New Zealand Medical Student Journal

Te Hautaka o ngā Akongā Rongoā

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Social Responsibility

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COVID-19 editorials from a surgical and ethical perspective

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EDITORIAL

Editors' welcome

Nicky Dunn, Gisela A. Kristono

Kia ora koutou katoa and welcome to Issue 31 of Te Hautaka o Ngā Akongā Rongoā, or the New Zealand Medical Student Journal (NZMSJ). In this issue of NZMSJ we are proud to share a wide range of interesting and high-quality articles by medical students and academics in both Aotearoa and abroad. The theme of Issue 31 is "Social responsibility", a pertinent topic to both medical students and health care professionals. This theme encompasses a wide range of important issues relevant to society today, and explores our role in these issues as future healthcare professionals. The theme of this issue was decided prior to the unprecedented events of 2020 and the coronavirus disease 2019 (COVID-19) pandemic. The pandemic has placed significant strains and challenges on healthcare workers and healthcare systems globally, bringing to light the important roles and responsibilities of health care workers. There have also been incredible displays of solidarity and teamwork as the world has tackled the outbreak. We are privileged to have a number of articles related to the COVID-19 pandemic and considerations related to social responsibility in this issue.

A brief introduction to articles in this issue

We are very fortunate to have a number of invited editorials and features which explore a range of important areas related to the theme of social responsibility. Firstly, Dr Lupe Tauemopeau presents the Pacific Health Perspective, highlighting the failures to date in achieving health equity for Pacific people in Aotearoa, and explores the obligation of the health system and professionals to change this. Dr Tauemopeau emphasises the importance of cultural safety and gives practical tips on how to improve cultural safety when working with Pacific people. Dr Scott Metcalfe and Liz Springford provide an in-depth overview of climate change, the effect on health, and why we as health professionals must be advocates. They provide a range of practical tips to make constructive change on a personal and professional level. We are very fortunate to have two COVID-19 related editorials exploring some of the ethical issues which have arisen during this pandemic. Associate Professor Angela Ballantyne and Dr Elizabeth Dai explore the ethics of a pandemic from an Aotearoa and global perspective. They highlight the political aspects, effects of healthcare inequities, and the importance of solidarity in these times. From a surgical perspective, Ms Sarah Rennie explored the effects on provision of surgical services on a local and national level as the pandemic unfolded, the challenges faced, and the positives that arose from the difficult situation. She also reflects on the social responsibility of the service and of individual doctors during this exceptional time. We are very grateful to the authors of our editorials for each of their important contributions to this issue and theme.

We are also proud to share a number of interesting feature submissions related to the theme of social responsibility. Firstly, in this issue's Māori Health Review, Emma Espiner and Nadine Houia-Ashwell explore the effect of the COVID-19 lockdown on gambling, harmful alcohol use, and access to unhealthy food. They highlight how three contributors to poor health outcomes were treated as essentials during lockdown and suggest changes to this which would enable a stronger emergence from the COVID-19 pandemic. Ellie Baxter, the President of the New Zealand Medical Students Association (NZMSA), shares and reflects on NZMSA's year to date, and their response to support students during the COVID-19 lockdown. We also have two feature articles related to medical education and the hidden curriculum. Firstly, Laura Nunez-Mulder, previous British Journal of Medicine (BMJ) Student Editorial Scholar and Sharp Scratch podcast creator, writes about her experiences in establishing the podcast, its purpose, and how it addresses the hidden curriculum of medical school. We also have Dr Art Nahill sharing his personal journey that led him to establishing IMReasoning with his colleague Dr Nic Szechket, part of an online education revolution. Dr Natalie Bell writes about her elective experience as a "floating doctor" in Bocas Del Toro in Panama. Meghan Scanlan takes us back to the 19th century when there was not one registered female medical practitioner, and then focuses on three of the many women who were pioneers for the women in medicine today. Michaela Rektorysova hosts an informative interview on military medicine, a specialty that may be less familiar to students. We are also fortunate to include our regular statistics primer written by Cameron et al., from the University of Otago Biostatistics Unit. This issue focuses on the often-confused value of the *p*-value, an important issue for all students and clinicians.

We were impressed at the large number of high-quality academic submissions for this issue. Associate Professor Göktepe et al. describes a case of a subconjunctival haemorrhage secondary to Pilates, a rare cause. Ahmed Sherif carried out a clinical audit investigating the rates of post-tonsillectomy haemorrhage at Nelson Hospital. Mustafa Sherif conducted a clinical audit to assess whether there are significant delays in verifying transthoracic echocardiography reports by the cardiology department at Nelson Hospital. Natalie Allen reviewed the literature surrounding the effectiveness of medical management of cataracts. Shehnaz Hussain carried out a survey of inpatients at Middlemore Hospital to evaluate patients' perspectives on having flowers in the ward environment. Last but not least Hussain et al give an overview of the literature into the pathophysiology and treatments of neovascular age-related macular degeneration.

For this issue's media reviews, Natasha Smyrke gives us her top five podcasts for medical students, and Karen Suresh reviews the *Stepwise clinical examination handbook* (2nd edition) by Matthew D. Mackey. We also have two book reviews in this issue. Patrick Macaskill-Webb reviews *The body keeps the score: Brain, mind, and body in the healing of trauma* by Bessel van der Kolk; and Uma Sreedhar reviews *Also human: The inner lives of doctors* by Caroline Elton.

Finally, we would like to congratulate our winners of the Issue 31 Creative Arts Competition: Jocelyn Lim, Harry Di Somma, and Dan Ieremia. This competition is an ongoing collaboration with NZMSA to showcase our fellow medical students' creative talents. Harry and Dan both submitted poems related to their clinical experiences, while Jocelyn captured a moment from the COVID-19 pandemic in a drawing of two healthcare workers in personal protective equipment, which is showcased on the cover of this issue.

Thanks and conclusion

The Editorial Board would like to thank the Universities of Auckland and Otago for their financial and academic support for the journal. We would like to thank the Medical Assurance Society (MAS), the Royal Australian and New Zealand College of Psychiatrists (RANZCP), and the New Zealand Dermatological Society Incorporated for their funding. We would also like to thank Catherine's Creations, Medisave, Medshop and the Royal Australasian College of Surgeons (RACS) for sponsoring the prizes for our Researcher Spotlight initiative, the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) for sponsoring our new RANZCOG Prize for the best student-authored blog post published this year, and Professor Frank Frizelle for his financial support for the Verrall Award. The winner of this year's Verrall award will be chosen from the academic articles included in the NZMSJ issues published this year, and will be announced at the end of the year. We would like to acknowledge the NZMSA for their ongoing support, and our Advisory Board members for their advice and guidance. Finally, the authors would like to thank the Editorial and Commercial Boards and our reviewers, as they have worked hard behind the scenes to enable this issue to be published.

We hope NZMSJ readers will enjoy the wide variety of interesting articles included in Issue 31. We would like to congratulate all of the authors who have contributed and encourage all readers to submit their work to NZMSJ in the future.

Pacific health perspective on social responsibility

Lupe Taumoepeau

The theme of this issue of the New Zealand Medical Student Journal is "social responsibility". When applied to health, this presents a value-based framework and proposes that an individual has an obligation to act for the benefit of society. With this in mind, I would argue that when it comes to health equity for Pacific peoples in Aotearoa, New Zealand (NZ), we are failing in our social responsibility.

Pacific health data can be difficult to find. One of the reasons for this is that equity measures often group Māori and Pacific data together, or simply present comparisons between Māori and non-Māori. The partnership between the Crown and Māori embodied in Te Tiriti o Waitangi demands an effective health system for Māori. Pacific people recognise their obligations, along with all peoples of NZ, to Māori. Unfortunately, these inequities in the system impact other groups in society, particularly Pacific people.

Understanding the demography of the Pacific population in NZ, and the socioeconomic factors impacting on Pacific peoples' health, is important. The 2018 Census recorded over 380,000 people in NZ (8.1% of the total population) who identify with at least one Pacific group.¹ This is projected to grow to over half a million people by the year 2038.² The term "Pacific peoples" is a collective term describing a dynamic and diverse population made up of more than 16 distinct ethnic groups, languages, and cultures. The Pacific population is youthful and becoming increasingly diverse. The median age among Pacific peoples is 24 years, which is 14 years below the median age for the general population, and only 5% are older than 65 years (compared to 14% of the non-Pacific population).¹ The majority of Pacific peoples living in NZ today (59.3%) were born here.¹

Despite this growing diversity, a number of enduring cultural values are shared among Pacific groups, including:

- > The central place of family (which contributes to identity and feelings of belonging)
- Collectivism and communitarianism (everyone working together to achieve common goals)
- > The importance of spirituality (attributing life events to a higher power)
- > Reciprocity (mutual help and interdependence)
- Respect (particularly towards elders, parents, women, and people in positions of authority)³

These values form a strong foundation for thriving and resilient Pacific communities, a vision articulated by the Ministry of Pacific Peoples following an extensive Pacific community engagement process.⁴

Of all population groups, Pacific peoples are most affected by inequities in the distribution of the socioeconomic determinants of health. Results from the census and other studies show that compared to all other ethnic groups, Pacific people are more likely to live in neighbourhoods of "high deprivation" and have the lowest median household incomes,⁵ higher unemployment rates,⁶ the lowest rates of home ownership,⁷ and the highest rates of household crowding.⁸ These factors affect health outcomes both directly and indirectly. Qualitative research has identified that Pacific peoples' understandings of health and wellness are strongly underpinned by a narrative of poverty and limited resources.⁹ Pacific people are clear that unhealthy lifestyles are not due to a lack of knowledge, but a lack of economic resources and the ability to "make better choices".¹⁰

There are persistent and significant inequities in health outcomes for Pacific peoples. These outcomes are reflected by a lower life expectancy, higher rates of chronic disease, and premature disability.^{11,12} Pacific peoples have twice the rate of avoidable deaths (47.3%) compared to non-Māori, non-Pacific populations (23.2%).¹³ They are three times more likely to have diabetes than the general population and have a higher incidence of mental health disease than the general population, yet access mental health services at a much lower rate.¹⁴ Pacific children are also affected, with higher hospitalisation rates than all other ethnic groups for acute and chronic respiratory and infectious diseases and serious skin infections.¹²

The health workforce has a central role in achieving equity. Initially, cultural competency was presented as a checklist of what the health professional should do if they were treating a person from a different culture e.g. ensuring a translator was available. However, it is now recognised that culture has a far more direct impact on health and is more complex than a checklist. This demands that as health professionals, we rise to the challenge of meeting cultural safety standards.

Cultural safety is defined by the Medical Council of New Zealand (MCNZ) as:

- > The need for doctors to examine themselves and the potential impact of their own culture on clinical interactions and health care service delivery
- > The commitment by individual doctors to acknowledge and address any of their own biases, attitudes, assumptions, stereotypes, prejudices, structures, and characteristics that may affect the quality of care provided
- > The awareness that cultural safety encompasses a critical consciousness where health care professionals and health care organisations engage in ongoing self-reflection and self-awareness and hold themselves accountable for providing culturally safe care, as defined by the patient and their communities¹⁵

This updated statement, which replaces the Council's statement on cultural competency from 2006, now places an emphasis on the health worker understanding their own culture and identity, and also recognises the power differential in the doctor-patient relationship. Ensuring that this power imbalance is not exacerbated by health workers overlaying their own cultural values and practices on patients, and challenging the cultural bias of individual colleagues or systemic bias within healthcare services, is paramount to moving towards health equity.

On a practical note, actioning cultural safety starts with engaging in self-reflection and self-awareness. No-one can be expected to know

everything, so be open to learning from your patients. For example, if you are unsure how to pronounce a Pacific name, it is best to ask the patient first rather than trying to pronounce it and asking if you pronounced it correctly. It is better to admit your difficulties with Pacific names and ask for the patient's help and then, with their coaching, attempt their name. This approach shows respect for the person and their heritage, as well as an interest in learning more. Take the time to build a relationship with your patient and include their whānau when developing a diagnosis and treatment plan. Limit the use of medical jargon, and recognise that verbal and non-verbal communication styles may differ from your own - adapt as needed. For example, in many Pacific cultures, continued eye contact can be a sign of disrespect, especially when this involves looking at authority figures such as doctors. Don't assume that a lack of eye contact shows disinterest or annoyance. Similarly, it may be better for you to avoid prolonged eye contact with Pacific patients as that may make them feel uncomfortable, as if they are being scrutinised, criticised, or challenged. Of course, lack of eye contact could also be due to anxiety, anger, or fear, just as with any other patient. Look for other signals from the patient (or their whānau), and if you are unsure, ask the patient: "I'm concerned that I might be doing or saying something to make you feel uncomfortable. Can you tell me what you are thinking?" Good communication between health professionals and patients is a fundamental component of high-quality health services. Work effectively with interpreters and local hospital Pacific cultural support units when required. As health professionals, we must exercise caution in grouping all Pacific peoples together and making assumptions about "Pacific" preference.

Enabling Pacific people to control and improve their health will change demands in our health care system. It is never too early to reflect on how our own views and biases impact on clinical interactions and care that we provide to patients. Caring is fundamental to humanity. It is part of being human and it should not have cultural, social, or economic boundaries. I encourage all medical students to commit to cultural safety in the spirit of social responsibility. Cultural safety benefits all patients and communities.

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Sharing your voice — healthy action for climate change

Liz Springford, Scott Metcalfe

Here we are now - what's next?

As we write in July, "Team Aotearoa" has muted community transmission of coronavirus disease 2019 (COVID-19), for now. So far, we've stepped up to this challenge, despite the COVID-19 crisis continuing offshore and sadly with rapidly growing waves in impoverished countries with less health sector capacity. Our country contemplates recovery, and the chance to build a much healthier future.¹⁻³

Our shared COVID-19 experience exposes fault lines of an overstretched health service and inequity across our country — but our visions of what we can do together to care for each other have expanded so much.

Post-pandemic renewal in Aotearoa New Zealand (NZ) must include everyone, with Te Tiriti o Waitangi partnership in everything that matters: decent jobs, decent housing, and a strong resilient health service within a healthy environment.

Climate change is a health threat

The health of each person that we treat has a complex background. Sometimes we can see that earlier actions may have prevented someone from becoming a patient now. Practising medicine means both responding to each patient's needs and advocating for better health for all,⁴⁵ where the four physical, emotional, social, and spiritual pillars of health (our hauora whare)⁶ all stand in a healthy environment.⁷

A healthy environment includes atmospheric warming kept below 1.5°C.⁸ Climate pollution is contributing to major health issues, growing disease burdens and increasing premature death around the world.⁹⁻¹² The continuing health effects are potentially catastrophic, and NZ will not be immune from these.¹³ Climate impacts, if unchecked, will widen inequities.¹⁴ But well-planned action to reduce greenhouse gas emissions means substantial health gains in the short and longer term. As *The Lancet* has said, "tackling climate change could be the greatest global health opportunity of the 21st century".^{15(p1861)}

Here in NZ, just as it is overseas,¹⁶⁻²⁰ the most vulnerable will be hit first and worst.^{13,21} We must reject arguments that trade off climate against a fairer NZ, that acting on climate pollution increases poverty. The reality is we need to urgently act so every one of us in NZ can live healthy lives,²² and live within planetary boundaries.^{23,24} We can both act to protect the climate and secure equity,²⁵ if we choose a just transition to a fair, net zero carbon future.

Those countries who damaged our global climate the least, but are suffering first and worst,^{16–19} are now understandably calling for loss and damage compensation.²⁰ NZ's role goes beyond halving our emissions this decade for net zero emissions well before 2040. We must share technology and finance, and compensate for climate damage (recognising that people want to thrive in their own countries and not become climate refugees). We also have a special responsibility for the well-being of our Pacific neighbours and whānau.

What our country must do for climate health

Make healthy choices. With post-pandemic renewal in Aotearoa NZ, let's choose carefully what we take into our future. Fossil fuels are the energy of the past. Every subsidy and every stimulus must move us to clean energy and growing the future industries, not resuscitating past climate polluters. Decisive government action determined which countries are coping with COVID-19, and which are not. Climate protection also demands bold, coordinated action, led by government.

Look beyond our shores. NZ must take fair climate action as a wealthy and historically high-emitting nation. Pacific leaders guided global decisions to limit warming below a hopefully humanly adaptable 1.5°C. Worldwide, emissions must halve by 2030, and drop by at least 7.6% each year.^{26,27} Under United Nations (UN) climate rules, more effort is expected from comparatively well-off countries. So that means NZ is expected to reach net zero emissions "well before 2040" in this global task. That's just 20 years from now.

Talk about how quickly we need to act. The faster we cut emissions, the better the impact, the easier the changes, and the more likely we can keep climate changes to humanly adaptable levels. Global citizenship means we must also resource less well-off countries to thrive (see the UN Sustainable Development Goals),²⁸ without burning up a high emissions pathway.

We know we can be powerful together. Let's make our COVID-19 recovery dollars do triple duty towards a fairer climate-protected hopeful future. Our future must include everyone, with Te Tiriti partnership in everything that matters: decent jobs, decent housing, and a strong resilient health service, within a healthy environment where climate-polluting emissions drop by at least 7.6% annually this decade.^{26,27}

NZ's Climate Change Commission calls for a climate change lens across all post-pandemic rebuilding — with six key principles to keep climate protection on track²⁹

- Look for long-term climate benefits from stimulus investment — analyse investments using long-term emissions prices that match our climate goals.
- 2. Bring forward transformational climate change investments that must happen anyway for multiple gains now.
- 3. Prepare people for tomorrow's jobs.
- 4. Shape the economic recovery plan in partnership with iwi/Māori, using the principles of Te Tiriti o Waitangi.
- 5. Keep up incentives to reduce emissions and adapt to climate change.
- 6. Change how we measure success use wellbeing measures for an inclusive, low-emissions, climate-resilient future.

