggest an emerging movement from a male-dominated workforce largely working full time, to a workforce with a higher proportion of females and part-time workers.

Of those under the age of 45, 9 out of 16 (56%) were female, and 7 out of 16 (44%) reported working part time. Overall, females were more likely than males to work part time (45% vs 27%). The gender and age distribution in different DHBs generally reflected that of the country as a whole. Nine practitioners (27%) had undertaken their initial medical training overseas.

Table 1. Survey respondents by gender, age group and full time / part time status

<table>
<thead>
<tr>
<th>Female Age</th>
<th>Full time</th>
<th>Part time</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-39</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>40-44</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>50-54</td>
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<td></td>
<td>1</td>
</tr>
<tr>
<td>55-59</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>Female Total</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Male Age</th>
<th>Full time</th>
<th>Part time</th>
<th>Total</th>
</tr>
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<tr>
<td>&lt;35</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>35-39</td>
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<td></td>
<td>2</td>
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<tr>
<td>40-44</td>
<td>2</td>
<td>1</td>
<td>3</td>
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<tr>
<td>45-49</td>
<td>6</td>
<td>1</td>
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<td>55-59</td>
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<td>&gt;60</td>
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</tr>
<tr>
<td>Male Total</td>
<td>16</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>11</td>
<td>33</td>
</tr>
</tbody>
</table>

Sub-specialisation—There are notable international trends toward subspecialisation in medical oncology. Survey responses suggest these trends are producing variable models of clinical practice in New Zealand. Respondents were asked to self-define their practice as “generalist”, “generalist with sub-specialty interests” or “sub-specialty only”.

Both respondents from peripheral centres described themselves as generalists, and 15 out of 18 respondents from cancer centres outside Auckland, the largest centre, classified themselves as generalists with sub-specialty interests. However, 10 out of 13 respondents from Auckland DHB described their practice as sub-specialty only.

Workload—Table 2 summarises the number of hours that survey respondents reported being contracted to work in the public system (defined as direct employment by a DHB), the average number of hours they actually worked, number and average
duration of clinics undertaken, number of hours of registrar support, and the number of first specialist assessments (FSAs) per annum under their care.

The number of FSAs is an indicator of the number of new patients, which has been recognised as a key determinant of clinical workload for medical oncologists. Survey respondents were also asked to state what they thought was a reasonable number of FSAs per annum for a full-time medical oncologist.

On average, respondents considered that a reasonable number was approximately 180. The median full-time practitioner reported being responsible for 220 FSAs per annum. Eight out of 22 full-time practitioners were responsible for more than 240 FSAs per annum, with a maximum of 280.

Part-time medical oncologists reported a proportionally higher clinical workload than full-time practitioners. Although the median part-time practitioner was contracted for 56% of the hours of a full-time counterpart, the number of FSAs seen per year was 68% of the number seen by the median full-time practitioner. Part-time oncologists also reported less registrar support than those working full-time.

Table 2: Medical oncologist workload by full time and part time

<table>
<thead>
<tr>
<th>Workload</th>
<th>Average</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full time (N=22)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contracted hrs in public system</td>
<td>48.8</td>
<td>50.0</td>
</tr>
<tr>
<td>Actual hrs worked in public system</td>
<td>53.5</td>
<td>54.5</td>
</tr>
<tr>
<td>Average clinics / week</td>
<td>4.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Average hrs / clinic</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Registrar hrs / week</td>
<td>9.5</td>
<td>10.3</td>
</tr>
<tr>
<td>No. of FSAs under care</td>
<td>210.8</td>
<td>220.0</td>
</tr>
<tr>
<td>Reasonable no. of FSAs / year</td>
<td>177.6</td>
<td>180.0</td>
</tr>
<tr>
<td><strong>Part time (N=11)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contracted hrs in public system</td>
<td>28.1</td>
<td>28.0</td>
</tr>
<tr>
<td>Actual hrs worked in public system</td>
<td>31.8</td>
<td>30.0</td>
</tr>
<tr>
<td>Average clinics / week</td>
<td>3.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Average hrs / clinic</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Registrar hrs / week</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>No. of FSAs under care</td>
<td>152.4</td>
<td>150.0</td>
</tr>
<tr>
<td>Reasonable no. of FSAs / year</td>
<td>170.0</td>
<td>185.0</td>
</tr>
</tbody>
</table>

Respondents were also asked to report the number of days per annum they spent participating in regional or national committees, work groups or leadership roles. This excluded roles for which respondents were specifically employed, such as regional network clinical director. Full-time oncologists reported spending a median of 8 days per annum on regional or national commitments, while part-time oncologists reported spending a median 4.25 days on these commitments.

**Future preferences**—In response to a question about their preferred balance in three year’s time between public, private, teaching, research and non-work pursuits, oncologists overwhelmingly expressed a desire to work less in public (70% of respondents) and to spend more time on research (73%) and in non-work pursuits (67%). Increased teaching time was also popular, with 39% wanting to spend more time teaching. No respondent expressed a preference to spend more time doing public clinical work in three years.
Qualitative responses—30 out of 33 respondents answered at least one qualitative question. All responses were free text and there was no restriction on the number of points respondents could make in response to a question. The main questions and responses are summarised below.

If a New Zealand-trained specialist, what were your main reasons for staying in or returning to work in New Zealand? If an overseas-trained specialist, what were your main reasons for coming to work in New Zealand?

By far the most common reasons given for staying in, returning or moving to New Zealand related to family connections. Twenty-four out of thirty respondents mentioned family and several of these specifically said that they wanted their children to grow up or be educated in New Zealand. Fourteen respondents nominated quality of life or lifestyle as important reasons for staying in or coming [back] to New Zealand.

What do you consider to be the most difficult or frustrating aspects of working as a medical oncologist in the New Zealand public health system?

A number of interrelated themes emerged in the responses to this question. Sixteen out of twenty-nine respondents cited the lack of resources available to their service as an important difficulty. The most common complaints were limited funding and a lack of senior medical officers, while lack of physical space, nursing staff, administrative support, diagnostics and palliative care were also mentioned. Eleven respondents specifically mentioned lack of access to pharmaceuticals or new technologies.

Eight respondents complained of the administrative burden of day-to-day practice, particularly the paperwork and multistep processes involved in gaining access to existing cancer drugs.

Other common reasons for frustration included difficulty doing research (cited by eight respondents), lack of support for SMOs (seven respondents) and excessive workload (six respondents). One respondent felt that “dependence of all parts of system on SMOs (including management requests for advice / input) overwhelms the medical oncologist”

What do you consider to be the most positive or rewarding aspects of working as a medical oncologist in the New Zealand public health system?

There were some clear themes in the responses to this question. Sixteen out of twenty-nine respondents described their colleagues including nursing and allied health staff or the collegial atmosphere as the most positive or rewarding aspect of their work.

The other most common response category related to patients, with 14 practitioners mentioning either the nature of patients (nine respondents) or their ability to be closely involved in patient care (six respondents).

Eleven respondents cited some advantages of the system at the service level or for themselves personally. Five respondents mentioned the ability to be involved and collaborate nationally. Four respondents appreciated the public health system where there is “access to care for all patients” and “treatments available are reasonable within the New Zealand context”.


Despite the frustrations cited under the previous question, a handful of respondents felt there were good opportunities for innovation, research or continuing medical education. Three respondents reiterated their appreciation of the lifestyle outside of work, while two mentioned the flexibility in working hours.

**What changes or improvements would make the biggest difference to your level of job satisfaction?**

Responses to this question also revealed some clear themes. Twenty respondents mentioned some kind of reduction in workload or support to use their time better. Fourteen respondents sought relief from the burden of administration, paperwork or processes. The most common single suggestion to improve job satisfaction was additional administrative support, mentioned by nine respondents.

Ten respondents wanted a reduced clinical workload with time freed up to do other things including research and clinical trials (seven respondents) and continuing medical education (four respondents) as well as being able to provide better quality patient care. The most common suggestions to make this possible included the development of clinical nurse specialists (six respondents) and hiring more SMOs (five respondents).

Three respondents mentioned increased resources in general, and one mentioned better availability of pharmaceuticals, as changes that would improve job satisfaction. Five respondents felt that increased remuneration would make a significant difference to them.

**Discussion**

Medical oncologists report that they are working beyond ideal capacity. Currently they are seeing over 210 new patients per annum with an expressed ideal of 180 which is comparable to that cited in Australia of 150-180. A similar survey conducted in Australia and New Zealand reported 83% of medical oncology consultants and trainees were working more than their ideal due to workplace constraints.9

There is a strong desire to decrease the clinical workload and increase other components of the job including research and teaching. This is common across both Australia and New Zealand. The median time that medical and radiation oncologists wish to spend in clinical work is 60% and the majority would like to spend up to 10% of their time teaching and up to 20% of their time in research.9 Administrative support was seen as a key area to free up time and to improve job satisfaction.

The demographics of the medical oncology workforce are changing with an increasing proportion of woman and part-time workers. A third of the medical oncology consultant positions in New Zealand are filled by women which is comparable to the 29% in Australia.8 The gender mix is more equitable in younger consultants with women contributing 56% of the 16 medical oncologists aged less than 45 years. Five of the 9 women in this age range were working part-time in comparison to 2 of the 7 men.

Overall a third of New Zealand medical oncologists were working part-time. Across Australia and New Zealand 38% of oncologists wished to work part-time and these
were predominantly women. The most common reason cited was children followed by lifestyle. Thirty percent of New Zealand oncologists over 50 years work part-time in the public sector, however the survey did not seek information regarding private practice.

Erikson reported that 32% of American Oncologists aged 50 -64 years indicated that they were interested in working part-time and that 60% of fellows completing training in 2005 rated work-life balance as extremely important in determining post-training plans and only 20% rated salary/pay as extremely important. This would suggest that work-life balance has a greater weighting than salary, consistent with only 5 of 33 respondents in this study commenting on remuneration as an issue with job satisfaction.

The current workforce expresses a desire to decrease workload at a time that it is recognised that there is an increasing demand for service. This demand is driven by ageing population demographics with associated increase in cancer incidence, the increasing survival of cancer patients, and the development of new drugs, technologies and treatment opportunities, with more treatment interactions per patient.

The growth in demand has been estimated as 2% per annum in Australia between 2009–2014 and the American Society for Clinical Oncology (ASCO) has estimated that the demand for medical oncologists is expected to rise by 48% between 2005 and 2020. In contrast the number of medical oncologists in the United States is projected to only increase by 14% over the same time. This equates to a potential shortfall of 3 800 oncologists in the United States, equivalent to a third of the 2005 workforce.

Of note an ASCO survey of the medical oncology workforce in 1996 showed the ratio of medical oncologists was 1.8 per 100 000 adult Americans. By 2005 this had increased to 3.5 per 100 000 population with further increases required to meet future demand. By contrast Australia reports 1.4 medical oncologists per 100 000 population and at the time of the survey New Zealand had 40 positions (not FTE) for a population of 4.3 million.

While the United States estimates a shortfall of over 3 000 medical oncologists by 2020, Australia estimates a shortage of 84-156 full time equivalent medical oncologists by 2014 over a baseline of 234 FTE in 2009.

There is no single strategy that will service future workforce demand. Approaches have included increasing the number of medical oncology trainees however in the United States this will not meet the predicted shortage. Further strategies include broadening the oncology workforce to make greater use of physician assistants, oncology nurse practitioners, and pharmacists to support the medical oncology service. Additional approaches include using technology such as electronic patient management systems and prescribing to increase efficiency and as raised above there is the scope to decrease administrative burden.

The majority of medical oncologists are New Zealand trained and have elected to work in New Zealand for family and lifestyle reasons, however they are frustrated by limited resources, wish to decrease their clinical workload and increase the opportunity for research or teaching. In addition the workforce demographics suggest an increasing proportion of female and part-time oncologists. It would appear that
future modelling for the medical oncology workforce may be based on a smaller proportion of full time consultants (wishing to have a smaller clinical load) and a larger proportion of part-time staff.

It is also apparent that current workforce capacity is not sufficient to manage the increasing number of patients. We need to develop models of care that are able to cater for the increasing service demands and the changing demographics and structure of the oncology workforce.

The results of this survey have helped stimulate and inform a project, supported by the Medical Oncology Working Group and sponsored by the Ministry of Health, to develop new models of care for medical oncology in New Zealand.

**Competing interests:** Nil.

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**References:**


The New Zealand Vocational Trainee 2011 Survey: a national snapshot of vocational training

Jonathan Foo, Jesse Gale, Maria Poynter, James Blackett

Abstract

Aim: To assess the opinions of New Zealand vocational trainees about the quality of their training.

Method: We surveyed New Zealand vocational trainees using an online questionnaire based on the Australian Medical Association Specialist Trainee Survey, in September and October 2011.

Results: The response rate was 24.8% with representation across training programs. Trainees expressed a high level of satisfaction with most aspects of their training, and results compare favourably with Australia. Access to training in the private sector, and value for money emerged as areas of concern, but also highlight the importance of reimbursed costs in the satisfaction of New Zealand trainees. Work life balance is of increasing importance to young doctors, and an unmet desire for extended leave from medical practice may present an issue for workforce capacity and training flexibility in years to come.

Conclusion: This survey provides a snapshot and a baseline, for future comparisons.

The training pathway for most New Zealand doctors requires a period of undergraduate study, prevocational work experience and then entry into a vocational training program for specialist training.

There are approximately 2124 vocational trainees comprising 16% of the total medical workforce. During their training these doctors deliver healthcare, and have an important service role in public hospitals.

Vocational trainees are specialists of tomorrow, so their quality of training, job satisfaction and demographics are important data, which contribute to workforce planning. Each specialist college assesses their own training program but there is evidence that an independent confidential survey may collect a less-guarded opinion from trainees.

Here we aim to provide an independent anonymous assessment of vocational training quality in New Zealand, for the first time. Surveys in Australia and United Kingdom are available for comparison.

Materials and Methods

For the purposes of this survey a vocational trainee was defined as a doctor enrolled in a vocational training program within a medical college, accredited by the Medical Council of New Zealand to provide vocational training.
colleges who attended the New Zealand Medical Association (NZMA) Trainee Forum in September 2011 were invited to participate, and they distributed the electronic survey to their vocational trainees by email between 16 December 2011 and 1 February 2012.

Separately, vocational trainee members of the NZMA were electronically invited to participate (98.2% contacted by email). There was no inducement or coercion to complete the online survey and responses were anonymous.

