ISSN 1179-3597 ISSUE 24 | JUNE 2017

NZMSJ

New Zealand Medical Student Journal
Te Hautaka o ngaa Akongaa Rongoaa

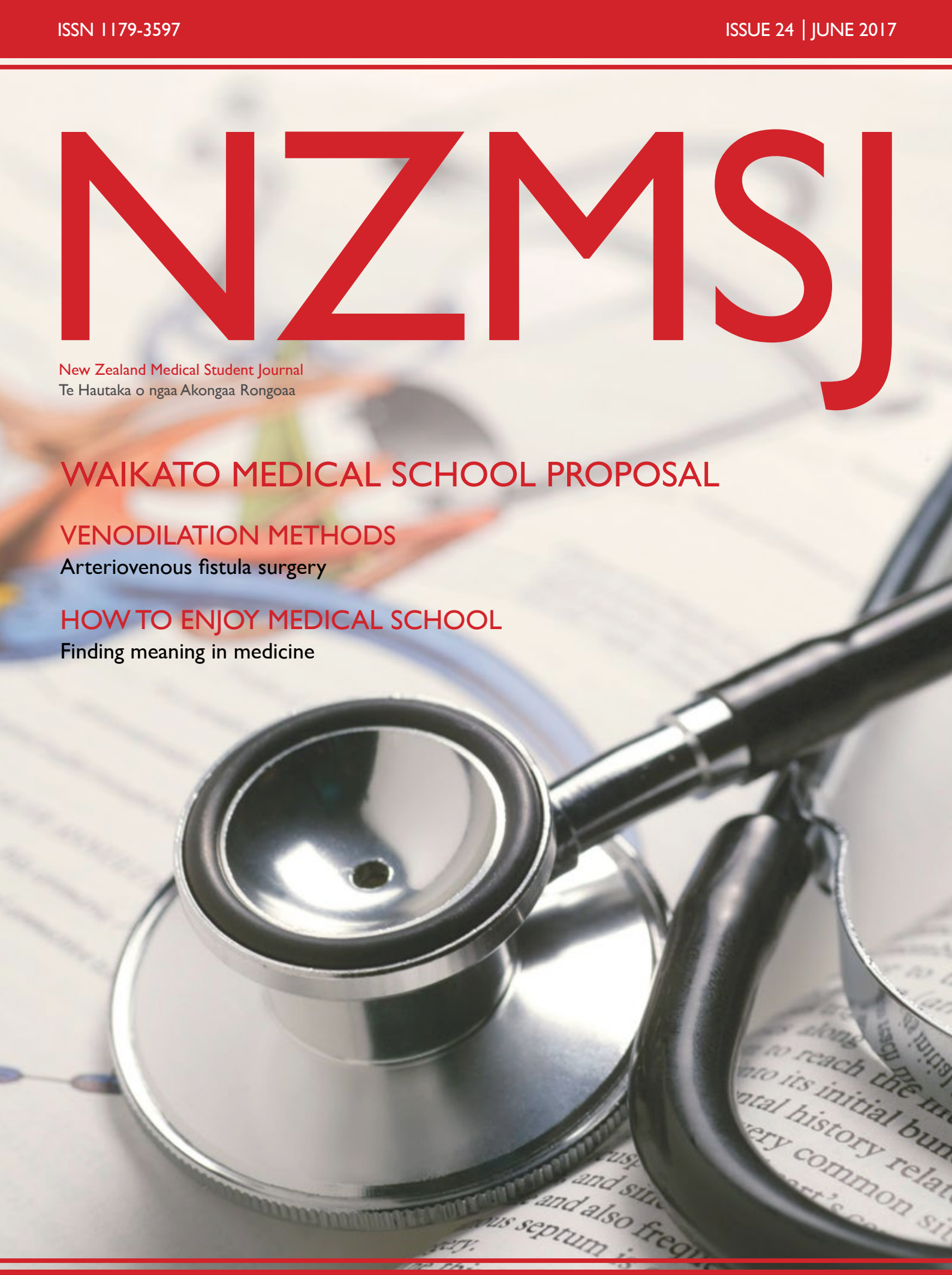
WAIKATO MEDICAL SCHOOL PROPOSAL

VENODILATION METHODS

Arteriovenous fistula surgery

HOW TO ENJOY MEDICAL SCHOOL

Finding meaning in medicine



EDITORIALARTICLES EDUCATIONALARTICLES ACADEMICARTICLES FEATUREDPIECES REVIEWS

Credits

Thanks to:
University of Otago Medical School, University of Otago
Faculty of Medical and Health Sciences, University of Auckland
Royal Australasian College of Surgeons (RACS)
Royal Australasian College of Physicians (RACP)
Royal New Zealand College of General Practitioners (RNZCGP)

Editorial Office
Website: http://www.nzmsj.com/
Email: nzmsj@nzmsj.com
Facebook: https://www.facebook.com/NZMSJ/
All other correspondence to:
New Zealand Medical Student Journal
c/- Medical Education Group
University of Otago Medical School
PO Box 56, Dunedin, New Zealand

NZMSJ

New Zealand Medical Student Journal
Te Hautaka o ngaa Akongaa Rongoaa

CONTENTS

Cover images courtesy of iStock

New medical school and beyond

Cheyaanthan Haran
Editor-in-Chief
6th Year Medical Student
University of Auckland

Aleksandra Turp
Deputy Editor
4th Year Medical Student
University of Otago

Welcome to Issue 24 of the New Zealand Medical Student Journal (NZMSJ)! This issue delivers an array of excellent articles from students and clinicians. The focus is on primary health medicine, safety in training and student engagement.

The effective delivery of health care in New Zealand's community setting, with equitable outcomes, has long been a difficult endeavour. The recent proposal of the Waikato Medical School aims to address this, but the opinions on this matter are obscured by multiple media reports. In contrast, we offer our readers a unique opportunity to engage with the stakeholders directly implicated in the proposal. Featuring in this issue, three independent guest editors provide their opinion on the proposal and the state of primary health care in our nation:

- Professor Neil Quigley (Vice Chancellor, University of Waikato)
- Professor Peter Crampton (Pro-Vice Chancellor and Dean, Otago Medical School, University of Otago)
- Dr Tim Malloy (General Practitioner and President, The Royal New Zealand College Of General Practitioners).

These editorials provide their view while keeping the current medical student community in mind. With the NZMSJ being a research journal free of political influence we do not take a stance on this proposal. Instead, our aim is to provide students with a medium to evaluate and formulate an opinion on a public health issue.

In 2015, a framework for medical student consent was developed and published, both in the New Zealand Medical Journal (NZMJ) and the NZMSJ. In this issue, The Royal Australasian College of Surgeons (RACS) build on the importance of consent by presenting a recent New Zealand case. Surgery has followed an apprenticeship model, and this article logically takes the reader through the difficulties of obtaining consent for trainees and students and the issue of safety in surgical training.

As per tradition, this issue showcases the extent of medical student work in academia, writing and scholarship. Lauren Smith (Otago) set out to discover the effectiveness of various venodilation methods to improve patient selection for arteriovenous fistula surgery. Boris Yow (Auckland) presents a case of varicella in a peripartum woman with serological evidence of previous infection and subsequent neonatal infection. Case reports are a simple yet effective delivery of medical knowledge, and as a student can offer valuable practice in academic writing. The NZMSJ encourages students to be proactive in selecting and submitting cases while on clinical rotations. Finally, Anna Perera (Auckland) extensively reviews the psychological factors involved in psoriasis management and discusses the efficacy of interventions.

To improve student engagement with the journal "how to" articles have been developed. It has direct relevance to the current student community as it aims to help students in their day to day lives as medical students. Carmen Chan (Auckland) has written an article for all students suggesting ideas on enjoying medical school. Dr Karyn Anderson offers insight into the medical elective and what considerations should be made when making this decision. This article is directed at senior students, however we encourage junior students to begin evaluating their choices. The reviews section in this issue encompasses several domains: documentary, course workshop and podcast. Husam Khalil (Auckland) reviews the documentary Cancer: the emperor of all maladies, Elwyn Rae (Auckland) reviews the recent surgical dexterity booster workshop delivered by the Waikato Cardiothoracic Surgery Unit and Joshua Smith (Otago) reviews the podcast Dr Aaron Rothstein's generalist medicine podcast.

On the journal front, we are pleased to have Dr Mel Lauti, Dr Mariam Parwaiz and Dr Ahmed Abdile who will sit on the newly formed NZMSJ Advisory Board. They will offer their experience and expertise as past Chief Editors. As mentioned in the Issue 22 Editorial, we will aim to further the journal in many areas and aim to keep the continuity of vision.

Finally, this issue would not be possible without the significant increase in financial and academic support from both the University of Otago and the University of Auckland who believe the journal is a necessary and worthwhile investment for medical students in New Zealand.

We hope you find lots of interesting material to read in Issue 24, which will further your love for medical literature and research. Our final congratulations to the authors who have published for their very first time and to our returning authors.

For more information about how to submit your work, see our website www.nzmsj.com/submission.

The Waikato Medical School proposal

Professor Neil Quigley
Vice-Chancellor
University of Waikato

INTRODUCTION

The University of Waikato, in partnership with the Waikato District Health Board, has submitted a proposal to the Government to set up a community engaged medical program that will help address a number of critical medical workforce issues. In particular, the proposal is aimed at addressing the shortages of general practitioners and specialists in other disciplines with general scope, particularly in locations outside of the main cities in New Zealand. The programme proposed is a four-year, graduate entry program that will purposefully select students who are committed to providing primary care in communities outside the main centres. Based on the evidence provided by similarly-structured graduate entry programmes in other countries the Waikato Medical School will bring much needed diversity in student selection processes, training, and health workforce outcomes.[1]

HEALTH WORKFORCE ISSUES

The primary drivers for a third medical school are our failure to train enough doctors and our failure to train the types of doctors that are required to serve the needs of our population. This failure is reflected in a shortage of doctors that is most acute in particular specialties and regions as indicated by both vacancies and our reliance on international medical graduates (IMGs). To address these shortages New Zealand needs to recruit a different sort of student, and train a different sort of doctor from those associated with the two existing medical schools at the University of Otago and the University of Auckland.

In 2014, 43.4% of New Zealand's medical workforce was trained overseas. This makes New Zealand the OECD country whose health workforce is most heavily dependent on international medical graduates. The New Zealand health system imports twice as many IMGs each year than it trains locally. For example, from 2009 to 2013 we registered 1806 NZ graduates and 5945 IMGs.[2] At present New Zealand imports 1,100 doctors trained in other countries to meet our health workforce needs. Most of these doctors stay for a short time, and only 25% are still here three years after their arrival.

The problems associated with New Zealand's health workforce are not unique, but where New Zealand is unique is in its failure to follow other OECD countries in creating additional medical education programmes designed to specifically address these challenges. With one medical school for every 2.35 million people, New Zealand has among the lowest ratios of medical schools to population in the OECD. The relevant ratios are 1:1.7 million in the UK, 1:1.6 million in the US and Canada, and 1:1.2 million in Australia. Based on any of these comparators New Zealand should be well advanced in developing a third medical school, and against Australian standards we would already have a third medical school and be considering a fourth. New Zealand's need for a third medical school is increased by the similarity in the medical education provided by the two existing New Zealand medical schools compared to the diversity of approach in medical training available internationally. The key lesson learned from Australia, North America and the UK is that the provision of additional medical schools needs to be about increasing both capacity and diversity in medical education and training models.

Diversity in medical education models is required because New Zealand suffers from a shortage of both New Zealand-trained doctors and doctors who elect to practice in particular specialities and geographic locations. Psychiatry, geriatrics, rehabilitation medicine, palliative care and obstetrics and gynaecology all have more than 50% IMGs as registered practitioners.[3] In addition, the proportion of the graduates from Auckland and Otago medical schools vocationally registered as General Practitioners (GPs) has trended down for the last thirty years. Current efforts to increase elections for this specialty are not likely to be adequate given that 60% of GPs outside the main metropolitan areas are IMGs, the vacancy rate in rural general practice is 20-25% and 40% of our current GPs plan to retire by 2025.[3]

New Zealand has wide disparities in health, especially in our rural and Māori communities. This is evidenced by the high amenable mortality rates in the more rural District Health Boards such as Northland, Tairawhiti, Lakes, Whanganui, and Hawkes Bay. Regional variations in the distribution of doctors per 100,000 of population are markedly skewed against provincial and rural locations. The shortage of primary care doctors and specialists in provincial and rural centres and hospitals results in large increases in costs for the health system as a whole (because patients do not seek treatment early, have more advanced conditions requiring more medical intervention and use the hospital emergency department as a general practice).[4] These disparities have been present for decades and, despite increased funding to the existing two medical schools (such as extra rural origin places in 2002) the disparities have continued.

THE WAIKATO MEDICAL SCHOOL PROPOSAL

New Zealand's two existing medical schools have attempted to introduce some diversity in their programmes but have done so within the constraints of their existing undergraduate entry model and their requirement for students to study health sciences at Auckland or Otago as a prerequisite for entry. The proposed Waikato Medical School is designed to provide a much greater level of diversity by complementing the work of the two existing medical schools in New Zealand. It will follow international best practice to provide the diversity in medical education and workforce outcomes that is necessary to meet New Zealand's challenges with the geographical location and specialist choices of its health care workforce.

The Waikato Medical School will be based in Hamilton and at regional clinical education sites in 12-15 locations throughout the central North

Island (depending on the community partnerships that are built). It will offer a medical degree programme which is unique in New Zealand, but widely adopted and regarded as international best practice. The programme will be graduate entry only, requiring an undergraduate degree from any university (compared to the current requirement to take health sciences at Auckland or Otago Universities to have the option to enter medicine). The Waikato programme will be four years in length rather than the five years currently required at Auckland and Otago Universities.

A critical feature of the Waikato Medical School is that it will be "community engaged", involving communities outside the main metropolitan areas in the design of the programme, selection of students, and training of students. Community engaged medical schools are part of the transformation of medical education from a two part pre-clinical (science-based) curriculum plus a clinical curriculum to an integrated, systems based approach.[5] This approach has been facilitated where Universities have engaged with their communities to ensure that their education and research are aligned with the health system's needs. Community engaged medical programs are formed through a partnership between the educational providers and the communities they serve, improving medical education while at the same time meeting community needs and advancing health equity agendas.[8]

The key elements of the proposed Waikato medical education model benchmarked against best practice internationally are reflected in its student selection processes, the clinical learning experience, the ethos of the programme, and the workforce outcomes.

STUDENT SELECTION

The very substantial excess demand for places in medical training programs in New Zealand and the high academic standing of those applying for entry to medical training, as well as the substantial number of New Zealand students being accepted to Australian graduate entry medical programmes each year, creates an opportunity to focus the selection of students on the characteristics that are most likely to lead to desired health workforce outcomes. While there is some evidence that graduate entry programs per se may change the nature of the students, the diversity is related more to selection policies than the nature of the program. The proposed University of Waikato Medical School will select students who have demonstrated high levels of academic achievement in an undergraduate degree and are predominantly from the communities in which medical practitioners are required. But the student selection and admissions process will also give a high weighting to evidence of engagement with and commitment to communities including a commitment to providing care in the communities from which the students are drawn.

CLINICAL EXPERIENCE

Community-engaged medical training focuses on students learning about medicine through supervised interaction with patients in a community setting. Under the University of Waikato proposal, each student will spend at least a year of the four years in community placements. There will be a high level of community engagement with their education and community support for the students on clinical placements. To facilitate this approach to training the University of Waikato proposal involves a commitment to invest in the physical infrastructure and the supervisory capability in 15 community education centres in the Midland Region. This will require additional investment, but has been shown in the Australian and Canadian settings to provide excellent educational experiences for students.[7,8]

ETHOS

The Waikato Medical School will be seeking students who demonstrate a strong commitment to the ethos of a community-engaged medical school, to public and community service and to reducing health inequities. This will include seeking Māori students who can demonstrate engagement with their community, especially rural communities. This ethos of the School will be reflected in its level of engagement with communities outside the main centres and the constant reinforcement throughout the curriculum of the World Health Organisation's definition of social accountability: "the obligation to orient education, research and service activities towards priority health concerns of the local communities, the region and/or the nation one has a mandate to serve".[9]

WORKFORCE OUTCOMES

Based on evidence from community-engaged graduate entry programmes in other countries, the Waikato Medical School would aim to produce graduates who are different in kind but not in quality to those produced by the two existing medical schools. The difference would be reflected in a high proportion of graduates who choose a specialty most relevant for health care outside the main centres. Following the workforce outcomes achieved by our exemplar programmes internationally, the Waikato programme will aim to have 50-60% of graduates electing general practice as a specialty and committing to practise outside the main centres, and a high proportion of the remaining 40% choosing a specialty and sub-specialty relevant to provincial and rural workforce needs. In community-engaged medical schools in other countries these workforce outcomes are achieved through the combination of selection of graduate entry students who can demonstrate a credible commitment to clinical care in a community setting, medical school staff who are committed to the ethos of community engagement, and a high proportion of the programme involving clinical experience in a community setting. It is not proposed to introduce formal bonding mechanisms, although some of these may be associated with scholarships provided by community groups that we expect to support students entering the programme. The workforce outputs of the programme would no doubt be closely monitored to ensure they achieved of the Waikato Medical School's stated goals.

CHALLENGES AND CONCERNS

A number of concerns about the Waikato Medical School proposal, and the idea of a third medical school in general, have been raised. In this section I briefly address those concerns.

QUALITY OF THE PROGRAMME

There is substantial international evidence that the doctors produced from four-year community-engaged graduate entry medical programmes are equivalent in quality to those from traditional programmes. Because the Waikato Medical School would need to be accredited by the Australian Medical Council, the quality of its proposed programme would be assessed against best practice in Australia from the outset.

SHORTAGE OF CLINICAL PLACES

The Waikato Medical School will need to take a different approach to clinical placements than that adopted by the two existing medical schools in New Zealand. The Waikato programme envisages all students spending substantial amounts of time in community clinical settings, including 30 weeks in the third year. The Waikato business case therefore incorporates the cost of investment in the creation of new clinical placements and does not rely on competition for those that currently exist.

PGY1 PLACES

The number of funded places available for PGY1 house officers would need to increase to accommodate the graduates of the Waikato Medical School, but the number of house officer positions needs to increase in any event given our unsustainable level of reliance on IMGs and the much higher level of places at PGY2. The current number of PGY1 places reflects the training needs of the past, and not current workforce needs. The government will have until at least 2024 to address this issue with respect to Waikato graduates.