Do read recent OraTaiao co-convenor Alex Macmillan's response³⁰ to the NZ Interim Climate Change Committee's call for expert evidence, as the latest comprehensive summary of NZ's climate and health issues and opportunities. We also recommend the NZ College of Public Health Medicine's *Priority Actions for Climate Health 2018*³¹ and the excellent How to Talk About Climate Change cheat-sheet, short guide and toolkit from The Workshop. $^{\rm 32}$

Reflections on advocacy for a healthier climate

Like many, we stumbled into climate health advocacy as inexperienced introverts after an "oh sh*t" moment in 2006. Not working out whether we had the skills to help, what best to do, or anything like that. Just: this is BIG, how can we help?! We started with personal change to cut our household emissions, becoming involved and influenced by others who had advocated climate protection for years. Then in the New Zealand Medical Journal (NZMJ), a hundred doctors called for NZ to pledge to halve emissions at the 2009 UN climate meeting in Copenhagen,²² demonstrating the power of collective action.³³

From there, working with many already strongly committed to organising for climate action, OraTaiao: The New Zealand Climate and Health Council began in 2010 — joining the global movement of health professionals advocating the health challenges of climate change and the health opportunities of climate action.

The name "OraTaiao" was gifted — connecting the concept Ora as alive/well/safe/ cured/recovered/healthy with Taiao as world/Earth/environment/nature/country. The group had to be organised, strategic, and safe — and OraTaiao developed a constitution, structures, and processes, with two co-convenors (one Māori) and governance by an annually-elected executive board, as an incorporated society. Every health professional, health student, health organisation, and others can join OraTaiao at https://www.orataiao.org.nz/join_us.³⁴

International and local evidence gets stronger: we can get real health gains now and in the future from smart climate action — this is a win-win situation.

Over the last decade, OraTaiao has led and shared many different climate experiences, working with many people and collaborating across a health sector increasingly committed to climate health action. OraTaiao's action has grown from the vision of "healthy climate, healthy people", strategy huis, and strong commitment to climate change responses promoting equitable health and social outcomes consistent with Te Tiriti. Examples are many and varied (see appendix*),³⁵⁻⁴⁶ alongside a joined-up health sector calling for climate action — collaborating with the New Zealand Medical Students' Association (NZMSA), Medical Colleges, the New Zealand Medical Association (NZMA), and other health sector groups.^{12,47-51}

So what follows, for post-pandemic renewal, are our anecdotal thoughts on climate and health advocacy, with help from friends. Most ideas are hard-won from messy experience, and some we wish we'd taken. We also write as *tauiwi* (non-Māori), conscious of our relative privilege, colonisation, our country's history of ongoing failures to honour Te Tiriti o Waitangi, and that some New Zealanders are repeatedly forced into activism⁵² by the injustices that exist across Aotearoa.

We hope this discussion helps your medical advocacy journey: encourages you to value your own insights, perspectives, leadership, and energy; consider what works for you (and what doesn't); and encourages you to support, share, and explore how friends, colleagues, and mentors can help, and you help them. Above all — *Ehara taku toa i te toa takitahi, engari he toa takitini* (my strength is not as an individual, but as a collective).

You're not the perfect climate saint yet?

Don't think that you have to be the perfect climate saint before speaking out. Yes, there'll always be those critics who tell you to be perfect before saying anything — don't let them silence your important voice. Sometimes our own "imposter syndrome"⁵³ and those internal voices — "why me?" and "what can I offer?" — can be the biggest barrier.

Look for what you care about, and do what you find easy to start with. Experiment with reducing your own climate-damaging footprint — there are the Household Climate Action Tool⁵⁴ and Toitū Envirocare Household Calculator^{55,56} to help you. What do you enjoy doing, or could try? Different roles grow climate-protecting action. Are you a researcher, a writer, a talker, or a doer? An organiser or happy to be organised? Paint placards or help hold them? Think of climate action as a rich bright patchwork quilt of many different people acting in different ways and in different places. Your patch matters.

Look for what's easy for you to do, and try other activities with support when you're ready. Share your experience, encourage others, learn, and teach, so both possibilities and new advocates grow.

Be kind to yourself, and keep safe. In the words of Niki Harré, be a "sustainable advocate"^{57(p206)} for sustainability. Life happens — exams, job changes, new places, new relationships, or patients dying. Doctors get sick too, ditto our families. Share the mahi. Keep it good for you.

Sometimes those who work hard are expected to keep doing more. Importantly, activists who are Māori can be doubly stretched by all the institutional failures to act on Te Tiriti obligations. Having boundaries for personal sustainability is healthy, especially when change is uncertain and can take much longer than hoped, with disappointing curveballs. Constantly considering how to be more effective matters, but sometimes the rationale for action is simply wanting to be on the right side of history, regardless of outcome.

What you can do safely depends on your situation. Sometimes your role, job, or personal identity means not being on the public frontline or protest.⁵⁸ Racism has been identified at every stage of NZ's justice system, and other discrimination — e.g. based on sexual identity, religion, or disability — is rampant. Some people are safer than others. At other times, your professional calling to protect health and wellbeing calls you to be there. There's an NZ-written discussion in *The Lancet* on medical professionals and civil disobedience that is helpful.⁵² Talking with trusted colleagues may help you decide.

Remember, the biggest changes we need are structural

We need the infrastructure — safe walking and cycle routes; affordable, convenient public transport; and widespread home insulation — and other structural changes that make it easy and affordable for all New Zealanders to live well with minimal climate-damaging emissions, regardless of income levels. So put your personal energy primarily into pushing for structural changes.

Vote for climate — and get everyone else to vote too. Vote for climate action in local and general elections — and talk about what you want and why.⁵⁹ This 2020 election is crucial to act quickly to limit warming to 1.5°C. Young people are changing public recognition of climate change, most visibly in the school strike for climate, with Pacific, Māori, and young voices to the fore. High voting turnout by young people can transform Parliament, and our climate future. Voting starts on Saturday, 3 October 2020 and is open for two weeks — make sure you (and everyone you know) votes during that fortnight.

Talk with your favourite political candidates and/or parties about the climate action you want to see. Turn up to local public meetings and ask candidates climate-related questions. Use helpful "how to" guides.⁶⁰ Do this in local elections in other years.

Discuss which party you believe is the best choice (or least worst) with your friends, family, and wider circles, including on social media — where that feels ok. Get active within political parties to get policies that protect our future. Keep conversations respectful — look at policies, promises, people, past performance, and the likely ability to deliver.

"The best treatment is political action... The best thing New Zealanders can do for the health of themselves and their children this year is make sure the party they vote for is serious about climate change."⁵⁹

What can I do — and how?

Climate action is always that ongoing dance between being strategic, getting the background planning in place, and seizing the oppor-

^{*}https://nzmsj.scholasticahq.com/article/17156-sharing-your-voice-healthy-action-forclimate-change/attachment/43938.pdf

tunities. Advocacy needs both opportunists and strategists — sometimes each of us has to do a little of both.

Build your knowledge bit by bit. Gradually grow your knowledge of climate change; the impacts and health consequences; and the options for emission reductions. It's worth understanding the corporate, political, economic, and other vested interests blocking urgent change.

You may need to challenge sacred cows and myths. For example, methane is promoted as a greenhouse gas that doesn't stay that long in atmosphere, and that ruminants are carbon neutral — carbon dioxide (CO₂) is removed from the atmosphere as the grass grows. But many fertilisers are fossil-fuel derived, and methane in our atmosphere packs a much bigger punch than carbon dioxide... and warms our oceans for hundreds of years.⁶¹

So, for many households, businesses, and community facilities along NZ's highly populated coastline, how much methane our cattle and sheep burp each year matters a lot. Oceans warmed by methane and CO_2 are expanding and eating away at our coastline, let alone the rest of the world where an estimated billion people occupy land less than ten metres above current high tide levels, and 230 million less than a metre, with estimates of 1–1.8 metres of sea level rise by 2100.⁶² For more detail on the health, equity, and climate costs of agriculture, see the appendix^{*}.

Grow your understanding of equity and climate justice. How does climate change worsen global, national, and local injustice, leading to avoidable illness and death? How can a net zero carbon future be inclusive, healthy, and equitable?

Constantly consider whose voices are loudest and who's missing from conversations? Are climate ideas, campaigns, and conversations shaped in Te Tiriti partnership from start to end? Are the experiences of tangata whenua clearly to the fore? A zero emissions future *not* co-constructed in Te Tiriti partnership is fundamentally zero emissions colonisation.

For tauiwi, a key role is to honour Te Tiriti, respecting and supporting Māori-led climate action, and operating in genuine partnership. There is much to learn, including how to work together and to work with (not against) Papatuanuku. Hear the voices of the Pacific. Being comfortable with being uncomfortable can grow deeper understandings.

What are the needs of various people in any given situation? Is there a clear way someone in a climate-destructive industry can easily get decent similarly paid work in a more sustainable industry? What happens to a town when a climate polluter is forced to shut down? What's the pathway to better jobs? What's proposed for the most vulnerable, people who are already in hardship? Are there climate-protecting solutions that also make lives easier? Have these solutions been built together?

Talk the walk. As you work to reduce your own personal footprint, share your personal experience. Experiment, make mistakes, be gentle on yourself, laugh, and try something else. Above all, talk about changes you're making personally, why, and what changes you want. When you are visible and encouraging, you become approachable, as others consider cutting their impact. We are social creatures influenced by those around us, especially people we like.

Talk — and listen. Influence is a two-way process — we have much to learn from each other in how we create a future that's climate-safe and where everyone can thrive. Practical experiences help change at a wider level — contact a local councillor to make your bike commute safer, or encourage a local shop to waste less.

Look for opportunities — people, places and times you can influence. We need the big government decisions, but we also need people to support politicians who will take those decisions. People's hearts, minds, and actions influence and interact right across NZ.

Think household, workplaces, your district health board (DHB), family and friends, community groups, local businesses, iwi, local councils, and central government. Some DHBs have sustainability officers — support yours, or call for your DHB to do this too. Link with your university's sustainability staff and groups. Use the Royal New Zealand College of General Practitioners' (RNZCGP) *Greening General Practice toolbox*⁶³ and the Ministry of Health's *Sustainability and the Health Sector guide*.^{42,64}

Formal opportunities come often. The NZ government is constantly consulting on policy changes that have climate implications, from transport to trade, and much more. These consultations may be directly from government departments, or from parliamentary select committees where you can talk to MPs.^{65–67} City and regional councils call for your feedback every year, on annual and long term plans. Cities can seriously help cut emissions, as more councils sign up to climate plans.

Recycle and upcycle your work. Share your submission or event with others to make it easy to grow greater numbers. Encourage colleagues, friends, family, and other groups to quickly have their say. Turn a written submission into a media release, newspaper letters to the Editor, or an opinion piece for a newspaper or a medical journal viewpoint article. Grow your message by recycling your submission ideas into the public space.

Upcycling tweaks and transforms materials for greater value. Celebrate successes, critically self-examine, reflect, review, and learn how to do it a little better for the next time. Health care has gained hugely from continuous quality improvement. It's worthwhile to apply those principles to climate advocacy.

Find ways to work with others. Sometimes a task shared between several seems easier to sign up for. Bring friends, or involve your family and flatmates. Be part of existing advocacy groups, or start your own if there's a gap that needs filling. Sometimes belonging to an advocacy group means filling an ongoing role, or joining events and taking on tasks when you have space, but simply being a member can grow a group's strength. Encouragement goes both ways, including of leaders and mentors. So value what you can do.

Build alliances with other advocacy groups, with other health professionals, amongst the Colleges, the NZMA, and with other students.^{48,49} Help each other, and share thinking and submission work. There is power in numbers, and shared interests. Take turns in taking the lead. Alliances can sometimes surprise. Rational and/or incremental policy changes appeal — but there's also the "garbage can" approach, where unlikely alliances with a shared interest can join to get fast change.⁶⁸ Be flexible.

Grow relationships with media, politicians, and other influential people. Do you have an issue, a good news story or a news tip, or evidence that demands action? Put yourself in their shoes — what do they need to make their job easier? What interests them? Can you tell your story quickly and credibly? Give reliable information? Real-life experience makes an impact. Our often two degrees of separation in NZ means although you may not be able to talk directly to someone in a position to take valuable climate-protecting action, you might know someone else who can talk directly. Or who knows someone who could connect you. Think laterally and creatively.

What's next?

Sharing your unique strengths and working with others in the service of something big and meaningful can be an amazing, life-giving experience. Mixing with people with great values, ideas, and skills can be inspiring and life-changing. Friendships grow from working together. Relationships build trust, and the ability to know who to call to quickly to make something happen.

Medical advocacy for climate health matters for healthy solutions that are fast, fair, and honour Te Tiriti. Hopefully learn from successes and failures, yours and ours. Be part of the climate health, public health, and medical advocacy communities. Discover the real difference you can make, together. Kia kaha.

^{*}https://nzmsj.scholasticahq.com/article/17156-sharing-your-voice-healthy-action-forclimate-change/attachment/43848.pdf

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Conflicts of interest

The contents of this manuscript are the authors' personal views, and do not purport to reflect the position of their employers or any other organisation.

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Social responsibility, solidarity, and equity in the time of COVID-19

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Is it only August? As David Burr Gerrard guips on Twitter — "Future historians will be asked which quarter of 2020 they specialize in".¹ We write to you from Singapore (over 47,000 cases as of 17 July²) and Victoria, Australia (which recorded a daily high of 428 new coronavirus disease 2019 (COVID-19) cases as we write³). From afar we watch whānau and friends in New Zealand happily travel during the school holidays, mask free; and it is like observing a parallel universe.⁴ We have watched the country fall in love, break up, and patch things up again with Dr Ashley Bloomfield.⁵ We smile (but, being New Zealanders, also roll our eyes just a little) as The Atlantic's Uni Friedman gushes, "New Zealand's Prime Minister May Be the Most Effective Leader on the Planet".6 We wonder if we could still get home, if we needed to. In Melbourne, residents are hunkering down for round two of lockdown and healthcare staff are bracing for the peak in case numbers. We've realised that for every COVID-19 case there are hundreds left struggling; every infectious disease pandemic is closely stalked by a shadowy mental health pandemic as lives are upended. And now for a second time, we are deferring elective procedures, increasing ICU capacity, and holding our collective breath before the daily briefing from the Victorian Premier, hoping case numbers won't climb again. The hope of a trans-Tasman bubble has become a distant dream. As other countries deal with their second and third waves, we consider: what has COVID-19 illustrated about health systems and bioethics? What have we learned, and what can we do better?

Pandemics are political as much as they are biological.⁷ As pathologist Professor Rudolf Virchow famously said, "Medicine is a social science, and politics is nothing more than medicine on a large scale". One clear example is the contested process of developing intensive care unit (ICU) triage tools to manage an overwhelming increase in demand. Globally, ICU triage has become the sharp and highly visible end of pervasive and entrenched social inequity.⁸ Many clinicians and ethicists have prioritised utility as the key ethical value — save the most lives (or the most life years) and maximise efficient use of $\mathsf{ICU}^{,9;10}$ This makes a lot of intuitive sense. However, this "fast thinking"¹¹ results in prioritising the healthy and the able bodied. Internationally, this was met first by critique and legal action from disability rights advocates on the grounds that it would amount to unjust discrimination of people with disabilities. Triage tools also have the more subtle effect of prioritising the lives of the privileged, simply because the easier lives to save are those of people with better underlying health status; and health status is not evenly distributed amongst the population. In China the case fatality rate (CFR) for COVID-19 was higher for patients with pre-existing comorbid conditions—10.5% for cardiovascular disease, 7.3% for diabetes, 6.3% for chronic respiratory disease, 6.0% for hypertension, and 5.6% for cancer.¹² In NZ, people living in areas of greater socioeconomic deprivation have higher rates of multi-morbidity; and prevalence of multi-morbidity differs by ethnicity: Pacific ethnic groups 13.8%, Māori 13.4%, and NZ Europeans 7.6%.¹³

Around the world the pandemic is laying bare the consequences of the unequal distribution of wealth and power¹⁴ and highlighting the social fault lines to which we have become accustomed.¹⁵ Black Lives Matter protests have erupted around the world in a moment that hopefully, finally, forces us to acknowledge and address the legacy of slavery and colonisation.¹⁶ Dr Donna Cormack (Kai Tahu, Kāti Mamoe), a Senior Lecturer at Te Kupenga Hauora Māori, has called for racism to be declared a public health crisis in New Zealand.¹⁷ Both the costs and benefits of public health measures will be differentially distributed across communities.

Marginalised populations are typically hardest hit by epidemics, on multiple levels. The ability to sustain social isolation is a luxury. According to analysis of cell phone data in the United States (US), high income demographic groups have reduced their geographic movement more significantly than lower income groups.¹⁸ Australia, like other wealthy countries, is grappling with the social vulnerability of a casualised workforce stripped of employment protections; public health departments can't exhort those with minor symptoms to stay home if they aren't entitled to sick leave pay. Many essential workers face a 'Sophie's choice' of risking their own lives and the lives of others to pay for rent and food. During severe acute respiratory syndrome (SARS) in 2002–2003, Toronto was unprepared to respond to the unique vulnerabilities of the homeless.¹⁹ As advice regarding masks has changed, African-Americans have pointed out that it is not safe for them to cover their faces in public as this may increase the chance they will be perceived as aggressive.²⁰ Evidence shows that people of colour are at increased risk of police violence in the US, in part because they are perceived to be threatening and violent.^{21,22} Emerging data from New York City shows that Black and Latino people are dying from COVID-19 at twice the rate of white or Asian people.²³ But in New Zealand Māori account for a disproportionately small number of COVID-19 cases, only 8% of the total (whereas 16% of the population is Māori).²⁴ This success may be in part due to iwi-led checkpoints protecting isolated and vulnerable communities.

Implicit racism may also have contributed to the slow response of many Western countries to coronavirus. Dr Marius Meinhof, a German sociologist argues that "'we' did not see a great threat, because 'we' perceived the virus as something related to the Chinese…other, disconnected from the West."²⁵ Persistent *orientalism* (the representation of Asia in a stereotyped way that is regarded as embodying a colonialist attitude) and post-colonial arrogance may have given the West a false sense of security. As Dr Pavesi, an Italian anaesthesiologist, wrote in March, "We always think of calamity as something that will happen far from us, to others far away, in another part of the world…But not this time. This time it happened here."²⁶ NZ had an advantage in this respect because by the end of March we could already see coronavirus as a health threat for 'countries like ours'.