The content of the survey was duplicated from the Australian Medical Association’s 2010 Specialist Training Survey, which comprehensively covered questions that reflected both the Australian Medical Council and New Zealand Medical Council’s standards for vocational education and training. Additional questions were used to explore the viewpoints of extended absences of leave from vocational training in New Zealand.

Data analysis was performed using Prism 5.0d (GraphPad Software Inc, California, USA). The data were analysed as a single group of New Zealand vocational trainees to preserve anonymity. Mean values and 95% confidence intervals (95% CI) were calculated. Likert type questions had a range of 1-5; where 1=“strongly disagreed” to 5=“strongly agreed”, and results were expressed as a mean (where 3.0 represented neutral sentiment).

To compare with Australian data, a weighted average score (WAS) was also displayed, where -1.00 represents 100% of respondents strongly disagreeing, 0.00 represents neutrality, and +1.00 represents 100% strongly agreeing. The percentage who either agreed or strongly agreed with each statement was also calculated.

**Results**

**General**—The response rate was 24.8% (527 of 2124) with 86% of all respondents answering all questions. Respondents claimed membership of 13 colleges (Table 1 lists the colleges and their acronyms) of which 10 were bi-national colleges (Australian and New Zealand).

Thirty-six respondents (7%) described themselves as members of two colleges. Only RNZCGP trainees were under-represented (82 of 647 trainees responded, 12.7% response rate) and RACP trainees were over-represented (201 of 388 trainees responded, 51.8% response rate).

**Table 1. Colleges whose trainees participated, with acronyms**

<table>
<thead>
<tr>
<th>College Name</th>
<th>Acronym</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian and New Zealand College of Anaesthetists (ANZCA)</td>
<td></td>
</tr>
<tr>
<td>Australasian College for Emergency Medicine (ACEM)</td>
<td></td>
</tr>
<tr>
<td>College of Intensive Care Medicine (CICM)</td>
<td></td>
</tr>
<tr>
<td>New Zealand College of Public Health Medicine (NZCPHM)</td>
<td></td>
</tr>
<tr>
<td>Royal Australasian College of Medical Administrators (RACMA)</td>
<td></td>
</tr>
<tr>
<td>Royal Australasian College of Physicians (RACP)</td>
<td></td>
</tr>
<tr>
<td>Royal Australasian College of Surgeons (RACS)</td>
<td></td>
</tr>
<tr>
<td>Royal College of Pathologists of Australasia (RCPA)</td>
<td></td>
</tr>
<tr>
<td>Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG)</td>
<td></td>
</tr>
<tr>
<td>Royal Australian and New Zealand College of Ophthalmologists (RANZCOI)</td>
<td></td>
</tr>
<tr>
<td>Royal Australian and New Zealand College of Psychiatrists (RANZCP)</td>
<td></td>
</tr>
<tr>
<td>Royal Australian and New Zealand College of Radiologists (RANZCR)</td>
<td></td>
</tr>
<tr>
<td>Royal New Zealand College of General Practitioners (RNZCGP)</td>
<td></td>
</tr>
</tbody>
</table>
Overall 53% were female, and the largest age group was 30-35 years (47%). Seventy percent of trainees completed their primary medical degree in New Zealand. The next largest cohort obtained their degree from the United Kingdom (14.5%), and only 1.7% of surveyed trainees obtained their primary degree from Australia.

Overall 39% of trainees had children, and 77% were in either a de-facto relationship or married. Respondents represented a full spread of junior and senior trainees (Figure 1).

Figure 1. Year of vocational training in all respondents

A total of 68% of surveyed trainees were based in the three major metropolitan cities (Auckland, Wellington and Christchurch) whilst 27% of trainees were based in smaller cities. Only 5% of trainees classified their location as either rural or remote.

Career choice and overall quality—The average time for trainees to decide on a career choice was 3.0 years after graduation. By the end of PGY2, 44% of trainees had decided on a vocational training program, 78% by the end of PGY4, and 13% took more than six years to decide.

Once in training, 90% of trainees were happy with their career choice and 69% of vocational trainees either strongly agreed or agreed that they were overall satisfied with their training program. Trainees were positive with the quality of their overall training program, the standard of training and their clinical experience during their training post (Table 2). The satisfaction about training was considerably less than the satisfaction with career choice (Table 2).

Selection criteria—Trainees agreed that the colleges had explicit criteria for selection into vocational training programs and secondly the colleges were fair and transparent about the process.

Examinations—Overall, trainees agreed that their colleges communicated well regarding examination details, but they were neutral regarding quality of examination feedback, and remediation (including the availability of resit examinations).
Flexible training options—Trainees agreed that overall, their college offered options for flexible training and supported trainees who used such options (Table 2).

Trainee wellbeing—Overall, trainees believed that their program supported safe working hours. Trainees were less satisfied in regards to policies of bullying, and college promotion of health and well-being. Trainees agreed that the colleges supported mentoring and an appropriate level of supervision; and had greater satisfaction with supervision than mentoring.

The costs of training—Overall, trainees were neutral about whether they experienced costs additional to their training program, and indicated these extra expenses did not cause financial hardship. Most vocational trainees who are employed in hospital settings have costs of training reimbursed, and clearly these registrars were less likely to indicate that training resulted in financial hardship than their community colleagues. Trainees did not feel that the costs of training represented value for money, whether they were paying for costs themselves or not.

Table 2. Weighted average scores (WAS) regarding opinions on quality of training

<table>
<thead>
<tr>
<th>Question</th>
<th>% who agree or strongly agree</th>
<th>WAS</th>
<th>Mean</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Career Choice and Overall Quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am happy with my career choice</td>
<td>90</td>
<td>0.65</td>
<td>4.29</td>
<td>4.20–4.38</td>
</tr>
<tr>
<td>I am satisfied with my training program</td>
<td>69</td>
<td>0.39</td>
<td>3.69</td>
<td>3.62–3.78</td>
</tr>
<tr>
<td>I am satisfied with the standard of training I receive</td>
<td>76</td>
<td>0.41</td>
<td>3.82</td>
<td>3.74–3.90</td>
</tr>
<tr>
<td>My training posts provide the necessary clinical experience to meet the objectives of my training program</td>
<td>77</td>
<td>0.43</td>
<td>3.86</td>
<td>3.79–3.93</td>
</tr>
<tr>
<td><strong>Selection into Training</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The selection processes for entry into the training program are fair and transparent</td>
<td>72</td>
<td>0.40</td>
<td>3.81</td>
<td>3.73–3.88</td>
</tr>
<tr>
<td>The selection criteria for entry into the training program are clear and explicit</td>
<td>66</td>
<td>0.35</td>
<td>3.70</td>
<td>3.63–3.78</td>
</tr>
<tr>
<td><strong>Examinations and Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The college has a clear curriculum to guide my learning</td>
<td>66</td>
<td>0.32</td>
<td>3.65</td>
<td>3.58–3.71</td>
</tr>
<tr>
<td>I am able to attend regular college-recognised educational activities</td>
<td>63</td>
<td>0.26</td>
<td>3.53</td>
<td>3.44–3.62</td>
</tr>
<tr>
<td>I am given protected time to attend educational activities</td>
<td>55</td>
<td>0.16</td>
<td>3.31</td>
<td>3.20–3.42</td>
</tr>
<tr>
<td>I am able to access adequate conference and study leave to meet my training needs</td>
<td>64</td>
<td>0.29</td>
<td>3.57</td>
<td>3.48–3.66</td>
</tr>
<tr>
<td>The college-recognised educational activities offered are relevant and meet my training needs</td>
<td>66</td>
<td>0.34</td>
<td>3.67</td>
<td>3.60–3.75</td>
</tr>
<tr>
<td>The college-recognised educational activities offered are of good quality</td>
<td>64</td>
<td>0.34</td>
<td>3.69</td>
<td>3.62–3.7</td>
</tr>
<tr>
<td>I am able to access training in the private or community sector as part of my college training program</td>
<td>28</td>
<td>-0.14</td>
<td>2.70</td>
<td>2.60–2.80</td>
</tr>
<tr>
<td>The college utilises technology effectively in delivering its training program</td>
<td>45</td>
<td>0.10</td>
<td>3.21</td>
<td>3.13–3.30</td>
</tr>
<tr>
<td>The college communicates effectively with trainees about exams, including exam results</td>
<td>62</td>
<td>0.30</td>
<td>3.61</td>
<td>3.52–3.69</td>
</tr>
<tr>
<td>The college provides all candidates with detailed feedback about their exam performance</td>
<td>33</td>
<td>0.00</td>
<td>3.02</td>
<td>2.92–3.12</td>
</tr>
<tr>
<td>The college provides unsuccessful candidates with appropriate remediation</td>
<td>17*</td>
<td>-0.2</td>
<td>2.97</td>
<td>2.89–3.03</td>
</tr>
<tr>
<td>There are sufficient exam places to accommodate all eligible candidates</td>
<td>63</td>
<td>0.36</td>
<td>3.80</td>
<td>3.66–3.80</td>
</tr>
<tr>
<td>The exam is run frequently enough to progress through training without undue delay if I am unsuccessful at the first attempt</td>
<td>42</td>
<td>0.03</td>
<td>3.05</td>
<td>2.95–3.16</td>
</tr>
<tr>
<td>Question</td>
<td>% who agree or strongly agree</td>
<td>WAS</td>
<td>Mean</td>
<td>95% CI</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------</td>
<td>-------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>I pay for education and training in addition to that provided by my college training program, in order to meet my training needs</td>
<td>43</td>
<td>0.03</td>
<td>3.05</td>
<td>2.95–3.16</td>
</tr>
<tr>
<td>The exam content is set at an appropriate level for the trainees being assessed</td>
<td>67</td>
<td>34</td>
<td>3.68</td>
<td>3.60–3.75</td>
</tr>
<tr>
<td>The written exam content is relevant to clinical practice</td>
<td>52</td>
<td>0.18</td>
<td>3.35</td>
<td>3.27–3.43</td>
</tr>
<tr>
<td>The oral exam content is relevant to clinical practice</td>
<td>70</td>
<td>0.41</td>
<td>3.82</td>
<td>3.75–3.90</td>
</tr>
<tr>
<td>The other exam content is relevant to clinical practice</td>
<td>48</td>
<td>0.24</td>
<td>3.49</td>
<td>3.42–3.55</td>
</tr>
<tr>
<td>I have confidence in the validity of the oral exam as an assessment tool</td>
<td>58</td>
<td>0.25</td>
<td>3.51</td>
<td>3.42–3.60</td>
</tr>
<tr>
<td>The college provides exam candidates with adequate access to educational materials to prepare for exams</td>
<td>52</td>
<td>0.18</td>
<td>3.36</td>
<td>3.27–3.45</td>
</tr>
</tbody>
</table>

**Flexible Training Options/Recognition of prior learning**

<table>
<thead>
<tr>
<th>Question</th>
<th>% who agree or strongly agree</th>
<th>WAS</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>The college offers appropriate flexible training options e.g. part-time and interrupted training</td>
<td>60</td>
<td>0.34</td>
<td>3.51</td>
<td>3.42–3.60</td>
</tr>
<tr>
<td>I feel the college supports those trainees who require access to flexible training options including parental leave</td>
<td>52</td>
<td>0.29</td>
<td>3.40</td>
<td>3.31–3.50</td>
</tr>
<tr>
<td>The training program’s limits on time to complete training adequately accommodates those trainees who access flexible training options</td>
<td>42</td>
<td>0.22</td>
<td>3.31</td>
<td>3.23–3.39</td>
</tr>
<tr>
<td>Accessing flexible training options would not disadvantage my career progression</td>
<td>52</td>
<td>0.25</td>
<td>3.39</td>
<td>3.30–3.48</td>
</tr>
<tr>
<td>The college has clear guidelines on recognition of prior learning policies and processes</td>
<td>45</td>
<td>0.20</td>
<td>3.24</td>
<td>3.16–3.33</td>
</tr>
<tr>
<td>The college grants appropriate credit (recognition of prior learning) for relevant prior training and experience</td>
<td>36</td>
<td>0.18</td>
<td>3.06</td>
<td>2.97–3.15</td>
</tr>
<tr>
<td>The lack of recognition of prior learning offered by my college has impacted negatively on my career progression</td>
<td>17</td>
<td>0.04</td>
<td>2.66</td>
<td>2.57–2.75</td>
</tr>
</tbody>
</table>

**Trainee Wellbeing/Supervision**

<table>
<thead>
<tr>
<th>Question</th>
<th>% who agree or strongly agree</th>
<th>WAS</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>My college training requirements are compatible with safe working hours</td>
<td>76</td>
<td>0.39</td>
<td>3.78</td>
<td>3.70–3.86</td>
</tr>
<tr>
<td>The college promotes and supports trainee health and well being</td>
<td>53</td>
<td>0.23</td>
<td>3.47</td>
<td>3.38–3.55</td>
</tr>
<tr>
<td>The college has a clear policy on dealing with bullying and harassment</td>
<td>37*</td>
<td>0.15</td>
<td>3.30</td>
<td>3.23–3.38</td>
</tr>
<tr>
<td>The college responds in a timely and appropriate manner to cases of bullying and harassment</td>
<td>14*</td>
<td>0.04</td>
<td>3.08</td>
<td>3.03–3.13</td>
</tr>
<tr>
<td>Mandatory rotations are adequately flexible to accommodate the personal circumstances of trainees.</td>
<td>44</td>
<td>0.13</td>
<td>3.27</td>
<td>3.18–3.36</td>
</tr>
<tr>
<td>I feel isolated in my training location</td>
<td>13</td>
<td>-0.4</td>
<td>2.19</td>
<td>2.01–2.27</td>
</tr>
<tr>
<td>I am satisfied with the level of supervision I receive</td>
<td>79</td>
<td>0.43</td>
<td>3.87</td>
<td>3.79–3.95</td>
</tr>
<tr>
<td>I am satisfied with the mentoring I receive</td>
<td>66</td>
<td>0.33</td>
<td>3.65</td>
<td>3.56–3.73</td>
</tr>
<tr>
<td>I receive appropriate feedback which is useful in guiding my ongoing performance</td>
<td>68</td>
<td>0.32</td>
<td>3.65</td>
<td>3.56–4.73</td>
</tr>
<tr>
<td>Regular or interim appraisals and/or assessments are routinely conducted</td>
<td>74</td>
<td>0.39</td>
<td>3.77</td>
<td>3.69–3.85</td>
</tr>
</tbody>
</table>