THE NEED FOR MORE DOCTORS

The data presented above make it clear that New Zealand needs to train a lot more doctors, and that it is untenable to continue educating

so few New Zealand doctors through only one type of medical school. Apart from the bottleneck at PGY1 level, all of the indicators suggest that the two existing medical schools do not have the capacity to train the number of new doctors needed by New Zealand in the next 25 years. Moreover, the suggestion that the problem will be solved by New Zealand citizens trained at the Australian medical schools lacks credibility: over the last few years New Zealand has been through an immigration boom driven in significant part by New Zealanders returning from, and fewer New Zealanders leaving for, Australia. Too few of the returners have been doctors to have any impact on our workforce shortages, and as the Australian economy strengthens in the next few years the outflow of New Zealanders to Australia is likely to resume. Rather than thinking about New Zealand doctors returning, it would be better to ask whether the many able New Zealand students being accepted into graduate entry programmes in Australia should have that option at a programme in New Zealand.

The data presented above also indicate that New Zealand's health workforce problems are distributional as well as being related to absolute numbers. The latest survey of the intentions of students in the two existing medical schools shows that only 1.5% of students would want to live in a community of less than 10,000[10] even though 20% of new Zealanders live in these smaller communities. Clearly the student selection and training models of the two existing schools cannot solve our shortage of doctors in provincial and rural areas.

THE COST OF A NEW MEDICAL SCHOOL

Because the Waikato Medical School proposal has been developed jointly by the University and the Waikato District Health Board, the set-up costs for the new medical school are not large, and the scale of the existing investment in the Otago and Auckland medical schools is not a relevant comparator. Many of the facilities and teaching staff required for New Zealand's third medical school already exist in Hamilton. The proposal is also cost effective because it would draw students from the existing pool of university graduates (in any discipline) in New Zealand without imposing the costs of a requirement for students to undertake a specialist entry programme at the University of Waikato. In the US, where graduate entry to medical school is always required, empirical evidence shows that no single undergraduate degree best prepares students for success. In fact, for 20 years, New York's Mount Sinai Medical School has tracked the performance of graduate medical students who enter with humanities degrees. Compared to their counterparts with a strong undergraduate science background, these humanities majors excelled in clinical placements, "where textbooks and Petri dishes give way to real patients and clinical problem solving".[11]

CONCLUSION

It has been almost 50 years since New Zealand last established a medical school. When the University of Auckland medical school was established in 1968, the population of New Zealand was 2.7 million. By the time that the first graduates could emerge from the proposed Waikato Medical School (2024) the population of New Zealand will have doubled, and the aging of the population together with changes in technology will have increased demand for health services to an even greater extent. This makes New Zealand distinctive in the OECD, but for the wrong reasons: Over the same period, other developed countries have established new schools of medicine and introduced new models of medical education to meet their changing health workforce and population health needs.

Discussion of the need for a graduate entry medical programme in New Zealand has a long history, but it has become particularly intense in recent years as the majority of medical schools in Australia have moved to graduate entry only programmes, and as the benefits of the diversity that is provided by community-engaged graduate entry programmes has become apparent. New Zealand can no longer afford to ignore the evidence on the benefits that alternative models of medical education to that offered by Auckland and Otago can provide. Moreover, ignoring the fact that the majority of the primary care in our (often high needs) provincial and rural communities is provided by doctors who did not grow up or train in New Zealand, and thus have little knowledge of the social and cultural context within which they are practicing, is as politically untenable as it is inappropriate as a model for providing health care in those communities. In other words, there is now overwhelming evidence that it is untenable to continue to do what we have done in the past and hope that it will produce different and more appropriate outcomes. New Zealand can no longer afford to have only one model of medical education offered by just two of its universities.

REFERENCES

1. Lawrenson R, Town I, Strasser R, et al
"The proposal for a third medical school in New Zealand: a community engaged graduate entry medical programme"
Forthcoming, NZMJ 2017.

2. Medical Council of New Zealand.
The New Zealand Medical Workforce in 2013 and 2014.
https://www.mcnz.org.nz/assets/News-and-Publications/Workforce-Surveys/2013-2014.pdf (Accessed Dec 2016).

3. Among many recent examples of publicity about these issues see:
New Zealand Herald. Rural GP shortage expected as a generation of doctors retire 16 January 2017.

4. **A fuller account of the financial costs of health workforce shortages is provided in University of Waikato and Waikato DHB. A third medical school for New Zealand at the University of Waikato [Internet]**
University of Waikato.
Available from http://www.waikato.ac.nz/major-projects/medical-school

5. Frenk J, Chen L, Bhutta ZA, et al.
Health professionals for a new century: transforming education to strengthen health systems in an interdependent world.
Lancet 2010; 376 (9756):1923-58.

6. Strasser R, Worley P, Cristobal F, Marsh DC, et al.
Putting communities in the driver's seat: the realities of community-engaged medical education.
Acad Med. 2015 Nov; 90(11):1466-70.

7. See for example Greenhill JA, Walker J, Playford D.
Outcomes of Australian rural clinical schools: a decade of success building the rural medical workforce through the education and training continuum.
Rural Remote Health. 2015 Jul-Sep;15(3):2991; and

8. Strasser R, Hogenbirk JC, Minore B, Marsh DC et al.
Transforming health professional education through social accountability: Canada's Northern Ontario School of Medicine.
Med Teach. 2013 Jun;35(6):490-6.

9. **Background to the framework for socially accountable health workforce education [Internet]**
Training for Health Equity Network.
Available from http://www.thenetcommunity.org/social-accountability-framework-background.

10. University of Otago and University of Auckland
"New Zealand National Data Report on the 2014 Medical Students Exit Questionnaire".

11. Schwartz A, Abramson J, Wojnowich I, et al
Evaluating the impact of the humanities in medical education.
Mount Sinai Journal of Medicine: A Journal of Translational and Personalized Medicine, 2009, 76, 372-380.

Does New Zealand need a third medical school?

Professor Peter Crampton
Pro-Vice-Chancellor, Health Sciences
Dean, Otage Medical School
University of Otago

This is an important question. I would like to lay out here some of the considerations that are necessary to take into account in answering the question. The perspective I bring is that of the University of Otago's Pro-Vice-Chancellor of the Division of Health Sciences and Dean of the Otago Medical School. In these two roles I have a considerable interest in health and medical workforce issues in general and specifically in the question of a third medical school. My medical background is in general practice and public health.

Otago's Division of Health Sciences, which includes the Otago Medical School, has a strong commitment to what the World Health Organization defines as social accountability:

> " the obligation to direct their education, research and service activities towards addressing the priority health concerns of the community, region, and/or nation they have a mandate to serve. The priority health concerns are to be identified jointly by governments, health care organizations, health professionals and the public."[1,2]

For this reason, it is my belief that the focus of the third medical school discussion should be on the national interest: what investment is needed to meet the medical workforce requirements of New Zealand's diverse rural and urban communities now and in the future?

My comments in this editorial should be read with two caveats in mind. First, last year I received a verbal briefing from the Vice Chancellor of the University of Waikato about his plan to launch a bid for a third medical school but otherwise the only information I have is from general media sources. I do not have access to more detailed information about the Waikato proposal. Second, this editorial is necessarily brief and omits discussion of many important factors that I care about very much, such as the Pacific medical workforce (in New Zealand and in Pacific nations), the importance of interprofessional education, and the regulatory requirements of the Medical Council of New Zealand and the Australian Medical Council.

WHAT PROBLEM ARE WE TRYING TO FIX?

My understanding from media sources is that the University of Waikato proposal is focused on meeting the needs of New Zealand's rural and Māori communities. In particular the proposal draws attention to the need for more New Zealand-trained general practitioners to address disparities in rural health status and to reduce the reliance on oversea–strained doctors.

These are important objectives that resonate with many communities around the country. Very similar issues are evident in rural and remote Australian and Canadian communities. In identifying these objectives, it is important to distinguish between three sets of issues:

- How many doctors should we train?
- What sort of doctors should we train (demography and discipline)?
- Where do we want them to work (distribution)?

These three sets of issues, while they are related, invite somewhat different policy responses.

The issue of medical workforce supply is focused on our medical schools graduating sufficient numbers of new doctors to meet anticipated population demand over coming decades. In 2008, the government approved the funding of an additional 200 medical places to meet the predicted medical workforce requirements for the next 20 years. This increase has been implemented over the past eight years and reaches steady state in 2020. The quantum was determined from future workforce planning begun in 2005 and planning continues today through Health Workforce New Zealand. The increase in 2008 was influenced by the assumption that New Zealand would continue to lose 25% of its medical graduates to Australia, a loss that has been markedly curtailed since 2008 with the massive expansion of medical programmes in Australia (1400 graduates per year in 2000 versus 3672 by 2018 (unpublished data ***Medical Schools Outcomes Database***)).

The regulatory framework for New Zealand's medical schools dictates that medical graduates must be equipped to take up any branch of medicine. We are not permitted to graduate new doctors who are specialists – for example, we cannot pre-determine a subset who must go into rural general practice – and moreover we place a positive value on ensuring that all doctors, whatever their specialty, have a broad, general training experience.

The planned increase in medical graduates is resulting in New Zealand having more graduates per 100,000 of population than, for example, in the USA or Canada (Table 1). The overall OECD data (see source data) suggest that the existing plan for the New Zealand medical workforce is consistent with many OECD peers.

TABLE 1: MEDICAL GRADUATES PER 100,000 POPULATION IN SELECTED OECD COUNTRIES, 2000-2014

	2000	2010	2014	2020*
New Zealand	7.4	7.3	8.7	11.9
Australia	7.4	12.1	15.3	
Canada	5.1	7.2	7.9	
Ireland	14.4	17.2	21.9	
UK	7.5	13.5	13.5	
USA	6.4	6.6	7.3**	

Source: OECD (2017), Medical graduates (indicator). doi: 10.1787/ac5bd5d3-en (Accessed on 16 March 2017).

** Based on a predicted population of 4.86 million and 580 domestic graduates by 2020.*

*** 2013 data*

This in turn raises the challenge of encouraging young doctors to take up the types of roles that are needed by New Zealand's diverse communities, which I discuss further below. The challenge of achieving the right medical workforce distribution is huge, and Australia provides a fascinating case study of how it is possible to achieve a significant oversupply of doctors without addressing the issue of distribution, thereby leaving rural areas under-doctored.[3]

WHAT QUESTIONS DO WE NEED TO ANSWER IN ORDER TO GUIDE OUR DECISION MAKING?

In considering a third medical school, in general terms a number of questions must be answered in order to enable decision makers to make an informed decision. The following list of questions (Table 2) is by no means exhaustive, but it gives a flavour of the type and scope of questions that need to be answered. For example, in considering the problems that another medical school might cause or make worse three points are noted in the table: 1) recruitment of medical academic staff to a new medical school would inevitably involve loss of key staff from existing medical schools; 2) redistribution of hospital and community clinical training opportunities refers to the proposed introduction of a further 240 undergraduates into the upper North Island (60 students in each of the four years of the proposed Waikato programme), which in turn would put severe pressure on available training places. Additional training placements would be difficult to find particularly in critical specialties such as general practice, paediatrics, psychiatry, obstetrics and gynaecology; 3) additional pressure on the postgraduate training pipeline was reflected, for example, in 2016 when the DHBs had to create 47 extra first-year house surgeon positions to employ graduating category one applicants (New Zealand graduates who were New Zealand/Australian citizens or permanent residents); despite this increase in positions nine category one first-year house surgeon applicants were not matched to a job.

TABLE 2: QUESTIONS WE NEED TO ANSWER IN ORDER TO GUIDE OUR DECISION MAKING

1. What are the medical workforce needs in relation to:

- Numbers of doctors
- Distribution of medical workforce
- Demography of medical workforce
- Discipline/specialty of medical workforce?

2. To what extent are these medical workforce needs under the control of medical schools and medical education?

- Student selection, curriculum and assessment criteria are under the control of medical schools
- Health system factors (see Table 3) are under the control of the Ministry of Health, District Health Boards, PHOs, iwi and communities

3. To what extent are these needs related to postgraduate training and support?

- From a policy perspective, the training pipeline from undergraduate study to vocational specialisation is an integrated system
- Without further investment, there is finite capacity within the DHBs and community-based health providers to employ and vocationally-train increasing numbers of medical graduates

4. For those medical workforce needs that are under the control of medical schools, to what extent are they being addressed already and to what extent would another medical school help?

- Selection of regional and rural-background students
- Selection of Māori students
- Selection of Pacific students
- Training experiences in regional and rural areas

5. What problems might another medical school cause or make worse?

- Recruitment of medical academic staff
- Redistribution of hospital and community clinical training opportunities
- Additional pressure on the postgraduate training pipeline

WHAT POLICY INSTRUMENTS ARE EFFECTIVE IN ADDRESSING RURAL MEDICAL WORKFORCE ISSUES?

As the Waikato proposal focuses on meeting the needs of rural communities, it is important to pay heed to two sets of factors: 1) the system-wide issues that bear on rural recruitment and retention, and 2) in relation to medical education, the international evidence on training medical students who actively choose to take up rural careers.

Of these two sets of factors, system-wide issues are probably the most important as no matter how effective medical education is, if the employment conditions in rural areas are not attractive for graduates rural communities will continue to struggle to attract and retain young doctors. System-wide issues are chiefly the responsibility of the Ministry of Health, the District Health Boards, PHOs, iwi, and rural communities (Table 3).

TABLE 3: HEALTH SYSTEM FACTORS THAT HELP OR HINDER THE RECRUITMENT OF RURAL DOCTORS

1. Working conditions: • On-call obligations • Presence of a highly skilled primary health care team (nurses, midwives, receptionists, manager etc) • Defined pathways of care that meet the patients' needs • Provision for annual leave, sick leave and educational leave • Physical infrastructure that is fit-for-purpose • Salary structure commensurate with urban community-based and hospital-based colleagues
2. Career development opportunities • Provision for peer support • Provision for continuing medical education • Provision for further postgraduate training and career development • Access to an active academic community • Provision for training medical students and doctors across the spectrum of junior medical students, senior medical students, first and second year house surgeons, and vocational trainees • Perceived status of role
3. Social opportunities • Work opportunities for partner • Educational opportunities for children • Opportunities to develop a personal social network

In terms of the role of medical schools in graduating students who are more likely to choose a rural career, the international evidence suggests that two strategies work:[4-6] 1) recruiting medical students who either come from a rural area or who have had significant rural exposure during their childhood and school education, and 2) providing all students with positive and enriching learning experiences in rural settings. Over the past decade or more both Otago and Auckland medical schools have implemented policies in response to this international evidence. For example, at Otago we routinely select at least 50 students each year specifically on the basis of their rural background. This affirmative selection pathway is called the 'Rural Origins Sub-Category' and offers preferential entry to medical school for students with a rural background who also meet academic admissions standards. We know that these students are more likely to want to work in rural areas. By the same token, we also know that neither we nor rural communities can force them into rural jobs if the system-wide issues are not propitious.

At Otago we provide a variety of rich and positive learning experiences in rural communities. All Otago students have a rural/provincial experience during their training, including many who have a year-long experience in rural or provincial settings (the fifth-year Rural Medical Immersion Programme and the sixth-year provincial placements).

An additional strategy that we have adopted at Otago is the provision of targeted postgraduate training opportunities for rural doctors. There is emerging evidence that these programmes are having a positive impact on New Zealand's rural hospital medical workforce.[7]

Is our investment in the above educational initiatives having the desired effect? For Otago medical graduates from 2012 to 2014, over 50% have not yet made a career decision, but of those who have, 22.2% have chosen general practice and another 4% have chosen rural practice; of those who have not decided, for 36.6% their first or second choice is general practice; a further 7% have chosen rural practice as their first or second choice (unpublished data ***Medical Schools Outcomes Database***).

THE MĀORI MEDICAL WORKFORCE

New Zealand has a shameful record of not training enough Māori doctors, and our Waikato colleagues have drawn attention to this issue by placing an emphasis on training more Māori doctors. Six years ago, in response to this poor record and other issues of under-representation in health professional groups, Otago developed a policy called 'Mirror on Society'.[8] This policy states:

> Ideally the make-up of health professional classes should be equivalent to holding a mirror up to society. In order to achieve this we aim to attract and support the most academically able students from a wide variety of backgrounds. The gender, ethnic, socioeconomic and rural/urban composition of our graduates should, more or less, reflect the diverse communities in Aotearoa.

The sociodemographic profile of health professional students is important because, in part, these characteristics influence future career choices in terms of place of practice and types of populations served.[4,5,9] We believe indigenous health is a crucial area of responsibility for New Zealand's universities. These Universities have a dual obligation to both honour the contractual obligations defined in the Treaty of Waitangi and to take action to correct the inequitable health and education outcomes experienced by Maori.

The following figure shows the trend in Otago's Māori medical student numbers over the past decade. Last year 45 new Māori doctors graduated from Otago and this year 62 new Māori students were taken into the programme (21% of the domestic intake into medicine). The University of Auckland is also markedly increasing its numbers of Māori medical graduates. New Zealand is on the way to having at least a representative number of Māori doctors. The trend illustrated in Figure 1 has required considerable investment over a long period of time. Outreach into high schools, a bridging programme, a dedicated pathway of admission and ongoing student support are all required to overcome educational inequity and ensure a graduation rate for Māori students commensurate with non-Māori students.

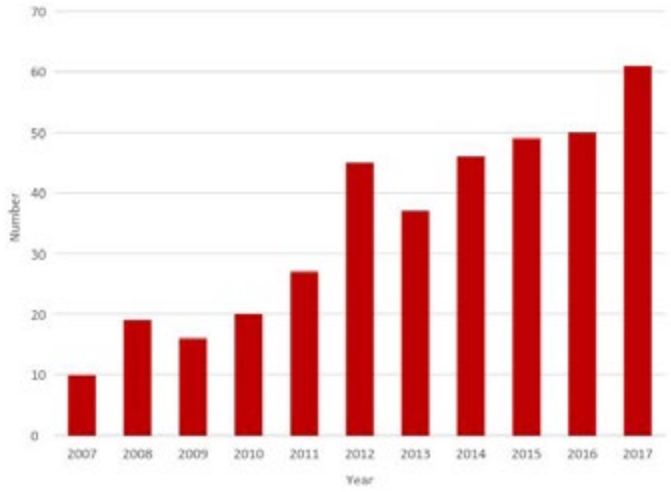


Figure 1: Number of Māori medical students at entry, Otago Medical School, 2007-2017

DOES NEW ZEALAND NEED A THIRD MEDICAL SCHOOL?

It is clearly a challenging task to draw together the information required to provide satisfactory answers to all the questions and issues listed above. A third medical school is a huge social investment for our small country. The system, through its leadership structures, most notably the Ministry of Health and the Tertiary Education Commission (through which we receive our funding), must in the first instance define the problem, in its own terms, that this investment is aiming to address. A number of different conclusions may be drawn. For example, if it is determined that New Zealand needs to train a higher number of doctors, then at some stage another medical school may be needed. If it is determined that our current medical students need more rural exposure during their training, then investment in rural infrastructure and support is needed; if we need more Māori graduates, then more pipeline support before medical school may be needed; if we need more graduates to select general practice as their career, then further investment in system-wide rural infrastructure may be required.