There are questions of international justice at play here as well. Economic analysis suggests that the global lockdown has slowed the

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economy and global aid donations such that millions of children, already at risk of malnutrition, will die as a result. Global public health measures may have protected the elderly at the risk of increasing infant and child mortality.²⁷ A protracted downturn in the global economy will likely lead to millions of people starving in Africa, a region where only 6% of the population is over 65.²⁸ Even in NZ, the economic and psychological impacts of a recession and job insecurity would be felt disproportionally by new graduates and young workers.²⁹

Where might the silver lining be here? The global response to coronavirus is an incredible act of solidarity, unity, and aroha. After years of delay, deflection, and dispute about climate change, it seemed like global decisive action was simply impossible. Nationalism and isolationist political policies have been more prevalent in global politics in recent years - Trump, Brexit, Bolsonaro, Erdoğan, and Modi.³⁰ Yet the coronavirus pandemic has been a stark reminder of our global interconnectedness, and together we have taken remarkable action. We have shut down borders, halted global air travel, and shared health data.³¹ Media³² and journals³³ have provided free access to coronavirus articles, one private company made the intellectual property and designs for ventilators open source,³⁴ and Singapore has made the technology for their tracking app freely available.³⁵ It is more obvious than ever that our health depends on the health of our neighbours — their food security, mental wellbeing, ability to self-isolate, and access to medical care. The health of our community depends on the health and security of the most vulnerable. We hope this solidarity and sense of social responsibility provide a platform for climate change action.

In what now feels like a prophecy from the distant past, Dr Tedros Adhanom Ghebreyesus, World Health Organisation Director-General, wrote in mid-January, "Public health is ultimately a political choice. We need to realise that health is an investment in the future...A pandemic could bring economies and nations to their knees. Which is why health security cannot be a matter for ministries of health alone."³⁶ The National Health Service was under threat in the United Kingdom,³⁷ and now people are clapping in the streets.³⁸ The US is finally seeing the impact of decades of underinvestment in public health and millions of people without medical insurance or access to health-care. In some ways, the world is experiencing a natural experiment in the effectiveness of different political regimes, public management structures, and health systems. We hope that world invests in public health, primary care, and addresses health disparities with urgency.

The health workforce internationally has taken on an extreme burden in the face of this pandemic. Some ethicists have argued that doctors have no obligation to work in unsafe conditions.³⁹ Harvard University medical school professor Michael Gibson is trying to track the healthcare professionals who lost their lives as a result of COV-ID-19 infection.⁴⁰ Health providers in Australia sit and wait, unclear whether they have successfully avoided catastrophe or if the worst is yet to come. Many health providers feel like Cassandra in Greek mythology, blessed with the gift of prophecy but cursed to never be believed. They know first-hand the fragility of the health system at the best of times and have predicted for years the potential for catastrophe. Constrained public health spending means the health system runs at or close to capacity, with even predictable bumps in demand like seasonal influenza outbreaks putting strain on the system. In Australia early in the pandemic health workers have been making their own hand sanitisers, re-using masks, and trying to source their own PPE — by making, borrowing, or competing on the open market.⁴¹ This entails mixed emotions — anger at the lack of preparation, feeling simultaneously vulnerable and yet enormously privileged, and some vindication when the predicted crisis comes knocking. Health providers bear witness to so much suffering and at the same time are inoculated against so much of it.

But within this chaos, health professionals have continued to care with compassion. PPE, especially hazmat suits, create a formidable barrier between the patient and the provider; often adding to the patients sense of isolation and fear.⁴² In NZ and overseas, doctors

have taken photos of their faces and taped these to the front of their PPE so that patients can "see" their face.⁴³ In Singapore all patients who test positive for coronavirus are hospitalised until they receive two consecutive negative tests. Patients may be isolated in for several weeks, unable to leave the ward or receive visitors. To help ease this burden on patients, health providers have dubbed themselves the "second family" and gone out of their way to provide care as well as treatment. We hope these doctors provide inspiration and hope for you.

There have been persistent calls for bioethics to focus less on high technology interventions and autonomy, and focus more on issues of justice^{44,45} — both epistemic justice (who controls the narrative, whose voice is heard as a legitimate authority) and just distribution of resources (who gets access to PPE, vaccines, and ICU). We hope that fairness, solidarity, and care become core values in our work, and that we more systematically account for the social and political contexts about which we write.

A liminal space is one of transition — waiting, transformation, sitting on a threshold. Liminal spaces may be physical (an elevator or an airport lounge), or moments in a life story (a break up, a job loss). They involve a feeling of uncertainty, opportunity, and change. Incredibly, much of the world is currently sitting in liminal space, together. We have been forced to do the difficult work of breaking established habits — consumption, flying, endless productivity. Now we have the opportunity to think strategically about how we want to live moving forward. This moment is critically important for your generation. We won't be going back to a pre-COVID-19 world order.

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Surgery, social responsibility, and the COVID-19 pandemic

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Introduction

Coronavirus disease 2019 (COVID-19) was declared a global pandemic by the World Health Organisation (WHO) on March 11, 2020.¹ A state of national emergency was announced for New Zealand on March 25, 2020 and continues currently.² As of May 30, 2020, COV-ID-19 has been confirmed in 213 countries with over 6,000,000 cases and 350,000 deaths worldwide.³ It has overwhelmed health care systems in many major world cities, leading to non-urgent elective surgery being suspended due to lack of beds or staff.⁴ During Level 4 lockdown in New Zealand all non-urgent elective surgery, endoscopy, and outpatient clinics were cancelled to protect our resources and patients from potentially being exposed in a high-risk environment; emergency and urgent surgery continued, and urgent outpatient consultations were conducted remotely.

How did it feel as a surgeon watching this pandemic unfold?

At first it was hard to assimilate. Were we overreacting? Did COV-ID-19 really have the potential to cause devastation?

Talking with international colleagues, it was apparent that we needed to take the rapidly evolving situation seriously, but in early March my level of concern felt out-of-step with that of some colleagues. At the front door of one New Zealand hospital, clinic nurses wore their usual uniform, with no additional personal protective equipment (PPE), as they assessed the risk of COVID-19 exposure amongst those arriving to the hospital. What would the impact have been if there was a positive case amongst all of those people? In early March, I felt anxious as I conducted surgical clinics while New Zealand was pausing and assessing the situation. Most of my patients were over 70 with co-morbidities; my instinct was that they should all be at home, not coming to see me.

What are the tensions in delivery of surgical services during a pandemic?

There were huge tensions for New Zealand surgeons as the pandemic unfolded: the additional health care burden caused by COVID-19, the risk to vulnerable patients brought into the health care environment, the need to minimise staff exposure with the potential of decreasing workforce capacity, and the risk of death to health care workers.⁵ We have seen hospitals in some countries become high risk environments, incubators for COVID-19. Conducting surgery puts patients into an immunocompromised state — increasing their risk of contracting COVID-19 and their morbidity and mortality.^{46,7} These risks need to be considered against the individual good for patients in obtaining immediate health care, and the desire to mitigate developing an unmanageable backlog of unmet service-delivery.^{4,8}

The potential benefits of service restriction need to be carefully balanced against the harms, both in the short and long term. As-

sessment of harms is not straightforward. For example, a reduction in throughput of patients, and delay in diagnosis, is likely to have a negative impact on long-term cancer survival. However, in the short term for some regions, there has been greater access to theatre for cancer-related surgery as non-oncological operations were deferred.

There has been an associated impact on education and training. Non-essential personnel, including surgical trainees, and medical and nursing students, were removed from procedure rooms, which reduced potential learning opportunities. At one stage the progression of surgical trainees was in doubt; fellowship exams were cancelled in May 2020 and selection for entry to surgical training was put on hold.

Throughout this dynamic period, however, I have been constantly mindful that uncontrolled COVID-19 would have a negative impact on our population in terms of deaths, patient and health care professionals' wellbeing, and the stress to our health care system.

What are the responsibilities of a surgeon during a pandemic?

There is little in the literature about the responsibilities of a surgeon. Park et al⁹ conducted a qualitative study inviting surgeons and trainees to identify their professional responsibilities. Their responses included responsibility for patient care, personal education, and care of self and colleagues. Social responsibility should be added to this list; we triage and prioritise care for our patients even in a non-pandemic situation.

Responsibilities to patient care

As surgeons we have a duty of care to our patients. Elective operations are conducted to improve patients' quality of life and often allow patients to return to normal functioning. We recognise that receiving a date for surgery results in disruption to our patients, including time off work, care arrangements for dependents, and the emotional impact of facing surgery. Surgeons are aware that cancelling or delaying a procedure can be a significant burden for the patient and their whānau, as well risking a deterioration in the patient's condition. Having surgery cancelled and treatments delayed due to the pandemic has felt devasting for some patients.

Surgery by its very nature does not lend itself to social distancing as identified by Moore et al in their linguistic analysis of communication in the operating theatre:

The nature of surgery requires that members of a surgical team work very closely together physically, adopting particular characteristic orientations and positions. Some procedures require team members to stand side by side, others to face each other across the table, and in all cases much closer together, more intimately than in any other social situation.^{10 (p925)}

During the lockdown period, our surgical practice has been altered in order to avoid surgical intervention where possible. For example, there has been good evidence that uncomplicated appendicitis can be treated with antibiotics in the first instance, accepting that about 30% of patients treated conservatively will eventually need surgery.¹¹ Traditionally in New Zealand surgeons have preferred the more definitive nature of surgery, but during this pandemic many patients with appendicitis and other infective or inflammatory surgical conditions have been treated conservatively in the hope that surgical intervention can be avoided or delayed.¹²

Surgery and endoscopy performed during lockdown has taken much longer than normal, with increased time for additional procedures during set up, intubation, and decontamination designed to minimise the risk of transmission of COVID-19 to staff and other patients. There has been uncertainty about whether operations should be done laparoscopically or open to decrease the potential spread of the virus.⁴ The Royal Australian College of Surgeons has conducted some rapid reviews to try and help surgeons assess the literature to make informed decisions about how to conduct surgery.¹³

Surgeons have been involved in writing protocols delivering surgical care during the pandemic including converting theatres into "hot" and "cold" spaces to minimise the risk of COVID-19 transmission to patients and staff.¹⁴ Patient referrals have been re-triaged to identify patients who must be seen as a matter of urgency with clinics moving to video or telephone consultations with face to face appointments as needed. Multidisciplinary meetings have also moved online to avoid contact while ensuring patient care continues.

Responsibilities for education

Surgeons have a responsibility for continuing our own education; we have a duty to remain up-to-date in terms of knowledge, technical, and non-technical skills. This usually involves taking part in training activities at departmental, national, and international levels through meetings and conferences. It also includes auditing practice to learn and improve. Face-to-face educational activities have been cancelled, but virtual communication has been extended, such as through educational webinars and regional and national information-sharing WhatsApp groups.

Surgeons are also responsible for training the next generation of surgeons. We provide learning opportunities for junior staff in all aspects of becoming a surgeon — technical skills, knowledge, professionalism, and, probably most importantly, judgement and decision making — in order to ensure they receive adequate experience and supervision to become independent practitioners. While many hands-on educational opportunities have been interrupted, online learning has continued, and indeed progressed, with additional webinars and creative use of existing platforms, such as such as spot surgical diagnosis via Twitter.¹⁵

As role models we have a huge influence on the development of our junior staff; the actions we take are scrutinised and internalised by our juniors with the potential to impact on their lives, positively or negatively. This is particularly important at times of change or pressure, such as during the COVID-19 response. It is vital that we take the opportunity to be kinder to our colleagues, especially junior staff, who may be looking to us at a time of great uncertainty.

Responsibilities to self and colleagues

Surgeons have a responsibility to themselves, to their families and personal relationships, and to their lifestyle, health, and wellbeing. In 2017 the Declaration of Geneva (a modern version of the Hippocratic Oath) was changed to include the following: "I WILL ATTEND TO my own health, well-being, and abilities in order to provide care of the highest standard."^{16 (p1971)}

Surgeons have been shown to have burnout rates ranging from 30-38%,¹⁷ and it is recognised that unwell or burnt out surgeons adversely affect patient care. There has been a move away from punitive responses preventing surgeons from accessing care or taking time out and increasing recognition that prevention rather than treatment of burnout is vital.¹⁷ The pandemic highlighted the need to stay home if

unwell, rather than to continue to struggle through due to a feeling of responsibility to our patients and colleagues. Health care professionals have adopted COVID-19 protocols for moving between work and home to reduce the risk of transmission of the virus between these environments. Some surgeons have also self-isolated from their families, concerned about unknowingly infecting their loved ones.

Surgeons have responsibilities to their colleagues; rosters have been changed to ensure there is no contact between teams and one team on non-contact duties such that they could step in and provide care if a team was infected with COVID-19.⁴ Many surgeons have considered how we might need to be redeployed,⁴ with some doing a refresher course on how to use a ventilator and care for critically unwell patients in an intensive care unit (ICU).

Social responsibility

Surgeons have a social responsibility to advocate for the health of communities and to consider approaches and systems that maximise both effective, efficient, and sustainable care. We have a responsibility to understand that we, and the health care system we work in, succumb to unconscious biases. This results in inequity for our patients, contributing to the disparities seen within health care in New Zealand with Māori and Pasifika patients having worse outcomes than Pākehā patients. While COVID-19 as a virus does not discriminate who it infects, there are gaping imbalances related to socioeconomic factors such as housing density, employment in high risk environments,¹⁸ and those with income insecurity. Worldwide infection rates are higher and outcomes worse for those already disadvantaged by poverty, ethnicity, and communities where there are increased barriers to accessing health care.¹⁹

PPE has run out in many countries.⁴ It has been frightening to see colleagues don bin bags in an attempt to protect themselves from catching COVID-19. It is worrying observing the disproportionately higher numbers of health care workers that have become infected with COVID-19 compared to the general population, often despite using PPE.^{5,14,18} If surgery continued in New Zealand during a pandemic it would necessitate the use of PPE, reducing stocks, and possibility leading to shortages. There is concern too that if surgery continued as normal it would mean hospital and ICU beds would be filled with post-surgical patients who could not be discharged, limiting beds available for patients with COVID-19. In some countries ICUs have overflowed into theatres with theatre ventilators needed for patients.¹⁴

Where to from here?

It has been estimated that 28,404,603 operations have been cancelled or postponed worldwide during what has been perceived as the peak 12-week COVID-19 disruption.²⁰ Many health care workers feel that the response to COVID-19 in New Zealand has avoided our health care system becoming overwhelmed. New Zealand has re-entered Alert Level 2 restrictions, with 1,504 COVID-19 confirmed and probable cases.²¹ Our hospitals remain open for emergency care and some elective surgery has resumed, but for some District Health Boards (DHBs), non-urgent treatment continues to be deferred as DHBs reconfigure their services. Outpatient clinic appointments remain mainly conducted by video or teleconsultations.²² The national breast and cervical cancer screening programmes have started up again but bowel screening is being introduced in a phased manner.²³ New Zealand appears to have successfully "crushed the curve", with its just-in-time lockdown. However, we are left with different challenges as we move forward and assess the collateral damage.

The risk of pandemic death in our country currently is lower than the risk of non-pandemic death from lack of access to surgical services and ICU beds with long term effects related to cancellations and delays in access. The COVIDSurg Collaborative has predicted worldwide that even with increasing normal surgical volume by 20%, it will take a median of 45 weeks post-pandemic to clear the operations cancelled and postponed due to COVID-19.²⁰ As surgeons try to reduce the backlog they will need to prioritise surgery, leading to further delay for benign conditions that may result in deterioration of the patient's condition. This is not only a bad outcome for the patient but also may reduce their ability to work.⁴ In turn this has a knock-on effect for our society with increasing costs due to unemployment as well as more complex and often more costly management strategies.

As we move forward we need to pay attention to health inequities, we need to consider how we provide a better, more accessible surgical service for the whole of New Zealand's population. To ensure equity in health care treatment in the post-pandemic phase requires assessment of how pathways to accessing appropriate care can be accelerated or adjusted to ensure Māori and Pacific Islander populations are prioritised to improve their health outcomes.¹⁹

There are some positive benefits from the pandemic that need to be kept; for example, a better understanding of the importance of hand hygiene. We have a greater awareness of the need to be prepared — such as education in donning and doffing PPE and correct fitting of N95 masks ahead of time.¹⁴ Telemedicine has much merit for some types of patient-doctor interaction, such as follow-up of patients. Telemedicine in our distributed environment also has many advantages for patients in minimising physical contact and reducing opportunities for viral spread. Patients often travel long distances for outpatient appointments, resulting in expense in terms of time and transport costs for appointments that are often delayed. Telemedicine enables patient to be seen and heard without the need to travel and potentially enables members of their whanau to be involved in their health care encounters. However, consideration needs to be given to facilitating telemedicine for those that don't have access to the technology needed, such as having teleconference hubs in rural and remote communities. Continuation of educational virtual meetings for surgeons is also better for the environment and has lower costs.^{4,24}

COVID-19 has given the surgical community a chance to re-look at our values. In order be responsible surgeons we need to show consideration, generosity, warmth, and concern to patients and colleagues. Responsible surgeons need to show tolerance and forgiveness even under provocation. These characteristics can be embedded in an ethical concern for others, often called kindness. Campling uses the prefix "intelligent" to denote kindness as "being in solidarity with human need" rather than a sentimental term.^{25 p3} When under pressure and requiring to make difficult decisions where one party may be perceived to be disadvantaged, kindness can require courage and strength. For a surgeon, kindness may come in many forms including not to treat a patient, to facilitate a trainee to operate, and to intervene when we see standards of behaviour that are detrimental. Research has shown that rudeness in the operating theatre has a negative impact on staff²⁶ and is detrimental to patient care,²⁷ but kindness is the antitheses of the inconsiderate. Kindness is facilitated by open, transparent communication. In the words of Campling: "Kindness rooted in kinship is a powerful concept — ethically, politically, socially and clinically — in the project of improving healthcare."^{25 p4} So as we navigate our way through the post-pandemic era with its significant challenges for surgeons, we need to remember kindness can always be shown through careful consideration, communication, and empathy.