**Costs of Training**

<table>
<thead>
<tr>
<th>Question</th>
<th>% who agree or strongly agree</th>
<th>WAS</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>The costs of the college training program represent value for money</td>
<td>26</td>
<td>0.11</td>
<td>2.82</td>
<td>2.73–2.91</td>
</tr>
<tr>
<td>The costs of the college training program have caused me financial hardship</td>
<td>16</td>
<td>0.00</td>
<td>2.48</td>
<td>2.37–2.57</td>
</tr>
</tbody>
</table>

**College Communication with Trainees**

<table>
<thead>
<tr>
<th>Question</th>
<th>% who agree or strongly agree</th>
<th>WAS</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>The college communicates well with trainees regarding issues that affect their training</td>
<td>56</td>
<td>0.18</td>
<td>3.36</td>
<td>3.27–3.46</td>
</tr>
<tr>
<td>The college gives trainees the opportunity to provide feedback on the training program and any proposed changes</td>
<td>56</td>
<td>0.21</td>
<td>3.42</td>
<td>3.33–3.50</td>
</tr>
<tr>
<td>I am confident that I will not be disadvantaged if I raise issues of concern with my college</td>
<td>48</td>
<td>0.14</td>
<td>3.29</td>
<td>3.20–3.37</td>
</tr>
<tr>
<td>The college actively seeks trainee input on training issues</td>
<td>57</td>
<td>0.25</td>
<td>3.49</td>
<td>3.41–3.57</td>
</tr>
<tr>
<td>The college responds to trainee concerns appropriately</td>
<td>35</td>
<td>0.09</td>
<td>3.19</td>
<td>3.11–3.26</td>
</tr>
<tr>
<td>The college effectively promotes the trainee representative and/or group</td>
<td>55</td>
<td>0.26</td>
<td>3.51</td>
<td>3.44–3.59</td>
</tr>
<tr>
<td>I am aware of how to contact my trainee representative group</td>
<td>57</td>
<td>0.20</td>
<td>3.39</td>
<td>3.30–3.49</td>
</tr>
</tbody>
</table>

* >50% of respondents answered “neither agree or disagree”.
Leave from training—A total of 25% of respondents had taken leave from medical employment. Out of this group 58% took less than a year of leave, 31% have taken between 1–2 years of leave and 7% have taken more than two years away from medical work (4% did not specify a duration). While 25% of trainees had taken leave from vocational training, 60% of all vocational trainees either strongly agreed or agreed that they would like to take extended leave if it was permissible by the colleges and Medical Council (Table 3). Several respondents also commented that they would be restricted from leave due to employer arrangements. Trainees desired to take extended leave for a variety of reasons (Figure 2).

Table 3. Viewpoints on extended leave from medical practice

<table>
<thead>
<tr>
<th>Question</th>
<th>% who agree or strongly agree</th>
<th>WAS</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>The college offers appropriate flexible training options e.g. part-time and interrupted training</td>
<td>60</td>
<td>0.34</td>
<td>3.51</td>
<td>3.42–3.60</td>
</tr>
<tr>
<td>I would like to take extended leave from medical practice, provided that it was acceptable to the Medical Council and my college</td>
<td>60</td>
<td>0.29</td>
<td>3.57</td>
<td>3.47–3.67</td>
</tr>
<tr>
<td>The Medical Council requirements for an extended absence from practice would prohibit me from taking leave of more than one year duration</td>
<td>30</td>
<td>0.09</td>
<td>3.18</td>
<td>3.11–3.25</td>
</tr>
<tr>
<td>My college's requirements would prohibit me from taking leave of more than one year duration</td>
<td>34</td>
<td>0.08</td>
<td>3.16</td>
<td>3.07–3.24</td>
</tr>
</tbody>
</table>

Figure 2. Reasons for desiring extended leave

Discussion

New Zealand vocational trainees appear to have an overall positive opinion of their training. Approximately 90% of respondents were happy about their career choice, and 69% were positive about their training program. These results are consistent with Australian surveys, where 88% and 68% of vocational trainees responded similarly to these questions.4

The MABEL longitudinal survey of Australian doctors found 85% job satisfaction amongst vocational trainees.6 British vocational trainees had 82.6% overall satisfaction with their training, which appears higher than in Australasia but the percentage was measured with five different questions.5

This survey noted key themes across training programs. Specific issues such as selection, the alignment of clinical experience with training objectives, college communication, safe hour guidelines and supervision were given a high level of satisfaction by trainees. It was important to find that New Zealand was not perceived as lacking in any areas of training quality when compared to Australia or United Kingdom.4,5

Issues of concern—Trainees were dissatisfied or neutral about access to the private sector for training purposes and whether the cost of the trainee program was value for money.

There is an ongoing discussion about how certain elements of medicine, particularly some surgical procedures, are increasingly isolated to the private sector.7 When training has occurred exclusively in the public sector, this raises the issue of how to train the future workforce for work that may only be undertaken in the private sector.

There are challenges regarding training in the private sector, and it remains largely an unmet desire for trainees according to our survey. There may be innovative funding models which support training in the private sector, such as the Waitemata District Health Board joint arthroplasty pilot8 but further data are needed.

Only 26% of trainees see training programs as value for money, despite the fact that many of the costs of their training are reimbursed by employers due to the current collective employment agreement. This may reflect costs that were not reimbursed, or a perception that the fees that are paid by employers were unjustified.

Our results compared favourably to Australia, where costs of training are not reimbursed, and thus many more Australian trainees felt that training was not value for money.4 Most of the bi-national colleges have the same fees and services between countries, indicating the relative effect of this reimbursement clause on the satisfaction of New Zealand trainees. Nonetheless, the dissatisfaction of New Zealand trainees with value suggests transparency and fairness remain important issues here.

Work-life balance—Work life balance is of growing importance for many doctors in training. The majority of respondents were either married or in a de facto relationship (77%) and more than a third (39%) had children. Demographics were very similar in Australia.4 Overall, trainees felt that their respective colleges provided options for
flexible training, including parental leave, and that taking up flexible training options did not disadvantage trainees.

More than half of respondents (60%) would have liked to take extended leave of absence. The reasons for extended leave were varied, and offer a perspective on the intentions and work-life balance of trainees (Figure 2). A majority would take time out for parental and family leave, and for academic research, and many respondents (>40%) would take leave for travel, overseas employment and different work-life balance.

The large number of respondents who desired extended leave was contrasted by the relatively small number of respondents (8.5%) who have actually taken leave for more than one year. Many respondents believed that either the Medical Council or their college prohibited extended leave. This perception may be preventing many from fulfilling their desire to take a non-linear pathway through their vocational training.

If more trainees were to pursue interrupted training and extended leave, it would certainly have implications on workforce planning and the design of training programmes.

**Comparison to Australia**—Most of the respondents were from Australasian (bi-national) colleges, and yet New Zealand respondents were positive about college communication and the potential for them to feedback and influence college policies.

In addition to issues of cost and value, New Zealand trainees expressed greater satisfaction than their Australian peers in response to the same questions on various aspects of training. Specifically in areas of examination content, feedback and remediation, training flexibility, institutional bullying, recognition of prior learning, and access to courses, the New Zealand respondents indicated greater satisfaction than Australians.

Further analysis was limited because of the low response rate of the Australian survey, where there were only 538 respondents out of the 10,649 trainees’ pool (5.1%).

**Limitations**—Our survey targeted New Zealand vocational trainees (16% of the medical workforce), and had a response rate of 25% (n=527). Of course such samples are subject to selection bias, but this is a sizable sample size relative to previous attempts to assess the sentiments of trainees at a national level.

Publically available demographic data on vocational trainees is limited and this survey provides some further insight. Health workforce numbers in 2009 describe 52% of all vocational trainees are men and 48% are women; this compares to our survey respondents where 53% were women. To our knowledge this is the first national survey on the sentiment of New Zealand’s vocational trainees.

Likert scores also prevent analysis of issues that affect only a small number of respondents. Some answers were meaningless, such as a high number of trainees who “neither agree or disagree” that their college has satisfactory measures to prevent bullying. These errors in study design were in part overlooked to maintain the same questions as the Australian survey.
Summary

Overall, New Zealand vocational trainees were satisfied with their career and training. This is a positive outcome, particularly given the nature of our bi-national colleges, and the importance of training in retention of doctors. The emerging desire for varied extended leave may reflect changes in how trainees see their career possibilities. This survey provides a useful baseline for assessing the perceptions of trainees in years to come.

Competing interests: Nil.

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References:

Demography of medical students at the University of Otago, 2004-2008: a changing spectrum?

David Perez, Alison Belton

Abstract

Aims To review the demography of University of Otago Year 2 medical students for the period 2004–2008 to determine whether our graduates reflect the changing demography of New Zealand society.

Method A demographic questionnaire was completed by students entering Year 2. This paper reviews data collected from 2004–2008 and compares the results with data collected between 1987–2000 and also with New Zealand census data.

Results The demographic spectrum of the University of Otago Medical School Year 2 students does not show a general shift towards the demography of the New Zealand community. However, there have been specific positive changes for entrants with a rural background and the proportion of students who are New Zealand citizens. Of concern Māori and Pacific Island students and students from families with lower socioeconomic and educational status are under-represented in the reported period although there has been more recent improvement. In addition the proportion of students with a parent as a doctor has risen compared to the 1987-2000 cohort.

Conclusions Further initiatives are needed to improve the numbers of Māori and Pacific Island students and students from lower socioeconomic backgrounds.

Change in New Zealand society continues unabated, reflected in demographic change and evolving expectations of health service delivery. The proportions of Māori and Pacific peoples continues to rise as illustrated by Māori rising from 13.0% to 14.7% and Pacific from 5.0% to 6.5% respectively between the 1991 and 2001 censuses.

There is a common view that the demography of the medical workforce should reflect the community that we serve although there is little research attempting to show that better outcomes ensue. Previous comparisons of medical student and general New Zealand demography have shown large discrepancies in educational and socioeconomic status of parents, domicile in main urban areas and ethnic origins, specifically Māori and Pacific Island.

To address these discrepancies a preferential Māori and Pacific Island scheme has been in place for many years to provide affirmative opportunities for entry to the University of Otago Medical School. Moreover, since 2004, the Government sponsored rural origin preference programme has been in place for an extra 20 students who have spent significant periods in pre-secondary or secondary education in rural schools.

A further innovation implemented at Otago since 2004 has been the incorporation of the aptitude test for medicine, the Undergraduate Medical Admissions Test [UMAT]
as part of the entry selection process. Although there is uncertainty as to whether UMAT has an impact on medical student demography, it should be borne in mind when interpreting any changes in the backgrounds of students.

Finally the continuing burden of medical student fees, which rose from $9750 to $10,762 between 2004–2008, also needs to be acknowledged when interpreting the data.

Methods

Between 1982 and 2008 all domestic students, including NZ citizens and residents, entering the University of Otago Medical School have been asked to complete a demographic survey. The questionnaire is voluntary and has been approved for use by the Faculty of Medicine, University of Otago.

The questionnaire covered age, marital status, country of birth, first language, citizenship, place of residence between ages 5–12, 13–18 and the year prior to entry, the year 13 school, year 13 subjects, state/private and single sex/coeducational status of the school, parents’ highest qualifications, parents’ attendance at university, parents’ occupations and parents or relatives as doctors.

Ethnicity was not surveyed in the questionnaire so ethnicity data in this report were obtained from the admissions database. In the period 2004–2008 approximately 10–15% of Otago’s students had international origins with most sponsored by their governments. The sponsored students have not been included in this analysis as they usually return to their home countries after graduation and therefore do not impact on the New Zealand medical workforce.

When the demographic questionnaire was developed the structure of the questions was determined by the classifications used in the New Zealand census current at the time. The data in this analysis were compared to the 2001 Census data for the usually resident population. Although a further census was carried out in 2006 there were changes in classification which made comparisons with some questionnaire categories impossible. Where concordant 2006 Census data categories are available they have been included.

Age-specific comparisons were made whenever possible. The classification of occupations in the questionnaire used the New Zealand Standard Classification of Occupations, NZSCO90 whereas the 2001 Census used the NZSCO99 classification. However, these classifications were comparable as the NZSCO99 is similar to NZSCO90 apart from more detailed sub-categorisation.

In relation to the urban status of the student’s home town, we have used the town identified for ages 13–18 on the grounds that this age range is likely to be the most formative in the individual’s choice of career. The numbers of registered Medical Practitioners in New Zealand between 2004 and 2008 were obtained from the Medical Council of New Zealand website. Trends across the years were evaluated using regression coefficients.

Results

Student demography—The numbers of students entering the University of Otago Medical School between 2004 and 2008 are listed in Table 1 along with demographic details. The numbers of students rose in 2008 as government funding for domestic places rose in response to doctor shortages partly resulting from difficulties in retaining graduates in the New Zealand workforce. The proportions of competitive graduate entrants, gender ratios and age characteristics remained relatively stable over this period.
Table 1. Entry categories and personal demographics for Year 2 University of Otago medical students: 2004–2008

<table>
<thead>
<tr>
<th>Variables</th>
<th>Year of entry</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>Average 2004–8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total students</td>
<td></td>
<td>222</td>
<td>232</td>
<td>235</td>
<td>236</td>
<td>248</td>
<td>235</td>
</tr>
<tr>
<td>entering Year 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of domestic students</td>
<td></td>
<td>194</td>
<td>192</td>
<td>193</td>
<td>197</td>
<td>211</td>
<td>197</td>
</tr>
<tr>
<td>Response rate to questionnaire</td>
<td></td>
<td>94.3%</td>
<td>96.4%</td>
<td>89.1%</td>
<td>99.0%</td>
<td>89.6%</td>
<td>93.7%</td>
</tr>
<tr>
<td>Graduate entrants</td>
<td></td>
<td>17.5%</td>
<td>17.2%</td>
<td>23.3%</td>
<td>21.3%</td>
<td>21.3%</td>
<td>20.1%</td>
</tr>
<tr>
<td>Sex: male/female</td>
<td></td>
<td>46%/54%</td>
<td>41%/59%</td>
<td>43%/57%</td>
<td>47%/53%</td>
<td>46%/54%</td>
<td>45%/55%</td>
</tr>
<tr>
<td>Age range, Median</td>
<td></td>
<td>17–41 yr</td>
<td>17–32 yr</td>
<td>17–35 yr</td>
<td>17–28 yr</td>
<td>17–34 yr</td>
<td>17–34 yr</td>
</tr>
</tbody>
</table>

The ethnicity, country of birth and citizenship status of domestic students is shown in Table 2. Students were permitted to list multiple ethnic attributions and the majority of students with Māori ancestry listed themselves as European/Māori. The proportions of all ethnic groups changed little over the 2004–2008 period. Compared to the census data the most striking features were the under-representation of Māori and Pacific students and the over-representation of ethnic Chinese.