While there no easy fix for rural medical workforce shortages, the University of Otago is committed to playing a significant role in finding the best solutions and ensuring that any new investment results in the maximum gains possible for rural communities and their healthcare workforce.

In the absence of both a thorough and impartial analysis and wide consultation with the numerous stakeholders, it seems hasty to jump one way or the other on the question of a third medical school. There is considerable potential to inflict net harm on our rather fragile and stressed health system by inserting a third medical school into the mix without first undertaking very careful analysis and planning. We need to heed the views of the many individuals and organisations that have a vital interest in the complex issues that surround medical education and postgraduate career pathways. The question of a third medical school carries with it many potential risks and benefits, and my plea to decision makers is ***festina lente*** -- make haste slowly.

ACKNOWLEDGEMENTS

Over the past seven years there have been occasional discussions and debates about the merits and timing of a possible third medical school, and in this paper I have drawn on the wisdom and insights of many colleagues.

I am grateful for the comments on an earlier draft of this editorial provided by colleagues.

REFERENCES

1. Boelen C, Heck J.
Defining and measuring the social accountability of medical schools WHO/HRH/95.7.
World Health Organization; 1995.

2. Murray R, Larkins S, Russell H, Ewen S, Prideaux D.
Medical schools as agents of change: socially accountable medical education.
Medical Journal of Australia. 2012;196(10):653.

3. Health Workforce Australia.
Australia's Future Health Workforce - Doctors.
Canberra Department of Health; 2014.

4. Rabinowitz H, Diamond J, Markham F, Paynter N.
Crititcal factors for designing programs to increase the supply and retention of rural primary care physicians.
JAMA. 2001;286(9):1041-1048.

5. Ranmuthugala G, Humphreys J, Solarsh B, et al.
Where is the evidence that rural exposure increases uptake of rural medical practice?
Australian Journal of Rural Health. 2007;5:285-288.

6. Strasser R, Couper I, Wynn-Jones J, Rourke J, Chater A, Reid S.
Education for rural practice in rural practice.
Education for Primary Care. 2016;27(1):10-14.

7. Nixon G, Blattner K, Williamson M, McHugh P, Reid J, .
Training generalist doctors for rural practice in New Zealand.
Rural and Remote Health. 2017;17(1):4047.

8. Crampton P, Weaver N, Howard A.
Holding a mirror to society? The sociodemographic characteristics of the University of Otago's health professional students.
New Zealand Medical Journal. 2012;125(1361).

9. Moy E, Bartman B.
Physician race and care of minority and medically indigent patients.
JAMA. 1995;273(19):1515-1520.

A rural winter

Tim Malloy
President
Royal New Zealand College of General Practitioners

Tim Malloy runs his own large rural general practice based in Wellsford, between Auckland and Whangarei.

Winter is coming. When the inevitable seasonal illnesses affect you or your family, I'd like to bet that, as a medical student, you have a choice of GPs, and can get an appointment fairly quickly. Not everyone in New Zealand has that luxury, and the Royal New Zealand College of General Practitioners is predicting a worsening shortage of GPs.

The shortage will hit hardest in rural and low-decile areas. We're seeing this situation building already now, and it's simply going to get worse if nothing is done.

There are enough medical graduates coming out of the two medical schools, Auckland and Otago, but the Royal New Zealand College of General Practitioners (the College) trains less than 200 per year to become GPs – around 30 per cent of graduates - and that's not enough to keep the workforce going. We need half of all graduates to enter the GPEP (General Practice Education Programme) and become the GPs of New Zealand's future. That means we need an increase in government funding to train more. And we need an increase in rural GPs.

Why isn't the current rate of training enough to keep the workforce going? Two reasons really. The first is that back in the '80s, financial concerns related to the oil crisis led the government to decrease the number of medical school admissions sharply. Student fees were introduced in 1990 and for various reasons general practice became unpopular as a career. As a result the number of medical graduates entering general practice dropped. This means that now, we have a bulge of forty per cent of the workforce aged over 55 and looking forward to retirement. You might think that's brilliant for you, because there will be more vacancies, and more practices for sale, but it's not good news for New Zealand as a whole.

The other reason is that the number of hours a modern GP works on average has sensibly reduced. Many new GPs have young families to care for, or take voluntary roles in their communities like sitting on trusts, boards, and advisory committees, or teaching and mentoring. Of course work-life balance also plays an important part in keeping us healthy and fit enough to treat our patients. But the upshot of reduced working hours is that we need to train even more GPs just to sustain the current workforce.

In addition, the workload for existing GPs is increasing, with more patients presenting with complex issues that take longer to diagnose and treat. Over a fifth of GPs are reporting feeling burnt out. We're hearing of more and more practices closing their books to new patients for several months at a time: a survey of our members showed that more than 45% had closed books for more than a month during 2016.

If we increase the number of GP registrars, and increase the funding needed to train them, we also need to persuade more of them to head into rural communities to work.

This is where the proposal by Otago and Auckland Universities comes in.

There's firm evidence that if you do your GP training in a rural area, and have a high-quality learning experience, you're more likely to go back there to work later on. That might be for practical reasons, like you've put down roots in a welcoming community, made friends, or found your life partner, and maybe started a family. Hopefully it's also because, like me, you've found out that rural general practice is rewarding, offers different experiences every day, and beats being in a city.

You can begin to see why the universities' idea of basing medical training centres in rural areas starts being quite attractive as a pipeline to supply GPs to those areas.

The College aims to place half of all its GPEPs in a rural practice for six months in their first year for the same reason. But, at that stage, you'll be 25 years old plus, and have probably already decided where you want to live, if not also who with – and statistically speaking there's a pretty good chance you'll be partnered up with someone from your medical school, which might make one of you taking a rural placement less easy or desirable.

This is why the College supports the Auckland and Otago Universities' proposal for a national network of training centres based in rural communities. We like the fact they offer a national solution, not a regional one. This is a major advantage over Waikato University's proposed medical school, which looks to be quite locally-focussed. We will of course work with anyone if it helps us get more rural GPs, but we think it makes more sense to train the GPs where they'll eventually work, while they're young, rather than trying to relocate them later on.

The Otago and Auckland proposal also makes sense because it will vertically integrate undergraduate, early post-graduate medical and vocational General Practice, as well as Rural Hospital Medicine (both of which are scopes under the College's auspices). It will also integrate horizontally, providing inter-professional education for all health professionals. General practice can only benefit from having its GPs train alongside the very health professionals who will work with you and be part of your practice team.

You might be reading this wondering why you should care. You're already on your pathway. Why would the number of rural GPs even affect you? The simplest answer is that rural communities supply New Zealand with a good chunk of its GDP (19% in 2011 – 2012), and right now they have the poorest health outcomes, especially Māori, who are proportionately more likely to live rurally. As New Zealanders we should all care about having a healthy, rural-reliant economy, and as health professionals, we're committed to equitable health outcomes and a sustainable profession. Ensuring that there is a good supply of rural GPs, and basing the training facilities in the community, with all the local benefits that that will bring, makes good sense.

New models of care will, of course, go some way to relieving the pressure on our GPs, but it's not the panacea. There also needs to be system changes in terms of training and funding. You may have seen that the College is campaigning to get more funding for more GPs from government, under the 'GP - Heart of the Community' banner. We've got quite a lot of traction in the media: the issue of a GP shortage seems to resonate with everybody. People care deeply about their GPs, and value the long-term health relationship they have with them. What's more, our GPEP registrars tell us that's reciprocated: this relationship is partly what made them choose the GP speciality.

I have personally met with the Minister of Health, Jonathan Coleman, and he is very aware of our views. I hope he takes our messages to heart ahead of this year's general election.

If you're thinking about your future, do seriously consider training with the Royal New Zealand College of General Practitioners. General practice and rural hospital medicine are fantastic, rewarding specialities, peopled by amazing, big-hearted specialists who are extremely skilled in their own right and proud of it. And do also consider working in a rural setting: you're welcome to contact me and come to my practice in Wellsford to see what it's like. But I warn you – you'll never look back.

Opinion: Who did my surgery? Modern day issues of consent in surgical education

Mr Ramez Ailabouni FRACS
Orthopaedic Surgeon

Mr Richard Lander FRACS
Executive Director for Surgical Affairs (NZ)
Royal Australasian College of Surgeons

Many consider that practicing medicine is an art form as opposed to an exact science. This is especially apparent in the surgical disciplines where the breadth of factors involved in the decision making are great at every step of the patient journey; from pre-operative workup right through to the intraoperative decisions and post-operative care. Surgical training has followed an apprenticeship model with doctors gaining experience by being actively involved in patient care.

Although contemporary surgical training is far from the old adage of; "See one, do one teach one", doing remains an integral part of acquiring the technical skills required to be a surgeon. Societal expectations of who will be undertaking their surgery and the amount of information they require have also significantly changed. There are multiple cases worldwide of complications arising from surgery where societal blame has been attributed to "surgical training". A recent New Zealand case means we are not immune.

A recent ophthalmology example occurred when a surgical Fellow (post-Fellowship trainee) had an extremely rare but catastrophic intraoperative complication whilst performing a very delicate eye procedure. This led to the patient losing sight in the operated eye. The Fellow was being supervised by a qualified ophthalmology consultant who was scrubbed and assisting him. A complaint was made to the Health and Disability Commissioner (HDC) as the patient claimed she was not aware she was being operated on by a doctor as part of training.[1] The HDC review found the individual doctors and the hospital involved were in breach of the patient's right to be informed of their participation in training and attributed the complication in part to the training of the Fellow.

The above case raised many questions amongst the medical community. What does this mean for training? Does this mean that we cannot undertake training without being a risk to patients? How does one obtain consent for I training if it is inevitability associated with complications? How do we ensure the patients' rights are met whilst ensuring we continue to train future generations of surgeons and physicians? Are the two issues at odds?

The Royal Australasian College of Surgeons (RACS) is a leading advocate for the surgical community and has the overriding responsibility for surgical training in Australia and New Zealand. The RACS Trainee Association (RACSTA) represents trainees at the College level. RACSTA took the initiative to help assess the impact of the case on New Zealand surgical training with support from the RACS National Board in New Zealand (NZNB). As part of unpicking the issues above, RACSTA undertook a systematic review of the literature on the issue of safety in surgical training. We also surveyed NZ surgical trainees to identify any impacts the case has had on their training. Finally, representatives from the NZNB with the NZ RACSTA representative met with Anthony Hill, current Health and Disability Commissioner and his deputy Dugal Meenal to discuss the case and its implications.

The rest of this article poses some questions around this topic and sets out to answer them given the insights gained from the above journey.

THE PATIENTS RIGHT TO BE NOTIFIED OF TEACHING. SHOULD ALL PATIENTS BE ASKED?

The Code of Patient Rights in New Zealand states under Right 6: The Right to be fully informed that "Notification of any proposed participation in teaching or research, including whether the research requires and has received ethical approval'.[2] Therefore, patients must be informed if they are participating in teaching and have the right to refuse such participation. In the ophthalmology case, the doctors involved claim to have undertaken such an explanation of who will be undertaking the surgery but this was at odds with the patient and their family members' recollection. There was no documentation that such permission for teaching was obtained. Hence the HDC found that there was a breach of the patients' rights. Furthermore, the hospital policy stated that involvement in teaching should be documented in the clinical notes which had not occurred. The above case is by no means isolated to New Zealand. Similar cases have occurred in Australia.[3]

Therefore, it is not only required that patients are adequately informed of their participation in teaching, but that such discussions are recorded in the clinical notes. Recollection bias affects any retrospective assessment and patients meet a myriad of team members on admission to hospital, hence it is easy to see how they could get confused. Having such documentation protects the student (at whatever level they may be) in case of any incidents or future review. It has been said that "If it is not in the notes then it did not happen".

WHO SHOULD OBTAIN CONSENT FOR TEACHING?

Having established that the patients must be informed of teaching participation and that this consent should be documented, questions arise

as to what informed consent means and who should seek this consent. As with any form of informed consent, the barometer of judgment would be the expectations that a reasonable person would expect to be given in any given situation. Context is everything.

Elective surgery is different to trauma or emergency surgery in the sense that more detailed discussions can occur prior to surgery. Not all elective surgery is the same. Knee arthroplasty for example is different to gender reassignment or breast augmentation surgery where patients may have a different threshold for their privacy. In the knee arthroplasty case it would be entirely appropriate for students to introduce themselves to the patient and obtain consent for their involvement in surgery. This ideally should be backed up by a more senior member of the surgical team. However, in the case of gender reassignment surgery it is ideally best for the supervising surgeon to obtain consent for all teaching and training that would occur, to ensure that there is no duress for the patient. Furthermore, where possible, students should introduce themselves to the patients and check that documentation for their participation has been included.

SO HOW MUCH INFORMATION SHOULD BE GIVEN TO THE PATIENT FOR AN INFORMED DECISION?

Informed consent relies on discussions with patients and should always be an individualised endeavour. The Code of Patient Rights lends more guidance here, stating that: "Before making a choice or giving consent, every consumer has the right to the information that a reasonable consumer, in that consumer's circumstances, needs to make an informed choice or give informed consent.".[2] When it comes to participation in teaching this may commonly include the identity of the students, their number, the extent of their involvement in surgery, their supervision or delegated authority and finally any associated risks involved with that teaching.

BUT TEACHING SURGERY IS ALWAYS RISKY, ISN'T IT? SO HOW WILL YOU OBTAIN INFORMED CONSENT FOR THAT?

It is a commonly assumed that acquiring surgical skills comes at an increased risk to patients. This belief is held by many doctors let alone the common public whose perceptions are so frequently influenced by contemporary media (such as medical television shows). The recent NZ RACSTA trainee survey highlighted that only 50% of surgical trainees were aware of any medical literature that supports safety of surgical training.

To examine the above hypothesis, NZ RACSTA undertook a literature review examining the last decade's literature on issues of safety in surgical training with assistance from RACS library staff. We reviewed 37 articles across seven different specialities. Many of these were retrospective reviews of the American College of Surgeons National Quality Improvement Program (ACS-NSQIP), which is a very large high quality database. The reviewed articles included articles examining both elective and emergency surgeries. In the articles, patient numbers varied from a few hundred to >50,000 patients. The papers had a variety of endpoints with short term (30 day) morbidity and mortality being the most commonly reported. Several papers also examined the medium to long-term impacts of training such as cancer free survivorship or 10-year arthroplasty results.

The consistent finding in the above literature was that supervised trainee involvement in surgery was not associated with increased short or long term risks especially in the elective setting. The only exception was emergency general surgical procedures where an increase in perioperative morbidity rates was documented. Consistently, however, the operative times were longer when a trainee was involved in surgery. This could explain the increased morbidity rates documented in emergency surgical procedures as patients are an already in a pro-inflammatory state.

SO CASE SETTLED THEN! SURGICAL TRAINING IS ALWAYS SAFE.

Life is never full of absolutes. The above literature review provided evidence-based backing that appropriately supervised surgical training is safe in most contexts. Whenever applying literature to one's practice it is important to establish if the context is similar and if the research findings are generalisable. Most the published literature was North America based, where trainee surgeons tend to be less experienced than their New Zealand and Australian counterparts given the different modes of selection onto surgical training. Therefore, based on surgical experience alone, one could assume that if supervised, Australasian trainees should likewise be safe. Furthermore, some of the published literature from the New Zealand joint registry backs this observation showing that revision rates for hip joint arthroplasty are similar in trainee supervised joint replacements to those performed by consultants.

The individual patient context is paramount and the risk assessment needs to be individualised to the patient's situation. It is important to clarify what is meant by risk. In medicolegal terms, patients should be notified of unmitigated "material risks". The High Court of Australia stated that "a risk is material if, in the circumstances of the particular case, a reasonable person in the patient's position, if warned of the risk, would be likely to attach significance to it or if the medical practitioner is or should reasonably be aware that the particular patient, if warned of the risk, would be likely to attach significance to it".[3]

Therefore, risks are to be identified by both the surgeon and patient, and doctors should discuss risks they think are significant for the patient. When it comes to teaching, such discussions of risk need to be highlighted when any material risks are not reasonably mitigated in that context. Most medical student teaching is very closely supervised and involves observation of surgical procedures, assisting by holding retractors or simple technical tasks such as suturing wounds. It is hard to imagine an unmitigated risk occurring in that setting. Therefore, other than seeking permission for the students to be present/involved, no specific discussions need to be had regarding risks associated with teaching in these circumstances.

In comparison, an advanced surgical trainee, undertaking a highly complex procedure such as decompression of spine in a revision setting, where adhesions are present, may indeed carry an increased risk to the patient even if the trainee is being supervised. In this setting, the risks associated with training are not mitigated and they need be discussed with the patient.

SO THESE DISCUSSIONS CAN BE VERY DIFFICULT! AREN'T SURGEONS GOING TO SHY AWAY FROM THIS?

Being a surgeon means ascribing to a set of common values inherent to the vocation. Patients and society demand our trust. Trust cannot be established without us meeting our expectations to the society that we serve and we must adhere by the Patients Code of Rights. Therefore, if we are to truly obtain informed consent, then as surgeons we should strive to meet those obligations. Many aspects of surgery are difficult. Surgeons get good at what they do through deliberate practice. This also applies to the issue of consent.

The striving to meet those expectations is inherent to the nine core competencies that RACS aspire to attain in its surgeons. Communication, judgement, professionalism and ethics and finally scholarship and teaching all apply here. These are all part of the so called "non-technical" aspects of surgery. Arguably these are more important than the technical aspects because otherwise surgeons would be mere technicians on a production line. It is our hope that future surgeons will rise to the challenges of obtaining meaningful consent from patients which routinely includes the need for teaching and training.

LET'S SAY SUCH CONSENT DISCUSSIONS ARE HAD; DOCUMENTING SUCH CONSENT IS DIFFICULT, ISN'T IT?

There is no doubt about that especially with the advent of the electronic medical record. RACSTA recognised that there are variations across hospitals in New Zealand with regards to the documentation of surgical

consent and patient participation in surgical education. 94% of trainees responding to a special RACSTA survey indicated their hospital consent forms did not stipulate if they could attend or participate in surgery. We also recognised that relying on individuals to document discussion about consent in the clinical notes would be likely to have poor compliance. To improve this documentation, the NZ RACSTA representatives are currently reviewing the perioperative documentation form across all District Health Boards (DHBs) to establish if these all meet the requirements and to assess if they specifically capture the patients' willingness to participate in the teaching of all health professionals involved with their care (including students). RACSTA hopes that this will reduce the burden on those seeking consent from patients and would normalise it to be a standard part of obtaining consent for surgical procedures nationwide.