Conclusion

Ultimately this pandemic has been frightening for patients and health care workers, and has highlighted our vulnerability. The post-pandemic period in New Zealand will be stressful for surgeons as we address the health issues that were relegated during the lockdown period. Considering our responsibilities during a pandemic requires surgeons to take a broader approach beyond responsibilities to patient care, ourselves, colleagues, and education. Surgeons need to engage in considerate leadership to ensure that urgent needs of patients are balanced with societal needs to ensure wellbeing for all. As we move forward we have a responsibility to advocate for investment in our public health service to ensure fair and equitable care for all the population and above all we need to ensure we engage in "intelligent kindness".

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To have or not to have flowers?

Shehnaz Hussain

Abstract

Flowers have many roles in a hospital setting but could present risks to patients. Our aim is to understand patient preferences for having flowers on the ward and whether they believe that flowers make their respiratory symptoms worse. Patients were surveyed by a single interviewer on a respiratory and gastroenterology ward at Middlemore Hospital in Auckland, New Zealand. Thirty patients were enrolled. Twenty-six patients (87%) did not mind having flowers on the ward. Patients who did mind (four) were concerned about flowers affecting their own health or the health of others — all but one had a diagnosis of a lung condition. Eleven patients (38%) felt that flowers would exacerbate their breathing problems or hay fever symptoms; however, only four of these patients wanted flowers removed from the wards for these reasons. The majority of patients in our survey did not mind having flowers on the ward although some were concerned that flowers ers might exacerbate their symptoms.

Introduction

Flowers are commonly found in New Zealand hospital wards, being gifted by family and friends to patients during their stay. Gifting of flowers is deeply rooted in many cultures to celebrate and mourn, but concerns have been raised that they could affect the health and recovery of patients. For example, hospitals in the United Kingdom (UK) have been reported to ban flowers in hospital wards because of concerns that bacteria in flower water might cause new infections in patients.¹

There are several potential challenges associated with having flowers on wards, including infection risk, hay fever, and added workload for staff. A study of 60 vase water samples from various environments, including hospital wards, showed that vase water grew many antibiotic-resistant bacteria, including 12 species of *Pseudomonas.*² These bacteria were identified as originating from the flowers, rather than the environments in which they were placed, therefore acting as a reservoir for multi-resistant bacteria.² In the context of the hospital, patients may have burns, open wounds, internal tubes, intravenous lines, and reduced immunity, making them more susceptible to infections. Patients with burns are particularly at risk and several authors have recommended that flowers and plants should be kept away from these patients.³⁴ However, a review of the literature concluded that evidence of cross-infection from the organisms growing in the soil and water of plants to patients was lacking.^{5,6}

Little is known about whether flowers increase respiratory symptoms in hospitalized patients. However, a 1998–1999 survey of 387 patients in a tertiary level hospital, found that the presence of flower arrangements in close proximity to patients was strongly associated with new-onset rhinitis symptoms.⁷

Another issue is increased workload for nursing staff. A survey of 39 nurses in the UK showed that 80% of them had a negative view

towards flowers on the ward, partially due to the amount of work it generated for them.⁸ One charge nurse commented that, "My staff don't have time to change stagnant water; spillage is responsible for slips, trips, and falls; and they cause hay fever."¹

These points raise the question of whether flowers should be discouraged on hospital wards. Southend University Hospital in the UK claimed that a survey conducted on patients' attitudes towards flowers showed that patients were supportive of a ban after considering that they were a potential health and safety risk.¹ New Zealand hospitals, including Middlemore Hospital, have no specific guidelines pertaining to flowers on general wards, but most burns units ban flowers.⁹ Some New Zealand district health boards (DHBs), such as MidCentral DHB, have a ban on flowers in the intensive care unit (ICU) because "of the risk of organisms that may be on the flowers".¹⁰ Therefore, we wanted to understand our patients' preferences and potential concerns for having flowers on the ward. There is also a lack of research about whether patients perceive that flowers exacerbate their respiratory symptoms. The results of this survey could potentially guide decision making by health care authorities when creating and assessing hospital guidelines.

This study aimed to identify whether patients have preferences for having flowers on the ward and whether they believe that flowers exacerbate their respiratory symptoms.

Methods

SETTING AND SUBJECTS

Patients of Ward 32 (primarily respiratory and gastroenterology patients with occasional outlying general medical patients) at Middlemore Hospital in Auckland, New Zealand were invited to participate in a short survey during the period from June 2019 to August 2019. We included patients who could speak English, were staying on Ward 32 (including patients of other medical teams who stayed on Ward 32), and were competent to understand the purpose of the survey and the questions. Our exclusion criteria included patients who were not able to complete the questionnaire for any reason or were too unwell.

SURVEY DESIGN

A single interviewer explained the purpose of the survey, the information to be accessed from their records, and confidentiality of their data and answers. Verbal consent was obtained and the date and time of this consent was recorded. We gathered data on sex, age, ethnicity, smoking status, primary and secondary diagnosis of each patient, and asked about their preferences with regards to flowers.

The interview was structured and included multiple-choice questions and open questions. A single interviewer read out the questions and multi-choice answers to each patient. The multiple-choice questions we asked were:

- 1. "Do you mind having flowers on the ward?" The multi-choice answers included: "Yes, definitely", "Yes, somewhat", "No", and "Undecided". We also asked them about the primary reason for their answer.
- 2. "Do the flowers on the ward make your breathing/hay fever symptoms worse?" The multi-choice answers included "Yes, a lot", "Yes, a little", "No", and "I'm not too sure".
- 3. "Have you had flowers in your room during your stay in the hospital?" The possible answers were "Yes" or "No".

Results

We surveyed 30 patients who were predominantly female (67%), between the ages of 50 and 90 years (83%), and under care of the respiratory team (67%) (Table 1). Twenty-six patients (87%) did not mind having flowers on the ward (Figure 1). Eleven patients (37%) felt that flowers exacerbated their breathing problems or hay fever symptoms (Figure 2). However, only four of these patients (36%) wanted flowers removed from the wards for these reasons. Six patients (20%) had flowers in their room during their stay and all but one of these patients did not mind having flowers on the ward. Of the four patients who did mind having flowers in the ward, all but one had a diagnosis of a lung condition (pneumonia, exacerbation of COPD, or metastatic malignancy to the lungs).

Table 1. Patient characteristics of 30 patients in Ward 32

Variables	Number (%)	
Sex		
Male	10 (33.3)	
Female	20 (66.7)	
Age		
20–29	2 (6.7)	
30-49	2 (6.7)	
50-69	15 (50)	
70–89	10 (33.3)	
90 plus	1 (3.3)	
Ethnicity		
Māori	4 (13.3)	
Pasifika	2 (6.7)	
Pakeha	19 (63.3)	
Indian	3 (10)	
Asian	1 (3.3)	
Other	1 (3.3)	
Smoking status		
Smoker	5 (16.7)	
Ex-smoker	12 (40)	
Lifetime non-smoker	13 (43.3)	
Admitted under		
Respiratory team	20 (66.7)	
Gastroenterology team	7 (23.3)	
General Medicine	3 (10)	



Figure 1. A pie chart demonstrating the percentage of patients that mind having flowers on the ward

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Figure 2. A pie chart demonstrating the percentage of patients that find that flowers make their breathing/hay fever symptoms worse

Table 2. Primary reasons for flower preference

Reasons why participants do or	Frequency
do not mind having flowers on the ward	(%)
They brighten up the room/ They look nice	8 (26.7)
They bring happiness and joy	5 (16.7)
They have a healing energy	3 (10)
They smell beautiful	3 (10)
They make me feel better / I like flowers	3 (10)
Doesn't matter to me, only my wife	2 (6.7)
They make me sneeze a lot	2 (6.7)
They're okay	1 (3.3)
As long as they're not smelly	1 (3.3)
I will chuck any flowers out that are in the room. I don't care	1 (3.3)
who has them or why; they affect my health and I am not	
afraid to remove them	
l understand it can exacerbate other people's symptoms	1 (3.3)

Discussion

The principal finding of this study was that most patients (87%) did not mind having flowers in the ward. To our knowledge, no other studies have explored patient preferences for having flowers on the ward. Other studies and articles have explored the preferences of staff members and the recovery of patients, but not patients' direct preferences. One study of 387 patients explored the prevalence of new-onset rhinitis due to hay fever and showed that 12.7% of patients developed rhinitis, which showed a strong correlation with nearby flowers on the ward (p < 0.0001).⁷ By comparison, 38% of patients in our study reported that it made their breathing or hay fever symptoms worse.

Our study shows that patients generally do not mind having flowers, and various other studies have shown improved outcomes and experiences when flowers are present in the ward. This lends some support towards having flowers in hospital wards. In a study of 90 female students, having flowers in a hospital room significantly improved their pain tolerance.¹¹ Other studies have followed patients post-operatively and randomly assigned them to two different rooms, one with flowers and foliage plants (intervention) and the other without (control). Those in the hospital rooms with flowers and foliage had significantly shorter hospital stays, requested less analgesia, had lower ratings of pain and anxiety, and more satisfaction with their rooms than patients in control rooms.^{12,13} A nurse interviewed in a private hospital said that they "welcome flowers in patients' rooms, as long as there are not too many, and they are not too smelly", adding that "they have a positive effect on the patients"¹ (it must be noted that often in private hospitals, space is not an issue). This positive effect was indeed seen in immediate and long-term effects on mood, memory, and positive social behaviours in both men and women.¹⁴

As seen, there are polarising scientific and non-scientific reasons for and against having flowers on the ward. It is important for the hospital to consider these when assessing and creating guidelines, so that patients are neither subject to harm nor denied any potential benefits. The predominant quoted reason for denying flowers on wards is the

"potential" infection risk it may possess, even when studies have shown to negate this idea. The microbes that do exist in flowers, soil, and water hold no true pathogenic potential to humans and have never been documented to cause infection to patients on the ward. Therefore, this shows that it is irrational to continue to believe that flowers could be a potential source of infection, which is in line with experts' view in the field of Infectious Diseases.

There are several limitations to this study. Firstly, our study population was small (30 patients) and involved patients on a mixed ward of predominantly respiratory and gastroeterology patients. Our study results may not therefore be generalisable to patients in other ward settings or hospitals. Secondly, this survey was only conducted during the winter period. Hay fever is more prevalent in summer and influenza more in the winter. It is important to gather data throughout the seasons since there is a large fluctuation throughout the year of respiratory admissions.

In our study, we asked whether patients "minded" having flowers on the ward. Future studies could evaluate whether patients "prefer" to have flowers on the ward as this could elicit a different response. Having the absence of negative feelings towards flowers may not necessarily mean that they have positive feelings towards flowers.

A strength of this study was that a single interviewer surveyed all the patients. This allowed for reduced interviewer bias and ensured that the questions were delivered in a similar manner. The survey was also short and succinct, ensuring a high participation rate.

Most hospitals in New Zealand do not have a specific policy regarding flowers on non-ICU or burns wards. However, florists are often located on hospital premises and therefore many hospitals indirectly support the presence of flowers on wards. Our study provides support for this practice from a patient perspective. However, since circumstances occur where flowers may not be appropriate or desired in wards, the development of simple guidelines could useful. These could be enhanced by further research on the risk from flowers of aggravating symptoms in patients with respiratory conditions.

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An overview of the pathophysiology and the past, current, and future treatments of neovascular age-related macular degeneration

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Abstract

Age-related macular degeneration (AMD) is the leading cause of blindness in elderly people in New Zealand and other developed countries. Neovascular AMD has a rapid onset and can lead to an overall loss of independence. Patients often present with an absolute central scotoma and distortion.

The pathophysiology of neovascular AMD is thought to be associated with polymorphisms and mutations in genes which are involved with the progression of the complement cascade. Vascular endothelial growth factor (VEGF) may contribute to the progression of AMD via excessive angiogenesis and permeability of vessels associated with the retina.

Current treatments for neovascular AMD act to reduce pathological angiogenesis via multiple mechanisms. Bevacizumab and ranibizumab bind to VEGF receptor 2 (VEGFR2), suppressing the actions of VEGF-A. Similar drugs, such as aflibercept, bind to placental growth factor (PIGF) in addition to VEGFR2, triggering similar effects. Endeavours to improve current treatments such as the safer use of brolucizumab and the use of the port delivery system for ranibizumab are being researched to maximise efficiency of therapies, to meet increasing demand.

There are many direct and indirect costs of AMD on patients and hospitals. With an ageing population who suffer from more comorbidities, AMD cases are expected to rise; we must therefore endeavour to improve existing treatments, and future techniques for management should not be discarded without serious consideration.

Introduction

Age-related macular degeneration (AMD) is the leading cause of blindness in elderly patients in developed communities.¹ In New Zealand (NZ), AMD affects approximately one in seven people over the age of $50.^2$ This prevalence is similar to other developed countries: approximately 700,000 people suffer from neovascular AMD in the United Kingdom (UK), with the figure potentially reaching 1.3 million by 2050. In addition to the effects of sight loss, AMD costs the UK National Health Service (NHS) £1.3 billion GBP annually, largely due to the cost of treatments such as aflibercept.³ The progression of AMD leads to loss of central vision, leaving many patients unable to read, write, or recognise both colour and detail, thus compromising quality of life.⁴ Although the exact functional pathogenesis of AMD is not fully understood, there have been recent improvements in genetic technologies leading to the identification of various polymorphisms that have shown to harbour unique associations with AMD.⁵ This essay will summarise some of the major components involved in the pathogenesis of AMD and the interactions between the major components, which lead to the development of the major pathological abnormalities. In this essay, "wet" or neovascular AMD will be focused on.

Classification and clinical manifestations

AMD can be classified into early and late phases. The early phase is characterised by the accumulation of lipid-rich subretinal deposits, called drusen. There are two clinical manifestations of advanced AMD: "wet" and "dry". The cause of dry AMD is largely unknown but is thought to involve retinal cell death, which results in an inability to pick up light stimuli and convey information to the neurons leading to the primary visual cortex. It does not involve the leaking of blood vessels supplying the eye. Although there is no treatment for dry AMD, progression is much slower, often spanning over many months to years.⁶

Neovascular or wet AMD has the most rapidly progressing vision loss compared to dry AMD. The scotoma is thought to be caused by damage to photoreceptors as a consequence of the growth of abnormal blood vessels in the sub-retinal pigment epithelium (sub-RPE) space. The growth of the new vessels is either from the retinal circulation, known as Type 3 macular neovascularisation (Type 3 MNV); or the choroidal circulation which pierces through Bruch's membrane, known as Type 2 MNV.⁷ Both these mechanisms can result in changes in the anatomy of the choroid and retina; the exudations from these vessels can therefore lead to wet AMD. Fluid may accumulate in the retina, subretinal space, and sub-RPE.⁸

Patients tend to present with distortion, blurring, or a central scotoma, which is more rapid in onset in neovascular AMD. Patients with vision loss from late-stage AMD may also develop visual hallucinations. Hallucinations may be unformed (randomly coloured lights or patterns) or formed (involving actual objects, people, or scenes).⁹ As well as optical coherence tomography imaging, a thorough history is needed to diagnose neovascular AMD, as volunteers are unlikely to admit to these symptoms unless directly asked. In some cases, patients are barely aware of their symptoms, as they have developed strategies such as eccentric fixation to overcome their symptoms; Figure 1 exemplifies this process.



Figure 1: A diagram to show to process of eccentric fixation

Pathophysiology

There have been a variety of proposed mechanisms which may lead to the development of neovascular AMD. Though the mechanism is uncertain, some studies suggest that the accumulation of oxidative stress, inflammatory cell infiltration, and genetic mutations, combined with environmental factors, lead to changes in the RPE and overall retinal anatomy.¹⁰ The underlying mechanism is thought to be a response caused by the complement cascade, which in turn alters the retina's structure and action. This theory is reinforced by the presence of inflammatory factors in the drusen and the specific genetic variants related to complement factor proteins that consolidate the susceptibility to AMD. One of the most significant genes was found to be Complement Factor H (CFH).¹⁰

As exemplified in Figure 2, CFH is a major inhibitor of the complement cascade at various levels. Firstly, it inhibits the conversion of complement component 3 (C3) to C3a/C3b, which are necessary for opsonisation during an inflammatory response. CFH also competes with Factor B to inhibit activation of C3b to C3bB. (Note that C3bBbP = a C3bBb complex, which consists of C3 convertase binding to Factor B). Furthermore, CFH binds C-reactive protein (CRP), which reduces the inflammatory response via limiting CRP-mediated opsonisation.¹¹ A genome association study investigating the ARMD1 locus found a single nucleotide polymorphism that was strongly associated with AMD in exon 9 of the CFH gene.¹² This polymorphism changed tyrosine to histidine at codon 402, which is the position of the gene Y402H. This leads to a conformational change in the structure of CFH, leading to a decreased binding to CRP. This may cause overactivity of the inflammatory proteins.