Although ethnic Chinese students remained over-represented a high majority were New Zealand citizens. There was a non-significant trend to more students holding New Zealand citizenship \[p\text{ value for trend } = 0.067\] which will hopefully translate into more students choosing to practice in New Zealand.

The country of birth data showed that approximately a third of students were born outside the country and this proportion was considerably greater than for the same age group in the usually resident population, i.e. 36.9% vs 21.3%.

Table 2. Ethnicity, citizenship and country of birth for Year 2 University of Otago medical students: 2004–2008

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ European</td>
<td></td>
<td>60%</td>
<td>62%</td>
<td>55%</td>
<td>56%</td>
<td>66%</td>
<td>59.8%</td>
<td>62.6% (59%)</td>
</tr>
<tr>
<td>NZ Māori</td>
<td></td>
<td>0.5%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>3%</td>
<td>1.3%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Eur/Māori</td>
<td></td>
<td>4%</td>
<td>5%</td>
<td>3%</td>
<td>5%</td>
<td>3%</td>
<td>4.0%</td>
<td>7.9%</td>
</tr>
<tr>
<td>Pacific</td>
<td></td>
<td>2%</td>
<td>0.5%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0.9%</td>
<td>5.5% (9.2%)</td>
</tr>
<tr>
<td>Chinese</td>
<td></td>
<td>13%</td>
<td>8%</td>
<td>13%</td>
<td>13%</td>
<td>11%</td>
<td>11.6%</td>
<td>4.8% (4.0%)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>20.5%</td>
<td>22.5%</td>
<td>28%</td>
<td>24%</td>
<td>17%</td>
<td>22.4%</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>n=183</td>
<td>n=185</td>
<td>n=172</td>
<td>n=191</td>
<td>n=189</td>
<td>n=920</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ citizenship</td>
<td></td>
<td>79%</td>
<td>84%</td>
<td>87%</td>
<td>84%</td>
<td>90%</td>
<td>84.8%</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>n=183</td>
<td>n=185</td>
<td>n=172</td>
<td>n=191</td>
<td>n=189</td>
<td>n=920</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Born in NZ</td>
<td></td>
<td>59.3%</td>
<td>64.3%</td>
<td>61.6%</td>
<td>62.1%</td>
<td>68.3%</td>
<td>63.1%</td>
<td>78.7% (77.0%)</td>
</tr>
<tr>
<td></td>
<td>n=182</td>
<td>n=185</td>
<td>n=172</td>
<td>n=195</td>
<td>n=189</td>
<td>n=923</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Rural and mental health pathways—Since 2004 the Government has funded 20 extra domestic places for students with a rural background or experience in mental health care. There is consistent evidence that a rural origin increases the probability of a subsequent career in rural practice.\textsuperscript{10–12}

The affirmative rural programme was available to students who had spent a major part of their pre-secondary or secondary education in a town with a population of 20,000 or less. The mental health provision was more likely to apply to mature entrants who have a greater variety of work experiences.

Table 3 shows the numbers of students who met the rural entry criteria along with the urban [home town] status of students. The urban status was listed as the student’s home town between the ages of 13 and 18, an age when career choices are being actively considered.

The urban status was compared to the previous demographic report by Heath et al\textsuperscript{4} covering the 1987–2000 period and also to the 2001 Census data. The nearest comparable age category from the Census was 15–19 years.

The mental health provision has had little impact. By contrast there has been an encouraging steady trend upwards in students who reported that they had a rural background [p value for trend = 0.025]. Although there were 20 extra places funded for the rural scheme at Otago, there were 51 students in the 2008 class who met the rural criteria.

If the rural scheme did not exist 20 of these students would not have gained admission. The Statistics New Zealand categories of urban status are listed as main [\textgreater{}30,000 population], secondary [10,000–29,999], minor [1000–9,999] and rural [areas not listed as urban].

The proportion of students from main urban areas remained higher than the general New Zealand population. However there may have been a re-distribution towards greater numbers coming from minor urban towns which are our typical country towns.

### Table 3 Entry via the rural and mental health schemes for year 2 University of Otago medical students: 2004–2008

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural background</td>
<td>N/A</td>
<td>10.8%</td>
<td>15.1%</td>
<td>13.3%</td>
<td>18.8%</td>
<td>24.2%</td>
<td>16.4% N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>79.0%</td>
<td>82%</td>
<td>80%</td>
<td>84%</td>
<td>86%</td>
<td>80%</td>
<td>82.4% 74.0%</td>
</tr>
<tr>
<td>Secondary</td>
<td>7.4%</td>
<td>7%</td>
<td>10%</td>
<td>8%</td>
<td>7%</td>
<td>6%</td>
<td>7.6% 5.8%</td>
</tr>
<tr>
<td>Minor</td>
<td>9.1%</td>
<td>7%</td>
<td>6%</td>
<td>7%</td>
<td>14%</td>
<td>8.2%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Rural</td>
<td>4.5%</td>
<td>3%</td>
<td>2%</td>
<td>0%</td>
<td>2%</td>
<td>2.2%</td>
<td>12.8%</td>
</tr>
</tbody>
</table>

Parental occupations—Selected occupations of mothers and fathers according to the NZSC090 classification are listed in Table 4. The striking feature remained the high representation of professional parents compared to the 2001 Census data. This was
particularly marked with ethnic Chinese students as 60% had a professional father. There was a marked increase in the proportion of professional mothers since the publication by Heath et al.\(^3\) for the 1987–2000 period.

Professional occupations hold the highest ranking on the New Zealand Socio-economic Index.\(^13\) There was little change in the technical, sales or agricultural occupations since the 1987-2000 data were reported [data not shown]. In the 2004-2008 period the proportion of students with one or both parents practising medicine remained high and ranged from 15–20% with an average of 18.8%. This contrasts with 12.5% for fathers and 2.3% for mothers in the 1987-2000 cohort. In 2001 the proportion of registered doctors in the usual resident population was 0.23%.

### Table 4. Parental occupations for year 2 University of Otago medical students: 2004-2008

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Father’s occupation</th>
<th>Mother’s occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionals</td>
<td>42.3%</td>
<td>45.4%</td>
</tr>
<tr>
<td>Trades/Machinists</td>
<td>6.6%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Not in paid workforce</td>
<td>9.4%</td>
<td>6.2%</td>
</tr>
</tbody>
</table>

Finally Table 5 shows the low proportion of medical students’ parents with no formal tertiary qualifications and the correspondingly high proportion with university degrees. These proportions are almost the inverse of the general population.

### Table 5. Parental tertiary qualifications for year 2 University of Otago medical students: 2004-2008

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No tertiary qualification</td>
<td>10.6%</td>
<td>57.1% (49.2%)</td>
<td>No tertiary qualification</td>
<td>14.8%</td>
<td>59.2% (52.6%)</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>30.8%</td>
<td>7.1% (9.3%)</td>
<td>Bachelor’s degree</td>
<td>29.8%</td>
<td>6.8% (10.6%)</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>32.0%</td>
<td>3.6% (4.4%)</td>
<td>Postgraduate degree</td>
<td>21.8%</td>
<td>2.1% (4.0%)</td>
</tr>
</tbody>
</table>

**Discussion**

This review of the demographic spectrum of the University of Otago Medical School year 2 students from 2004-2008 is derived from an established, longitudinal data-set.
and does not address a priori hypotheses but provides a useful status update of our medical student population in this period. The data do not show a general shift towards the demography of the New Zealand community. However, there have been some specific positive changes in relation to entrants with a rural background and the proportion of students who are New Zealand citizens.

The gender balance appears to have stabilised around the 55% female/45% male split. The Australasian Medical Schools Outcomes Database\textsuperscript{14} reported the 2010 gender split for domestic students in Australasian medical schools to be 54% female/46% male. The data presented do not show any obvious trends in medical student demography resulting from the introduction of the UMAT aptitude test, however, prospective analyses on more mature data will be required to address this issue.

Despite the long existence of the affirmative Māori and Pacific Island scheme the numbers of Māori and Pacific Island students in the 2004-2008 cohort remain lower than population percentages. These affirmative programmes allow all Māori and Pacific students who meet the academic entry criterion to enter medical school without being subjected to competitive ranking. One aspect of the problem lies in the under-representation of science literacy among Māori and Pacific secondary school students.

The University of Otago Medical School has responded to this challenge by appointing Associate Deans and more academic staff in Hauora Māori and Pacific Health, by devoting more curriculum time to these areas and by offering support programmes to Māori and Pacific Island students. In addition the Tū Kahika foundation programme for Māori students and the POPO Initiative to support Pacific students during Health Sciences First Year provide academic and social support to students in their initial years at university.

Encouragingly these measures appear to be helping with the percentage of Māori students rising from the 2004-2008 average of 5.3% to 15.9% in 2012 [personal communication].\textsuperscript{15} The same comparison for Pacific students showed a rise from 0.9% to 3.3%. Australian medical schools also have under-representation of indigenous students with 0.9% identifying as Aboriginal or Torres Strait Islanders compared to the general population percentage of 2.7%.\textsuperscript{13}

The affirmative rural scheme introduced in 2004 appears to be gaining traction. The 24.1% of students in the 2008 class who had rural origins is similar to the population percentage for secondary and minor urban towns and rural areas. The success of this scheme may relate in part to the emphasis that the University of Otago’s Dunedin School of Medicine has placed on rural attachments in the 4\textsuperscript{th} and 5\textsuperscript{th} years of the medical course. In 2000 a 7-week rural attachment was introduced for 5\textsuperscript{th} year students. In 2007 a Rural Medicine Immersion Programme [RIMP] was offered to 5\textsuperscript{th} year students across the Faculty of Medicine whereby they could complete all their clinical attachments in primary care practices in secondary or minor urban towns. From small beginnings this programme now has 20 participants and there is a prospect for further expansion.

Other measures the University of Otago Medical School has used in an attempt to expand the demography of students is the ‘Other Categories’ admission pathway for
mature students. In addition up to 30% of students enter as graduates. Medical Schools in other countries have attempted to broaden their student base but with limited success.\textsuperscript{16,17}

A limitation of these analyses relates to the data categories being obtained from the 2001 Census which limits comparison with more contemporary census data. This applies to ethnic categories, designation of rural origins and categories of employment. In addition, the response rate to the questionnaire was incomplete raising the possibility of selection bias. Despite this, the trends reported give a useful insight into the origins of New Zealand’s medical workforce.

Clearly there needs to be continuing focus on innovations in our admission processes, policies and evaluations to provide a medical workforce which reflects and can serve the needs of our changing community. Further research in New Zealand is required to understand the perceptions of our differing communities about the nature of medical practice and the motivators or obstacles to gaining entry to medical training. We also need more information on whether doctors who come from lower socioeconomic communities ultimately practice in more deprived areas.

Competing interests: Nil.

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Acknowledgement: We thank Professor Peter Herbison for statistical assistance.

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References:
15. Personal communication, B Smith, Manager, Faculty of Medicine, University of Otago, 2011
Kids in the cold: outcomes for New Zealand households with children using prepayment metering for electricity
Kimberley C O’Sullivan, Philippa L Howden-Chapman, James Stanley, Simon Hales

Abstract

Aims Although fuel poverty is becoming increasingly researched, there is very limited information currently available on the experiences of and effects on children living in fuel poverty. This paper examines the consequences of using prepayment metering, a payment method typically used by low-income households, on households with children.

Methods We present new results from two postal survey datasets, the Electricity Prepayment Meter Users’ Survey undertaken in late 2010 and the follow-up survey undertaken in 2011, which explore the outcomes of prepayment metering and living on low-incomes for households with children.

Results Among prepayment consumers, households with children experience greater levels of hardship. Households with children were statistically significantly more likely to cut back on grocery spending, and indicated greater levels of financial difficulty than childless households. Although there were no differences between the groups for most indicators of poor thermal comfort levels, households with children were statistically significantly more likely to report seeing their breath condensing indoors on at least one occasion during the winter.

Conclusions Policies to address fuel poverty should include protections for prepayment meter consumers, and households with children using this payment method who are especially vulnerable.

Fuel poverty has commonly been defined as the inability to afford adequate household energy services, including maintaining World Health Organization (WHO) recommended indoor temperatures, for less than 10% of household income.1,2

Fuel poverty presents a multisectoral challenge because it is caused by the energy inefficiency of the house and the available heating sources, combined with income poverty, which prevent the household from achieving healthy temperatures.1,3

Drivers of fuel poverty in New Zealand, where the problem is estimated to affect one in four households, include the poor quality of the housing stock, relatively high levels of income inequality, and the increasing price of electricity which occurred after deregulation of the industry.4,5

Fuel poverty has received little attention in New Zealand which has no official definition or measurement of fuel poverty, or specific policy to address the issue.5,6 This is in contrast with other jurisdictions, such as the United Kingdom where the Parliament, with all-party support, agreed to aim to eradicate fuel poverty as far as reasonably practical by 2016.7
The effects of fuel poverty are broad, with typical coping strategies of fuel poor households identified by several studies falling into three broad categories including: self-rationing of energy consumption, e.g. restricting heating, lighting, and use of hot water; financial redistribution through restricting other spending, e.g. limiting grocery spending; and in some cases debt and disconnection from energy or other services.\(^8\)-\(^10\)

A recent review of the health impacts of cold homes and fuel poverty in the United Kingdom highlights many findings which are applicable to New Zealand.\(^1\) In particular, the Marmot Review Team (p 11), commented:

“Fuel poor households must choose either to spend more than 10% of their income on heating, which has a detrimental impact on other aspects of health and well-being, or to under-consume energy and live in a cold home to save money. Deprived and vulnerable households – especially those who do not have access to social housing – are more likely to live in energy inefficient housing, and less likely to have the resources or the resilience to deal with the negative impacts of cold homes and reduced income.”\(^11\)

The WHO recommends maintaining indoor temperatures of between 18°C and 24°C for the general population.\(^12\) For vulnerable groups, such as the very old or young, a minimum temperature of 20°C is recommended. These temperature ranges have been debated, perhaps due to the use of the term “thermal comfort”, in the guideline. Whether electricity conservation, including reducing indoor temperatures below comfortable levels, contributes negatively to mental health may be dependent on attitudes and cultural factors.\(^10\),\(^13\)

Problematically, in New Zealand space heating is undervalued, and indoor temperatures are cold by international standards.\(^4\) However as Ormandy and Ezratty (In press, p1) note:

“While the term ‘thermal comfort’ is used to cover a variety of circumstances, the World Health Organization’s guidance on thermal comfort is not just about ensuring a sensation of satisfaction with the ambient temperature, it is inextricably linked to health. It is a guidance for the home environment, and aimed at protecting health, particularly the health of those most susceptible and fragile to temperatures outside that range, such as the very young, and older people.”\(^14\)

In elderly people, respiratory effects have been shown to occur below 16°C, (in those with chronic respiratory disease below 21°C), while increases in blood pressure are seen below 12°C, and risk of hypothermia increases below 6°C.\(^11,14,15\)

Fuel poverty and cold indoor temperatures contribute to excess winter mortality and morbidity, especially in temperate countries. A recent study linking New Zealand census and mortality data found the highest risk of dying in winter among low-income people, those living in rented accommodation and those living in cities.\(^16\)

While most of the earlier studies investigating the physiologic effects of adverse temperatures on health focused on adults, some research highlights the outcomes for children. In children with asthma, increasing temperatures inside the home has been shown to reduce symptoms and days off work and school.\(^17,18\) Reduced calorific intake in the winter in low-income families is evidence of the ‘heat or eat’ problem in the United States.\(^19\)

One Boston study found that children from households receiving the Low-Income Home Energy Assistance Programme payments to assist with home energy costs were less likely to suffer undernutrition, be overweight, or require acute hospitalisation.\(^20\)
Child health and development in children less than three years of age is negatively affected by household energy insecurity, defined as the household having had an unheated or uncooled day, using a cooking stove for heating, or being threatened with or having been disconnected from utility services in the previous year.\(^\text{21}\)

A narrative synthesis of five intervention studies examining specific effects of cold housing on health noted that the effects of fuel poverty on children is under-researched, but that adolescents living in cold housing are at risk of mental health problems and engage in increased antisocial behaviour.\(^\text{22}\)

At the extreme end of the spectrum, children appear to be over-represented in fatalities from unintentional domestic fires relating to fuel poverty. In a report investigating fatal unintentional domestic fires in New Zealand from 1997–2003, 131 deaths were identified in total, 10% of these were due to unattended candle fires, the third most significant risk factor for residential fire fatality.\(^\text{23}\)

There were 13 deaths in eight candle fires during the study period; eight of these victims were children.\(^\text{23}\) In three households the electricity had been disconnected for non-payment, another household had no electricity due to remote location.\(^\text{23}\)

Stories of local families struggling to manage high electricity costs, cold homes, and low-incomes are not new, with several examples making headlines in recent years.\(^\text{24-26}\) One group of consumers likely to experience high rates of fuel poverty are those using prepayment metering, an electricity payment method often used by low-income consumers with electricity debt, or who have difficulty budgeting.\(^\text{27}\)

While there are advantages of prepayment metering such as reduced electricity consumption, and greater awareness and control of electricity use,\(^\text{28,29}\) low income households tend to have less discretionary electricity consumption and therefore fewer opportunities for reducing consumption.\(^\text{30}\) One of the most significant disadvantages to using prepayment metering is the risk of households “self-disconnecting”\(^*\) or running out of credit on their prepayment meters, resulting in their household being without electricity services, which may have serious health consequences.

\(*\) The term “self-disconnection” refers to the service being shut off when a prepayment meter runs out of credit. While the term problematically implies the consumer has agency to make a choice to disconnect, the term is widely used and understood so we use it here.

We investigated the use of prepayment metering from a consumer perspective in a nationwide postal survey of electricity prepayment meter users, and found that while almost all respondents felt the benefits of using prepayment outweighed the risks of running out of credit or self-disconnection, over half of respondents experienced self-disconnection in the past year.\(^\text{31}\)

One third of respondents experiencing self-disconnection were without electricity for more than 12 hours, and 17.0% reported six or more events in the past year. A follow-up postal survey in late 2011 investigated whether patterns of self-disconnection within households had changed over time and explored the heating practices of households using prepayment metering.\(^\text{32}\)

The study found that self-disconnection remained problematic over time, and that prepayment metering encourages restriction of space heating in already cold homes.
Over half (57.0%) of respondents reported restricting space heating, although more than two-thirds reported experiencing shivering and more than half being able to see their breath condensing inside their home during the winter months on at least one occasion.\textsuperscript{32}

Parents and caregivers responding to the survey commented on the negative impacts of electricity prepayment metering on their children, for example “the kids get sick of me telling them to conserve power”, indicating increased family tension.\textsuperscript{31}

The consequences of self-disconnection were more problematic, with some adult respondents stating that the worst thing about their last self-disconnection event was “not being able to prepare baby’s bottle”, or “can’t cook my kids dinner”.\textsuperscript{31}

Although not a focus of the original study design, these comments indicate there are specific issues faced by families using prepayment metering which may increase hardship experienced by children in these households.

Given that New Zealand has high rates of child poverty, and poor child health and wellbeing equity in general,\textsuperscript{33} households with children, who use prepayment metering to pay for electricity, may be particularly vulnerable to the disadvantages of using this payment method.

In this paper, we present new results from two survey datasets, the Electricity Prepayment Meter Users’ Survey undertaken in late 2010 and the follow-up survey undertaken in 2011, which explore the outcomes of prepayment metering for households with children.

**Methods**

The Electricity Prepayment Meter Users’ Survey 2010, fully described elsewhere, was a nationwide postal survey undertaken with the support of three major electricity retailers in New Zealand who provided an anonymised random sample to investigate the advantages and disadvantages of using prepayment metering from a consumer perspective.\textsuperscript{31} In 2008, 52,664 prepayment meters were used in New Zealand (Electricity Commission 2008), which equates to around 3\% of households.

The 2010 survey sample included a total number of 768 customers, calculated presuming a response rate of 50\% (384), providing adequate study power assuming 50\% frequency of self-disconnection in the population. The final response rate for the 2010 survey, which included a rigorous protocol of repeat mailings was 47.9\%. Of the 359 respondents to the 2010 survey, 324 (90.2\%) agreed to postal follow-up and were included in the 2011 sample. The 2011 survey, also fully described elsewhere, achieved a response rate of 61.0\% using a similar protocol.\textsuperscript{32}

In both years respondents were offered a $20 supermarket voucher to thank them for completing the survey, which were sent by the researchers on receipt of the survey form.

Survey data for both years were entered into a Microsoft Access database and analysed using Epi Info version 3.4 (Center for Disease Control, Atlanta, GA). The uncorrected chi-squared test was used for significance testing, with an alpha level of ≤0.05.

**Results**

Households with children made up 54.3\% of the respondents to the 2010 survey, and 47.8\% of the 2011 survey. Comparison of responses to the 2010 survey found few sociodemographic differences between those who did not consent to postal follow-up, those who consented but did not respond to the 2011 survey, and those who consented and responded to the 2011 survey.\textsuperscript{32}
Statistically significant differences were found between the groups for households with children (Chi squared = 9.53, p value = 0.009), who were over-represented in the group that consented, but did not take part in the 2011 survey.

The average expenditure per month on electricity differed in households with children ($175.06 in 2011, and $158.78 in 2010) and households without children ($128.38 in 2011, and $119.48 in 2010). For households with children, the median expenditure per month of $160.00 in 2011 was unchanged from 2010, whereas in households without children, median expenditure rose to $120.00 per month in 2011 from $100.00 in 2010.

Results from the 2010 survey found that households with children were significantly more likely to report that they first found out about using prepaid metering from family or friends (Table 1). Indicators of ‘bill stress’ were marginally significantly more common for households with children (p≤0.10).

These bill stresses included: starting prepaid metering because of debt accruing on the electricity account; being unable to pay any of the telephone, gas, or water bills in the past year; and having help from family or friends to pay for electricity in the past year. The likelihood of experiencing a self-disconnection event in the past year was also marginally significantly higher among households with children, with 57.8% reporting an event compared with 47.4% of households without children.

Table 1. Self-disconnection and bill stress in households with and without children in 2010

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Children Proportion (95% CI)</th>
<th>No children Proportion (95% CI)</th>
<th>Chi-squared and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Started using prepaid meter because debt had built up on the electricity account</td>
<td>26.5% (20.3–33.5)</td>
<td>18.6% (12.8–25.6)</td>
<td>χ²=2.99, p=0.084</td>
</tr>
<tr>
<td>First found out about using prepaid metering from family or friends</td>
<td>60.0% (52.6–67.1)</td>
<td>45.5% (37.5–53.7)</td>
<td>χ²=7.14, p=0.008</td>
</tr>
<tr>
<td>Self-disconnection event in past 12 months</td>
<td>57.8% (50.4–65.0)</td>
<td>47.4% (39.5–55.6)</td>
<td>χ²=3.68, p=0.055</td>
</tr>
<tr>
<td>Unable to pay any of telephone, gas, or water bills by due date in past 12 months</td>
<td>44.9% (37.6–52.3)</td>
<td>35.3% (27.8–43.3)</td>
<td>χ²=6.64, Probability=0.084</td>
</tr>
<tr>
<td>Had a grant or loan from family or friends to help pay electricity in past 12 months</td>
<td>17.3% (12.1–23.5)</td>
<td>10.9% (6.5–16.9)</td>
<td>χ²=2.82, p=0.093</td>
</tr>
</tbody>
</table>

Results significant at an alpha level of ≤0.05 are highlighted in this and all following tables.

Results from the 2011 follow-up survey similarly found trends that households with children were experiencing greater bill stress than childless households. Receiving help from family or friends over the past year to pay for electricity was marginally significantly more likely among households with children.

The follow-up survey also investigated whether households using prepaid metering restrict grocery spending to afford electricity. Almost three of five
households with children (56.8%) reported cutting back on groceries to pay for electricity, compared with 2 (41.2%) of 5 childless households (p≤0.05).

When asked if they would be able to access $500 in the next week for a family emergency, the trend was for households with children to report more difficulty in both survey years (Table 2). Households with children were statistically significantly more likely to report that the money would be unattainable.

Households with children were four times as likely to report that they could use a money-lender in 2010, (16.2% compared to 3.8% of childless households, p≤0.01) an indicator of a precarious financial position. In 2011 the difference was reduced but the absolute numbers increased with more households in both groups reporting they could use a money-lender. Even so, households with children remained over 2½ times more likely to report that they would use a money-lender (22.5% in households with children, 8.5% without children, p≤0.05).

<table>
<thead>
<tr>
<th>Options to access money in a family emergency</th>
<th>2010 Survey results</th>
<th>2011 Follow-up survey results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children Proportion (95% CI)</td>
<td>No Children Proportion (95% CI)</td>
</tr>
<tr>
<td>Self-fund</td>
<td>28.6% (22.3–35.7)</td>
<td>35.3% (27.8–43.3)</td>
</tr>
<tr>
<td>Family or friends</td>
<td>33.5% (26.8–40.8)</td>
<td>23.7% (17.3–31.2)</td>
</tr>
<tr>
<td>Work and Income</td>
<td>16.8% (11.7–22.9)</td>
<td>15.4% (10.1–22.0)</td>
</tr>
<tr>
<td>Bank</td>
<td>10.8% (6.7–16.2)</td>
<td>16.0% (10.6–22.7)</td>
</tr>
<tr>
<td>Money-lender</td>
<td>16.2% (11.2–22.3)</td>
<td>3.8% (1.4–8.2)</td>
</tr>
<tr>
<td>Not available</td>
<td>31.4% (24.7–38.6)</td>
<td>21.8% (15.6–29.1)</td>
</tr>
</tbody>
</table>

Indoor temperature data were not collected from participants in this study, however the follow-up survey included questions to investigate self-rated thermal comfort. Similar indicators have been used in other studies as a proxy for objective measurements when assessing whether indoor temperatures are likely to fall within healthy ranges, and to indicate whether households suffer fuel poverty.

There were no significant differences between the groups for four of the indicators, although at least two-thirds of the respondents to the survey reported problems achieving thermal comfort overall (Table 3). However, households with children were statistically significantly (p≤0.01) more likely to report being able to see their breath condensing inside their home on at least one occasion during the winter months, with 71.3% of households with children reporting this problem, compared to just under half of childless households.
Table 3. Indicators of thermal comfort in households with and without children in 2011

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Children Proportion (95% CI)</th>
<th>No Children Proportion (95% CI)</th>
<th>Chi-squared and p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>House has been cold this winter</td>
<td>80.7% (70.9–88.3)</td>
<td>75.0% (65.1–83.3)</td>
<td>$\chi^2=0.86, p=0.355$</td>
</tr>
<tr>
<td>Used heating when cold this winter</td>
<td>83.0% (73.4–90.1)</td>
<td>85.6% (77.0–91.9)</td>
<td>$\chi^2=0.24, p=0.625$</td>
</tr>
<tr>
<td>Had house colder than would have liked this winter</td>
<td>71.9% (61.4–80.9)</td>
<td>67.4% (57.0–76.6)</td>
<td>$\chi^2=0.45, p=0.503$</td>
</tr>
<tr>
<td>Shivered inside this winter on at least one occasion</td>
<td>70.5% (59.8–79.7)</td>
<td>66.3% (55.9–75.7)</td>
<td>$\chi^2=0.36, p=0.548$</td>
</tr>
<tr>
<td>Saw breath condensing inside this winter on at least one occasion</td>
<td>71.3% (60.6–80.5)</td>
<td>48.4% (38.0–58.9)</td>
<td>$\chi^2=9.82, p=0.002$</td>
</tr>
</tbody>
</table>

Reasons for having the house colder than they preferred over the winter months were not significantly different between households with and without children. There were also no significant differences in the heating types used as the main heating source.

More households with children named “other” heating sources as the main heating source, most commonly these were specified as using no heating, or using additional blankets or clothes, though again the small difference (15.7% compared with 9.3% of childless households) was not significant.

When asked what the reasons for using the heater type specified as the primary heating source were, the only significant difference between the groups was that households with children were less likely to identify convenience as a reason than households without children (34.8% compared to 49.5%, $p\leq0.05$).

Discussion

The results of this paper suggest that, among prepayment consumers, households with children experience greater levels of hardship. This is in the context of prepayment customers already experiencing financial hardship compared to the general population, with lower levels of home ownership, low household income, and high rates of bill stress, while paying 3–38% more per unit of electricity by using this payment method depending on regional pricing differences.25,31,35

Households with children were significantly more likely to report cutting back on grocery spending to afford electricity than childless households, which has other flow-on effects on health and wellbeing.19,20 The problems highlighted here are likely to affect a significant number of children. Based on the most recent national figure of prepayment metering consumers from 2008,36 around 28,000 households using prepayment metering have at least one child under the age of 18.