SUMMARY

We live in a world of increased societal expectations regarding information and informed decision making. Recent cases highlight the need for patients to have an informed discussion regarding their involvement in surgical training. It is ultimately the patient's right and we must strive to deliver care in a manner that preserves those rights.

TAKE HOME MESSAGES

- Patients have a right to informed consent for trainee/ student participation in surgery.
- Documentation of patients' consent to participate in teaching is critically important.
- Familiarise yourself with your hospital's policy on documentation of teaching consent.
- Be cognisant of the patients' context.
- Medical student involvement in surgical teaching is unlikely to be associated with an increased risk to patients.

REFERENCES

1. **Decision 13HDC01345 [Internet]**
Health and Disability Commissioner. [Cited 5 Mar 2017]
Available from http://www.hdc.org.nz/decisions--case-notes/commissioner's-decisions/2015/13hdc01345

2. **The code (full) [Internet]**
Health and Disability Commissioner. [Cited 5 Mar 2017]
Available from http://www.hdc.org.nz/the-act--code/the-code-of-rights/the-code-(full)

3. **Rogers v Whtaker (1992) HCA 58; CLR 479 [Internet]**
High Court of Australia. [Cited 5 Mar 2017]
Available from http://www.austlii.edu.au/au/cases/cth/HCA/1992/58.html

Venodilation methods improving patient selection for arteriovenous fistula surgery: the quest to achieve gold standard in haemodialysis

Lauren Smith
4th Year Medical Student
Otago Medical School
University of Otago

Mrs Gerry Hill
Department of Vascular Surgery
University of Otago
Dunedin Hospital

Dr Kate Thomas
Department of Vascular Surgery
University of Otago
Dunedin Hospital

Mr Paul Cessford
Department of Vascular Surgery
University of Otago
Dunedin Hospital

Mrs Lynda Anderson
Department of Vascular Surgery
University of Otago
Dunedin Hospital

Mrs Jo Krysa
Department of Vascular Surgery
University of Otago
Dunedin Hospital

Lauren Smith is a fourth year Medical Student at Christchurch School of Medicine. She has completed a degree majoring in Functional Human Biology and has received a prestigious scholarship in Biomedical Sciences and University of Otago Dux Scholarship. She has a keen interest in research, and a passion for reducing the disparities seen in indigenous and Pacific Island health.

ABSTRACT

Autologous arteriovenous (AV) fistula is the gold standard for vascular access in haemodialysis. Vein suitability is determined by a patient's vein diameter and the vein's ability to dilate. This study aimed to determine which of the following was most efficient.

1) arm in a water bath,
2) Bair Hugger air jacket (providing patients with warm air),
3) handgrip exercise, was most efficient at dilating the cephalic vein, compared to venous tourniquet.

In this cross-over study 12 patients with chronic kidney disease had their vein diameter measured by ultrasound for each of the three venodilation techniques. Each venodilation technique was measured with and without tourniquet, and compared with control tourniquet. The water bath was the most efficient and effective method, causing 21 ± 15% ($p = 0.0010$) increase in vein diameter after 10 minutes and 34 ± 15% ($p < 0.0001$) after 40 minutes with 1 minute tourniquet. The Bair Hugger air jacket was comparable but significant dilation was only achieved after 40 minutes with 1 minute tourniquet, 26 ± 16% ($p < 0.0001$). These results suggest that use of a water bath for preoperative vein mapping may increase the number of patients eligible for AV fistula. Given that AV fistula has a lower rate of complications than other forms of vascular access in haemodialysis, use of the water bath may be beneficial.

INTRODUCTION

Autologous arteriovenous (AV) fistula, formed by connecting a vein to an artery, is the gold standard for achieving vascular access for haemodialysis of patients with kidney failure. It has low rates of complications including thrombosis and infection, allowing it to stay functional for longer.[1]

Adequate vein diameter is crucial for successful AV fistula formation. Patients with vein diameters of <2 mm are rarely considered for an AV fistula.[2] Evidence for this comes from a study by Mendes et al. which showed that in patients with a cephalic vein diameter of <2 mm a successful fistula maturation was achieved in only 16% of cases.[3] Lockhart et al. used a tourniquet in preoperative vein mapping in order to induce venodilation. They suggested the optimal diameter was >2.5 mm and showed that out of the patients who could reach this diameter after applying a tourniquet, 33% formed successful fistulae.[4] This was a similar success rate to those with adequate vein diameter before tourniquet. These studies suggest that vein diameter and its ability to dilate play an important role in successful AV fistula formation.

The protocol in the Vascular Laboratory Depatment of Surgery at Dunedin Hospital is to use a tourniquet to dilate the vein prior to assessment. There is some evidence however that techniques other than tourniquet may be more effective at venodilation. A study by van Bemmelen et al. looked at several potential interventions including gravity, heat, supine positions, and tourniquet. They showed that submersion of the arm in 44°C water for 2 minutes increased the diameter most effectively.[5]
Current research into the different ways of dilating veins is limited even though a successful intervention aiming to maximise venous diameter could help with preoperative vein mapping where a patient's suitability for fistula is assessed. If a more effective method of venodilation is found this could be added to the current practice, which would increase the proportion of patients getting AV fistulas and improve those patients' overall outcome. This study aimed to determine whether peripheral heat using 40°C water immersion, central heat via a Bair Hugger air jacket or handgrip exercise is most effective at dilating veins, in comparison to tourniquet as the current practice. A Bair Hugger air jacket is a temperature management unit which allows effective and safe warming of a patient's body using warm air. To our knowledge there have been no

previous studies looking at all three interventions against tourniquet. The rationale behind these techniques was that heat and exercise improves blood flow, and therefore, should dilate the vein, particularly when used in conjunction with venous tourniquet.

METHODS

Participants

Twelve patients with either stage 4 or stage 5 chronic kidney disease were recruited for the study through the Dialysis Unit of Dunedin Hospital, after gaining written consent. The participants were either pre-dialysis or currently receiving peritoneal dialysis. They came into the lab between November 4 and December 7, 2015 for vein diameter assessments on three separate days. The order of the three interventions over the three days was randomly assigned at the beginning of the study using a Latin Square Design. These interventions were

1) arm in a water bath,

2) Bair Hugger air jacket to provide central heating, and

3) handgrip exercise.

To standardise participants' status prior to each assessment, participants were instructed to be well-hydrated. Specifically, they were asked to drink at least one litre of fluid the day before each session and to avoid tea and coffee that morning. They were also tested at the same time of day for each of their three assessments to help reduce possible diurnal variation. Height and weight was measured at the beginning of the first visit, and information was gained on age, co-morbidities and medications. Hospital records were used to confirm any co-morbidities and to gain results of current creatinine and eGFR levels.

INTERVENTIONS

On arrival, the patient rested supine in a warm room (~22-24°C) for 15 minutes before the first baseline measurement, which measured vein diameter without tourniquet or interventions. A temperature data logger (Squirrel SQ2010, Grant Instruments, Cambridge, UK) recorded skin temperature over time using probes applied to the forearm and shoulder on the same side as the intervention to measure its effects, and ear on the opposite side of the intervention, for accessibility. The cephalic vein was measured in transverse section using a high-resolution ultrasound transducer (12 MHz), from inner wall to inner wall in the proximal, mid, and distal forearm. The locations were marked on the skin and recorded as a distance from the elbow crease, in case re-measurement was required, to ensure consistent measurements within subjects each time they were assessed. The sonographer was unable to be blinded from the interventions, however there was blinding of the analysis to minimize observer bias.

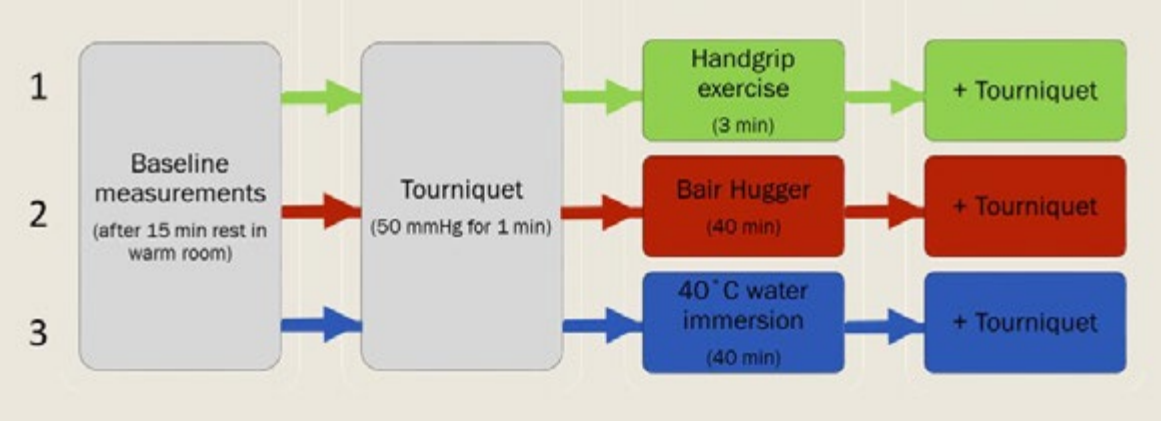


Figure 1. Study protocol for each of the three interventions, 1) arm in a water bath, 2) Bair Hugger air jacket, and 3) handgrip exercise

After doing baseline measurements, venous occlusion by tourniquet (standard protocol) was carried out as a control (Fig. 1). This involved inflating a blood pressure cuff around the upper arm to 50 mmHg for 1 minute prior to ultrasound measurement. Nelson et al. showed no difference in vein diameter when using BP cuff compared with tourniquet, and it is easier to be consistent between participants when using the BP cuff as 50 mmHg pressure can be maintained, which is why it was chosen.[6]

Next, one of the three interventions were conducted as follows. The water bath intervention consisted of placing the participants' forearm in a bath of 40°C water for 40 minutes, measuring vein diameter every 10 minutes while the arm was in the water. After this a tourniquet was applied for an additional minute with the arm remaining in the water, followed by a final measurement.

For the Bair Hugger air jacket intervention, the participants' body (including arms) was placed into a Bair Hugger air jacket. The participants wore the Bair Hugger air jacket for 40 minutes and with measurements every 10 minutes followed by 1 minute of using a tourniquet in conjunction with the Bair Hugger air jacket. The participants arm was removed from the Bair Hugger jacket for measurement (approximately 30 seconds).

In the handgrip intervention, the patients performed a handgrip exercise of continuous contractions for 3 minutes without tourniquet followed by another 3 minute hand grip exercise with tourniquet. Vein diameter was measured after both exercises.

Ethical approval was obtained by the University of Otago Human Ethics Committee for this research.

STATISTICAL ANALYSIS

The percentage increase in vein diameter was calculated from baseline for each measurement. Repeated measures two-way ANOVA was used to compare the three measurement sites and showed no statistical significance, so all measurement sites for each intervention was averaged. Repeated measures two-way ANOVA was used to compare the interventions and the dilation within each phase of the study (control tourniquet, intervention, and intervention with tourniquet), and a Sidak correction for controlling for multiple comparisons was used.[7] 3 minutes of handgrip exercise was compared to 40 minutes of Bair Hugger air jacket and water bath. Data were analysed using GraphPad Prism version 6.0 for Windows (GraphPad Software, La Jolla California USA). Data are given as mean ± 95% CI, unless otherwise stated.

To determine if the interventions were effective in the group with smaller vein diameters the subjects were also split into two groups for analysis: those with a distal cephalic vein diameter after tourniquet of <3 mm and those with >3 mm diameter. One participant was excluded due to only having a vein of <3 mm for 2 of the 3 days after the control tourniquet measurement. The two groups, those with <3 mm and >3 mm veins, were compared using two-way ANOVA.

RESULTS

Table 1 Demographic and clinical data.

Characteristic	< 3 mm group, n (%) or mean ± SD	> 3 mm group, n (%) or mean ± SD	Total, n (%) or mean ± SD
Total patients in analysis	4 (100)	8 (100)	12 (100)
Age (y)	61 ± 11	62 ± 11	62 ± 11
Gender			
Male	1 (25)	8 (100)	9 (75)
Female	3 (75)	-	3 (25)
BMI			
Normal <24.9 kg/m^2	3 (75)	3 (37.5)	6 (50)
Overweight 25-29.9 kg/m^2	0 (0)	2 (25)	3 (25)
Obese >30 kg/m^2	1 (25)	3 (37.5)	4 (33)
Co-morbidities			
Type II diabetes	1 (25)	3 (37.5)	4 (33)
Hypertension	4 (100)	8 (100)	12 (100)
Hyperlipidaemia	1 (25)	5 (71.4)	6 (50)
Cardiac problems	2 (50)	3 (37.5)	5 (42)
Peripheral vascular disease	1 (25)	1 (12.5)	2 (17)
Ex-tobacco use*	2 (50)	4 (50)	6 (50)
Chronic kidney disease			
Stage 4	-	2 (25)	2 (17)
Stage 5	4 (100)	6 (75)	10 (83)
Creatinine (umol/L)	438 ± 108	442 ± 132	440 ± 119
eGFR (mL/min/1.73m2 L)	10 ± 3	12 ± 4	11 ± 4

Abbreviations are: BMI, Body Mass Index; eGFR, estimated glomerular filtration rate

* no current smokers

In short, 12 participants (75% male, age mean ± SD: 62 ± 11 years) came into the vascular laboratory on three separate occasions to see the effect of hand exercise, water bath and Bair Hugger air jacket on participants' venous diameter. The majority of these participants (83%) had stage 5 CKD, while the rest had stage 4 (Table 1).

The effect of interventions on all participant's cephalic vein diameter.

A comparison of results of all three interventions and their effect on the vein diameter is represented in Figures 2, 3 and 4. Handgrip exercise was carried out for 3 minutes without tourniquet followed by 3 minutes with tourniquet, with vein diameters taken after each. After 3 minutes of handgrip exercise the vein diameter reduced 7 ± 21 % ($p = 0.93$) and increased with tourniquet by 13 ± 21 % ($p = 0.41$) compared with the control measurement, neither of which were statistically significant (Fig. 2).

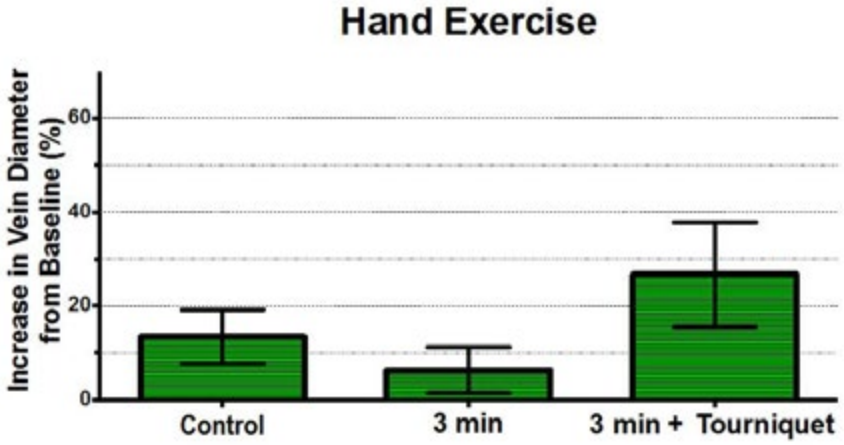


Figure 2. Average percentage increase in cephalic vein diameter in response to hand exercise. The error bars indicate the SEM.

The Bair Hugger air jacket was applied for 40 minutes, with the addition of 1 minute of tourniquet at the end, with measurements being taken every 10 minutes to see its effect on vein diameter. The Bair Hugger air jacket caused a statistically significant increase in vein diameter from control measurement of 26 ± 16% ($p < 0.0001$) only after 40 minutes of Bair Hugger air jacket with 1 minute tourniquet (Fig. 3). However, no significant increase was seen with any other time interval of applying the Bair Hugger air jacket. The right arm needed to be taken out of the Bair Hugger air jacket to be measured, which also caused a drop-in arm temperature of 0.5-2.0 °C, recorded by the temperature data logger. The shoulder temperature did not drop however, but gradually increased 4-5 °C over the 40 minutes

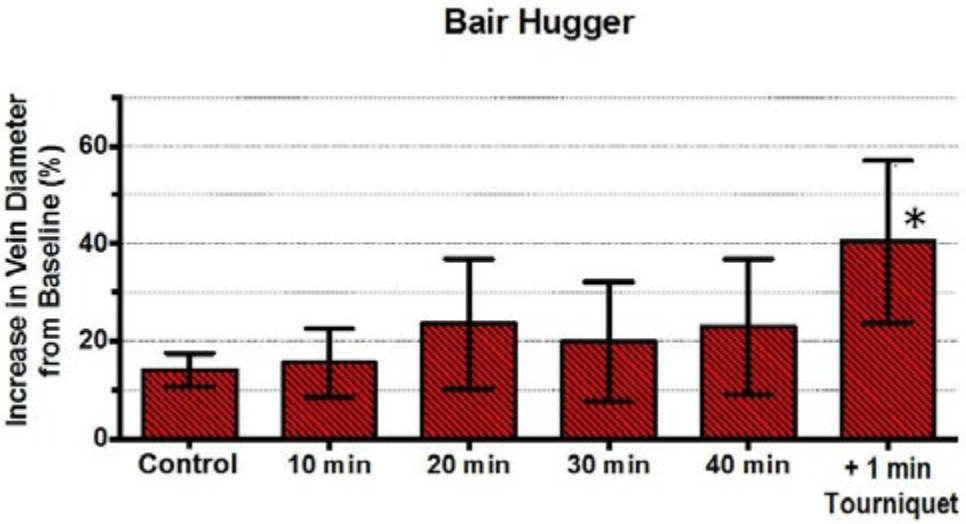


*Figure 3. Average percentage increase in cephalic vein diameter in response to Bair Hugger air jacket. The error bars indicate the SEM. * indicates a significant difference from the control measurement.*

The right arm was immersed in the water bath 40 minutes, with the addition of 1 minute of tourniquet at the end, with measurements being taken every 10 minutes to see its effect on vein diameter. Incubation in the water bath caused a statistically significant increase in vein diameter compared with the control measurement for all lengths of incubation tested in the study.

The 10 minute incubation resulted in increase of vein diameter by 21 ± 15% ($p = 0.0010$), whilst 40 minutes incubation led to an increase by 28 ± 15% ($p < 0.0001$). When used in conjunction with tourniquet, the water bath caused a mean increase of 34 ± 15% ($p < 0.0001$) compared with the control measurement (Fig. 4).