Figure 2: Mechanism of action of CFH (in normal regulation)

A prospective study by Seddon et al. (2007)¹³ concluded that in the CFH gene, a single histidine allele C correlated with a 2.5 times increase in the risk of AMD onset; while a homozygous histidine variant genotype was correlated with a 6.35 times greater risk. This study was carried out in the United States of America (USA) between 1990 and 2001, with 1466 Caucasian participants. The mean follow-up time was recorded as 6.3 years and the AMD status was determined by grading fundus photographs. The study also carried out a predicted population-attributable risk (PAR) for the homozygous and heterozygous risk populations, showing they made up 20–60% of all AMD patients. The connection between AMD and the Y402H polymorphism was therefore established. This was a prospective study, meaning there is the possibility of bias in the results due to differential loss-to-follow-up.¹³

Another study by Grassi and colleagues (2006)¹⁴ investigated the PAR of the Y402H risk variant for AMD among Hispanic and Asian populations, finding a PAR of 17% and 8.1% respectively. This brings into question the strength of the connection between Y402H and AMD. The study also showed that the environment and non-coding alleles may have had an impact on the development of neovascular AMD, which is beyond the scope of this article.¹⁴

Vascular endothelial growth factor (VEGF) is also thought to have a role in the pathophysiology of neovascular AMD. The growth factor is spliced at various loci and so results in multiple different isoforms. VEGF-A 165 is crucial in the control of angiogenesis; in patients suffering from AMD, there are higher levels present. Many other isoforms are present physiologically, however for the purposes of neovascular AMD, VEGF-A is particularly important. Polymorphisms in VEGF encoding genes lead to an increased risk of AMD. The AMD risk allele C has been specifically identified as a unique polymorphism — it causes an increased risk of AMD in both homozygous and heterozygous populations. These polymorphisms lead to an increase in angiogenesis and vascular proliferation in pathological processes such as neovascular AMD.¹⁵

The gene locus LOC387715/ARMS2 lies on chromosome 10q26; an insertion-deletion mutation here may also play a role in developing neovascular AMD. The mutant locus causes a significant increase in messenger RNA (mRNA) turnout by removing the polyadenylated tail, reducing the expression of the LOC387715 phenotype.¹⁶ The PAR for populations who were homozygous and heterozygous for the risk allele was 8.21 and 2.69 times greater risk respectively, relative to a no-risk population.¹⁷ By contrast, a different polymorphism leading to a mutant codon at the LOC387715 locus was shown to have a protective phenotype.¹⁸ To reiterate, in both cases, there is an instability in LOC387715. In the first (insertion-deletion) mutation, the risk is increased; but a premature nonsense mutation reduces the risk of AMD. This highlights the complexity of the genetic interactions that may have a hand in causing neovascular AMD. Many other genetic and non-genetic factors are involved; a few with particularly strong associations with neovascular AMD have been mentioned above.

Background of treatments

As established previously, neovascular AMD results from abnormal growth of blood vessels in the sub-RPE space. VEGF is vital for the growth of new blood vessels, particularly VEGF-A, which is involved in mitosis and regulation of endothelial cell survival and as a chemoattractant for endothelial progenitors from the bone marrow. Furthermore, VEGF-A is the most important inducer of permeability in the vasculature; it causes the formation of fenestrations between capillary endothelial cells by disrupting their intercellular junctions.¹⁹ VEGF-A's functions are facilitated via the transmembrane receptor VEGFR2, which triggers a downstream cascade of signalling molecules such as kinases or protein phosphatases. The formation of perforations and vessels then allows the extravasation of inflammatory cells and fluid.²⁰ Based on this, a pathological increase in vasculature (such as in neovascular AMD) results in an increase in oedema and an inflammatory response.¹⁹ This explanation is critical in understanding the basis of the management of neovascular AMD, the majority of which is carried out via anti-angiogenic drugs. Previous therapy using pegaptanib sodium and verteporfin, as well as current therapies such as Avastin (bevacizumab) and Eylea (aflibercept) will be further explored below.

Previous treatments

PEGAPTANIB SODIUM

Pegaptanib sodium is an anti-angiogenic drug approved by the Food and Drug Administration (FDA)²¹ for wet AMD, but it is not recommended by National Institute for Health and Care Excellence (NICE) guidelines.²² Therefore, this treatment is no longer used to treat AMD. Pegaptanib sodium only inhibits isoforms of VEGF which contain at least 165 amino acids in its polypeptide; VEGF-A165 is a member of this group.²³ It functions by binding to the 55 amino acid heparin-binding domain of VEGF. These sites are not present in smaller isoforms of the VEGF family; as a result it does not affect the biologically active proteolytic products. The purpose of this selectivity is to reduce the abnormal angiogenesis present in neovascular AMD, whilst minimising inhibition of other smaller, physiological VEGF molecules.²⁴

VERTEPORFIN PHOTODYNAMIC THERAPY

Angio-occlusive therapy is a treatment that is no longer used to treat neovascular AMD, unless the patient has polypoidal choroidal vasculopathy. This therapy involves administering intravenous verteporfin, which is subsequently activated by a laser. Verteporfin accumulates in proliferating cells; in wet AMD, these are the endothelial cells of retinal microvasculature. The laser triggers a photochemical reaction which generates reactive oxygen species (ROS) in the endothelium. This causes platelet aggregation and thus the formation of a stable haemostatic plug, occluding the vessels selectively without affecting the overlying retina. However, altering the endothelium can lead to an increase in VEGF expression and cause angiogenesis, which is unideal.²⁵ This is one of the reasons for its discontinued use.



Figure 3: A summary of how verteporfin photodynamic therapy works

Current treatments

In recent years, treatments such as pegaptanib sodium have been replaced with newer treatments. Currently, treatments such as ranibizumab, Avastin (bevacizumab), and Eylea (aflibercept) are used as a first line of treatment for neovascular AMD. These drugs will now be discussed, as well as brolucizumab, which may be used to treat AMD but has recently been flagged for safety concerns by American Society of Retina Specialists (ASRS).

RANIBIZUMAB AND AVASTIN

Ranibizumab is a humanised antigen-binding fragment (FAB) of a monoclonal antibody, initially obtained from mice. It acts to selectively inhibit VEGF-A, including all its proteolytic products and isoforms. Ranibizumab prevents VEGF-A from interacting with VEGFR2 on the endothelial cell surface, limiting the formation of fenestrations, cell proliferation, angiogenesis, and leakage from vasculature.²⁶ FAB molecules can easily pass through the retina. This is because its structure shares similarities with a human antibody: at its C terminus, it contains five variable domain substitutions, one constant domain substitution, and six amino acid substitutions.

The MARINA²⁷ and ANCHOR²⁸ trials were both Phase III clinical trials which led to ranibizumab being a widely used treatment for all subtypes of neovascular AMD. The MARINA trial measured outcomes at 12 and 24 months. The results showed that at 12 and 24 months, 25–34% of treated patients had gained a minimum of 15 letters of visual acuity, compared to only 4–5% of the control group.²⁶ After the ANCHOR trials displayed similar outcomes, ranibizumab was approved and recommended by the FDA28 and by NICE21 for the treatment of wet AMD. As it is significantly more expensive compared to bevacizumab, it is restricted to a third-line treatment for wet MD in New Zealand.²⁹



Figure 4: Ranibizumab's mechanism of action

Bevacizumab (sold under the brand name Avastin) is a common treatment for several conditions, including metastatic colorectal cancer, neovascular glaucoma, and neovascular AMD. Its mechanism of action is remarkably similar to that of ranibizumab; though both drugs are derived from the same parent molecule, ranibizumab is smaller and has been pharmacologically altered to bind more strongly to VEGF than bevacizumab.³⁰ In New Zealand, Avastin is offered as the first-line treatment for neovascular AMD as it has few adverse side effects and is the considerably cheaper alternative to ranibizumab.²⁹

A case-series study conducted in 2007 reflects the success of Avastin in treating neovascular AMD.³¹ In the study, 79 eyes (from 74 patients) received an initial injection of bevacizumab to treat wet AMD. Among those who were followed up, mean central retinal thickness decreased from 304 +/- 83 micrometers at baseline to 237 +/- 105 micrometers at three months (p = 0.00002). There was also a mean improvement in visual acuity, from 20/100 at baseline to 20/80–1 at three months (p = 0.040). Twenty five percent of eyes from the patients in this study appeared to have a sustained response to a single injection and therefore did not require further injections.³¹ Though conducted retrospectively and with a small sample size, this study further supports the beneficial effects of bevacizumab.

EYLEA

Aflibercept, commonly sold under the brand name Eylea, is currently used as a second line treatment in neovascular AMD. Although it has been suggested that Eylea is more effective than drugs such as Avastin, Eylea costs significantly more than alternative treatments. According to the NICE technology appraisal 294, the total annual cost of treating an AMD patient is estimated at just less than £7,000 GBP, which is based on a course of 8.5 injections; each vial of Eylea is priced at £816 GBP.³² Aflibercept is also indicated as a treatment in metastatic colorectal cancer and all stages of diabetic retinopathy.³³

Similar to the drug mechanisms described above, aflibercept binds and inhibits the action of VEGF-A and placental growth factor (PIGF), which is also a member of the VEGF family.³⁴ There are two receptors that factors such as VEGF-A bind to: VEGFR1 and VEGFR2, respectively. It has been suggested that PIGF competitively binds to VEGFR1 and thus leads to a slight increased availability of VEGF-A to bind and activate VEGFR2,³⁴ which is thought to produce a stronger angiogenic stimulus than the activation of VEGFR1. In addition, it is thought that PIGF could also promote angiogenesis and endothelial cell survival in the retina, independent of VEGFR signaling; this is possible because of PIGF's ability to bind and activate neuropilin 1 receptors, which is also a co-receptor of VEGF.³⁵

Future directions

Laser photocoagulation has been considered as a treatment for wet AMD since the turn of the century. This was done by using a laser to block newly emergent vessels at the expense of risking damage, such as to the retina, or accidental removal of normal vessels which thereby worsens the central scotoma.³⁶ Although there are currently readily accessible anti-VEGF and anti-inflammatory therapies with a significantly higher efficacy and a dramatic reduction in iatrogenic risk, new treatments are being developed.

BROLUCIZUMAB

Brolucizumab, like other drugs mentioned above, works by inhibiting the action of VEGF-A. In 2019, the FDA approved the brolucizumab injection for the treatment of wet AMD³⁷; this was a result of two large-scale, phase III randomised controlled trials, called HAWK and HARRIER. The trials concluded that on average, brolucizumab had a larger correction in visual acuity at 48 weeks and caused a greater reduction in central subfield retinal thickness at 4, 8, 12, and 16 weeks, when compared against aflibercept.³⁷

Whist it has been approved for use in several countries, including New Zealand, in February 2020, the ASRS reported severe side effects of Brolucizumab, such as retinal vasculitis, retinal haemorrhage, and cataracts, which can lead to vision loss.³⁸ Though the drug is already in use, future developments would involve research into whether this drug could be made safer to avoid its potential adverse effects.

PORT DELIVERY SYSTEMS

Alongside new therapies, research is being conducted into a more convenient, safer way of administering existing treatments. A randomised controlled trial (RCT) on a port delivery system (PDS) with ranibizumab was conducted in 2019.³⁹ It used a subconjunctival refillable reservoir of ranibizumab to release the antibodies in a controlled manner, eliminating the need for injections, which are invasive and expensive. This was a phase II trial, and although the results appeared promising, much progress needs to be made before this method of drug administration can be used in hospital settings.

Conclusion

Neovascular AMD is a severe, progressive condition, which can have many negative effects on a person's quality of life. A person's loss of visual function can have knock-on effects for their overall productivity and their ability to work and learn. In short, a person with neovascular AMD is at risk of suffering a loss of independence, as well as being burdened with related costs such as carers or nursing home care. The other direct costs of AMD on healthcare are excessive, and with an ageing NZ population who suffer from more comorbidities, the cases of AMD are expected to rise.⁴⁰ Based on this, it is imperative that existing treatments for treating wet AMD are improved, and novel techniques for management are not discarded without serious consideration. As suggested above, there are many factors which influence the onset and progression of AMD; the more relevant pathways are currently targets for much of the existing intervention. Although previous and current medications (such as those that block VEGF-A action) are efficacious, newer drugs such as brolucizumab and the use of a PDS are in early stages of development. Nonetheless, we can perhaps remain cautiously optimistic about the future of managing AMD.

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Medical management of cataracts: Promising or pointless?

Natalie Allen

Abstract

Cataracts are a significant and common cause of reversible blindness, for which definitive management is by surgical removal. However, a lack of ophthalmologists and funding means many do not have access to such procedures worldwide. Therefore a less invasive and cheaper alternative is desirable. This paper aims to provide a brief overview of the physiology and risk factors of cataract formation, as well as discussing current evidence regarding prevention and management of cataracts non-surgically. This review finds there are numerous promising prevention strategies to reduce the likelihood of a cataract developing. These include aldose reductase inhibitors, non-steroidal anti-inflammatory drugs (NSAIDs), and vitamin supplementation. However, further large-scale human trials are required for definitive medical prevention strategies. There is also almost no data on alternative management of established cataract as opposed to prevention of cataract development. This identifies a key gap in the literature requiring further investigation.

Review

Cataracts continue to be a significant cause of blindness worldwide, despite technological advancements. The gold standard treatment for hundreds of years has been surgical removal of the opacified lens.¹ Modern cataract surgery is not without its costs and risks.¹² Complications occur in 1–5% of patients and the worldwide burden of cataract surgery is upwards of several billion dollars per year. There is also a 10–20% chance of posterior capsule opacification with each cataract operation, although this is easily fixed.¹ In addition, the demand for surgery far exceeds supply, particularly in developing countries, with the associated issue of inequitable access.³ Cataract surgery can also present significant challenges in certain circumstances, such as patients with additional ocular pathology, small pupils, unstable lenses, or diabetic retinopathy.² A cheaper, non-invasive, and accessible alternative to surgery would be welcome.

There is extensive literature regarding strategies for medical prevention of cataracts, but almost no research has been conducted on the medical treatment of an established cataract. Do any of these hypotheses actually reduce the risk of cataract prevention, and will there ever be a viable medical alternative to cataract surgery?

A cataract is an opacification of the lens, the aetiology of which is complex and multifactorial. Patients typically present with blurred vision and glare (reduced vision in the presence of oncoming light).⁴ Cataracts can broadly be classified based on cause: age-related, paediatric, or secondary. Age-related cataracts are the most common, and can be categorised as nuclear, cortical, and posterior subcapsular based on the location of opacification within the lens.⁴ Risk factors for cataracts include age, female sex, Asian ethnicity, certain genetic patterns, low education level, and myopia.^{4–6} Systemic illnesses such as diabetes mellitus and hypertension also contribute.^{4,5,7} Environmental factors such as lifetime exposure to ultra violet (UV) light and other sources of oxidative stress also contribute to gradual damage to lens proteins. There is an increased incidence of cataracts in countries with higher UV exposure.⁸ It is also thought that the lens contains a substantial amount of protective antioxidants which are degenerated by time and smoking.⁷ Almost any ocular pathology such as trauma, inflammation, glaucoma, vitrectomy, or any other intraocular surgery contribute to cataract formation, as well as corticosteroid exposure which is the treatment for many conditions. Therefore, there are a multitude of potential targets for cataract intervention.

Diabetic cataracts are thought to be a result of increased glucose causing overflow from the glycolysis pathway into alternative metabolic pathways. When glycolysis is overloaded in hyperglycaemia, the nicotinamide adenine dinucleotide phosphate (NAPDH)-dependent aldose reductase enzyme is activated, producing sorbitol. Sorbitol increases osmotic pressure and draws water into the lens, and these fluid shifts cause refractive changes and opacification.¹ Sorbitol is also converted to fructose via this pathway resulting in ongoing hyperglycaemia and oxidative stress.⁹ Hence one of the oldest proposed medical methods for inhibiting cataracts is the use of aldose reductase inhibitors. One such drug, sorbinil, showed promising effects in both preventing and slowing the development of cataracts in diabetic rats.¹⁰ A recent trial demonstrated the use of Vitamin K1 as an aldose reductase inhibitor and was shown to significantly reduce sorbitol and drop blood glucose levels by 65% at 90 days.⁹ However, despite encouraging results in rats and clinical trials in humans several decades ago, aldose reductase inhibitors are still not found in clinical practice.9-13 There is one new aldose reductase inhibitor called Epalrestat which is commercially available in Japan, but apart from this, they are virtually non-existent in clinical ophthalmology.¹¹ There have been no human clinical trials investigating aldose reductase inhibitors in cataract development published within the last five years. It is unclear why this is, but for now it remains a possible avenue to be further investigated.^{7,13}

Another potential medical solution to cataract formation is the use of antioxidants and vitamins to reduce the impact of oxidative stress and UV damage to the lens.^{1,6–8,14} It was found that pyruvate and ascorbate significantly prevented photosensitive damage in the eyes of rats and mice. This involved measuring certain metabolites within the lens as well as apoptotic cell death after UV light irradiation.⁸ Caffeine was also found to be efficacious in inhibiting cataracts induced by galactose in rat and mice lens organ cultures.⁸ Caffeine is believed to prevent oxidative stress in the tissue.^{8,13} In a major prospective cohort, multivitamins such as CentrumTM were associated with reduced incidence of nuclear cataracts.⁶ Other vitamins also seemed promising, but a large meta-analysis involving 117,272 patients found no difference in incidence or progression of cataract with supplemental beta-carotene, Vitamin C, or Vitamin E.¹⁴ It is suggested that different areas of the lens have individual metabolic pathways for antioxidants and thus the issue is not the antioxidants themselves but the uptake into the lens structure.¹³ A randomised placebo-controlled trial would be required to demonstrate any preventive benefit, but would be expensive and prolonged and may not reveal a strong effect. Vitamin and caffeine supplements are cheap and readily accessible, and thus could be widely implemented in lower socioeconomic areas.

There has also been significant debate over the role of aspirin and other non-steroidal anti-inflammatories (NSAIDs) in cataract formation. An early case control study showed a strongly protective effect, with up to a 50% reduction in cataract development with these analgesics in human participants.¹⁵ However, a large cohort study and a cross-sectional study showed no association or even an increased risk of cataract surgery with NSAID use.^{16,17} A challenge to testing this idea is that cataract is a gradual pathology and so trials would be expensive and prolonged. The majority of data comes from cross sectional population based studies or cohort studies. Hence, it is challenging to be certain around the outcomes of NSAIDs in cataract prophylaxis.

Reduction in modifiable risk factors is the most substantiated method of preventing cataracts to date.¹³ Quitting or reducing smoking has a dose-response relationship in terms of cortical cataract risk, with a hazard ratio of 1.4 in the smokers compared with non-smokers. Exposure to UV can also be vastly reduced by sun protection and wearing sunglasses outdoors, but sun protection behaviour across a lifetime is difficult to measure, and has not been shown to affect cataract incidence.⁶ Maintaining good glycaemic control is imperative to protect against cataract development in diabetics.⁷ Reducing alcohol intake would likely be preventative, as would eating a diet rich in fruits and vegetables.^{13,15,18}

The author could find no clinical studies testing whether a cataract could be reversed or treated with medication. One barrier to testing these medications might be that participants would be required to delay cataract surgery while trying the medication, and long periods of treatment may be required.¹

As cataracts remain a prevalent and pressing cause of vision loss, and surgical access remains inadequate in many areas, there would seem to be a need for medical treatment. Barriers to testing potentially promising strategies, such as aldose reductase inhibitors, certain vitamins, and NSAIDs, are that controlled trials are long and expensive for a gradual disease process. Few companies are motivated to invest in these trials when the medications are cheap and not patent protected. Currently, the only preventive treatment for cataracts is reducing modifiable risk factors. Therefore, with our current knowledge, the best way to prevent cataracts is the best way to prevent every other pathology: a healthy lifestyle.