As the surveys were not designed to look at households with children specifically, the samples are too small to be definitive; however households with children were significantly more likely to report being able to see their breath condensing indoors on at least one occasion during the winter months than childless households. Almost three quarters (71.3%) of households with children experienced this problem, compared to just under half (48.4%) of childless households.
Although reasons for this are complicated, with several potential contributing factors including greater indoor humidity due to higher household occupancy and heating and behavioural practices, households experiencing this problem are unlikely to be achieving indoor temperatures adequate for safeguarding health. Despite there being no differences between the groups for the remaining indicators of poor thermal comfort used, more than two-thirds of study respondents overall reported problems achieving thermal comfort and, by inference, healthy indoor temperatures.

Children living in households that use prepayment metering are likely to be living in fuel poverty, as well as experiencing the effects of general poverty, both factors which are harmful to child health and wellbeing. Further research that specifically focuses on both the experiences of and outcomes for children in fuel poor households is urgently needed. This should also include exploring alternatives to prepayment metering such as the use of informative billing and in home display devices which could provide some of the benefits of increased consumer information and control of home energy use without the risk of self-disconnection.

While the problem of fuel poverty is tied to income poverty, energy inefficiency of housing and heating appliances are contributory problems. In New Zealand, fuel poverty is partly driven by the structure of the electricity market and ongoing price increases in the domestic electricity sector, which are likely to be exacerbated by further privatisation of the market.

An official definition of fuel poverty must be developed in order to allow measurement of the scale and depth of the problem in New Zealand. This will allow for targeting and monitoring of specific multisectorial policies required to address widespread fuel poverty. There has been some recent policy and academic discussion of this. This study highlights the importance of retaining minimum standards for healthy home temperatures as part of a definition of fuel poverty, as the results suggest that although consumers using prepayment metering report sub-optimal thermal comfort levels across the board, the indoor environments of households with children are even less satisfactory.

Policies to address fuel poverty should include at minimum: extension of energy efficiency retrofitting of housing and heating appliances with specific targeting towards fuel poor households; improvements in the private rental housing stock which should include the introduction of a mandatory housing ‘warrant of fitness’ as suggested by the Children’s Commissioner’s Expert Advisory Group on Child Poverty; and protections for consumers using prepayment metering to pay for electricity, who are at particular risk of the effects of fuel poverty.

In addition, significantly reducing fuel poverty in New Zealand is likely to require regulation of the domestic electricity market to better protect low income consumers. Measures that may be required include alternative tariff structures, for example progressive pricing, and implementing minimum requirements for smart-metering technologies. Furthermore, targeting households with children who use prepayment metering may be justified as this study shows that within this already deprived population, households with children are especially vulnerable.
Competing interests: Nil.

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Medical education—the next 40 years

Tim J Wilkinson

Abstract

As the Christchurch campus of the Otago Medical School celebrates its 40th anniversary, this paper ponders where medical education might head in the next 40 years. The patient must remain at the centre of health care and health care education but such education needs to be placed within nurturing environments that value support and innovation. Synthesising evidence, weighing up options, considering the personal factors that a patient brings and the uniqueness of a person’s particular illness will be increasingly important roles of a future doctor. This requires interpreting complex data, people skills, flexibility, redeployability and, at times even acting like the “Parish priest”. Ultimately however, if we select the right people, create the right expectations, and give them the right learning opportunities, then the curriculum will look after itself.

The Christchurch campus of the Otago Medical School celebrates its 40th anniversary in 2013. This prompts us to ponder where medical education might head in the next 40 years. However, as the Nobel Prize-winning physicist Neils Bohr reminds us, prediction is very difficult, especially about the future.

Any future predictions about medical education are therefore likely to be speculative, but we can divide the issue into those aspects that are likely to change and those that are likely to remain the same. Those things that are likely to change are the nature of health care delivery, the role of the doctor and the change in patient demographics. Those things that are less likely to change are the principles of effective education, the powerful impact of role models and the health care environment, and that the patient will remain at the centre of health care.

The stakes are high in medical education. In 1944, the UK Goodenough Report\textsuperscript{1} noted that “properly planned and carefully conducted medical education is the essential foundation of a comprehensive health service”. Over 50 years later, \textit{Training Tomorrows Doctors, a Report of the Commonwealth Fund}\textsuperscript{2} mentioned that “at a time of unprecedented advances in medical knowledge and rapid changes in the organisation and delivery of healthcare, the primacy of the education of a nation’s healthcare workforce remains constant”. It seems likely therefore that the place of medical education in effective health care delivery will remain important into the future.

Rather than speculate about what a future curriculum might look like, as there are many variables that might affect that, instead it is likely to be more helpful to consider what factors need to be taken into account in looking at any curriculum developments. Such factors could then be taken as criteria by which to judge if a curriculum evolution is moving in the desired direction.
Start with the patient

Good medical practice in New Zealand and the UK emphasises that good doctors make the care of patients their first concern; they are competent, keep their knowledge and skills up to date, establish and maintain good relationships with patients and colleagues, are honest and trustworthy and act with integrity.

The health and wellbeing of people has always been the goal of medicine and this is unlikely to change. However, the needs and attributes of patients may well change, some of which we have seen already.

The context of health care is changing. As a geriatrician colleague reminded us, “Observing old people in hospital is like teaching zoology in a zoo. Observing old people in their homes is like teaching zoology in the woods and fields”. Likewise, studying medicine in hospitals could be likened to studying zoology in a zoo; whereas studying medicine in the community is like studying zoology in the woods and fields.

Our health care education needs to continue to be focused more on the patient, and therefore “the woods and fields”. Nevertheless, extremes of illness are always likely to feature in hospitals, and seeing such extremes can assist in recognising milder versions. Hospitals are likely to remain important in health care education.

Sometimes as medical educators we are asked whether medicine should be learnt in urban settings, in rural settings, in the community or in the hospitals. Such questions are almost framed as though it were a competition to see which context offers the most. Instead, education should be like a balanced diet – there should be variety and a mixture of contexts in which to learn. That way the weaknesses of one context can be balanced by the strengths in another. Furthermore, it is easier to recognise the strengths of a context, when one notices its absence somewhere else. Such considerations are not just about where our students intend to practise in the future.

While exposure to rural settings, for example, is known to be an important factor in encouraging doctors to practise rurally in the future, it can equally be argued that exposure is even more important for those students who have no intention of practising in rural settings. Understanding the healthcare needs of rural communities and the support needs of rural doctors is important for any urban doctor. Likewise, understanding the support needs of general practitioners is important for hospital-based doctors.

Similarly, the needs of hospital based doctors for community-based doctors. Appreciating the roles of other health practitioners and the limitations in which they work is a vital precursor to effective teamwork. Thus the choice of contexts in which to learn medicine should be mindful of these, and other educational, factors rather than by unquestioning tradition (“we’ve always done it this way”) or by defending threats to power bases.

The nature of illness is also likely to change over time – chronic illness is increasing in prevalence and importance – this trend is likely to continue. Whether we will see a resurgence of the “old” acute illnesses, particularly infectious diseases remains to be seen. The health effects of climate change may alter the prevalence and geographical distribution of some diseases. So-called lifestyle diseases, such as problems with obesity or addictions, are also likely to increase in prevalence.
Patient demographics are changing and are likely to continue to do so – the well-documented projections in the age makeup of our population will mean a steady increase in the proportions of older people in our communities. The proportion of people are identify as Maori is likely to continue to increase.

Among all populations, it is likely that all patients will continue to be better informed – the access to the same information as one’s doctor through the internet means that increasingly people will come along not so much seeking “the answer” but wanting help to decide between “the answers”. Furthermore, making a distinction between patient needs and patient wants will continue to challenge doctors to decide which areas to legitimise as “worthy” of the health dollar.

Synthesising evidence, weighing up options, considering the personal factors that a patient brings and the uniqueness of a person’s particular illness will be increasingly important roles of a the future doctor.

Future role of the doctor

There has been much speculation about how the role of the doctor may change in the future. The complex marriage of the art and science of medicine is likely to be enduring. Doctors need to be scientists and humanists.

Medicine is predicated on a sound scientific base with a sound understanding of people. As such, the role of a doctor could be seen as a translator where the “language” of the patient is translated into science so that it can be understood and helped. Likewise, the language of science needs to be translated back into the language of the patient, so that the complexities can be understood. Doctors need to be fluent in both.

In a graduation address, a recent Dean of Otago Medical School reminded us that medicine is about making difficult decisions with incomplete information. While it is hard to argue that any area of health practice is uniquely “owned” by medicine, and it is equally hard to argue that any area of health practice is not important for a doctor to know about, it could be argued that dealing with complex uncertainty is one of the areas that distinguishes doctors from other health practitioners. This requires skills in evaluation, synthesis and scholarship.

Doctors will be expected to have excellent skills in leadership. Good leaders aren’t necessarily those “in charge” but are able to be flexible in their role so that they can take charge when necessary and follow others when necessary.

Workforce planners also have their views on the role of the doctor. Doctors are expensive to train and expensive to run. Health care delivery is evolving. This suggests that future doctors need to be flexible and redeployable. It is increasingly unusual for people to remain in the same career over their entire working life, yet our medical education systems have high “up front” costs (not just in time and money but also in personal commitment). Is it still appropriate to consider “once a cardiologist, always a cardiologist”? If our workforce needs to be flexible, then our training needs to produce flexible workers. This underpins the call for more generalists in healthcare.
We also need to ask what areas will not remain unique to a doctor. While doctors will need to remain prescribers, proceduralists or technicians, we are likely to see some of these roles increasingly taken over by others.

Interpreting complex data, people skills, flexibility, redeployability and, at times even the “Parish priest” encompass, and will continue to encompass, what our doctors need to be.

Get the learning environment right

Alan Clark, a previous Dean in Christchurch, suggested that we should “get the learning environment right and the facts will look after themselves”. This is very good advice. People learn much more from what they see around them than from what they are told to do. Similarly, people learn much more from rich experiences than from sitting in darkened rooms with slides. This is not to undervalue what good theoretical underpinning adds to these rich experiences.

Learning can only occur in a person’s head. A teacher cannot make a student learn. As such, learning requires time and thought. Cramming someone’s head with facts competes with, and hinders, this time for thought. These observations have lead to the rise of so-called self-directed learning and independent learning.

The trap with self-directed learning is that sometimes it can be mistaken for directionless learning or teacherless learning. Ultimately, the direction will come from the health problems that need to be addressed, so maybe self-managed learning might be better term.

The role of the teacher is to help the student see the desired destination of what needs to be learnt, create the right conditions, ask the right questions, and then let the student go so that he or she can find their own path to that destination. Teachers can contribute to deciding what is important, can make use of their experience, can help a student navigate the path to the destination but cannot do the learning.

Learning takes time and space—commodities that are always under pressure in any curriculum—with medicine no exception. One of the suggested goals for medical education is for us to standardize the learning outcomes but individualise the learning process. In other words, set the right environment, ask the right questions and allow time, space and resources for the students to do the learning.

The major challenge of medical education is to integrate formal knowledge with clinical experience and to develop habits of inquiry and innovation. The gold standard of good medical education is where students learn the underlying theory and science of a problem at the same time as they encounter that problem in real life.

Learning the theory before the experience risks not seeing the relevance or applicability of what needs to be learnt. On the other hand, learning the theory after seeing the problem risks not making the most of that learning experience. It is therefore very difficult to get that timing right – but we should not stop trying.

American educator, Abraham Flexner, at the beginning of the 20th century, recognised this problem when he noted that medical education was either predominantly based in practice with little underpinning science, or primarily based in universities, without
seeing patients. His suggested solution was to link both the science (university) and practice (clinical environments) together.

Early attempts at this linkage resulted in the first few years of a medical course being based in universities and lecture theatres and the later years being based in clinical environments. Whilst this was an improvement on what had occurred previously, it still created a gap between the theory and practice of medicine.

Increasingly, we are trying to close that gap so that theory and practice occur as close as possible to each other. This means that all years of medical course need to reinforce the underpinning sciences (not just the earlier years) and provide clinical experience (not just the later years).

Somewhat in jest, I have sometimes suggested we should have an upside-down curriculum—this would start with the trainee intern year whereby the novice student would spend time immersed in a variety of health care settings, observing what happens and what needs to be learnt. The middle years would be spent acquiring such attributes and the last year would finish with anatomy and other foundation sciences—by which time, the student would have a yearning to know more and clearly see the relevance of why he or she had to learn where not to put needles or what drugs not to prescribe.

While this curriculum model has clear logistic problems, and may create as many problems as it solves, putting an immersion year early in the course might help with selection processes into medicine—a student who completed a year of immersion in medicine and a variety of health contexts and who still wants to be a doctor, is likely to have the motivation needed to take them through their training and beyond.

The other model of education that I find useful is the “rocket launch” model. An analogy has been drawn between the teaching and learning of medicine and the launching of a rocket. The old model suggested that you need to provide the rocket with enough fuel to last its whole journey. It will take off with enormous force and gradually return to earth just as the fuel runs out.

The analogy in relation to medical education suggests that we need to equip our students with all the knowledge and skills they need for their professional practice. They would then be launched into their professional careers and hopefully the parabolic curve they follow would mean they would run out of this knowledge just after they reached retirement age. Instead, the new model makes use of refuelling stations.

A successful launch needs to provide the rocket with enough fuel to get to the next refuelling stage, and with the equipment to engage with refuelling stations so that it can remain in orbit and functional for as long as is needed. Likewise, the analogy for the new model of medical education suggests a medical programme needs to equip students with enough core knowledge but more importantly with the skills by which they can constantly engage with new learning throughout their professional life.

Finally we need to consider, not just what should be learnt, but how it should be learnt. If we accept the role of the future doctor is as translator, leader, synthesiser but not fact memoriser, then we need to consider models of learning that support this. Some have referred to this as transformative learning.
In such learning, students develop leadership attributes; moving from fact memorisation to searching and synthesis for decision making; from seeking professional credentials to achieving core competencies in teamwork; from non-critical adoption of educational models to creative adaptation of global resources. I look forward to seeing ways developed that encourage this.

**Select the right people**

Just it is important to get the learning environment right, it could also be claimed “select the right people, give them the right learning opportunities and the curriculum will look after itself”. To this could also be added, and try not to demotivate the students, or make them too cynical, while they are going through it.