The degree of venodilation caused by the water bath was significantly greater than that of the Bair Hugger air jacket after 10 - 40 minutes ($p < 0.0001$ after 10, 30 and 40 minutes, $p = 0.0006$ after 20 minutes). However, after the use of 1 minute tourniquet directly after 40 minutes of the intervention there was no significant difference between the water bath and Bair Hugger air jacket groups (9 ± 13% ($p = 0.30$)).

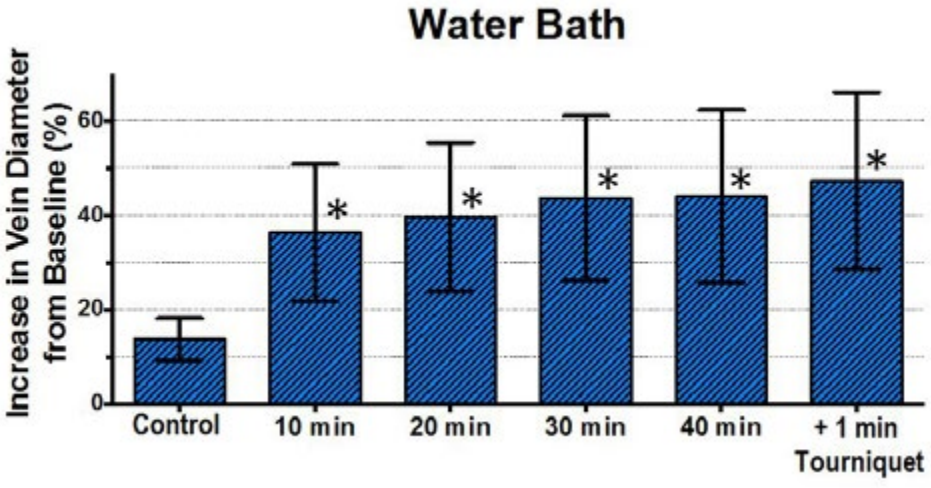


*Figure 4. Average percentage increase in cephalic vein diameter in response to water bath. The error bars indicate the SEM. * indicates a significant difference from control measurement.*

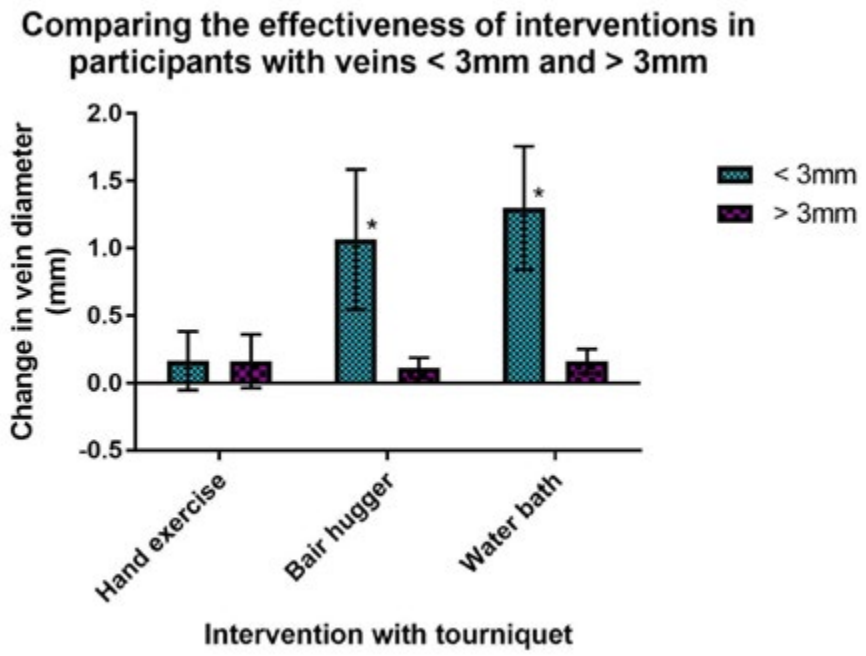


*Figure 5 Comparing the effect of the three interventions on veins of <3 mm or >3 mm. The change in diameter from the control measurement to 40 min of the intervention with tourniquet is shown.The error bars indicate the mean with SEM. * indicates a significant difference between <3 mm group and <3 mm group.*

If used in practice, the intervention would be most needed in those patients which do not reach eligibility criteria for AV fistula, which are those with <3 mm veins, therefore it is important these interventions work effectively in this group of people. To assess this the participants were split into two groups, those with <3 mm and >3 mm veins, and their results are shown in Figure 5. In participants that already had a vein diameter of >3 mm after the control measurement, the benefit from the three interventions was not statistically significant (hand exercise p = 0.63, Bair Hugger air jacket p = 0.84, water bath p = 0.63). There was a large increase in vein diameter in participants with veins <3 mm after water bath of 1.30 ± 0.30 mm (p = 0.038) compared with the control measurement. Bair Hugger air jacket caused an increase in vein diameter of 1.01 ± 0.30 mm compared with control measurement in those with <3 mm veins, although this was not statistically significant (p = 0.0718) (Fig. 5). The Bair Hugger air jacket had a significantly larger effect on vein diameter in the <3 mm vein group with a difference of 0.95 ± 0.83 (p = 0.0198), as did the water bath with a difference of 1.14 ± 0.83 (p = 0.0048). This means the interventions appear to be more effective in those participants with <3 mm veins.

The effect of interventions on <3 mm vein diameter group

Table 2 Total Number of Participants reaching 3 mm vein diameter (no. #)

	Bair Hugger	Water bath
Control	9	8
10 min	9	10
20 min	9	10
30 min	9	10
40 min	10	11
40 min + 1 min tourniquet	11	10

The number of participants reaching the criteria for AV fistula of 3 mm cephalic vein was determined to see if the effect of the interventions differs from current protocol with regards to patients reaching eligibility criteria. After 10 minutes of water bath two additional participants reached criteria (3 mm), followed by another one after 40 minutes of water bath (11/12 participants). Bair Hugger air jacket caused one participant to reach the criteria after 40 minutes, and another one with tourniquet (11/12 participants). One participant did not reach the criteria regardless of the intervention.

DISCUSSION

Results showed that the water bath was the most efficient and effective mechanism for dilating the cephalic vein, taking the least time to reach a significant dilation (10 minutes) of 21 ± 15% (p = 0.0010), and achieving the largest vein dilation of 34 ± 15% (p < 0.0001). This is beneficial as there is a limited amount of time with each patient when they come in for preoperative vein mapping, making the efficiency of the venodilation process advantageous.

In the participants with vein diameter of <3 mm the greatest results were seen using the Bair Hugger air jacket and water bath interventions. This is promising as this is the cohort which would not be put forward for the AV fistula application under the current protocol. There was no effect from the handgrip exercise seen in this group of participants, which suggests it is not a good method for dilating veins.

In this study, there were still several participants who managed to meet the criteria for AV fistula after using the water bath or Bair Hugger air jacket, who did not after control tourniquet which is the current protocol. The water bath allowed three of these participants to meet the criteria; two of them after only 10 minutes, one after 40 minutes. The Bair Hugger air jacket took 40 minutes with tourniquet to have a significant effect on vein diameter (26 16%, p < 0.0001) compared with 10 minutes for water bath (21 ± 15%, p = 0.0010), and also took 40 minutes to allow 1 participant to reach eligibility criteria for fistula formation compared with 10 minutes for water bath. The water bath is therefore a more efficient method of dilating veins which is supported by van Bemmelen et al. which showed that immersion of the arm in warm water (44 °C) for 2 minutes caused significant vein dilation. [5] The study by van Bemmelen only involved immersion for 2 minutes in warm water however this

study did it for a total of 40 minutes, measuring every 10 minutes.[5] This is because the interventions were used in test participants and the vein diameter continued to increase up to 40 minutes, for both water bath and Bair Hugger air jacket, so to get a full representation of the effect 40 minutes was chosen. There was quite a quick increase within the first 10 minutes for the water bath, but the vein diameter within this time was not recorded which is a potential limitation. However measurements were only done every 10 minutes as each measurement with the Bair Hugger air jacket is 30 seconds when the arm is not being heated, therefore affecting the vein dilation. To keep measurements consistent, both the Bair Hugger air jacket and water bath were measured every 10 minutes rather than at smaller intervals.

Other advantages to using a water bath for vein dilation were found in this study. During the water bath procedure, the ultrasound probe could be placed under the water in such a way that no direct pressure needed to be applied to the arm (act as a standoff) whereas above the water gel is required, which could have altered the vein diameter slightly. This meant that the probe would not cause any compression of the vein when below the water. An accurate measure of diameter could then be obtained. In addition, the temperature is more stable with the water bath as the arm can remain in the water during measurements, in contrast to the Bair Hugger air jacket which required the arm to be removed from the jacket and into cooler air to do the measurement. This may have reduced the dilation of the vein when using the Bair Hugger air jacket, but also demonstrates a benefit of the water bath. Most vascular labs would not have their own water bath or Bair Hugger air jacket system, therefore one would need to be purchased for the unit if it was used, which could be a barrier to its use for preoperative vein mapping. Once purchased however the water bath is very cost effective as only the water needs to be replaced, while the bath itself is re-used each time, unlike the Bair Hugger air jacket where each patient uses a new jacket for hygiene reasons.

Limitations of this study include the small sample size and possible gender bias. In addition, there was only 4 participants who had <3 mm veins, which is the group of people these results are most likely to affect as they would currently not be put forward for an AV fistula. Ideally the study would have more participants with <3 mm veins to ensure the intervention functions effectively in these individuals, so future studies should look specifically at this group. Measuring the participant's arm outside the Bair Hugger air jacket was also a limitation as this could have affected the vein dilation, however we were unable to find a solution for this as it is more a limitation of the Bair Hugger air jacket. Another limitation is the inability to blind the sonographer to the interventions, which could create observer bias.

This research will be continued by using a water bath on patients who come in to the Vascular Laboratory for preoperative vein mapping and have a vein diameter of <3 mm after tourniquet. The results will be prospectively audited to see if water bath increases the number of patients being put forward for AV fistula formation, compared with venous tourniquet alone and to determine if these patients go on to form successful AV fistulae.

CONCLUSION

Overall, the water bath was the most effective and efficient mechanism for dilating veins prior to using them to form the AV fistula. The methods used in this study were assessed in comparison with the use of venous tourniquet, a current standard practice. Although the study was conducted on a small number of participants, thanks to using the water bath, several participants met the criteria for the procedure of AV fistula. If used during preoperative vein mapping, water bath could improve the ability to assess each patient's vein diameter and increase the number of patients receiving AV fistula, which is the gold standard for haemodialysis.

ACKNOWLEDGEMENTS

The author gratefully acknowledge the Otago Medical Research Foundation for providing the Southern Victorian Charitable Trust Summer Scholarship. They would also like to thank the participants for taking the time to be in this study.

The author has no conflict of interest to declare.

REFERENCES

1. Santoro D, Benedetto F, Mondello P, et al.
Vascular access for hemodialysis: current perspectives.
Int J Nephrol Renovasc Dis. 2014;2014(7): 281-94

2. Vascular access for hemodialysis [Internet]
National Institute of Diabetes and Digestive and Kidney Disease. [Coted 6 Aug 2015]
Available from http://www.niddk.nih.gov/health-information/health-topics/kidney-disease/vascular-access-for-hemodialysis/Pages/index.aspx

3. Mendes RR, Farber MA, Marston WA, et al.
Prediction of wrist arteriovenous fistula maturation with preoperative vein mapping with ultrasonography.
J Vasc Surg. 2002;36(3):460-3

4. Lockhart ME, Robbin ML, Fineberg NS, et al.
Cephalic vein measurement before forearm fistula creation: does use of a tourniquet to meet the venous diameter threshold increase the number of usable fistulas?
J Ultrasound Med. 2006;25(12):1541-5.

5. van Bemmelen PS, Kelly P, Blebea J.
Improvement in the visualization of superficial arm veins being evaluated for access and bypass.
J Vasc Surg. 2005;42(5):957-62.

6. Nelson D, Jeanmonod R, Jeanmonod D.
Randomized trial of tourniquet vs blood pressure cuff for target vein dilation in ultrasound-guided peripheral intravenous access.
Am J Emerg Med. 2014;32(7):761-4

7. Abdi, H.
The Bonferonni And Šidák Corrections For Multiple Comparisons.
Encyclopedia of measurement and statistics. 2007;:1-9

Psychological factors in psoriasis management

Anna Perera
5th Year Medical Student
School of Medicine
University of Auckland

Anna Perera is a 5th year medical student at Middlemore Hospital. Having completed an MSc in Health Psychology prior to starting medicine, she has an interest in the application of psychological concepts and techniques in the clinical context.

ABSTRACT

Psoriasis is chronic, immune-mediated disease of the skin and joints, which typically follows a relapsing and remitting course. Clinical manifestations of the disease most commonly involve the development of well-demarcated, erythematous, scaly plaques on the scalp, knees, back, and extensor surfaces of the elbows. Psoriasis can have a significant detrimental impact on the psychological health of patients, and similarly, the experience of psychosocial stress plays an important role in exacerbations of the disease. This review explores the significance of psychological factors in the context of psoriasis and discusses the efficacy of psychological and stress-reduction interventions in improving outcomes. The resulting implications for management of psoriasis will also be highlighted.

INTRODUCTION

Psoriasis is a chronic, inflammatory skin condition affecting approximately 3% of the adult population.[1] It is characterised by the development of scaly, erythematous plaques which are raised and well-demarcated. Lesions commonly occur on the elbows, knees and scalp. The severity of the disease ranges from mild psoriasis involving localisation of plaques on a single body part, to severe psoriasis where there is extensive coverage of the body and involvement of regions such as the hands, face, and genital regions, causing significant functional disruption. Furthermore, the severity of the disease is likely to vary considerably over the individual's life course, with the experience of exacerbations commonplace.[2, 3]

Psychosocial Stress and Psoriasis

In addition to physical symptoms of psoriasis, psychosocial stress is inherently associated with the disease process. It is widely accepted that there is a positive temporal association between the experience of stress and the onset of psoriasis, and psoriatic exacerbations.4 Evidence suggests that psoriasis can have a significant psychological burden on patients,[5] accordingly, the assessment of psoriasis severity not only includes the physical manifestations of the disease but also the degree to which the individual is psychosocially disabled by their condition.[6]

Evidence shows that both low-grade chronic stress and major stressful events can have a detrimental effect on the prognosis of immune-mediated conditions such as psoriasis.[7] Numerous studies have reported an association between stress and psoriasis, both with regard to the onset of psoriasis and disease exacerbations.[8, 9] Between 39% and 72% of patients report the occurrence of a stressful life experience in the one month prior to their first episode of psoriasis.[10, 11] A significant proportion (~60%) of individuals with psoriasis also cite stress as a precipitating factor in exacerbations of their condition.[12] When compared to individuals with other dermatological conditions, such as urticaria, acne, and basal cell carcinoma, people with psoriasis are more likely to report a stressful event as preceding the onset of disease exacerbations, demonstrating the significant role of stress exposure for the onset, and progression of psoriasis.[13, 14]

It is important to note that while psychosocial stressors can result in the manifestation of psoriasis symptoms, the disease itself can have a considerable detrimental impact on a person's psychological wellbeing. Psoriasis can be disfiguring and elicit stigmatisation. The condition requires adherence to recommended treatment and necessitates increased engagement with healthcare services, all of which can impair a person's quality of life and increase their likelihood of psychosocial comorbidity.[15, 16] Both depression and anxiety are more prevalent among patients with psoriasis when compared to healthy controls and patients with other dermatological conditions such as vitiligo, lichen planus, and leprosy. A vicious cycle can eventuate for the psoriasis patient, whereby psychosocial stress can trigger physical symptoms. In turn the disease-associated stress is amplified, causing further exacerbation of psoriasis symptoms and perpetuation of the disease.[5, 17]

Despite the well-recognised link between psychosocial stress and heightened disease manifestation in psoriasis, the pathophysiological mechanisms underlying this relationship are not yet fully understood.[2] An important aspect appears to be downregulation of the hypothalamic-pituitary-adrenal (HPA) axis, as a consequence of chronic activation due

to constant stress exposure. Richards et al. found that, compared to healthy controls, patients with psoriasis exhibited lower baseline levels of salivary cortisol and a reduced serum cortisol response to a stress task.[18] Unlike the control group, psoriasis patients demonstrated no correlation between serum cortisol and pulse rate before, during, or after the stress task, which suggests a degree of dysregulation between the HPA axis and the sympathetic-adrenal-medullary pathway.[18]

Comparing HPA axis activation between healthy controls and patients with psoriasis is complex, given the large degree of heterogeneity between groups. Thus, some researchers have focussed solely on patients with psoriasis and have attempted to identify differences within the patient group that have associations with stress.[19] Individuals with psoriasis who report exposure to high levels of stressors exhibit greater clinical severity of the disease and lower mean cortisol levels, when compared to their less stressed counterparts.[18,20] Similarly, Gupta et al observed that people with psoriasis who had increased exposure to stress and considered themselves 'stress reactive' had a reduced cortisol response after exposure to a stressful event in an experimental paradigm.[6] While there may be considerable individual variation between people with psoriasis in terms of physiological responses to psychosocial stress, the role of stress in facilitating the onset of the disease and eliciting exacerbations is widely accepted in the literature.[21]

PSYCHOLOGICAL AND STRESS-REDUCTION INTERVENTIONS

Given the importance of psychosocial stress, it follows that psychological interventions may be beneficial to people with psoriasis. In particular, stress management techniques such as mindfulness, relaxation, and biofeedback, which aim to reduce physiological arousal and augment psychological adaptation to adverse situations, have been shown improve the symptoms of psoriasis.[21,22]

A study by Kabat-Zinn et al. highlighted the efficacy of mindfulness-based stress-reduction (MBSR) in increasing the healing rate of psoriatic lesions. MBSR utilises a combination of mindfulness meditation and body awareness, with the aim of helping an individual to self-regulate in an adaptive manner, and consequently achieve stress-reduction and relaxation.[23] Individuals with psoriasis who were undergoing UV treatment were randomised into a control group that received only UV treatment or an experimental group that listened to a guided MBSR audio-recording during their treatments. The intervention was effective in changing individuals' perceptions surrounding their illness and treatment, namely,

a) increasing positivity about their treatment,

b) increasing belief in the extent to which they thought treatment was helping their condition, and

c) eliciting a greater degree of relaxation.

What was most significant was how these changes facilitated an improved clinical outcome, whereby individuals in the experimental group exhibited an increased rate of healing of psoriatic lesions.[23] The positive effect of MBSR on both psychological and physical indicators of disease severity suggest that it would be a useful adjunct to standard treatment.