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ACADEMIC: CLINICAL AUDIT

Post-tonsillectomy haemorrhage rates at Nelson Hospital

Ahmed Sherif

Abstract

Removal of the tonsils and adenoids are common procedures performed across the globe. While the number of operations have been decreasing steadily over the past several decades, tonsillectomy remains the second most common day case surgery in the paediatric population. Although considered safe, tonsillectomy can manifest complications including nausea, pain, and difficulty eating. The most significant complication following surgical removal of the tonsils is post-tonsillectomy haemorrhage (PTH), which can develop immediately post-operatively or up to two weeks from the procedure. Clinical practice guidelines advocate the need for annual audits in centres where tonsillectomies are performed to ensure PTH rates are similar to international figures. We have investigated the complication of bleeding following patients undergoing tonsillectomy, adenoidectomy, or adenotonsillectomy in Nelson to assess PTH rates.

Introduction

Removal of the tonsils is a common procedure performed across the globe. While the number of operations has been decreasing steadily over the past several decades, tonsillectomy remains the second commonest day case surgery in the paediatric population.¹

Although considered safe, tonsillectomy can manifest complications including nausea, pain, and difficulty eating. The most significant complication following surgical removal of the tonsils is post-tonsillectomy haemorrhage (PTH), which can develop immediately post-operatively or up to two weeks after the procedure.² Clinical practice guidelines advocate the need for annual audits in centres where tonsillectomies are performed to ensure PTH rates are similar to international figures.¹

A 2017 meta-analysis of 87 studies from January 1980 to June 2016 by Francis et al. showed that the rate of PTH was roughly 4% following tonsillectomy in the paediatric population.³ Primary PTH, defined as bleeding within 24 hours of tonsillectomy, made up approximately 12% of all PTH. Secondary PTH, defined as occurring more than 24 hours following tonsillectomy, made up 63% with the remaining PTH unclassified in timing – either primary or secondary.³ Additionally, the analysis reports similar incidences of PTH amongst different operating techniques including cold dissection, electrocautery and coblation.³

When reviewing New Zealand figures, a 2019 retrospective study of 2177 Auckland paediatric patients undergoing tonsillectomy alone or tonsillectomy with an additional procedure (e.g. adenoidectomy, inferior turbinate cautery etc.) revealed a PTH rate of 3.6%.⁴ The average time from surgery to PTH occurrence was 6.6 ± 3 days, with 99% of bleeds occurring within the first two weeks of operation.⁴

We have investigated the complication of bleeding following patients undergoing tonsillectomy or adenotonsillectomy in Nelson to assess PTH rates within two weeks of their operation.

Methods

DESIGN/SETTING

The audit was conducted at Nelson Hospital, a 180-bed secondary-level hospital in New Zealand. Consistent with the methods used in audits conducted in Australasia, we retrospectively reviewed the clinical information of patients of all ages (adult and paediatric) who underwent tonsillectomy or adenotonsillectomy between 1 January 2019 and 31 December 2019.⁵

Ethics approval was not required, in accordance with National Ethics Committee guidelines for quality improvement projects.

Results

PATIENT CHARACTERISTICS

Our audit included 133 patients who were operated on at Nelson Hospital and 35 patients operated on at Manuka Street Hospital (Table 1). Overall, there was a fairly even split between female and male patients. In the paediatric population (<18), the ratio of female to male patients was 0.9:1. In the adult population, the ratio was 5.2:1 (Figure 1). The most common age group undergoing surgery was the five to nine year-old group. The mean patient age was 14 years old. The youngest patient in our cohort was two years old while the oldest was 70 years old (Figure 1).

	Nelson	Manuka Street	Total	
	Hospital	Hospital		
Tonsillectomy	69	25	94	
Adenotonsillectomy	64	10	74	
Total	133	35	168	

Table 1: Operation performed at Nelson Hospital and Manuka Street Hospital



Figure 1: Nelson Hospital patients stratified by age and gender

All patient bleeds presented to Nelson Hospital or Wairau Hospital Emergency Department (ED), irrespective of whether the operation was done privately or publicly. The characteristics of the 35 patients operated on privately at Manuka Street Hospital were not

available to us due to confidentiality policies. However, Manuka Street Hospital cases were still included in the audit.

POST-OPERATIVE PRESENTATION

Within two weeks of their operation, 30 patients out of the total 168 cases (18%) presented to Nelson or Wairau Hospital ED (Figure 2). Over half of these were caused by haemorrhage, and four cases attributed to sore throat, fever and acute pharyngitis. A significant number of patients (9) had an unspecified diagnosis (Figure 2).



Figure 2: Presentation to ED within two weeks of discharge

Seventeen patients out of the total 168 cases (10%) presented to the ED within two weeks due to bleeding (Figure 2). All of these patients were considered to have secondary bleeding, as the bleed occurred after 24 hours post-operatively. The red dashed line denotes the point at which secondary bleeds occur. The average time from surgery to bleed occurrence was 7.1 days for the total population, 6.8 days for the adult population and 7.5 days for the paediatric population (Figure 3).



Figure 3: Incidence of bleeds following operation

Patients who underwent tonsillectomy alone made up the significant majority of those presenting to the ED with bleeding (Figure 4).



Figure 4: Operation details of patients who presented to the ED with bleeding

Tonsillectomy Technique		Bleeds	Incidence
Bipolar and blunt dissection	64	5	7.8%
Bipolar dissection	26	8	30.8%
BiZact	3	0	0%
Coblation	57	3	5.3%
Monopolar and bipolar cautery	2	0	0%
Monopolar diathermy	16	1	6.3%
All tonsils	168	17	10.1%

Table 2: Incidence of bleeds by tonsillectomy technique

The incidence of bleeds within two weeks following tonsil removal at Nelson was 10.1% (Figure 2). Bipolar dissection alone had the highest rates of associated bleeding with 30.8%. Despite being the second commonest method of tonsillectomy at 57 procedures, coblation had one of the lowest rates of bleeding with 5.3% (Table 2).

Female presentation to the ED due to bleeding was almost double that of males. Additionally, it appears that up until adolescence, males and females are equally represented in patients presenting with post-tonsillectomy bleeding. After this point, female patients are disproportionally presenting. The mean age of presentation with a bleed was 26 years old. When considering our paediatric population, eight patients presented with bleeding. The total number of paediatric cases performed was 134 which decreases the incidence of bleeding to 6% in the paediatric population (Figure 5).



Figure 5: Nelson Hospital patients presenting to the ED stratified by age and gender

All patients who presented to Nelson and Wairau ED with bleeding were admitted onto the Ear Nose and Throat (ENT) ward and observed overnight. Around two thirds were managed medically (i.e. received tranexamic acid, antibiotics and supportive cares). Four patients required a return to theatre to achieve surgical haemostasis, indicating a return to theatre rate of 24%. Three patients (18%) presented to the ED twice with bleeding. Of those three, one patient (6%), a three-year-old, required a single unit blood transfusion (Figure 6).



Figure 6: Management of patients presenting with bleed

All patients who required a return to theatre for surgical haemostasis were female, which is likely due to the fact that female presentation with bleeding was nearly double that of male presentation (Figure 5). Three of the four patients were part of the paediatric population. Despite having a relatively low rate of bleeding incidence (Table 2), bipolar and blunt dissection made up 50% of patients returning to theatre (Table 3).

Return to Theatre

Age	56	18	10	5
Gender	Female	Female	Female	Female
Operating technique	Bipolar	Bipolar	Bipolar	Coblation
	and blunt	and blunt	dissection	
	dissection	dissection		
Time to Post-tonsillectomy	9	5	3	8
haemorrhage (days)				

Table 3: Characteristics of patients returning to theatre

Discussion

In our cohort, 168 patients underwent tonsillectomy or adenotonsillectomy from 1 January to 31 December 2019 at Nelson Hospital or Manuka Street Hospital. Seventeen of these patients presented to Nelson or Wairau Hospital ED within two weeks of their operation due to bleeding. As a percentage, 10.1% of the total patients presented with bleeding (Table 2).

Francis et al. and Alvo et al. report rates of post-tonsillectomy bleeding of 4%, less than half the rate of our cohort.^{3,4} However, they only include paediatric populations, while our cohort is comprised of all ages. When only considering our paediatric population, the rate of bleeding decreases to 6% (Figure 5), closer to what Francis et al. and Alvo et al. report. A study in Australia, which included adults as part of the population, demonstrated PTH rates of 6.9%,⁶ reasonably less than our cohort's bleeding incidence of 10.1%. However, the difference here is likely to be caused by our small sample size.

Table 2 highlights the large variation in incidence of bleeds by tonsillectomy technique. This is in contrast to what Francis et al. report. They did not observe an appreciable difference in bleeding rates amongst different tonsillectomy techniques.³ A possible reason for the large difference in bleeding rates by technique in our cohort is the small sample size, which is a cause of random error reducing generalisability of our results. As suggested by Francis et al, it is unlikely that surgical technique produces a true difference in bleeding rates.³

When considering Figure 5, it is apparent that a discrepancy exists in the rates of ED presentation between males and females, with nearly double the number of females presenting due to bleeding compared to males. This is in contrast to Alvo et al. who reports higher incidences of PTH amongst males (Table 4)⁴ and Kwok et al. who observed no difference.⁶ The discrepancy in our cohort is likely due to our patient characteristics. As noted earlier, PTH rates are comparable between males and females up until adolescence, when more females present with bleeding (Figure 5). This is consistent with our ratio of female to male patients, which is similar in the paediatric population but 5:1 in the adult population (Figure 1).

The management of patients who presented to Nelson ED with bleeding is consistent with that as described by Alvo et al. and Dharmawardana et al.⁴⁷ All patients who present to Nelson are admitted onto the ENT ward and observed overnight. Alvo et al. had a return to theatre rate of 28% in their Auckland cohort, which closely matches our rate of 24%.⁴ Dharmawardana et al. had a rate of 21% in their Australian cohort.⁷

	Nelson	Auckland (Alvo A et al.)
Number of operations	168	2177
Number of bleeds	17	78
Incidence of bleeds	10.1%	3.6%
Primary bleed	0%	6%
Secondary bleed	100%	94%
Mean time to bleed	7.1 days	6.6 days
Medical management	76%	72%
Return to theatre	24%	28%

Table 4: Comparison of Nelson cohort and Auckland cohort.⁴

LIMITATIONS

The largest limitation in our audit is the subjectivity surrounding presentation. As there is no clear margin for what is considered a "bleed", some patients may not present despite a bleed. This is an expected issue in a retrospective study. Additionally, some patient presentations were not stated clearly and left unspecified. As a result, it is unknown why they presented. These patients are viewed as lost to follow-up and can be a source of incomplete data resulting in cohort bias. Finally, our small sample size is a cause of random error reducing generalisability of our results.

RECOMMENDATIONS

- Clearly state in ED notes why the patient presented rather than leaving it "unspecified". The rates of bleeding postoperatively could potentially be much higher. An ED code linked to Nelson Hospital's database could prove beneficial in future.
- If tonsillectomy is indicated for childhood obstructive sleep apnoea (OSA), partial tonsillectomy (tonsillotomy) could be considered as it yields similar results but with substantially less postoperative pain, quicker recovery, and most critically less postoperative (and intraoperative) bleeding.³⁸

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About the author

> Ahmed Sherif is a fifth-year medical student at the University of Auckland. He had an immersive experience in his selective in otolaryngology at Nelson Hospital. He enjoys population health, cycling, and re-reading Harry Potter.

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Patient consent

Individual patient consent was not sought or required for this clinical audit.

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Clinical audit — verifying transthoracic echocardiography reports

Mustafa Sherif

Abstract

Transthoracic echocardiography (TTE) is a key diagnostic and prognostic tool in a wide range of cardiac conditions. Referrals to the Cardiology Department at Nelson Hospital for TTE are received from various settings across the Nelson Marlborough District Health Board (NMDHB) including primary care, inpatient, and outpatient. This audit was undertaken to assess whether there are significant delays in verifying TTE reports by the Cardiology Department at Nelson Hospital. The primary objective was to determine the time taken to verify TTE reports, stratified based on severity of abnormalities. The results will inform actions required in the current process of verifying reports by the cardiologists at the hospital. Secondary factors that may impact on delivery of care or efficiency of TTE were also analysed to assess areas for further recommendations.

Introduction

Transthoracic echocardiography (TTE) is a key diagnostic and prognostic tool in a wide range of cardiac conditions.

Referrals to the Cardiology Department at Nelson Hospital for TTE are received from various settings across the Nelson Marlborough District Health Board (NMDHB) including primary care, inpatient, and outpatient. The 2017 Cardiac Society of Australia and New Zealand (CSANZ) guidelines for TTE recommend that the timeframe between referral for a TTE and the report being available to service providers depends on the urgency when triaged by a cardiologist into emergency, urgent, semi-urgent, or routine priorities.¹ The bulk of NMDHB referrals are of routine priority which CSANZ suggests to be reported within three months of referral.¹

Urgency crit	eria triage			
	Inpatient	Example	Outpatient	Example
Emergency	Immediate	Emergency in	N/A	N/A
		Cath Lab		
Urgent	Within 1–2	Post STEMI	Within 14 days	Decompensated
	days			HF
Semi-urgent	Before	post AVR	Within 4–6	New controlled
	discharge		weeks	SOB
Routine	As in- or	Clarification of	Within 3	Stable AF,
	outpatient	murmur	months	Stable murmur

Table 1: CSANZ triage urgency criteria.

Guidelines on the timeframe of TTE reporting based on urgency at triage, adapted from CSANZ appropriateness guidelines for adult TTE, March 2017.² Cath = catheterisation; N/A = not applicable; STEMI = ST elevated myocardial infarction; HF = heart failure; AVR = aortic valve replacement; SOB = shortness of breath; AF = atrial fibrillation.²

The process to make the report available within the cardiology department at Nelson Hospital is as follows:

- 1. The referral is triaged based on indication and urgency
- 2. The TTE is performed by the sonographer
- 3. The sonographer reports the TTE and prints out the physical files
- 4. The reports are organised into groups based on urgency at triage and the sonographer's severity findings
- 5. The cardiologist takes the physical reports and verifies them after reconciling it with the echocardiogram on the image viewer software, *syngo*,³ alongside the electronic patient records

Verification by a cardiologist involves reporting the findings and signing the report off to be put into the electronic patient records so that the report is available to NMDHB service providers.

The current process of verifying reports by cardiologists is tedious and contributes to unnecessary workload in the cardiology department. The final verification step takes approximately 20 minutes per patient. Although all TTEs are reported and made available within the recommended timeframes based on the CSANZ guidelines,¹ there is room for improved efficiency within this process. With 4129 echocardiograms performed in NMDHB from 2017–2018 and similar numbers in previous years,⁴ it is prudent to seek means of easing this substantial workload in the cardiology department.

Aim

This audit was undertaken to assess whether there are significant delays in verifying TTE reports by the cardiology department at Nelson Hospital. The primary objective is to determine the time taken to verify TTE reports stratified based on severity of abnormalities. The results will inform actions required in the current process of verifying reports by the cardiologists at the hospital. Secondary factors that may impact on delivery of care or efficiency of TTE will also be analysed to assess areas of further recommendations.

Method

The audit was conducted as a retrospective review of TTE reports from 185 patients between 21 November 2019 and 21 February 2020. The reports have been evaluated for their date of referral, date of reporting, referral setting, technical quality of the echocardiogram, site of TTE, and severity of findings. The time taken to verify reports has been defined as the time between a TTE being performed by the sonographer and it being signed off by a cardiologist.

Findings

PRIMARY OUTCOMES

The primary outcomes highlight that around 90% of reports are reported within nine days of referral. All were reported well within the three months suggested by CSANZ. There is an apparent bimodal distribution with a right skew in the time of verification. Thirty-five percent of reports are verified within 1-3 days, 40% of reports are verified within 5-8 days, and the times taper off after 10 days.



Figure 1: Distribution of time to verify TTE reports (n = 185).



Figure 2: Distribution of time to verify reports stratified by index of severity of TTE findings as determined by the verifying cardiologist. Represented times include >95% of the data (outlier times >20 days have been omitted for clarity).

SECONDARY OUTCOMES



Figure 3: Total TTE activity across hospital sites in NMDHB.



Figure 4: Setting of referral for TTE in NMDHB



Figure 5: Indications for TTE. ACS = acute coronary syndrome; VFU = valve follow up.

Discussion

Areas of good practice:

- > Reporting of TTEs falls well within recommended timeframes from CSANZ guidelines.
- > One streamlined service is provided within the Nelson Hospital Cardiology Department across two sites. Distribution of TTE activity matches the 2017–2018 period: ~80% within Nelson Hospital and ~20% within Wairau Hospital.⁴
- > Indications are well documented at triage.

Recommendations:

- > The majority of reports are verified within 10 days. However, 10% of reports exceed 10 days and 3% exceed 20 days to verification. These outliers reflect gaps in current reporting. Delays to verification attributed to non-electronic reporting include: poor organisation of physical copies of reports; lack of ordering by triage urgency and severity of abnormal findings; excessive piles of reports; lost and forgotten pieces of physical copies from cardiologists when taken from one setting to another; and the need for three systems of data by cardiologist to verify (physical TTE report, electronic patient records, and syngo). Alternative processes for verifying reports such as direct reporting on syngo could minimise times to verify reports.
- > With 3.8% of referrals from an unstated source and 1.1% from the pre-admissions group (Figure 4), the specific department for these referrals should be sourced during triage.

Conclusion

The audit findings support the need for alternative means of verifying TTE reports. Streamlining reporting into one system (*syngo*) that is viewable in electronic patient records would increase the efficiency of reporting and ease workload. Although reporting by *syngo* is available, it is currently inaccessible in electronic patient records to different service providers.