Selecting the right people to admit to medical school is probably the most important decision a medical school can make. In 2002 the BMJ devoted a whole issue to considering what makes a good doctor. Letters to the editor were invited and one person’s summary of the responses suggested that “all we can hope to do is select students with the right gifts (not the right exam results) and somehow stop them from going rotten through overload, cynicism and neglect during their training and early career”. Of course, trying to predict people’s behaviours from day to day is hard enough, but devising systems to select young students in order to determine how they may practise as doctors for the rest of their lives is a near impossible task. To my mind, the most important attribute to select for, but arguably the most difficult to measure, is motivation.

We don't want to select those people who just *want* to be doctors, we certainly don’t want to select those people who *might* want to be doctors, what we want to select are those people who *enthusiastically* want to be doctors, who have given the matter considerable thought, who have considered all the options, who have looked at what medicine demands, and despite all that, still really want to be doctors. This goal is easier said than achieved.

When I looked at what differed between graduates who entered medical school, compared with school leavers, motivation was one of the biggest differences – graduates were more sure of their career decision and were more motivated to do medicine. What was interesting about this finding, however, was that this was not due to the graduates having a degree, but that the graduates were older – they had had more time to consider their options, looked around and still decided medicine was right for them. As such, a gap year (or gap years) may be more important than a prior degree.

I don’t have the answers about how we measure attributes relevant to selection, particularly motivation, but I’m not sure that a two-hour test and/or 30-minute interview is likely to be sufficient. Despite looking at other measures, whichever way we look at it, prior academic achievement remains the most consistent predictor of success in medical school and beyond.

If we assume that future behaviour is best predicted by past behaviour, then some documentation of past behaviour and past achievements could be a good place to start. This may be why prior academic achievement works so well as a selection criterion.
Nevertheless, New Zealand medical schools are unique in selecting most medical students after a year at university.

Other medical schools either select directly from school or after a degree. This first year of university could offer untapped opportunities to try to measure some of these attributes that we think are important in informing selection decisions.

Whatever else we need to select on, we need to base them on the important roles of a doctor – synthesiser, scientist, humanist and leader, not on an ability to recall facts by rote.

**Work within good systems**

The learning environment cannot be discussed without considering the powerful effect of the health care environment. Moving into clinical practice and into an environment of experienced practitioners can be stressful.

> There is an encounter with the hospital that new studies describe as brutalising in impact. 
> Samuel Bloom

Graduating medical students cross over from a highly idealistic phase and enter another culture often constrained by the philosophy of those educated and trained in a different era. Medical schools can help students learn all manner of appropriate behaviours and attitudes in medical practice, but if they do not see these role modelled, then they will quickly be undermined. The recognition of, and focus on, professional identity is an increasing challenge in medical education.

To my mind, there are four solutions: creating synergistic relationships between the medical schools and the health care systems; equipping our graduates with the skills to learn in workplaces and to work well with others; helping all practitioners recognise and challenge behaviours in colleagues that are unacceptable; and finally, creating a culture of reflection and quality improvement.

When I undertook a review of professionalism, I looked at many of the definitions of professionalism that had been given and tried to distil what was common to them all. In the end, one of the elements that appealed to myself and my colleagues the most we phrased as a “commitment to improvement in oneself, others and systems”. Professionals continually want to improve themselves, they want to improve others (which incorporates teaching) and they want to improve the systems in which they work.

Creating effective relationships between a medical school and a health care system is the basis of what has been called a symbiotic curriculum. This is where education improves clinical service and clinical service improves education. As for any relationship, this requires nurturing, which in turn requires close communication and collaboration between both parties.

Such symbiotic improvements are likely to be mediated through role models and a culture of questioning. Such improvements don’t occur in a vacuum but are stimulated by colleagues and patients who ask difficult questions and refuse to be put off by easy answers.
End with the patient

Just as we began with the patient, so should we end with the patients. Medical schools need to show social accountability. This includes contributing to the diversity of the workforce, and to improving access to health care.

Keeping the patient at the centre, attending to common courtesies, and a willingness to improve are enduring attributes of good health care and good medical education. This is illustrated by noting that problems with health services that lead to complaints have often been classified into problems with communication, a lack of courtesy, kindness or empathy, a lack of self reflection or openness to criticism, problems with teamwork, lack of commitment to quality improvement, and finally, sometimes to problems with competence.

As healthcare becomes increasingly able to do more and more, and as quality of life will increasingly compete with length of life in a person’s values, our decisions with patients will move not just from knowing what to do but to knowing when not to do it, and having the skills by which such decisions are discussed and agreed with patients.

Never think you’re finished

Just as professionalism includes a commitment to improve in self, others and systems, so too must medical education have a commitment to improvement. There will be no perfect system of medical education—there are too many tensions to resolve for this to emerge. What is more important is that thought is given to these tensions, there is commitment to looking for innovative ways to resolve some of the tensions and there is commitment to question the status quo. This means medical education needs to be embedded with evaluation, research and quality feedback loops. Medical education needs to embrace and nurture a culture of innovation, courage to fail, openness to change, reflection and yearning to improve.

Above all, we all have an individual responsibility to be a good role model—we are not just the products of medical education but, regardless of our positions, the shapers of its future.

What might this all look like?

It is tempting to put this all together to show what the “perfect curriculum” might be. However, this probably doesn’t exist and those that think they have one are likely to be wrong. Instead, each curriculum is likely to be unique, as everyone needs to do the best with what they have got.

What is more important is that people care about the curriculum they have; they worry that it isn’t good enough; and they are committed to its improvement. That way the curriculum will be dynamic, innovative, responsive and populated by enthusiasts. Probably no more can be asked for more than that.
Competing interests: Nil.

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Bullosis diabeticorum: case report and review

Angela J Zhang, Michele Garret, Steven Miller

Abstract

Assessment of the foot is an essential component of clinical examination of the patient with diabetes. As the prevalence of diabetes in New Zealand is increasing rapidly, a growing number of clinical encounters will involve individuals with diabetes. We present a case of bullosis diabeticorum, review the important clinical features and propose a management strategy for this rare dermatological complication of longstanding diabetes.

Case report

A 56-year-old male presented with painless blistering of the plantar aspect of his left foot which had appeared rapidly the previous day. There were no systemic symptoms, nor new medications. He had longstanding type 2 diabetes (T2DM) (HbA1c 56 mmol/mol), diabetic retinopathy, peripheral neuropathy and nephropathy. He was treated for right Charcot neuroarthropathy managed by prefabricated walker (Moon Boot), and wore orthotic insoles and shoe on the left.

Examination revealed tense blisters over the plantar aspect of all toes on the left containing haemoserous fluid (Figure 1). There was no surrounding erythema nor signs of inflammation. The remaining skin and mucous membranes were intact.

The blisters were aspirated and washed daily with antiseptic (Betadine) washes to prevent secondary infection. Over 3 weeks there was spontaneous de-roofing and drainage followed by uneventful healing.

Figure 1
Four weeks later he re-presented with identical blistering on the right foot. Again the blisters developed rapidly (on this occasion overnight) with no clear precipitant. Examination findings were identical to the previous episode (Figures 2A and 2B). Investigations revealed normal inflammatory markers, normal white cell count and negative autoantibody screen.

Figure 2A

Figure 2B

The diagnosis of bullosis diabeticorum (BD) was made. The blister on dorsum of the hallux was left intact and spontaneously resolved. The blister on the 2nd toe de-roofed spontaneously. The remainder were drained then dressed to prevent secondary infection.

A Darco post-op open toe shoe was used to relieve pressure and accommodate dressings. Antibiotics were not given at any stage and (on both occasions) the blisters healed without scarring over a 6-week period, after which he resumed wearing the Moon Boot and othoses.

Review

BD was first used in 1967 to describe a rare dermatological complication of diabetes mellitus, but similar lesions had been reported previously. Blisters or bullae arise acutely (less than an hour to overnight) on the acral regions unprovoked by trauma. There is no established association with glycaemic control, other diabetes complication, drugs, infection or inflammatory conditions. Although feet are most often affected, blisters can occur on the trunk, arms or hands.
Lesions are mostly unilateral, but bilateral blistering can occur. Mechanical causes and other blistering dermatoses should be excluded before the diagnosis of BD can be made. Although usually confined to longstanding type 1 diabetes, BD can occur in T2DM and has been reported in prediabetes.

The lesions vary in size (0.5 cm² to 10 cm²), are usually filled with sterile serosanguinous fluid and resemble burn-blisters without surrounding erythema. They have no pathognomonic histological features.

The clinical course is mostly benign with complete healing within 5–10 weeks unless secondary infection occurs. Infection can lead to chronic ulceration. Lesions can become recurrent.

Affected individuals are usually male (2:1 or 3:1), median age 65 years, with prevalent complications as expected with observed long diabetes duration (median 14 years).

BD is rare, with estimated annual incidence of 0.16% in a tertiary diabetes care facility.

There is no consensus on treatment, and no randomised trial evidence exists to guide practice. In most cases debridement when required, exudate management and appropriate pressure-relieving footwear allows spontaneous healing.

We advocate aspiration of tense blisters that continue to increase in size, and use of non adherent absorbent dressings with regular (1–5 days) inspection and dressing changes. Use of adhesive dressings risks unplanned de-roofing of blisters.

Due to significant risk of harm we advise against performing skin biopsy (in the absence of clear evidence to the contrary) in the setting of spontaneous blistering typical for BD.

**Conclusion**

BD is a rare complication of diabetes that should be recognised and managed appropriately by health professionals who care for individuals with diabetes. The precise aetiopathological mechanisms remain obscure. We have described a case of recurrent BD with successful outcome following conservative management.

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A murmur and a bleed: the Heyde syndrome

Smita I Negi, Risheng Xu, Aashish Anand

Clinical presentation—A 75-year-old lady with long-standing severe aortic stenosis (AS) (Figure 1), coronary heart disease status post bypass grafting, history of stroke, and transient ischaemic attacks, presented with acute severe gastrointestinal bleed.

Figure 1. Calcific severe aortic stenosis on transthoracic echocardiogram

She underwent a colonoscopy and an oesophago-duodenoscopy and both showed no active source of bleeding. A capsule endoscopic examination of the jejunum revealed multiple angiodysplasias (Figure 2).

Figure 2. Images of angiodysplasia of the jejunum obtained on capsule endoscopy
These angiodysplasias were cauterized with good results. Upon calculation of her risk for open valvular replacement, she was deemed a candidate for percutaneous transcathe...
multimers involved in haemostasis and bleeding in previously latent intestinal angiodysplasias.

Valve replacement has been shown to improve the haematological abnormality and a reduction in bleeding.

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Endoscopic appendicectomy: can it be done?

Acute appendicitis is a condition that will affect between 7% and 12% of humans at some point throughout the course of their lives.¹ It remains the most common intra-abdominal emergency requiring surgical intervention. Treatment of acute appendicitis is well described in the literature with current evidence favouring laparoscopic over open techniques in the majority of patients.² As the field of laparoscopic surgery improves, there is also increasing interest in natural orifice surgery (NOS). As the appendix lumen is in direct connection with the caecum, it may just be feasible to remove the appendix by colonoscopy.

Brief literature review on Pubmed using the keywords “appendectomy” and “colonoscopy” yielded only 85 results. Only eight of these articles touched on the topic of removing the vermiform appendix with colonoscopy. One study performed by Silberhumer et al went as far as to design and instrument new devices for performing appendicectomy at colonoscopy.¹ They undertook a prospective prototype development program study in 25 colons from adult human cadavers. Various prototypes were evaluated by inserting them into the lumen of the appendix with the aim of inverting the appendix into the caecal lumen.

A prototype that combined suction holes and grabbing of the appendicle tip proved to be the most effective. The procedure was separated into five parts: placement of the colonoscope and overtube, appendicle imaging, inversion of the appendix, ligation, and removal of the appendix. It was noted that in 22 out of 25 tests partial inversion of the appendix was successful. The volume and tension of the mesoappendix secondary to fat deposit proved the main reason for incomplete inversion. However this was overcome in the majority of cases by an endoluminal longitudinal incision at the mesenteric side of the partially inverted appendix.

Whilst the above study is exciting and potentially opens the door to a new intervention in the management of acute appendicitis, it is vital to identify the limitations and challenges of such a procedure. Certainly the technology required such as a suture ligation mechanism and tubular structure to insert into the appendicle lumen for inversion must be further developed.

As this procedure is currently described it could not be used in the management of acute appendicitis. Oedematous tissue would likely obstruct the lumen of the appendix thus creating a barrier to the insertion of the vacuum tube. Also the risk of perforation of the appendix may be higher secondary to the fragility of the wall in acute inflammation. In the case of perforated acute appendicitis a laparoscopic or open technique would still be required.

Advantages of colonoscopy assisted appendicectomy are certainly great. Avoiding abdominal wall incisions will presumably result in less post-operative pain secondary to the avoidance of injury to the abdominal wall layers and parietal peritoneum. Once the appendix is inverted this procedure may be likened to that of polypectomy and thus nil general anaesthetic would be required.³
As a result procedures may be able to be performed in the outpatient setting, thus freeing up more time in the operating theatre for other cases. There are a number of cases in the literature that describe successful colonoscopy assisted removal of intussuscepted appendices.\(^1\) Therefore if inversion of the appendix is made possible then there is literature to support completion colonoscopic appendicectomy.

Uncertainty still remains as to the usefulness of this procedure in the clinical setting. It has been outlined above that this procedure is not appropriate in the setting of acute appendicitis. Said et al present a case of missed appendicitis whereby colonoscopy was performed as a diagnostic investigation following normal abdominal ultrasound scan and gastroscopy.\(^4\) Colonoscopy was performed and an inflamed appendicle orifice was seen and intubated using an endoscopic retrograde cholangio-pancreatography (ERCP) catheter and pus was aspirated.

Following this the patient’s symptoms improved and they underwent an elective appendicectomy five months later. Avoidance of surgery in the setting of acute appendicitis in certain patients via the use of antibiotics is another option that is controversial, though supported by some of the literature.\(^5\) If acute appendicitis was able to be managed with the above non-surgical techniques then certainly there would be a place for colonoscopy assisted appendicectomy in the outpatient setting.

It is still early days in the development of the technique of colonoscopy assisted appendicectomy. There is much more research to be done and technology to be developed. However in answer to the question “can it be done?” Well the answer is most certainly yes and the potential benefits that this procedure may offer in the future are certainly worth pursuing.