Similarly, Zachariae et al. found that the addition of psychotherapy incorporating stress management, guided imagery, and relaxation training to standard treatment was effective in reducing psoriasis symptoms.[19] Specifically, individuals who received the 12 week psychotherapy intervention displayed significant reductions in Psoriasis Area Severity Index (PASI) scores and Total Sign Scores, and exhibited decreased blood flow to plaques relative to patients who received standard treatment.[19] The combination of relaxation training and biofeedback has also been shown to augment disease outcomes, with psoriasis patients receiving such an intervention reporting significant symptom improvement relative to those who were only given pharmacological treatment and phototherapy.[24]

The addition of cognitive behavioural therapy (CBT) to standard pharmacologic treatment has been shown to elicit reductions in clinical disease severity, psychological distress, and overall disability in patients with psoriasis.[25] The aim of CBT is to explore the relationship between an individual's cognitions, behaviours, and emotions. Evidence shows that elucidating such associations will encourage the individual to develop more adaptive coping strategies that are less physiologically and psychologically taxing. Fortune et al conducted a randomised controlled trial to evaluate the efficacy of a six-week CBT programme that incorporated relaxation techniques.[26] The intervention also placed emphasis on maladaptive cognitions about psoriasis and provided support to patients on how best to manage such beliefs in their daily life. Participants who received this intervention as an adjunct to their normal clinical care showed a significant reduction in PASI scores at six weeks and at six months follow-up, whereas individuals who received only standard care exhibited no significant reductions at either time point. Furthermore, 64% of patients exposed to the intervention achieved greater than 75% clearance of their psoriasis at six months, compared with 23% of standard care group. Improvements with regard to anxiety, depression, and self-reported disability were also obtained in the experimental group, with maintenance at six months follow-up.[26]

While the efficacy of stress-reduction interventions highlights their use as adjunctive treatments for psoriasis, it is important to take a considered approach when analysing findings. One must take into account the influence of expectancy when interpreting observed differences in psychosocial distress and symptom manifestation between experimental and control groups. Specifically, a patient's expectation that the intervention will have a positive effect may reduce psychological distress and elicit reductions in disease severity, rather than the relaxation and stress-reducing components of the intervention.[23] In addition, the long-term use of stress-reduction as a means to reduce the symptoms of psoriasis is unknown. Given that psoriasis is a lifelong condition, it would be useful to know whether such interventions need to be delivered on a regular basis to maintain any gains in clinical outcome.[21]

Although current experimental evidence only highlights the clinical benefits of short-term stress-reduction, it is hoped that employment of such strategies will also be advantageous for psoriasis management in the long-term. Phototherapy and pharmacologic treatments can bring about significant clinical benefit, but they are by no means a cure for the disease. Stress-reduction interventions have the potential to benefit patients greatly, as they have the capacity to reduce the clinical symptoms of psoriasis and to lower the degree of psychosocial stress associated with the disease, both of which are likely to have a significant bearing on the overall level of disability experienced by patients.[15,27] The literature suggests that the addition of arousal reduction strategies, such as de-stressing and relaxation, to standard treatment is likely to augment improvements in clinical severity and overall disability.[3]

Engagement in arousal reduction strategies would likely have most clinical benefit for patients with psoriasis who considered themselves to be 'stress-reactive' and clearly able to identify associations between stressful experiences, and psoriatic exacerbations. Similarly, if a patient reports increased exposure to stress, either due to stressful life events or low-grade chronic daily stressors, it is very likely that these techniques will help reduce the severity of his or her psoriasis.[18,20] However, while stress-reduction can aid significantly in managing psoriasis, the clinician has a responsibility to emphasise to the patient that de-stressing and relaxation are not a replacement for conventional pharmacologic treatment or phototherapy. Rather, attempts to reduce psychosocial stress should be framed as an adjunctive treatment, which can assist in achieving optimal clinical outcomes.[32] Another important factor to consider is if the patient is experiencing clinically significant level of psychosocial stress. If this is the case, and the patient is also considered to be at high risk of developing a psychiatric co-morbidity such as anxiety or depression, it would be appropriate to recommend a more intensive intervention, such as tailored psychological therapy from a health psychologist or psychoactive medications from their general practitioner.[6]

Therefore, when considering the clinical management of people with psoriasis and making treatment recommendations, it is imperative that clinicians employ a holistic perspective, incorporating the biopsychosocial model of illness.[27] To ensure optimal care is provided to patients, it would be pertinent to encourage management of psychological stress through means such as stress-reduction and relaxation.[28] In particular, using de-stressing and relaxation techniques to cope with psoriasis-associated stress such as reduced self-confidence, the experience of stigma due to visible plaques, and exacerbation-related disruptions to normal routine, would be advised. Referring patients to web-based resources (e.g. www.mypsoriasis.co.nz[29]) and psoriasis support organisations (e.g. Psoriasis Association[30]) would also be useful in helping integrate stress-reduction and relaxation into their lives.

CONCLUSION

Psychosocial stress is inherently linked to the clinical manifestations of psoriasis. Accumulating evidence suggests that stressful experiences can have a considerable detrimental impact on disease severity and increase the overall level of disability experienced by patients.[6] While the exact underlying physiological mechanisms are still unclear, it is thought that psychological stress facilitates the onset of psoriasis and elicits disease exacerbations through down-regulation of the HPA axis.[2, 18] Accordingly, interventions such as MBSR and CBT, which incorporate stress-reduction and relaxation, are effective in improving the clinical parameters of psoriasis as well as reducing psychological distress.[21,23,26] Evidently, effective management of psoriasis necessitates consideration of the psychosocial health of the patient in addition to standard pharmacologic treatment and phototherapy. It is strongly advised that people with psoriasis make attempts to reduce stress and integrate relaxation into their daily routines. Employment of such strategies are likely to help patients greatly in managing psoriasis, through limiting progression and recurrences of the disease, and preventing the development of complications.[13, 28]

REFERENCES

1. Rachakonda TD, Schupp CW, Armstrong AW.
Psoriasis prevalence among adults in the United States.
J Am Acad Dermatol 2014;70:512-516.

2. Nestle FO, Kaplan DH, Barker J.
Psoriasis.
New Engl J Med 2009;361:496-509.

3. Ghaffar SA, Clements SE, Griffiths CEM.
Modern management of psoriasis.
Clin Med 2005;5:564-568.

4. Hunter HJA, Griffiths CEM, Kleyn CE.
Does psychosocial stress play a role in the exacerbation of psoriasis?
Brit J Dermatol 2013;169:965-974.

5. Fortune DG, Richards HL, Griffiths CEM.
Psychologic factors in psoriasis: consequences, mechanisms, and interventions.
Dermatol Clin 2005;23:681-694.

6. Gupta MA, Gupta AK.
Psychiatric and psychological co-morbidity in patients with dermatologic disorders: Epidemiology and management.
Am J Clin Dermatol 2003;4:833-842.

7. Cohen S, Doyle WJ, Skoner DP.
Psychological stress, cytokine production, and severity of upper respiratory illness.
Psychosom Med 1999;61:175–80.

8. Fortune DG, Richards HL, Corrin AR, Taylor RJ, Griffiths CE, Main CJ.
Automatic vigilance for psoriasis-specific and psychosocial threat in patients with psoriasis.
J Behav Med 2003;26:211–24.

9. Gaston L, Lassonde M, Bernier-Buzzanga J, Hodgins S.
Psoriasis and stress: A prospective study.
J Am Acad Dermatol 1987;17:82-86.

10. Seville RH.
Psoriasis and stress.
Br J Dermatol 1977;97:297-302.

11. Polenghi MM, Molinari E, Gala C, Guzzi R, Garutti C, Finsi AF.
Experience with psoriasis in a psychosomatic dermatology clinic.
Acta Derm Venereol (Stockh) 1994;186:65-66.

12. Fortune DG, Richards HL, Main CJ, Griffiths CEM.
What patients with psoriasis believe about their condition.
J Am Acad Dermatol 1998;39:196-201.

13. Al'Abadie MS, Kent GG, Gawkrodger DJ.
The relationship between stress and the onset and exacerbation of psoriasis and other skin conditions.
Br J Dermatol 1994;130:199-203.

14. O'Leary CJ, Creamer D, Higgins E, Weinman J.
Perceived stress, stress attributions and psychological distress in psoriasis.
J Psychosom Res 2007;62: 611-619.

15. Richards HL, Fortune DG, Griffiths CEM, Main CJ.
The contribution of perceptions of stigmatisation to disability in patients with psoriasis.
2001;50:11-15.

16. Kurd SK, Troxel AB, Crits-Christoph P, Gelfand JM.
The risk of depression, anxiety, and suicidality in patients with psoriasis: A population-based cohort study.
Arch Dermatol 2010;146:891–895.

17. Richards HL, Fortune DG, Griffiths CE, Main CJ.
The contribution of stigmatization to disability in patients with psoriasis.
J Psychosom Res 2001;50:11-15.

18. Richards HL, Ray DW, Kirby B, et al.
Response of the hypothalamic-pituitary-adrenal axis to psychological stress in patients with psoriasis.
Brit J Dermatol 2005;153:1114-1120.

19. Zachariae R, Oster H, Bjerring P, Kragballe K.
Effects of psychological intervention on psoriasis.
J Am Acad Dermatol 1996;34:1008-1015

20. Evers AM, Verhoeven EWM, Kraaimaat FW, et al.
How stress gets under the skin: cortisol and stress reactivity in psoriaris.
Brit J Dermatol 2010;163:989-991.

21. Fordham B, Griffiths CEM, Bundy C.
Can stress reduction interventions improve psoriasis? A review.
Psychol Health Med 2013;18:501-514.

22. Lavda AC, Webb TL, Thompson AR.
A meta-analysis of the effectiveness of psychological interventions for adults with skin conditions.
Brit J Dermatol 2012;167:970-979.

23. Kabat-Zinn J, Wheeler E, Light T, et al.
Influence on a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (UVA).
Psychosom Med 1998;60:625-632.

24. Keinan KS, Segal A, Gal U, Brenner S.
Stress management for psoriasis patients: The effectiveness of biofeedback and relaxation techniques.
Stress Manag 1995;11:235-241.

25. de Korte J, Van Onselen J, Kownacki S, Sprangers MA, Bos JD.
Quality of care in patients with psoriasis: an initial clinical study of an international disease management programme.
J Eur Acad Dermatol Venereol 2005;19:35-41.

26. Fortune DG, Richards HL, Kirby B, Bowcock S, Main CJ, Griffiths CE.
A cognitive-behavioural symptom management programme as an adjunct in psoriasis therapy.
Brit J Dermatol 2002;146:458-465.

27. Rapp SR, Exum ML, Reboussin DM, Feldman SR, Fleischer A, Clark A.
The physical, psychological, and social impact of psoriasis.
J Health Psych. 1997;2:525-537.

28. Janowski K, Pietrzak A.
Indications for psychological intervention in patients with psoriasis.
Dermatol Ther 2008;21:409-411.

29. My Psoriasis [Internet].
Wellington: Abbvie; c2014-2017 [cited 25 Jul 2016].
Available from http://www.mypsoriasis.co.nz

30. Psoriasis Association of Southland [Internet].
Invercargill: Psoriasis Association; c2013-2017 [cited 25 Jul 2016].
Available from http://www.psoriasis.org.nz/living-with-psoriasis

Varicella in a peripartum woman with serological evidence of previous infection, and subsequent neonatal infection

Boris Yow
6th Year Medical Student
School of Medicine
University of Auckland

Boris is a 6th year medical student from the university of Auckland. He is currently completing his training in the Waikato region on the North Island. Being of Hong Kong descent and witnessing the SARS epidemic, he found infectious diseases interesting and enjoyed his selective in infectious diseases at Middlemore hospital.

ABSTRACT

Chickenpox or primary varicella is a common childhood exanthem. Adult primary varicella is a serious but rare infection because lifelong immunity is typically acquired after childhood exposure. There are, however, case reports of clinical re-infection in the literature. Varicella in pregnancy may have multiple complications for both the mother and fetus. This is a case report of a pregnant woman who developed clinical varicella in the peripartum period despite serological evidence of previous infection. Her baby subsequently developed neonatal varicella two weeks after delivery and discharge. This report discusses the phenomonon of varicella re-infection and highlights the need to maintain a high index of suspicion for varicella in at-risk populations.

CASE

Patient consent for case report obtained verbally.

A 30-year-old gravida 2 para 1 woman at 39 weeks gestation by dating ultrasound scan presented to the delivery suite with painful regular contractions. She was assessed to be in the active phase of stage 1 labour by the midwife. The midwife noted a generalised rash which progressed over several hours and requested an obstetric review.

The patient recalled that the rash started one day ago around her upper chest. She was intending to visit her family doctor but presented to the delivery suite due to her painful contractions. She had experienced mild subjective fevers overnight but felt well. She did not have any coryzal or conjunctival symptoms, and did not complain of pruritus. There was no recollection of any sick contacts in the previous two to three weeks. She stated that she had varicella as a child and this was corroborated by her mother. She had one daughter who was 4 years old and had been immunized against varicella. The daughter was well and had no sick contacts at pre-school.

On examination, the patient had erythematous macules which were well circumscribed with diameters of approximately 2mm. Some of the macules had central nodular components surrounded by erythema. On closer inspection there were one or two possibly fluid-filled vesicular lesions. The rash was scattered and bilateral, located primarily on the face (with additional scalp and post-auricular involvement), neck, chest and proximal upper limbs. Lesions crossed the midline with no dermatomal distribution.

The physical examination was otherwise unremarkable and her vital signs were normal.

A blood sample to test for serum varicella IgG was immediately sent to assess immunity. Based on the clinical picture at this time, it was thought that she was unlikely to have varicella zoster virus (VZV) infection or reactivation. Labour progressed normally with delivery of a healthy baby girl with a rash which was erythematous and macular with sporadic pustules. This was thought to be erythema toxicum and not varicella.

On clinical review the following morning, ten hours later, the woman had developed more lesions, with some of the previously nodular lesions becoming vesicular. There was an increased concern for varicella, the patient was placed into an isolation room away from other maternity patients and several vesicles were swabbed and sent off for VZV DNA PCR testing. Contact tracing within the hospital was conducted by an infection control nurse specialist.

The paediatrician discussed the case with a paediatric infectious diseases specialist and the baby was given an empirical dose of varicella zoster immunoglobulin and observed over 24 hours. During this time the progression of the rash in the mother slowed and she was subjectively and objectively well. The baby developed no vesicular lesions or features suggestive of varicella. Her vitals were within normal parameters. They were discharged and the mother advised to return should the baby become unwell or develop a new rash.

Several days following discharge, serum varicella IgG returned positive, signifying previous VZV infection and theoretical immunity. The PCR swabs of the vesicular lesions also tested positive for VZV DNA. Although there was no history of contact with an infected individual, this presentation

was thought to be a VZV re-infection rather than a disseminated herpes zoster re-activation because the rash was generalised with no clear dermatomal preference or distribution.

Two weeks after discharge, the baby developed crops of vesicular lesions on the face, head, feet and bottom, and re-presented to the hospital. She was otherwise well with feeds, not irritable, and not dyspnoeic. She was diagnosed with neonatal varicella, and was discharged after 48 hours of clinical observation with no indication of needing further varicella zoster immunoglobulin.

DISCUSSION

Primary VZV infection, commonly known as chickenpox or varicella, is a common childhood viral exanthem caused by human herpes virus.[3] Varicella has a classic generalised rash which transitions from erythematous papules, to fluid-filled vesicles, then to pustules. Adult varicella has a greater morbidity than childhood varicella, with a common complication being viral pneumonitis. A group at risk of further morbidity to varicella are pregnant women.[1] The phenomenon of varicella re-infection is rare, more commonly the virus re-activates as herpes zoster, also known as shingles.

Varicella is a highly contagious illness with high transmission rates. It has two key methods of transmission: either direct contact with fluid from vesicular lesions, or inhalation of aerosolized vesicular fluid or respiratory secretions. Patients are infective from one to two days prior to the onset of the rash, until all the skin lesions are crusted over. Patients should be isolated in a closed room until they are non-infective. The room should be equipped with negative pressure ventilation to prevent airborne transmission of the virus. Contact precautions for healthcare workers involving gown and gloves should be undertaken, and all staff looking after the patient should have evidence of immunity to varicella.[2] Due to confusion about the diagnosis of varicella in the above case, there was a delay in implementing airborne and isolation precautions for the patient until subsequent clinical review. While all maternity rooms in the hospital were single rooms, there was still a transmission risk as the room is in direct contact with the corridor which was a shared space. However, the patient did not have a significant number of vesicular lesions nor coryzal symptoms, therefore her infectivity was probably lower than a primary varicella infection. Nevertheless, there was still a possibility of a varicella outbreak in a high risk obstetric population due to delays in diagnosis.

Prior to the availability of the varicella vaccine, most children were expected to have been infected before adolescence, providing them with immunity against re-infection. However, an American surveillance study found that 9.5% of paediatric patients diagnosed with varicella had a previous diagnosis of varicella by a physician or a recollection of a rash with features typical of varicella.[3]

Re-infection in adulthood after childhood exposure or vaccination is rare but there are case reports of immunocompetent patients who experience a subclinical response,[4] or clinical re-infection.[5-9] Most case reports of varicella re-infection feature healthcare workers because they have evidence of previous infection with documented levels of serum varicella IgG. The test for serum varicella IgG is predominantly used by healthcare workers to show immunity to varicella as part of their job requirement. This test is not routinely used by the general population, which makes documenting varicella re-infection in the community almost impossible. Cases of re-infection may be misdiagnosed as primary varicella. Varicella re-infection may be less rare than classically considered but this will be difficult to prove.

Historically varicella in pregnancy was a condition with a high mortality of up to 36%,[10] however the RCOG guidelines suggest that the rate is now lower due to advancing medical care.[11] Complications in pregnant women infected by varicella include pneumonia, hepatitis and encephalitis. The fetus is also at risk of congenital anomalies if the mother is infected in the first trimester. Lastly, peripartum maternal infection leads to neonatal varicella which is associated with high mortality. Due to the possible complications, varicella in pregnancy should be treated as outlined in the RCOG guidelines.[11]

Re-infection by VZV in pregnancy has not been well researched. Martin et al. published a case series of four pregnant women with serological evidence of previous varicella exposure, who had contact with an infected individual and subsequently developed clinical features suggestive of varicella with an accompanying increase in IgG titres.[12] In two patients, the infection was described as mild. One of them had approximately 50 lesions as opposed to the classically expected hundreds of lesions. All four patients delivered healthy normal babies. Similar to this case, all of the women had a milder course of illness with no acute sequelae associated with primary VZV infection such as pneumonia or encephalitis. However, all four women developed symptomatic varicella in the first or second trimester of pregnancy, rather than in the peripartum period as in this case.