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About the authors

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Conflict of Interest

Mustafa Sherif is the 2020 Academic Sub-editor for the New Zealand Medical Student Journal. This article has gone through a double-blinded peer review process applied to all articles submitted to the NZMSJ, and has been accepted after achieving the standard required for publication. The author has no other conflict of interest to declare.

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An unusual cause for subconjunctival haemorrhage: Pilates

Muhammed Emin Göktepe, Ebru Erge, Erdinç Yavuz, Onur Öztürk

Introduction

Subconjunctival haemorrhage occurs when a blood vessel ruptures and blood accumulates in the subconjunctival space.¹ It is generally seen as a result of a trauma in young patients; spontaneous haemorrhages, particularly as a suspected complication of hypertension, are common in older ages. In addition, Valsalva manoeuvre, haemorrhage diatheses, leukaemia, hereditary haemochromatosis, atherosclerosis, medications that prolong clotting time, contact lens trauma, conjunctivitis, cavernous haemangioma of the conjunctiva, and eye surgery are proposed as other causes.^{2,3} We report a case of subconjunctival haemorrhage with suspected unusual aetiology managed in primary care.

Case description



Figure 1. Right subconjunctival haemorrhage

The 40-year-old female health worker attended our family medicine outpatient clinic in September 2019 with a complaint of surface bleeding in the right eye (Figure 1). The ocular history revealed that a similar event had occurred five to six times before, each event lasting around five to six days before wearing off. She had not previously sought medical attention and therefore had no treatment for previous ocular haemorrhages.

In relation to systemic health, the patient had asthma and atopic dermatitis and she irregularly used budesonide and fluticasone. She had had three problem-free pregnancies. In her family history, her father had been diagnosed with diabetes mellitus and hyperlipidaemia and her mother diagnosed with hypothyroidism and migraine. The patient started doing Pilates four months prior to presentation, typically three or four days a week, for 30 to 40 minutes each session. She stated that her ocular haemorrhages started within this period. There were no other symptoms such as headache, nasal symptoms, or endaural haemorrhage.

Blood pressure was 115/70 mmHg, radial pulse was 74 beats/minute, and a thorough physical examination revealed no abnormal findings. The visual acuity was 10/10 right and 10/10 left. A light-red subconjunctival haemorrhage was present in the nasal aspect of the right eye. Pupillary reflexes and fundoscopic examination were normal.

A complete blood count, biochemistry, bleeding times, coagulation factors, and urinalysis were performed, and no abnormal findings were found. The patient was referred to cardiology and ophthalmology clinics. An eye drop containing fluorometholone 0.1%, a low potency corticosteroid, was prescribed two times per day to the right eye. Echocardiography and 24-hour ambulatory blood pressure measurement were performed through the cardiology clinic and no abnormal findings were noted.

When she attended for her most recent haemorrhage, we recommended she stop doing Pilates temporarily, as no other clear aetiology was identified upon examination. She has had no further complaints of subconjunctival haemorrhage over four months since giving up Pilates. Therefore, we postulate that Pilates might be the reason for the episodes of subconjunctival haemorrhage.

Discussion

Subconjunctival haemorrhages are mostly harmless. They do not cause pain or vision loss and the accumulated blood is reabsorbed in a few weeks. However, it can be the first sign of systemic diseases in a minority of patients. Some studies found that the aetiology of almost half of the cases was related to hypertension.^{3,4}

Subconjunctival haemorrhage is not a frequent diagnosis in primary care. Its prevalence is less than 1% even in ophthalmology outpatient clinics, and most of these patients are female.^{1–6} Patients often observe subconjunctival haemorrhages when they wake up in the morning and the presence of a haemorrhage in the eye may worry many patients. The condition generally presents unilaterally in the eyes.⁶

Such subconjunctival haemorrhages typically require only symptomatic treatment: a warmish compress and topical tear supplements or lubricants (hydroxypropyl cellulose, methyl cellulose, and synthetic tears) can be useful. Doctors should take action according to aetiology. If the complaint persists, doctors should investigate if there is another pathology and refer the patient to an ophthalmologist immediately.^{37,8}

Detailed medical history taking, physical examination, and assessment of coagulation tests are required in primary care. Our patient was examined in detail and referred to ophthalmology and cardiology due to unexplained aetiology. Subsequent assessment did not yield any results indicative of an aetiology. Therefore, after due consideration of history and investigations we suspect that the repeated subconjunctival haemorrhages were most probably associated with Pilates.

Pilates is a set of mind-body exercises that was developed by Joseph Pilates and includes posture stability focused on strength, flexibility and posture, muscle control, and breathing techniques. Nowadays, it has increased in popularity all over the world, especially among women. In the literature, there are many studies on its benefits.⁹¹⁰ Increased intraocular pressure or minor trauma due to some exercises in Pilates may theoretically cause rupture of conjunctival blood vessels.¹ The patient presented here appears to be an uncommon case, possibly indicating that Pilates could cause subconjunctival haemorrhage.

Conclusion

Pilates is increasingly becoming one of the most popular exercise methods internationally. Our case indicates that Pilates may be an unexpected and uncommon cause of subconjunctival haemorrhage.

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Patient consent

Individual patient consent was obtained for this case report.

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The New Zealand Medical Students' Association (NZMSA): A year in review 2020

Ellie Baxter

Usually, when writing the annual review of the NZMSA's year, the president would outline all of the plans for the year and how they have come into fruition. This would typically include the NZMSA Conference and our other events, our advocacy points and focus months, and the results of all our planning and hard work. However with the coronavirus disease 2019 (COVID-19) pandemic much of this has gone out the window, so this year's review will look much different to years past.

2020 has been the year of the unexpected, consisting of events that are no doubt for the history books: the Australian bushfires, the aftermath of the Whakaari (White Island) eruption, the coronavirus pandemic, the Black Lives Matter movement, and it's only June! This year has brought so much disruption to society, loss of life, and hardship. The whole world has stopped and been given a chance to stand back and appreciate what is important in life, and come together with strong leadership and community action.

For the medical students of Aotearoa, this year was like no other. Pre-clinical students have had to study virtually from afar, removed from the student community and having to adapt to a new way of learning and living. Many clinical students have been kept home from clinical placements, losing valuable experience and exposure to real-life medicine, and with expectations to make this up at a later date. For our Trainee Interns it has been a year of uncertainty; clinical placement has continued under unpredictable circumstances and without overseas electives, as they prepare to enter a disrupted workforce. While this year has been one that no-one could have predicted, it has tried and proven the dedication of students to the field of medicine. I hope that all medical students look back at their perseverance with pride and look forward to their careers with more drive and passion than ever.

In anticipation for this year, NZMSA met to plan our advocacy strategies and initiatives. We identified wellbeing, politics, and workforce as key advocacy points for which we wanted to run focus months. We planned and began to organise our events. Our Clinical Leadership Forum theme was "Attitudes in Advocacy", which was intended to provide practical advocacy skills as well as inspire students as to what they could achieve. The NZMSA Conference, Unite, was to be held in Christchurch from 5-7 June, which looked to be yet another successful conference that would have brought students from all over the country together for a weekend of great speakers and social events. The Medical Education Summit was to be in May, with plans to open it up and make it more accessible to a wider group of students to encourage further interest in the medical curriculum and education. The Otago University Medical Students' Association (OUMSA) in Dunedin offered to host the Sports Exchange, giving all cohorts the chance to win the shield back off Christchurch (go, Welly!). We also planned to increase engagement with our members through social media platforms.

By all accounts, it looked to be a great ahead year for NZMSA, and it is a real shame that things did not go our way. I would like to acknowledge this and the hard work that has gone into events and initiatives that weren't able to come to light. Thank you to the conference team, the Events Officers, and the rest of our team for planning events, initiatives, and focus months that we have not had the time nor opportunity to carry out.

The NZMSA executive are incredibly proud of what we have accomplished despite all the disruption. NZMSA's mission statement is to unite, represent, and empower the medical students of New Zealand, and this year this has been more important than ever.

NZMSA has had to adapt to best support and advocate for students during a turbulent time. COVID-19 has generated a number of unexpected issues and discussions including cancelled overseas electives, virtual classes, alterations to medical curriculums and year length, early Trainee Intern employment, delayed Post-Graduate Year One (PGY1) employment... the list goes on. For each of these issues, NZMSA has voiced student opinions and concerns, and clarified communication. Behind the scenes, there have been many late-night Zoom meetings and persistent emails to achieve what we hope has been a tangible difference for our students.

All of our activity has required collaboration with others and making the most of our connections. Each regional medical students' association and their executives have been working tirelessly, and we at NZMSA have tried to help coordinate their efforts. We hoped to support them in their work and provide a platform for discussion, cooperation, and idea sharing. Our relationship with Te Oranga has only continued to further add to this.

We've worked with the medical school faculties across the country to keep students up to date, clarify communications, and solve issues. Our involvement on the Advanced Choice of Employment (ACE) reference group, our position on the New Zealand Medical Association (NZMA) Doctors-in-Training Council, our student representative on the NZMA board, and our relationships with various other medical organisations has allowed us to voice the medical student perspective on a number of COVID-19-related issues. We have tried to keep students in the loop and give our opinion on bigger picture issues, many of which will affect how the New Zealand health care system recovers from COVID-19.

With regards to events and initiatives, Semester One was not as successful as hoped with many cancellations and postponements. Beyond the Med School Gates was held as an online event for the first time ever. It included speakers from the NZMA, both junior doctors' unions, the Medical Assurance Society (MAS), the Medical Protection Society (MPS), and ACE; and two newly graduated house officers shared useful information about joining the workforce. This was really well received, and followed by the release of this year's *Guide to Graduation* booklet. The NZMSA and Association of Salaried Medical Specialists (ASMS) mentoring programme is back for a second year running. Initially postponed due to COVID-19, both parties are now looking at rolling this out for 2020. We anticipate this will be well appreciated support for fourth-year medical students, providing them with mentorship and wellbeing-related advice from senior colleagues.

Looking forward to Semester Two and what remains of the year, NZMSA is aiming to bring our events calendar to all students in an altered online format. We want to rebuild our medical student community and provide initiatives that are better than ever. There will be online political panels on medical-related issues and dissemination of information regarding the upcoming election. Our wellbeing month will bring wellbeing events and content to students all over the country. Our annual Medical Education Summit will be held as a webinar with speakers on medical education and adaptability of the curriculum. The NZMA-NZMSA Teaching Awards will need to be presented. There is still much time in the year, and we are excited and hopeful to see what it brings.

I would like to thank you all for your support this year. It has been a trying time, but for our team it has been an absolute privilege to be doing this work and representing New Zealand medical students. We have definitely made lemonade out of lemons and I admire every member of the executive for their persistence and hard work. I wish next year's executive the best of luck; I am sure that they will do a phenomenal job in the post-COVID-19 era.

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Acknowledgement

The rest of the NZMSA executive

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INVITED FEATURE

Sharp Scratch: Podcasting the topics that medical school won't teach you

Laura Nunez-Mulder

I launched *Sharp Scratch* with The BMJ's multimedia team in the spring of 2019, during my year running all things student at the world's fourth leading medical journal. It's a podcast where medical students, newly qualified doctors, and expert guests meet in a studio to talk about the things we need to know to be good doctors but that we may not learn at medical school.

I've since returned to medical school and joined a new year group, where I often find myself in a circle of strangers. Many times in the last 12 months, the professionalism strand of my medical degree has put me in a circle with students I have met once or twice to discuss personal stories and to reflect.

Many of the stories are familiar. The student with mental health problems shadowing an intimidating doctor on placement who feels unable to disclose their needs. The delirious or psychotic patient who inappropriately comments on a student's appearance. The student who overhears a joke about a patient and feels a line has been crossed. And a general anxiety about a future career where we will have to respond well in situations even more complex than these.

When I'm in a circle of reflecting students, I don't always say what I'm thinking. But I'm usually thinking about an episode of *Sharp Scratch*.

Hidden curriculum

When we — the *Sharp Scratch* team — first thought we could make a new podcast for medical students, we interviewed medical students and new doctors, asking them what problems they experience at university or placements or work. What we found was unsurprising: the leap from student to doctor is huge. Despite having just taken final exams, the newly qualified doctors encountered problems that they felt unequipped to solve.

How to cope, how to succeed, how to fit into your role in the healthcare system — these topics are unlikely to be covered on a formal medical school curriculum. Rather, we are expected to absorb them from our environments on clinical placements. This is the "hidden curriculum": unspoken, unofficial knowledge of customs, rituals, and other aspects of working life that experienced doctors take for granted.¹

In the BMJ editorial that launched the podcast, I laid out what the hidden curriculum teaches medical students:

The hidden curriculum includes administrative skills. [...] essential skills such as writing a discharge letter, ordering a test, and navigating patients' notes are rarely formally taught. [...] newly qualified doctors are often left to learn these and other important skills on the job, under pressure.

The hidden curriculum includes tips for success and wellbeing. In the camaraderie of hard work, we glean ideas for surviving, even thriving: how to pick a good supervisor for a project, how to get clinical skills signed off by the deadline, and how to leave a ward round

when we've learnt all we can take that day. From doctors already on the shop floor we learn how to cope with a night shift, a death, a mistake, a complaint, or a bully.

The hidden curriculum includes healthcare culture. We follow the lead of the doctors and students around us. Should I avoid going to the ward because I have a cold? Should I tell my personal tutor about my mental illness? Should I share my revision notes with peers? Should I take my time with a patient when my supervising doctor wants me to speed up? Should I consider quitting medicine before it gets too hard? Such unspoken questions affect our professional relationships and clinical practice. They deserve open and honest discussion and resolution.²

At its best, the hidden curriculum teaches us essential skills and coping mechanisms. We cannot do without it. But the hidden curriculum causes harm, too. At its worst, it perpetuates unsafe shortcuts, poor coping strategies, and a toxic work culture.

Sharp Scratch exists to pull the hidden curriculum into the open to scrutinise it, warts and all — and to draw out the lessons that we need to become safe, patient-centred, healthy doctors.

The making of Sharp Scratch

Each episode covers a topic that the *Sharp Scratch* team choose from the hidden curriculum. You can come up with ideas by asking yourself questions such as: what aspects of being a new doctor am I unprepared for? What do I wish someone had told me sooner? What did I find surprising, frustrating, or difficult in my first week as a doctor?

The next step is to identify who has expertise in the area. Sometimes a jobbing doctor is expert enough. At other times we want the head of the Faculty of Occupational Medicine (Episode 12: "Being a sick doctor"), or a stand-up comedian (Episode 17: "Gallows humour"), or even a NASA scientist who researches sleep in space (Episode 1: "How to survive a night shift"). One expert is in the studio, to field our questions and keep us on the right track. Other experts contribute in pre-recorded audio.

Then a few of the *Sharp Scratch* podcasters meet in the studio in London. The regular podcasters are ten medical students and new doctors from different parts of the UK, and though we may have felt like a circle of strangers recording episode 1, we have become friends. When recording begins, we open by exploring why the topic matters, and the questions we have. Then we delve into the answers with the help of experts. When recording ends, we go for coffee.

Favourite episodes

I had the joy of hosting 17 episodes of *Sharp Scratch* before handing over to my successor at The BMJ, Anna Harvey. I hosted on topics ranging from night shifts to dating, from clinical mistakes to gallows humour. One of the hardest recordings was Episode 6: "How to treat someone who's racist or sexist". It unpicks how individuals and institutions can respond when a patient says something offensive, with expert contributions from doctors who changed policy and practice at their hospitals. I have recieved sexist comments in a clinical setting — you can listen to the episode to hear more about that — and I found myself reeling with the implications for my own practice even in the middle of hosting the conversation. More than once, lost in my own thoughts, I had to ask our producer, "What should I ask next?"

Thanks to the social internet, I know I'm not the only one who finds it refreshing and useful to learn about the hidden curriculum in an explicit way. Abbie Tutt, a third-year medical student at the University of Warwick in Cambridge, says that she particularly liked Episode 20: "Working with the multidisciplinary team". "It was helpful to hear what others really think of us [medical students]. I felt bad for the student nurses and how much we interfere in their learning without realising. It's where the nurse versus doctor rivalry stems from, and I think if we all knew a bit more about it we could be more courteous to our colleagues."

Good reason to hope

A year and a half since the first episodes, I see recurring themes in the *Sharp Scratch* studio: desire for clear guidance, drive for better health care culture, and hope.

Firstly, medical students want answers. We want black and white, five-step instructions that will guide us through what to do in challenging situations — similar to the diagnostic and treatment algorithms we memorise for exams. And although the hidden curriculum doesn't lend itself to easy answers, we usually manage to find some practical tools to see us through varied and nuanced situations. When it comes to the challenges of medical school and my first months on the job, I will fall back on the lessons I've learned in the studio.

Secondly, our doctors and expert guests want health care culture to change. Among all of us on the *Sharp Scratch* team there is a determined optimism that our generation of health care staff will be the ones to change it: to see a rise in civility; a flatter hierarchy; an ever safer, more patient-centred, healthier workforce.

And finally, there is good reason to hope. The hidden curriculum includes the marvellous and the mundane and the dreadful; some weeks we go deep into the flaws of our profession. But our guests — many of them changemakers — tell us time and time again that they have seen culture and practices change for the better.

We are entering into the profession in a time when it is used to challenge and change. As future doctors, we get to stand on the shoulders of the health care professionals before us and continue to change health care culture — and the hidden curriculum that reinforces it — for the better.

A new episode of Sharp Scratch goes live every second Friday on Apple podcasts and other major podcast apps. Find out more at bmj. com/sharpscratch. Follow BMJ Student on Twitter, Facebook, and Instagram for Sharp Scratch updates and behind the scenes insights. Follow Laura on Twitter at @Inm_rugby.

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Conflicts of Interest

'Laura Nunez-Mulder was employed by The BMJ in 2018–2019. She has received payment to write articles for BMJ OnExamination.