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Families burdened by the cost of tongue-tie division

This letter is in response to recent public interest in the area of tongue-tie and the operative solution, frenotomy. Currently there is no clinically accepted definition, examination method or classification structure to enable comparative studies regarding treatment.\(^1\) This is particularly concerning when one considers that the treatment for tongue-tie, frenotomy, has been shown to be effective, quick and painless with virtually nil complications.\(^1\)\(^–\)\(^3\)

Furthermore, with the re-emerging importance of breastfeeding, research has shown a link between tongue-tie and breastfeeding difficulties.\(^2\)\(^–\)\(^4\) Unfortunately, there is a lack of uniformity among the multidisciplinary teams that manage this condition. Another issue that has arisen is the cost associated with the simple operative solution, frenotomy.

In reviewing the literature there were 217 articles including 24 reviews that included the key words tongue-tie or ankyloglossia in PubMed. Cochrane had three randomised control trials (RCT).

Some of the key findings in the literature outlined that ankyloglossia is a typical interdisciplinary problem with a wide range of healthcare professionals seeing patients with tongue-tie on a regular basis. There is speculation that ankyloglossia plays a significant role in early breast-feeding difficulties. To support this statement in a physiological sense an ultrasound study has been done looking at infants with ankyloglossia who were having persistent feeding difficulties that found that these infants demonstrated two different tongue movements during breastfeeding. The infants compressed either the tip or the base of the nipple making them less effective breast feeders than their non tongue-tied counterparts .\(^4\)

Though it has been stated that no one particular surgical method can be favoured over others, frenotomy under local anaesthesia is safe and cost-effective. Frenotomy should be performed by a medical professional that is adequately qualified and competent in the procedure. The process of frenotomy that we recommend is that topical anaesthesia is applied (local may also be used at the discretion of the surgeon), the lingual frenulum isolated and a quick snip made (Figure 1).

Potential complications include damage to the orifices of the surrounding submandibular glands as well as the tongue itself. Bleeding, infection and pain are also complications associated with all operations that cannot be ignored in the case of frenotomy.
Figure 1. Topical anaesthesia is applied, the lingual frenulum is isolated and a quick snip made. A minimal amount of bleeding is noted that self resolved in this case.

One study suggests that frenotomy without anaesthesia is safe in almost all infants and some older children. Furthermore, several studies imply that the vast majority of patients experience benefit from the division of their tongue-tie.

There is evidence to support frenotomy. One study showed tongue-tie division was far superior to the intensive, skilled, professional support of the lactation consultant. Another suggests that tongue-tie identification be integrated into routine neonatal checks, with immediate referral for outpatient frenotomy. It is also reported that measurements of the length of frenulum and intercisal distance with a boley gauge allows an assessment of the severity of ankyloglossia.

We have adapted this with our own tool to make it an achievable task in the newborn child (Figure 2), as this is the most important time for tongue-tie identification and release. Note however that this tool has not yet been formally evaluated in clinical research trials.
Figure 2. Tongue-tie tool with built in measuring device to quantify severity of tongue tie. A surgical blade will be incorporated into tool that can be released in order to snip lingual frenulum if tongue-tie is of pathological significance. This tool has not yet been evaluated and the authors welcome its use in future clinical trials.

With an incidence in the newborn well-baby population of 4.8% this condition demands a stronger research focus. There are common themes emerging that support the identification and release of tongue-tie in infants and small children. Failure to perform an urgent frenotomy is associated with breastfeeding, speech and swallowing difficulties to varying degrees. As such we feel that frenotomy should be offered to parents of infants with tongue-tie on the public healthcare system.

Frenotomy is a simple procedure to perform and is associated with minimal cost to the healthcare professional offering treatment. Parents with newborn infants are burdened by enough cost and should not have to pay an exuberant fee for a simple, safe and effective treatment of a potentially burdensome medical condition.

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References:


The State Once Again to the Rescue


We call the attention of our readers to the report submitted to the Friendly Societies Parliamentary Committee and published elsewhere in this journal. We understand that it is impossible for the proposed scheme of subvention to friendly societies to become law this session of Parliament so that, fortunately, there will be an opportunity for medical men to take time to study the situation.

Dr. Gibbs and Dr. Kemp appeared before the Committee and gave evidence, and an informal meeting of the Council held on November 17 considered the question, and decided to submit it for the consideration of divisions of the association. Perusal of the proposed scheme will reveal the fact that the State aid is to be given only to the friendly societies, and may, or may not, percolate in part to the doctors who will attend the beneficiaries.

The scheme, if adopted, is calculated, also, to popularise the friendly societies and bring a great accession to their ranks, and in this connection, let it be remembered, there is no wage limit as a bar to membership. We believe that the profession should insist upon receiving direct from the Government any money which Parliament may vote for the medical attendance of any class of people. The friendly societies must not be allowed to become increasingly the taskmasters of the medical profession.

It may be thought that if we consent to the proposed scheme of subvention to friendly societies, we shall be warding off a bigger scheme akin to that of Lloyd-George, but subvention may only be an instalment the position is something of this sort:—A man believes he must be robbed, and prefers to be robbed of £10 rather than £50, or he is not quite certain that he will be robbed, and will be in no wise accessory to robbery.

There are several courses open to the profession which we shall briefly outline. We may—

1. Deny the necessity for any subvention or social insurance scheme in New Zealand, and point to the National Provident Fund, Old Age Pensions, outdoor sick relief, friendly societies' sick benefits, public hospitals, the charity of the medical profession, etc., etc., as being all-sufficient. This country pays now nearly half a million pounds sterling per annum in pensions, and there are only about a quarter of a million heads of households from the North Cape to the Bluff to uphold the stability of the country's finance.

2. Agree to the subvention scheme as at present proposed, or ask for a direct subvention to the medical practitioners, in approved cases, or through the National Provident Fund office, or the hospital boards, and not per medium of the friendly societies.

3. Advocate a State medical service, or a scheme of national health insurance.
4. Wait until the Lloyd-George scheme has taken its final form, perhaps on a voluntary basis, as in Germany, before anything definite is attempted in New Zealand.

5. Advocate the consolidation of the funds of friendly societies so that all the lodges may be financially able to give adequate sick relief to their members. Some of the lodges have large accumulated funds, and others are far from being sound from the actuarial point of view.

It is not, perhaps, out of place to point out that the absence of self-reliance, and ever-increasing aid from the State destroyed the Roman Empire; the barbarians only gave the tottering structure a final kick. Absit omen.
Treatment of hypertension

The authors of this paper from Melbourne note that a significant proportion of individual taking antihypertensive therapies fail to achieve blood pressures <140/90mmHg. To elucidate they have examined the association of blood pressure control with antihypertensive therapies and clinical and lifestyle factors in a cohort of adults at increased cardiovascular risk.

The researchers record that of 3623 participants (1975 men and 1648 women) receiving antihypertensive therapy, 1867 (52%) had blood pressures ≥140/90 mmHg. 79% of this cohort were receiving only one or two antihypertensive drug classes. There was also an association with increased age, male sex and waist circumference for this group.

The researchers conclude that prescribing additional antihypertensive drug classes and lifestyle modification may improve blood pressure control in this population of individuals at increased cardiovascular risk.


Thromboprophylaxis following hip and knee arthroplasty

Venous thromboembolism (VTE), comprising pulmonary embolism (PE) and deep-vein thrombosis (DVT) are a risk after all major surgical procedures and this is particularly so for major limb orthopaedic operations.

In this paper the authors report on a retrospective review of 300 consecutive hip and knee arthroplasty patients (150 each) over a 2-year period at Tasmania’s major public hospital.

Documentation of the thromboprophylaxis used and the prevalence of symptomatic venous thromboembolism (VTE) and major bleeding occurring within 90 days postoperatively were noted. The 90-day incidence of symptomatic VTE was 2.7% for knees and 1.3% for hips. The in-hospital and post-discharge VTE incidence was 0.7% and 2.0% respectively.

The researchers note that only 36.5% continued to receive pharmacological thromboprophylaxis following discharge, predominantly an antiplatelet agent (55.5%).

The implication is that it would be preferable to continue thromboprophylaxis in all patients after discharge from hospital. Two hip arthroplasty patients developed bleeding warranting cessation of thromboprophylaxis during their admission.

Effectiveness of non-benzodiazepine hypnotics

This meta-analysis reviews the effectiveness of the non-benzodiazepine Z drugs (eszopiclone, zaleplon, zolpidem) currently approved by the US Food and Drug Administration (FDA) for the treatment of insomnia.

Thirteen studies involving over 4000 participants in which the Z drugs were compared to a placebo were included. Studies including healthy patients with normal sleep or single night studies with induced insomnia were excluded.

The conclusion of the review was that the Z drugs produced slight improvements in subjective and polysomnographic sleep latency, regardless of type of drug. The reviewers found insufficient information in the studies to enable them to comment on adverse events.

They also point out that a “weakness of our analysis was that all of the trials were industry sponsored, which has been shown to overestimate the drug effect.”

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Inappropriate Prescribing (Med11/201P)

Charge

The Professional Conduct Committee (PCC) charged that Dr Denis Wong (the Doctor) was guilty of professional misconduct. The particulars of the charge were that:

1. Between 11 January 2000 and July 2002 Dr Wong prescribed Triazolam (Halcion) on a regular and overlapping basis to his Patient, knowing that she had a history of drug dependency issues and knowing that she was subject to a Restriction Notice issued under section 25 of the Misuse of Drugs Act 1975 and section 49(2) of the Medicines Act 1981 prohibiting every medical practitioner from prescribing controlled drugs and benzodiazepines to or for this Patient, except for prescriptions or supplies given by medical officers employed at a gazetted Alcohol and Drug Treatment Centre; and

2. Between November 2004 and June 2010 Dr Wong inappropriately and/or excessively prescribed Triazolam (Halcion and/or Hypam) to the Patient on a regular and occasionally overlapping basis and in high doses, and knowing about her drug dependency issues; and

3. In the period June 2005 to November 2005 inclusive and December 2007 to June 2010 inclusive, Dr Wong inappropriately and/or excessively prescribed Duromine 30 mg on a regular and occasionally overlapping basis to his Patient, knowing of her drug dependency issues and without satisfactorily addressing her reported body image/weight problems.

Finding

The Doctor admitted the charge and acknowledged and accepted that his prescribing of Duromine and Triazolam as detailed in the charge was inappropriate and excessive and was done on a regular or occasionally overlapping basis.

The Tribunal was satisfied the Doctor was aware of the terms of the Restriction Notice yet he continued prescribing the Halcion on a prolonged basis and that Duromine was being inappropriately and excessively prescribed to the Patient. The Tribunal expressed its strong disapproval of the Doctor’s conduct.

The Tribunal was satisfied that in these circumstances each of the particulars separately amounted to malpractice and bringing disrepute to the profession.

Background

The Doctor practised as a General Practitioner. The Doctor first saw the Patient in 1995 and at all the material times the Patient was a sickness beneficiary and at times she used more than one alias.
At the Patient’s initial consultation she told the Doctor that she was taking Duromine (an appetite suppressant and a drug sought after for abuse as well as being a controlled drug) and Diazepam (a benzodiazepine) and had been on “meds for 13 years”. At this consultation the Doctor issued a repeat prescription of the drugs and continued to prescribe these for her on subsequent visits.

A Restriction Notice was issued by Medicines Control with regard to the Patient on 12 April 1996 prohibiting every practitioner from supplying the Patient with controlled drugs and benzodiazepines, except for prescriptions given by Medical Officers employed at a gazetted Alcohol and Drug Treatment Centre.

On or about 14 May 1996 the Doctor was contacted by Medicines Control about a prescription he had issued to the Patient for Duromine. The Doctor advised he had written the prescriptions before he had seen the Restriction Notice and he did not know the Patient by the alias she was using, was a restricted person. The Doctor advised Medicines Control that he would not prescribe any further controlled drugs or benzodiazepines for the Patient.

On 30 September 1996 the Doctor recorded “BZD dependency” in his clinical notes for the Patient. And on 20 December the Doctor recorded that the patient was “on diazepam liquid”.

When the Patient saw the Doctor on 11 January 2000 he prescribed her Halcion (a Benzodiazepine). The Doctor continued to prescribe Halcion for the Patient in 2000 on 14 separate occasions.

On 23 January 2001 the Doctor saw the Patient and noted that she still needed Halcion and issued her further prescriptions on 17 occasions through to July 2002.

The Patient offered several reasons for needing the (overlapping) prescriptions advising the Doctor that; she was travelling to Auckland to visit with her sister in law who was dying of cancer; she was travelling overseas; or that her hand bag had been lost or stolen.

The Doctor acknowledged that all of the Halcion prescriptions issued to the Patient were in the knowledge that she had drug dependency issues and knowing that she was subject to the April 1996 Restriction Notice and he was not authorised to prescribe Halcion to his Patient during this time.

At the Patient’s request the Doctor took steps to get her name removed from the restricted persons list from Medicines Control and have the Restriction Notice revoked. Medicines Control agreed that the Doctor should be a nominated prescriber for the Patient on a new Restriction Notice which would supersede the April 1996 notice.

From 13 December 2004 until 13 December 2005 the Doctor prescribed Halcion for his patient on 21 separate occasions. The Doctor prescribed Duromine to the Patient between July and November 2005 on 8 occasions.

Around August 2005 a pharmacist contacted the Doctor and advised him that staff had witnessed the Patient selling medication she had just collected from the pharmacy. The Doctor told the pharmacist that it was their word against that of the Patient and he would continue to prescribe to her.
Medicines Control wrote to the Doctor on 9 November 2005 advising him that the Patient was currently receiving regular and overlapping prescriptions for Duromine and Halcion. Medicines Control noted that the increased dose of Duromine seemed to be at odds with the high dose of Halcion and, because of the overlapping prescriptions the Patient had received approximately 100 tablets of each medication more than she should have in this time.

Between 13 December 2005 and 12 December 2007 the Doctor issued, on 40 occasions, sometimes overlapping, prescriptions for Halcion for the Patient. There continued to be 49 further, occasionally overlapping, prescriptions of Halcion between 03 January 2008 and 08 June 2010.

The Doctor prescribed Duromine to the Patient on 20 occasions from 07 December 2007 until June 2010.

**Penalty**

The Doctor was censured and ordered to pay a fine of $7,000, costs of $26,300 to the PCC and costs of $6,600 to the Tribunal. The Tribunal noted that the Doctor was intending to retire and imposed conditions of practice to apply if the Doctor subsequently decided to resume practice.

The Tribunal directed that a notice stating the effect of its decision be published in the New Zealand Medical Journal and the decision and a summary be published on the Tribunal’s own website.

The full decisions relating to the case can be found on the Tribunal web site at [www.hpdt.org.nz](http://www.hpdt.org.nz)

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