The main differential to varicella re-infection would be disseminated shingles. Disseminated shingles in immunocompetent people is a rare occurrence.[13-15] It typically presents with a vesicular rash in a dermatomal pattern followed by extra-dermatomal lesions days later, but a generalized distribution has been reported.[15] Serological investigations will not assist in distinguishing between VZV re-infection and disseminated shingles as they will be serologically similar with rising IgG titres and absent IgM.[4,16] Although shingles is common in pregnancy, fetal complications are extremely rare,[17] with only one reported case of infection in utero.[18] There have been no case reports in the literature of peripartum disseminated shingles causing neonatal varicella post-delivery.

It is highly likely that this case represents a clinical re-infection by VZV in pregnancy rather than disseminated herpes zoster for several reasons;

1) the generalized onset of the rash with no dermatomal distribution,
2) the development of neonatal varicella in the newborn,
3) the presence of varicella zoster IgG, and
4) the mild course of illness in both the mother and the newborn.

This case suggests that a clinical re-infection by varicella in the peripartum period can cause neonatal varicella, however more case reports of this rare phenomenon will be required to confirm this. Moreover, this case demonstrates that the presence of varicella IgG does not necessarily exclude a diagnosis of varicella or guarantee immunity. Clinicians need to remain alert for the possibility of varicella re-infection. Pregnant women are a group of the population at higher risk of morbidity and mortality from varicella, although the evidence suggests that the course of illness may be milder, the diagnosis of varicella re-infection should still be considered if the clinical picture is consistent; isolation protocols should be enacted swiftly and specialist advice sought.

REFERENCES

1. Kirkham C, Harris S, Grzybowski S.
Evidence-based prenatal care: part II. Third-trimester care and prevention of infectious diseases.
Am Fam Physician 2005;71(8):1555-60.

2. Chicken pox. Clinical Overview [Internet]
Centre for disease control and prevention. [Cited 1 Jul 2016]
Available from http://www.cdc.gov/chickenpox/hcp/clinical-overview.html

3. Hall S, Maupin T, Seward J, et al.
Second varicella infections: are they more common than previously thought?
Pediatrics 2002;109(6):1068-73.

4. Arvin AM, Koropchak CM, Wittek AE.
Immunologic evidence of reinfection with varicella-zoster virus.
J Infect Dis 1983;142(2):200-5.

5. Talbot GH, Skros M, Fisher M, et al.
Immunologic evidence of reinfection with varicella-zoster virus.
J Infect Dis 1984;149(6):1035-6.

6. Dyer J, Greenfield M.
Recurrent Varicella in an Immunocompetent Woman.
Cutis 2016;97(1):65-9.

7. Johnson JA, Bloch KC, Dang BN.
Varicella reinfection in a seropositive physician following occupational exposure to localized zoster.
Clin Infect Dis 2011;52(7):907-9.

8. Gurevich I, Jensen L, Kalter R, et al.
Chickenpox in apparently "immune" hospital workers.
Infect Control Hosp Epidemiol 1990;11(10):510-2.

9. Ku C, Liu Y, Christiani DC.
Case report: occupationally related recurrent varicella (chickenpox) in a hospital nurse.
Environ Health Perspect 2005;113(10):1373-5.

10. Broussard RC, Payne K, George RB.
Treatment with acyclovir of varicella pneumonia in pregnancy.
Chest 1991;99:1045-7.

11. Royal College of Obstetricians and Gynaecologists.
Chickenpox in pregnancy (Green-top guideline no. 13) 4e.
1997. Updated 2015.

12. Martin KA, Junker AK, Thomas EE, et al.
Occurrence of chickenpox during pregnancy in women seropositive for varicella-zoster virus.
J Infect Dis 1994;170(4):991-5.

13. Gupta S, Jain A, Gardiner C, et al.
A rare case of disseminated cutaneous zoster in an immunocompetent patient.
BMC Fam Pract 2005;6(1):50.

14. Gomez E, Chernev I.
Disseminated cutaneous herpes zoster in an immunocompetent elderly patient.
Infectious disease reports 2014;6(3):34-7.

15. Petrun B, Williams V, Brice S.
Disseminated varicella-zoster virus in an immunocompetent adult.
Dermatol Online J 2015;21(3).

16. Cradock-Watson JE, Ridehalgh MK, Bourne MS.
Specific immunoglobulin responses after varicella and herpes zoster.
Journal of Hygeine 1979;82(2):319-36.

17. Enders G, Miller E, Cradock-Watson J, et al.
Consequences of varicella and herpes zoster in pregnancy: prospective study of 1739 cases.
Lancet 1994;343(8912):1548-51.

18. West SL, Newton RW, Baildam EM, et al.
Recurrent hemiplegia associated with cerebral vasculopathy following third trimester maternal herpes zoster infection.
Dev Med Child Neurol 2006;48(12):991-3.

How to enjoy medical school: finding meaning in medicine

Carmen Chan
6th Year Medical Student
School of Medicine
University of Auckland

Carmen is currently the Vice-President External for the New Zealand Medical Students Association and enjoys climbing mountains in her spare time.

Medical school presents many daunting challenges as a student. The first year is engulfed by fervent swotting for medical school entry, the subsequent two years are spent digesting the wealth of academic and medical knowledge. To top it all off, in the final three years, we are sent into hospitals where we are confronted by the brunt of humanity, both at its best and its worst. This journey can be both enthralling and similarly exhausting.

So, amongst the whirlwind of this great vocational endeavour, what does this leave you?

Young, idealistic and visionary?

Broken, battered and seeking employment/better work hours?

When I was younger, my mother would let me put my ear to her chest. I imagined two inverted lobes splashed in red, pulsing away inside. People told me that the heart was a symbol of love and thus I asked my mother to buy me a stethoscope so that I could hear what love sounded like. She thought that I had wanted to be a doctor, bought me a plastic one and told me to 'wait'.

Heartbeats. It was my second year in medical school that I finally experienced a fulfilment of this childhood dream. Using a stethoscope was probably one of the happiest days of my life. Yet five years down the track, I found that opening a toy doctor's play set as a gift from my supervising General Practitioner (GP) shattered a plaque in my hardening myocardium and brought back memories of those earlier days. Entrained into the processes of hospital procedures, examinations and protocol, I had forgotten the memory of what it was like to experience wonder. So many things that were once unique had become the norm.

For those who have retained a clear vision of why you have gone to medical school, I encourage you to continue with your pursuit. Do not lose it. Keep nurturing it, and let it change and grow - just as you do. To those who wonder over the process of change that medical school engenders, I speak to you in camaraderie. One cannot commit to a six-year programme, and remain untouched at the other end.

Medical school will challenge your perspective of the world, and of yourself. The great question is how you will choose to respond. Here are a few personal reflections on how to embrace this vocational endeavour and make your life a little easier:

PRE-CLINICAL STUDENTS

Write your goals for what you want out of medical school. Be visionary. Put down the things that you want to do, and try. Document the moments that have given you wonder and make you feel excited. Keep reviewing them. It will keep you inspired when you look back on them as a clinical student, and a doctor during those hard yards.

Get amongst. Spend time with your friends within, and outside of medical school. Being on campus full-time with a cohort that you will spend the next six years with (minimum) is a pretty remarkable opportunity to make some close friends (possible even meet your soulmate). You will be travelling to different parts of the country, and be working alongside each other for a lifetime to come. Your memories together in medical school will be some of the best times of your life. Take opportunities to foster friendships with 'non-medical' friends. They will keep you grounded as you delve deeper into the world of medicine. It only gets busier as a junior doctor!

CLINICAL STUDENTS

Starting the fourth year of medical school is probably one of the biggest leaps in medical school. From spending 'full-time' at university, you are swept up into a world of hospital symphony and you are the junior member of the ward team. Here is a practical tip: Get your House Officer's and Registrar's contact number. Hit them up, stay in touch. It will make your ward rounding experience significantly easier.

The wards. It is exciting, it is new and it is challenging. You are going to have days when you feel like the world's your oyster, and there will be times, when you feel like you are a fly on the wall. Some days, you will question if anyone is experiencing what you are feeling and wonder if what you are doing is right. There will be too many experiences, interactions and moments that you will barely be able to encapsulate into words.

It is OK. Embrace it all. Talk about what you are experiencing with your classmates. You will be surprised to find that you are not the only one feeling that way. Ask for help. Medicine is a long journey, and when you work as a doctor, it is about working as a team. The first step towards learning how to look after patients is learning how to look after yourself. Find yourself a mentor. It is sometimes great to have someone to bounce your thoughts off about vocational aspects of training, and to lend insights into your experiences. I recall walking home after one long day as a fourth-year medical student on her first surgical run and feeling incredibly sleep deprived. I woke up every day, and I went to the hospital. I finished. I went to the gym. I went home. I did the housework and studied. I slept. Each day felt so repetitive. What was I doing? I remember conversing with a registrar about it one evening and he chuckled, telling me that it was what he has been experiencing for years, and giving me added perspectives on the placement. It was immensely helpful to laugh and bounce these thoughts off with somebody who are a few years ahead of me in training. Medicine is an apprenticeship model, and it is about both learning and teaching from each other.

Communication. Talking to other members of your team, and also communicating with your consultant about ward expectations can also help to assuage any unspoken concerns. Having attended the Association for Salaried Medical Specialists conference, and spoken to consultants at this event, it can be true to say that often consultants would welcome engagement from us medical students about the learning experience, as much as we would welcome their input.

Offer yourself as a mentor. The recent years has seen our national medical students' associations recognise the importance of medical student health and wellbeing and the insurgence of various mentorship pathways and wellbeing networks. Get involved.

Auckland Medical School has several mentoring networks established between second and third year medical students, and similarly between fourth year and fifth year medical students. Additionally, there are a number of culturally specific support groups such as the Māori and Pacific Admission Scheme (MAPAS), Young Auckland Chinese Medical Association (YACMA), Christian Medical Fellowship (CMF), Diversity in Practise and Grassroots Rural Health Club. Throughout the year, the Auckland University Medical Students Association (AUMSA) also hosts a number of wellbeing and social events that enable us fellow students to connect. The Faculty of Medical and Health Sciences has similarly revamped their MBChB Portal to include new wellbeing resources the students can access.

Otago Medical School similarly offers second to third year mentoring, fourth to fifth year mentoring, 'study buddy' tutoring programme, 'TI as Teachers' initiative (commencing in 2017) and coffee buddies programme for connecting international students with a local Kiwi.

Nationally, there is an online Women in Medicine Network that the New Zealand Medical Students Association (NZMSA) has kick–started in conjunction with the Association of Salaried Medical Specialists (ASMS). This connects female medical students and physicians at all stages of their training on one platform. A formal relationship is similarly being explored between NZMSA and ASMS on creating a mentoring programme for all medical students to be mentored by a consultant from this organisation. Keep dreaming big. Learn the protocol, but keep thinking of the possibilities. Study what breaks the human heart, but do not underestimate the strength of courage and vulnerability. Allow yourself to experience and share that feeling. Understand what you are experiencing, validate it and figure it out.

When I was a second-year medical student, a fellow Trainee Intern shared these words with me which I never fully understood until this year. I now leave them with you to ponder:

> "Never lose that spark and creativity. So many bright, intelligent and creative minds come into medical school and by the fifth year, they are roboticised into thinking that medicine is just one big road map. I mean, a doctor? Anyone can be a doctor – it just comes with being able to do administrative work and diagnosing. However, for some reason, our role accords us with a respected position in society and we have the capacity to use that towards doing and achieving things that others might not. Be excited about being a doctor. Keep up your interests outside of medicine. Never let them beat it out of you. Do not forget to see the bigger picture."

I wish you a fulfilling and brilliant life and medical career.

How to decide on your medical elective: insights from a medical volunteer in Africa

Dr Karyn Anderson
Obstetrics and Gynaecology Registrar
Waikato Hospital

Karyn took time out the New Zealand medical workforce in 2016 to spend 12 months traveling and volunteering in India as well as southern and eastern Africa. She spent 6 months volunteering as an obstetrics registrar in a mission hospital on the outskirts of Nairobi. She also supervised medical students who conducted free clinics for the rural tribal communities of the Maasai Mara and impoverished areas of Nairobi. Together with volunteers from the United States (US) and the United Kingdom (UK), and inspired by visible changes in the health and wellbeing of the communities in which they worked, Karyn has started her own Non-Governmental Organisation, Kenya Health Movement, to widen not only the experience for medical students, but also the number of communities able to receive quality, free and easy to access medical care.

It is coming around to that time of the year again, when medical students across the country are allocated their elective quarter and begin the process of organising their electives. The medical elective offers a chance to experience medical practice in a different culture, country, resource setting, or specialist area. It can be one of the most challenging and rewarding experiences a student may undertake at medical school, and is certainly one of the most eagerly anticipated. However, medical electives can present challenges previously not encountered as a medical student. The decision of where to go and what to do with this invaluable opportunity can be a difficult one. As an Obstetrics and Gynaecology registrar, I have taken part in voluntary medical service across six different countries and three continents in the four years since my own medical student elective. To ensure you have the safest and most enriching experience, I urge you to clearly identify your own ethical values, motivations and goals before committing to a medical elective.

Spending most of my time working in under-resourced settings in Africa, I can attest that working in demanding, unfamiliar cultures and circumstances often promotes increased independence and self-reliance, leading to immense personal growth. By living and volunteering my medical skills in Nairobi, Kenya over the past 6 months, I have acquired deeper understanding of some of the more subtle skills that make a skilled doctor an excellent doctor. Growing up a New Zealand European, in a rural farming community north of Auckland, I have never before experienced being a minority within a community. Certainly as a native English speaker, I have never had to grapple with learning a new language. When you find yourself barely able to convey where you want to go on a bus or what vegetables you would like to buy at a local market, obtaining a sensitive and appropriate history from a patient or getting an informed consent becomes infinitely more difficult. Even through a translator the subtleties of 'the art of medicine', such as compassion, can be lost and one has to learn to focus on the non-verbal aspects of communication. These often overlooked cues can make you a more patient-centred doctor in your future practice. This is particularly relevant in instances such as breaking bad news or consenting a patient when subtle cues of confusion, fear, or a lack of understanding could go unnoticed.

It is also critically important that your choice of country and centre reflects the main goal of your medical elective. If you want to experience the latest developments in cardiothoracic surgery you are best to seek opportunities in large university hospitals in Europe, the United Kingdom, United States of America, and Australia. It would therefore be unfair to expect this of a hospital in rural Tanzania. Participating in a medical elective in a developing country can however provide you with an opportunity to see diseases you may not be able to see here in New Zealand, or much more advanced pathology than would commonly present back home. Practising in a resource limited setting can also teach a student the value of clinical exam, rather than relying on imaging or investigations.

Once you have decided on the country, the next consideration would be what region or size of hospital or clinic you wish to visit. Being involved with medical outreach activities or medical electives in rural clinics provides an opportunity for family-centred care and an often more intense experience of culture. This in its self can be an incredibly enriching experience. Cultural activities such as attending morning prayers and meditation while conducting medical outreach at a Buddhist monastery in the Indian Himalayas; sleeping in a mud hut listening to the growls of hyena at night; or learning to dance with the Maasai tribe are events that have made my medical volunteer work unforgettable. In fact some of my most rewarding experiences as a doctor have occurred while volunteering in rural communities. Overwhelming expressions of gratitude from communities such as the sacrifice of a goat in my honour, and its subsequent presentation to me in the form of a cloak; or being draped in prayer scarves from a renowned Buddhist monk are experiences unrivalled within the confines of our New Zealand hospital system (in which you will spend the early part of your career).

Community outreach can also provide a valuable public health focus to a medical elective. The interplay of the wider social determinants of health such as poverty, unemployment and education, with the individual disease or illness are highlighted when working at a close community level. Joseph, a young boy we came across while conducting outreach in one of the poorest communities in Nairobi, is a prime example of the

social determinants of health. Presenting with a severe skin condition, he was found to be suffering from pellagra, a vitamin B3 deficiency, as a result of his malnutrition and Acquired Immune Deficiency Syndrome (AIDS). The wider health determinants at play here were a country with high unemployment, poor access to contraception to control family size, low educational achievement in a school system only publicly funded to completion of primary school, lack of empowerment of women, and no social welfare system. Kenya Health Movement, funds not only his hospital stay and ongoing medications, but also provides food donations, Human Immunodeficiency Virus (HIV) and health screening for the rest of the family, housing for the family, and sponsorship for his return to school; through which they were able to make a much more significant improvement in his health.

Medical electives are undoubtedly an invaluable learning experience, in more ways than purely gaining medical knowledge. However, it does also pose new challenges and dilemmas for a student, particularly in resource limited settings. It is important to realise the impact your presence has on the clinic, hospital or health system you work within, as well as your own safety and limitations. Health systems in developing countries are under immense pressures and hosting medical elective students can place further stressors onto an already stretched medical staff to provide adequate supervision and teaching, as well as physical resources. At its worst this could mean an experience such as on my own medical elective in Tanzania, where the hospital I visited had such little resources that we would wash, dry, and reuse disposable gloves.

Students may also find themselves being asked to perform procedures they are not competent to perform, placing both themselves and their patients in harm. Even as an obstetrics and gynaecology registrar I faced this issue, during my recent time volunteering in a Kenyan hospital. A woman was transferred to our hospital after suffering a prolonged labour, during which her baby had died, and presented with post-partum haemorrhage. She lost an estimated three litres of blood prior to arriving. Her resuscitation was put on hold due to the inability of her family to pay the hospital fee. Later it was established that the hospital would cover the costs of an operation to repair her cervical tear and a possible hysterectomy, but no surgeon was available to perform the surgery. As a junior registrar I felt the surgery was outside of my competency. The alternative was to witness her bleeding to death in front of our eyes. A more experienced surgeon was found eventually, resolving my internal dilemma. Sadly the woman lost too much blood and did not survive the surgery. This was far from an isolated experience and may challenge an elective student to the core of their values.

While the final year medical elective offers you a world of opportunities and an array of unforgettable experiences, it does require careful consideration of goals and expectations and a considerable amount of planning to take full advantage of the opportunity. Regardless of the focus or location of your medical elective, you will look back at your time fondly, knowing the experience has shaped you into a more grounded, empathetic, and skilled medical practitioner, and global citizen.

If you wish to learn more about our non-governmental organisation (NGO), Kenya Health Movement, or join us for your medical elective, visit our website kenyahealthmovement.com, send us an email kenyahealthmovement@gmail.com or visit our Facebook page.

CANCER: the emperor of all maladies

Husam Khalil
6th Year Medical Student
School of Medicine
University of Auckland

Husam, is a 6th year medical student studying in North Shore Hospital. His interests include cardiology and oncology. An avid foodie, Husam also enjoys a game of football or tennis.

" CANCER: The Emperor of all Maladies" is a three part documentary initially released in March 2015. Directed by Barak Goodman, this fascinating documentary follows up on the Pulitzer Prize winning book written by author, Siddhartha Mukherjee. The piece takes the viewer on a journey through time, beginning with an ancient discourse of cancer, through to the development of novel treatments researched today. Alongside this, the audience is drawn into the personal lives of several patients diagnosed with cancer to experience the irrevocable highs and lows on their individual journeys. This provides a touching insight into this disease which all doctors will inevitably encounter at some point in their careers.

We hit the road on the discovery of cancer in Part 1, titled "Magic Bullets." Goodman begins, by citing an ancient Egyptian physician whose note regarding the earliest records of cancer treatment simply stated; "There is none." The audience is then looped through in time and introduced to past flawed hypotheses. I was intrigued in particular by a previous fluid theory; the belief that an imbalance of "melancholia", one of the body's four essential fluids could have been the cause of cancer.

From this point, Goodman explains the innovative and experimental developments made in discovering chemotherapy. Focusing mostly on Dr. Sydney Farber, who despite the opposition of his peers decided to trial aminopterin in children with the previously incurable disease, leukaemia. He shocked the medical world in 1947 when he observed clinical and haematological remission in these subjects, thereby paving the way for modern chemotherapy. The focus on surgical therapy comes next by the radical, yet flawed, views of Mr William Halsted. The discovery that tumours were simply collections of abnormal cells meant the logical next step was to surgically excise the culprit. I was captivated as I was introduced to this perfectionist with a hard and fast belief that "cutting more meant curing more", which culminated in the radical mastectomy. While it was somewhat successful, it left many women deformed and subject to remission when the cancer was non-localized. Finally, radiotherapy is briefly touched on citing the young medical student who founded the treatment, and how he succumbed to the disease himself through overexposure to said radiation.

Although the viewer's introduction to these three modalities is certainly the strength of this episode, it perhaps omits the progression to current surgical and radiotherapy treatment in favour of telling the narrative of Farber and his partnership with Mary Lasker in promoting research and passing the national cancer act, something I personally found less stimulating. In spite of this, the episode allowed an appreciation of the dedication which two scientists showed on their mission scouring thousands of natural and synthetic chemicals for anything which might have positive oncological outcomes. Overall I found this episode inspiring, it added to my admiration of the ongoing medical research and work performed behind the scenes in the medical world.

Part 2, "The Blind Man and the Elephant", progresses from portraying how treatments were developed into explaining the science behind the causes of cancer. The episode's strong point is the way it perfectly presents three primary routes; chemical, viral and genetic – each of which is delved into on the way to discovering more about the "emperor of all maladies". The viewer is then introduced to the oasis of knowledge surrounding discovery of the oncogene and the pathogenesis of cancer which were utilised by pioneers to develop targeted cancer treatments still employed today. Throughout this episode, we also hear the account of a highly respected surgical oncologist struck by the very disease she spends her whole life curing. Whilst this gives us only a glimpse of the manner a bilateral breast cancer diagnosis can turn a life upside down, it also superbly highlights the sobering nature of cancer and that nobody, including medical professionals, are safe from its reaches.

We conclude in Part 3, "Finding the Achilles Heel." Scientists have now gained more knowledge from unravelling the human genome, discovering tumour suppressor genes and learning of cancer's ability to develop resistance to certain targeted therapy. With this, the finale served to highlight how each cure for cancer came with an added layer of complexity. Goodman brilliantly demonstrated the theory behind scientific concepts such as karyotyping and targeted drugs through the use of graphical demonstrations that take the viewer inside the laboratory. This simplified the technical concepts and showed how this new found information served to kick-start attacking cancer through combination therapy that is individualised to each patient.

Also tacked onto this episode is the development of a new innovative treatment, immunotherapy. As promising as they initially build it up to be, the viewer is brought back to reality when introduced to Emily, a young leukaemia patient whose parents agree to trial new immunotherapy drugs in a last-ditch hope of saving their daughter's life. We are shown that while many new therapies come with much hope, scientists are ultimately still experimenting. Consequently, Emily has a near death reaction trialling this treatment when her IL-6 levels skyrocket leaving her in need of ICU support and a quick-thinking doctor to save her life. Whilst the astronomical cost of many of these drugs was touched upon, it could have been discussed in greater depth by the documentary. In saying that though, America's differing health structure makes the discussion regarding cost and accessibility less applicable to a New Zealand audience. Particularly with the ethical dilemma surrounding Pharmac's funding of costly cancer drug, "Perjeta" being the centre of recent controversy.

The enormity of cancer makes covering all bases in 6 hours nigh on impossible and as a result, made some omissions inevitable. However, Goodman's attempt to systematically take the viewer through the scientific breakthroughs is the forte of this documentary. The incorporation of presidential speeches and past news footage was another technique I found added to the reality of the problem at hand. I believe Goodman's use of real patients gives a peek of what impact this atrocious disease can have not only on an individual but an entire household. Having personally experienced this catastrophic situation in my own family, I cannot see a way in which any director could demonstrate in entirety the debilitation this causes to an individual without truly going through this journey. Nevertheless, Goodman's efforts at introducing the audience to a disease that leaves most people shivering in their spine is extremely commendable. In summary, I would recommend this for students interested in uncovering the basics of cancer in a methodical and entertaining way. This piece was made for viewing with the general public in mind and might further stimulate enthusiasts to delve deeper into the intricacies of the "emperor of all maladies".

Waikato Cardiothoracic Unit - surgical dexterity booster workshop review

Elwyn Rae
6th Year Medical Student
School of Medicine
University of Auckland

Cheyaanthan Haran
6th Year Medical Student
School of Medicine
University of Auckland

Elwyn is a 6th year medical student who grew up in South Auckland and is currently placed at the Waikato Hospital. He is very passionate about Surgery and General Practice, and in his spare time enjoys tramping and playing tennis.

Throughout medical school, a significant proportion of our time is spent learning how to examine patients, list differential diagnoses and formulate basic management plans. While all of these are undoubtedly core skills required by a PGY1 doctor, they fail to touch on an element that is attractive to many medical students - surgery. After all, despite the almost exclusive reference to studying 'Medicine,' after the many years of toil, students receive a Bachelor of Medicine and a Bachelor of Surgery! Yes, medical students are allowed to occasionally suture an incision site or even excise small skin lesions, but does spending a vast majority of our surgical time observing or applying skin retraction entitle us to the surgical component of our qualification? Given that Olympic champions require approximately 10,000 hours of training to achieve precision, accuracy and speed in their given sport, why are junior surgical trainees expected to arrive fully competent with their basic surgical skills after such a remarkably limited amount of practice?

In an attempt to address this issue, the Cardiothoracic faculty at Waikato Hospital recently looked at new ways to allow medical students and newly graduated doctors to develop their surgical skills. Aiming to explore fun and innovative approaches to improve basic surgical skills outside of operating theatres, the Cardiothoracic multidisciplinary team held the Surgical Dexterity Booster workshop on 25th January 2017.

Lured by promises of learning how to master surgery, we joined a group of thirty senior medical students and house officers filled with eagerness and trepidation about what we were about to face. Cardiothoracic surgeon Mr. David McCormack fired up the afternoon with a stirring address about what he hoped we would take away from the workshop and introduced the other members of the cardiothoracic faculty who would be nurturing our fingers that afternoon. A distinct contrast to other workshops was immediately apparent as we learned that each station was designed to showcase how using everyday objects found in an average home could provide practical dexterity training. Concluding by taking our orders for complementary barista–made coffee was the icing to what was becoming an increasingly fine–looking cake!

The first three stations perfectly captured the refreshing approaches to learning we would encounter throughout the afternoon. The starting station was led by Cardiothoracic nurses Kelsey Simpson and Jacque Roberts, who had the pleasure of covering basic suturing technique with the twist of forgoing traditional mediums like pork bellies (or patients) in favour of various fabrics. Groups were tasked to suture together the striped patterns on tea towels and after a brief kick-start of our imaginations, it became glaringly obvious that the lines before us were wound margins! Our hosts quickly proved themselves excellent teachers of correct surgical instrument handling and soon even the slightly rustier surgeons among us were wielding simple interrupted and subcuticular sutures like professionals. The final exercise was to close the gaping hole between the dark margins of a surgical cap, a stimulating challenge for those eager to test their newly sharpened suturing skills. While this station did not have the most technically demanding tasks, it was an ideal refresher for those without recent surgical rotations. Confidence with suturing is one of the most important surgical skills a student can develop, and using fabrics was a novel but brilliant approach to practising suturing that was surprisingly effective at building muscle memory.

The second station introduced knot tying, taught by cardiothoracic surgeons Mr. Nand Kejriwal and Mr. Grant Parkinson. After quickly demonstrating our ability to tie fine sewing threads with surgical instruments, we moved onto hand-tying which tested our dexterity as we advanced from thick cords to smaller threads which were increasingly difficult to see. Ingeniously, this station was entirely performed on wooden blocks, tying

the knots around small hooks and later around a pair of stretched rubber bands which cleverly simulated skin tension. For the more tactilely gifted among us, large cups were used to mimic the awkwardness of operating at depth. Slowly but surely, the calm and patient advice of our hosts won out on the day as everyone gradually built familiarity handling knots and (with varying speeds) were able to replicate the slick hand movements of experienced surgeons. This station was especially challenging for those of us who had never ventured into the territory of hand-tying before, but also captivated the more experienced hands among us through simple changes that demanded finer dexterity.

The third station of the afternoon was focused on fine bi-manual dexterity and sought to stoke the still-smouldering competitiveness that had brought each of us into medical school. Mr. McCormack charged us to sprint against a partner by placing coloured grains of rice onto checkerboard squares, armed with only a pair of Debakey forceps and a wearying sense of hand-eye coordination. After moving 15 grains of red rice, the stakes were raised to moving 40 grains with our non-dominant hand and finally a race against the clock to fill an entire checkerboard with alternating colours of rice one at a time while switching hands! To cool off, the station ended leisurely with dropping rice into tiny openings of short straw segments held upright by Blu-Tack. Moving rice with forceps sounds trivial on paper, but throw in music and the driven nature of caffeine-deprived medical students, and suddenly tensions flared as though an Olympic medal was at stake! Remarkably, this station was a lot of fun and we found ourselves enjoying the exercises without realising they were a test of our fine dexterity. While potentially a subtle hint to the next generation of surgeons that operations are best enjoyed with accompanying music, this station also showcased an easy way to practise overcoming pressure while handling instruments.

After reinvigorating our aching minds and fingers with the previously mentioned barista coffee generously supplied to order by our cardiothoracic hosts, we dived back into the remaining trials. Kelsey Simpson and Jaque Roberts again drew inspiration from the kitchen to teach tissue handling and avoiding torque, this time through the handling of hard-boiled eggs. Challenged first to remove the fragile shell from the egg without scratching the inner surface, we then sliced our eggs in half and attempted to suture along the egg's surface. This activity proved harder than expected as any excess force tore the needle through the egg white, although more than one person did manage to successfully suture the two halves of their egg back together! Perhaps the most frustrating station of the afternoon, repeatedly running a suture through an egg effectively highlighted how easy it was to unconsciously use shortcuts instead of allowing the needle to follow its curvature. While not the most ideal medium compared to flesh, suturing with fragile eggs was a firm test of combining precision and delicacy which would appeal to anyone with a taste for egg salads!

The next station once more found itself rummaging through the kitchen, this time using bananas to practise fine suturing and appreciating suture angulation. This art was demonstrated by Mr. Kejriwal and Mr. Parkinson who taught us the principle of suturing blood vessels using small continuous sutures around the circumference of small holes punched into the bananas. Although a relatively short station compared to the others, it required an intense amount of focus to interact with the miniature operating site below us. Running a continuous suture around a one centimetre diameter hole also demanded an exceptional level of instrument control and manipulation of suture angulation, which many of us would have struggled with if not for the teaching from the previous stations. Seeing an immediate result of our progress was a very satisfying experience.

The final station of the day was a taste of the cardiothoracic speciality; cannulation and operating at depth. This station run by Mr. McCormack combined previous elements we have been taught and showcased how to suture two pursestrings in the ascending aorta (banana) where an arterial cannula would be placed. Despite being one of the more relaxed stations, it also required a degree of competence to smoothly transition between the different suture approaches to complete the pursestrings. By the end many of us felt like masters of the banana operating suite, requiring an additional challenge of operating through a deep box mimicking operative depth. A much greater test of our newly practised dexterity, the awkwardness reminded us that countless hours of practice awaited us before we would begin to feel comfortable performing the same movements on real patients.

Overall, the Surgical Dexterity Booster workshop was highly enjoyable and educational. A common interest in surgery was one of the only shared features among those attending, but at the end of the day each of us found the course a memorable experience. Bananas and eggs sound more like a cake recipe than a practice medium for suturing, but they proved entertaining ways to master fine finger movements and instrument handling in ways that could easily be replicated for hours at home.

In addition to covering all of these different components of surgical skills, each of these stations also contained something else that made the afternoon a success. The course was hosted by enthusiastic surgeons and nurses who looked like they enjoyed the course as much as we did, creating a fun environment for all involved and firmly proving that each of these household kitchen items had a place on the operating table of the future. Our only concern was their willingness to fuel the caffeine addictions of young doctors! A huge thank you to the Waikato cardiothoracic multidisciplinary team for hosting this event, and we eagerly await any future experiences hosted by them or other faculties with a creative flair for teaching. If you are a student and interested in becoming a surgeon, definitely watch this space!

Mr David McCormack is always happy to assist students! Please do not hesitate to get in touch with him if you want to be invited to further courses, organise an elective or see operations. Get in touch with him via his email: David.McCormack@waikatodhb.health.nz

REFERENCES:

1. Skills Education Committee [Internet].
Essential Surgical Skills. Royal Australasian College of Surgeons.
Jan 2015 [Cited 25 Feb 2017].
Available from http://www.surgeons.org/media/473135/2015-01-27_gdl_essential_surgical_skills_document.pdf

Dr. Aaron Rothstein's {GeM} generalist medicine podcast

Joshua Smith
6th Year Medical Student
Otago Medical School
University of Otago

Josh is a 6th year medical student currently residing in Palmerston North. He is passionate about medical education and has recently started his own podcast assisting medical students as they transition through their degree and beyond.

It's not every day that medical education makes you laugh, but Aaron Rothstein has nailed it.

As a family practice doctor (GP) in Sioux Lookout, a remote small town in Northern Ontario, Aaron's scope of practice extends far beyond that of an inner-city GP. From one episode to the next we find him hanging out in the ED, saving the day in ICU, and all the while keeping a variety of inpatient wards ticking over. His is truly ***general*** practice, and his podcast reflects this.

With 27 episodes to date, Aaron covers an amazing breadth of topics: anything and everything from paediatric critical care to mountain medicine, from toxicology to liver disease and acute coronary syndrome. Episodes are usually 30-40 minutes long which I found was the ideal length; whether you're looking for a distraction during a particularly laborious lecture on professionalism, or seeking solace from the sound of your flatmate's questionable night-time habits. They are pitched at just the right level for 4th and 5th year medical students, sometimes with a little extra for those potential distinction enthusiasts (e.g. drug doses).

Aaron strikes a good balance between developing stimulating, original content while at the same time ensuring his listeners build fundamental skills and knowledge across a number of medical/surgical departments. It can often be daunting as a student trying to keep on top of all the specialties we are exposed to, but it's reassuring to see podcasts like these that help to accommodate such generality and tie all the learning together.

One of my favourite things about Aaron's teaching style is his frequent recaps that keep you switched on, culminating in a "rapid fire review" that wraps up the entire podcast in the last few minutes. I also cannot recommend his two-episode feature on antibiotics enough; after a couple of repetitions you'll find the content diffusing seamlessly into your brain (unlike all the lectures on this topic you've ever had!)

Aside from being packed with useful content, Aaron's podcast is a delight to listen to. His sunny personality and goofy sense of humour shine through on every episode. I tend to listen to podcasts tucked up in bed and often found myself laughing out loud at an inappropriately late hour! This guy seems like the kind of doctor you'd actually look forward to working the graveyard shift with. The kind of doctor you walk away from more optimistic about those dreaded end-of-year exams and more secure about your future in medicine.

Aaron is also a pretty nifty songwriter. With top hits like "Farewell Sweet Hepatocyte" and "Be a Hero (ACLS)" you can look forward to a refreshing way of reviewing the content that will give that singing haematologist from Christchurch a run for his money.

In summary, Aaron Rothstein and his ***GeM Podcast*** are informative, memorable, and funny - a true gem indeed.

Interested in contributing?

The New Zealand Medical Student Journal aims to support medical student development, be a forum for opinions and discussion, and publish the educational writing of medical students. To this end, the Journal accepts submissions in the form of original research articles, academic review articles, feature articles including case reports and conference reports, book reviews and letters. The Journal commits to rigorous peer review and freedom from commercial influence.

The NZMSJ follows The International Committee of Medical Journal Editors (ICMJE) recommendations. The official and most recent version can be found at www.icmje.org.

In keeping with the NZMSJ's ethos of encouraging students to submit articles, we are proud to offer prizes to acknowledge excellent work.

CRITERIA FOR ACCEPTANCE

- Submission is of interest to medical students
- Follows the mandatory format requirements
- Spelling, grammar, and clarity is to an acceptable standard
- Written approval from research supervisors is required for original research articles
- Written consent from patients is required for case reports
- Author's email address for correspondence
- Completed manuscript cover sheet (found at: http://www.nzmsj.com/submission.html)

SUBMISSION

Using "Article Submission" as the subject, email the article to: chief_editor@nzmsj.com

REVIEW PROCESS

- All submissions will be reviewed by two of our student reviewers. Academic articles will also be sent for expert review. Authors will be required to revise their articles during this process.
- Final article selection for publication will be made by the NZMSJ editorial board once the review and revision process is completed.
- Acceptance of an article into the review process does not constitute a guarantee of publication. It is the intention of the NZMSJ to provide authors with the benefit of external review and revision processes that are standard internationally for published journals. This is in keeping with our educational aim to assist medical students in making the transition from writing for medical school to writing for academic journals.

SUBMISSION GUIDELINES

Visit the NZMSJ Submission Guidelines webpage, http://www.nzmsj.com/submission.html, for more information on reporting guidelines, ethical considerations, format and style. Please read these guidelines thoroughly before submission.

For further submission related enquiries, please contact: chief_editor@nzmsj.com

EDITORIAL OFFICE

Website: http://www.nzmsj.com
Email: nzmsj@nzmsj.com
Facebook: https://www.facebook.com/NZMSJ/
All other correspondence to:
New Zealand Medical Student Journal
c/- Medical Education Group
University of Otago Medical School
PO Box 56
Dunedin
New Zealand

We are currently accepting submissions for Issue 25 due for publication in November 2017.

NZMSJ

New Zealand Medical Student Journal
Te Hautaka o ngaa Akongaa Rongoaa