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INVITED FEATURE

A new era of medical education

Art Nahill

When a colleague asked me at morning handover the ominous question, "Do you remember that patient you sent home yesterday with gastritis?" my heart immediately began to race. As it turned out the "gastritis" patient I had discharged (with a stern warning to cut back on his drinking) had returned to the emergency department later the same day with worsening chest and epigastric pain from an extensive type A aortic dissection requiring immediate surgery. Fortunately, the patient survived this clear diagnostic error and ultimately did well but I was left shaken and filled with questions. As I reviewed the case in fine detail through many sleepless nights, I could immediately recognise several instances where my diagnostic thinking had gone awry. The patient had been handed over to me as a case of gastritis in a well-known binge-drinker and I had never actually guestioned the accuracy of that diagnosis. His pain had come on very suddenly, which is unusual for gastritis, but that fact didn't figure prominently enough in my reasoning. He had required morphine for pain but how often is gastritis that painful? Even though it gradually became clear where I had made errors in reasoning, I was left with the even larger question of how my thinking had gone so wrong? I considered myself a good doctor but wondered now if "good doctors" could really make such mistakes? Was I, in fact, a "bad" doctor?

Thus began a personal journey to turn what had been a horrible mistake into a learning experience that would not only help my own healing but would hopefully help future patients by improving my diagnostic accuracy. Thus began hours of thinking, reading, and learning about the cognitive processes that underlie the complex activity of diagnosis. Thus began my travels to Australia and the United States (US) to talk with and learn from experts in clinical reasoning. Thus began my efforts, along with those of my friend, colleague, and techno-geek Dr Nic Szecket, to teach clinical reasoning to students and colleagues. Thus began the podcast *IMreasoning*, whose tagline is, "Conversations to inspire critical thinking".

When we began the IMreasoning podcast some five years and 62 episodes ago, Nic and I wanted to address what seemed to be a gap in many medical school curricula and post-graduate training programmes. Many educational efforts, despite significant improvements over the years, seem to still be focused on the transmission and retention of factual information rather than the development of frameworks and strategies to guide the reasoning process. We saw an opportunity to address that gap in medical education through a creative, non-threatening, self-paced, and increasingly popular format: the podcast. As we set about purchasing some basic equipment and (mostly Nic) learning about the technical stuff like "stingers" (little musical clips often employed in podcasting), sound engineering, recording, and editing, we had very few expectations. We thought we might have a dozen or so listeners (mostly our mothers, spouses, and kids who would be forced to listen out of familial obligation) but never imagined we would reach a point of 13,000 downloads a month from

all over the world (mostly from Australia, New Zealand, the US, and the United Kingdom, but also from as far away as Iceland). Clearly, we had tapped into something, the desire for which we had vastly underestimated.

There is no doubt that factual, disease-based knowledge is important in transitioning from a good medical student to a good doctor. However, the possession of such knowledge alone is not sufficient. Patients do not generally present themselves to us with diseases; rather they come with stories of how this feels, and for how long. They present with weakness and dizziness that they struggle to describe. Becoming an experienced clinician involves taking the mental index cards we filed away in drawers called "What I Know About Congestive Heart Failure" or "Everything I Remember About Pulmonary Embolism" for example and placing them in a new drawer labelled "Shortness of Breath". We can then compare and contrast the data we glean from the patient, the physical examination, and ancillary testing with the index cards or "illness scripts" in the shortness of breath drawer to find the best match. But often the process of re-categorising the disease-based anatomy and pathophysiology we learned in medical school into an accessible compendium of symptom-based frameworks is left to us to figure out, or worse yet, to chance.

In the journey from student to expert clinician, there is no substitute for seeing patients. Lots of them. But quantity alone is not sufficient. Becoming an expert requires deliberate and painstaking practice. Through *IMreasoning*, we have attempted to break down the complex process of diagnosis into recognisable chunks that learners can deliberately practice to improve. We have attempted, for example, to emphasise and articulate the frameworks we use for various common disease presentations. We have tried to take our listeners along with us as we discuss the cognitive obstacles, pitfalls, and false starts along the journey to an accurate diagnosis. We have tried to explain the role that statistics, likelihood ratios, and probabilistic thinking play in that journey. We have discussed our own mistakes and the anguish that we sometimes feel in the presence of so much medical uncertainty. And like many teachers, we have learned about ourselves and become better at what we do by teaching others.

But *IMreasoning* is just a small part of a burgeoning online medical education movement that is harnessing the power of collective wisdom and the connectivity of the internet to revolutionise the journey we take from student to expert clinician. Whether via Facebook Live events, Twitter groups, or online courses, medical students today have a dizzying menu of educational options that extend well beyond the traditional medical school curriculum. Even the most traditional medical journals have begun to expand their offerings to include video tutorials and interactive simulations, all in an attempt to provide wider opportunities for self-directed learning and deliberate practice.

These are exciting times in medical education. It has never been easier to fill in gaps in our knowledge base, flesh out the illness scripts and frameworks we have developed for various diseases and presentations, and to engage with realistic patient simulations. Gone are the days when a medical student would have to go physically to the medical library and search through printed sources that might or might not hold the answer to a pressing question. Not all sources of online information and education are of equal quality, of course, but with a bit of diligence, curiosity, and healthy skepticism it should be possible to find sources that one can trust and use to catalyse the alchemy that turns experience into expertise. We are proud that *IMreasoning* has contributed, even to a small degree, to this amazing educational revolution.

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COVID-19 and the disproportionate harms of gambling, alcohol and the obesogenic environment in Māori

Emma Espiner, Nadine Houia-Ashwell

Welcome to the third New Zealand Medical Student Journal (NZMSJ) Māori Health Review. We prepared this review in the wake of the second coronavirus disease 2019 (COVID-19) outbreak in Aotearoa, New Zealand. We reflect on the impact of the Level 4 lockdown from 25 March to 27 April 2020 on three public health issues which have historically disproportionately affected Māori compared with non-Māori; gambling, harmful alcohol use, and the obesogenic environment.

During the Level 4 lockdown, the pandemic pressed pause on three of the most addictive things in our society but it also showed how we treat them as absolute essentials as a nation. Alcohol was classified as an essential service, fast food dominated the news coverage as Alert Level 4 was lifted and people queued for hours outside fast food restaurants, and the community sector ground to a halt due to the loss of revenue from pokies. The pervasiveness of addictive products illustrates the extraordinary challenges that public health advocates have faced to reduce harm in these areas, exacerbated by opposition from vested interests such as industry lobby groups and multinational companies.

We reflect on lessons from the national response to the threat of the global pandemic. We then propose some pro-equity interventions and advocate to reframe our unprecedented collective action to eliminate COVID-19 to support Māori to achieve the same access to health and wellbeing as the rest of the population in the future.

Gambling-related harm

When Alert Level 4 was announced, all electronic gaming machines (EGMs or "pokies") were suddenly unavailable for use for the first time since they were legalised in 1988.¹ This was disastrous for the community sector, as a significant source of funding vanished overnight. But the obverse to this was the removal of a source of harm for people affected by harmful gambling, and their families.

Expenditure on EGMs comprises a significant proportion of the money spent by New Zealanders on gambling, with \$924 million New Zealand dollar (NZD) spent on pokies out of a total \$2,402 million NZD in the 2018/19 financial year.² While EGMs are associated with approximately 39% of overall gambling spending,² their use causes more harm proportionally than any other form of legal gambling.^{3,4} A Ministry of Health study found that playing EGMs was associated with a range of health and social harms including participation in illegal activities, poor mental and physical health, and poor quality social relationships.⁵ There is also a higher association with gambling addiction, with 30-60% of losses to EGMs estimated to come from problem gamblers.⁵ The literature describes the insidious combination of technology and behavioural science employed by the gambling industry to generate harmful addiction among users.⁶ This includes design and marketing strategies to induce people who gamble to overspend,6 and there is evidence that reward pathways in the brain are altered in

response to gambling on EGMs.⁷

There is a gradient of harm from the use of EGMs which aligns with socioeconomic status (SES), with lower SES correlated with increased harm.⁸ Pokies are more densely concentrated in low socioeconomic regions; this aligns with the evidence showing that proximity to EGM venues is a risk factor for problem gambling.⁸ Māori are more likely to be affected by gambling-related harm than non-Māori due to increased exposure in communities where Māori are more likely to live, and the correlation with other factors which predispose to harmful gambling such as poverty, other addictions, and job insecurity.⁹ The Alert Level 4 lockdown was a snapshot of what our communities could look like without pokies.

This brings us to the question of what should we do post-COVID regarding the disproportionate harm from problem gambling experienced by Māori and those living in low socioeconomic areas. One proposed approach is to ensure equity in the distribution of funds from pokies. This does not eliminate the harms from problem gambling, but it would ensure the profits are not being unfairly distributed.

The Problem Gambling Foundation Group, Hāpai Te Hauora, and The Salvation Army produced a white paper - an in-depth expert report - in response to the reduction in gambling due to the Alert Level 4 lockdown. The paper proposes a post-COVID-19 approach which would build upon the health benefits of reduced harmful gambling, but offer a practical way for community groups to maintain their activities in light of the loss of income from the EGM revenue stream.¹⁰ Titled Ending community sector dependence on pokie funding the report by these three public health organisations suggests that as an interim solution, the government should directly fund community and sports grant recipients for six months while the sector is reviewed. The authors estimate \$120 million NZD would maintain community groups and sports organisations activities for six months, and thereafter a government grant scheme could replace EGM revenue. Currently there is a disproportionate contribution from the poorest communities and from Māori and Pacific whānau to the EGM income, but it is not necessarily distributed back into those same communities.⁸ A government grant scheme is seen by the authors of this white paper as an opportunity to ensure more equitable distribution of funding.¹⁰

There has been an enormous demand for government assistance, with gross domestic product (GDP) predicted to remain below pre-COVID-19 levels until 2022, and job losses across tourism, hospitality, and other industries accruing by the day.¹¹ Community groups such as grassroots sports clubs which have traditionally relied on revenue derived from pokies will have to compete with many other interests. In May the government announced a relief package for the sport sector of \$265 million NZD.¹² This will bridge the gap temporarily but does not address the ethical challenge of ensuring fairness for whānau who lose money to EGMs without seeing a proportionate return in benefits directly to their community. One potential solution

offered by the authors of the white paper is to ring fence funding which comes from particular communities so that it is returned to funding applicants in those communities.¹⁰ The argument is that, if the general population is unable to extricate ourselves from our addiction to gambling funding, we can at least ensure the harms are mitigated by ensuring the revenue derived from gambling returns to the communities most affected by gambling-related harm.

Harmful use of alcohol

Alcohol was classified as an essential service during the Alert Level 4 lockdown and was available to the public at supermarkets and through online retailers.¹³ Despite concerns from health professionals and researchers that harmful use of alcohol could increase during the restrictive Level 4 lockdown conditions,¹⁴ the government determined it would potentially cause more harm to not allow alcohol sales for people already struggling with addiction issues, there were also concerns raised about people leaving the safety of their "bubbles" to seek alcohol in areas far from their homes if alcohol supplies were limited to fewer retailers.¹⁵ In 2017/18, 79% of adults in New Zealand consumed alcohol, with one in four drinking hazardously in a way that could harm themselves or others.¹⁶

The classification of alcohol as an essential service could be seen to reflect both the high rates of alcohol dependence in New Zealand and the perception of the political impossibility of restricting alcohol availability, influenced by the strong culture of alcohol use in mainstream society. The government response to the Law Commission's 2010 report¹⁷ into the regulatory framework for the sale and supply of liquor demonstrates the intransigence of political leaders with respect to alcohol law reform.¹⁸ Few recommendations were implemented, and those with the most potential to positively influence alcohol harm were ignored completely such as minimum pricing and regulating advertising and sponsorship. Instead, local alcohol policies (LAPs) were introduced - ostensibly a mechanism for communities to have a say in the availability of alcohol in their community, but in reality a failed experiment which has seen the industry, highly resourced and supported by lawyers, fight community groups to continue to sell liquor against their wishes.^{19,20}

It remains to be seen what the impact of the Alert Level 4 lockdown has had on rates of harmful drinking and the associated harms. Early indicators from New Zealand suggest that overall consumption has only increased slightly, but data from the United Kingdom point to increased use amongst problem drinkers, whereas people who have low risk drinking behaviour have decreased their use somewhat.^{21,22}

Historically, alcohol has been linked with death due to injury,²³ and with greater restrictions on freedom of movement during Alert Level 4 it is possible that fewer injuries have occurred. Casualties from road traffic crashes practically disappeared overnight and the closure of licensed premises reduced opportunities for physical violence and resulting injury in these environments. However, anecdotal reports suggest that domestic violence increased, with some regions reporting higher domestic violence call-outs for police.²⁴ Alcohol is a carcinogen²⁵ and if there has been an increase in alcohol use during the Alert Level 4 lockdown, there is the potential that this will affect cancer-related deaths in the future, especially if increased rates of drinking are sustained post-lockdown among people who already drink hazardously. Additionally, the mental health issues associated with harmful alcohol use may have been increased or exacerbated by the emotional strain and economic consequences of lockdown, including the anticipated rise in unemployment and increase in dependence on government assistance, not only among those already relying on benefits but for individuals and families who have not previously needed to access government support.

When we consider how this might impact Māori, we have a large evidence base which describes how Māori are currently affected by alcohol-related harm. Māori are more likely than non-Māori to be affected by harmful alcohol use,²⁶ with inequities in the health system compounding morbidity and mortality relating to alcohol use.²⁷ The

evidence shows that Māori are diagnosed later, are more likely to have advanced forms of cancer, receive less timely and poorer quality care, and die younger than non-Māori.²⁷ Māori women are 2.36–3.59 times more likely to suffer intimate partner abuse than non-Māori,²⁸ with Māori women more likely to report being injured due to someone else's drinking than non-Māori.²⁹ Māori women comprise 63% of the prison population, making our wāhine the most incarcerated indigenous women in the world.³⁰ Forty-eight percent of Māori prisoners are affected by drug and alcohol addiction issues, and Māori are less likely than non-Māori to receive timely and relevant alcohol rehabilitation services.³¹

A kaumatua and Māori warden from South Auckland, David Ratū, took a claim to the Waitangi Tribunal in 2017 alleging that the existing legislation does not sufficiently protect Māori, and that our communities are disproportionately populated with alcohol outlets in close proximity to venues like marae, kōhanga reo, and kura kaupapa.³² The application is due to be considered in 2020, with the Tribunal assessing the Ratū's recommendation that the legislation governing the sale and supply of liquor be amended to ensure Māori representation on local authorities so that there is effective oversight by Māori for alcohol licence applications. This would also allow for Māori representation to be mandated when consideration of issues such as regulation of advertising and marketing of alcohol products is occurring. Te Tiriti should have ensured these protections for Māori were in place from the inception of the laws regulating the sale and supply of alcohol,³³ which forms part of Ratū's argument that the existing system is flawed and a breach of Te Tiriti.32

Reduced access to unhealthy food

The first images on the television news as the Alert Level 4 lockdown was eased down to Alert Level 3 were of individuals and families queueing at fast food retailers, with some retailers hiring extra staff for traffic control purposes as roads were clogged with people desperate to have their first junk food fix in six weeks.³⁴⁻³⁶ This continued for several days, with some journalists effectively providing free advertising for multinational fast food giants like McDonald's and KFC through their coverage.

During the Level 4 lockdown, hospitality businesses were forced to close, and smaller food retailers such as fresh fruit grocers and butchers spent time in economic limbo while the government wrestled with the decision to classify them as essential services.¹⁵ The businesses who had existing online retail services fared better than those who had never needed to consider online channels to access their customers. This concentrated food security for the nation in the hands of the large supermarket chains, the co-operative Foodstuffs and Australian-owned Woolworths Group New Zealand (formerly Progressive Enterprises).

The loss of access to cheap, unhealthy food and the dominance of the two large supermarket chains in controlling the provision of food to the entire country cast issues of food insecurity into the spotlight. Māori are more likely than non-Māori to experience food insecurity, partly explained by socioeconomic factors and through suffering a disproportionate burden of non-communicable disease compared to non-Māori.³⁷ Those who live with insecure work and in low SES communities are more sensitive to pricing decisions made by food retailers.^{37,38} The pattern of retail pricing decisions made by supermarket chains has been shown to respond to these market forces by offering food with poor nutritional value such as potato chips at a much lower price point than healthy food.³⁹ Māori are more likely than non-Māori to live in deprived communities, and to experience financial insecurity, therefore we are more likely to be presented with cheap and unhealthy food options by the food retailers which dominate the Fast-Moving Consumer Goods (FMCG) market in New Zealand.³⁸

Similarly, we see fast food retailers concentrated in low SES communities with 13.7 times the number of fast food outlets per 10 000 people in the most deprived areas compared to the least deprived areas.⁴⁰ Some of these retailers are unashamed of their contribution to the poor health of their customers, citing market forces as a reasonable motivator for establishing their restaurants in the poorest areas most affected by diseases linked with obesity, and the availability of "healthy" options on their menus as sufficient action to discharge their social responsibility.⁴¹

Māori suffer disproportionately from diseases related to obesity.27 Before COVID-19 we had a convergence of structural factors which ensured that this became entrenched, as outlined above. There is no lack of evidence⁴⁰ describing these factors and their relationship to the greater burden of disease experienced by Māori, but there has been a lack of political will to address them. A tax on sugary drinks has been recommended by the New Zealand Dental Association (NZDA), and the World Health Organisation (WHO). $^{\!\!\!\!\!^{42,43}}$ When the pricing considerations of supermarket operators are understood, it is possible to appreciate that the only way to change their behaviour is to make it less profitable for them to loss-lead on unhealthy food items. It would similarly be straightforward to fix the saturation of low SES communities with fast food retailers, by limiting the numbers of outlets available per head of population, limiting advertising and marketing of unhealthy food to children, and strengthen resources for promoting healthy diets. Employing these levers would disrupt the market imperative of retailers to position themselves preferentially in poor communities and provide poor quality food.⁴⁰

Finally, interventions to decrease the harms from unhealthy food environments must be approached in a culturally appropriate way. Research into indigenous food security and food sovereignty issues affirms the inextricable link between indigenous food security and the health of the environment.⁴⁴ Initiatives like māra kai or traditional Māori food gardens have been evaluated and shown to contribute to community wellbeing through the provision of healthy food as well as establishing relationships among community members and encouraging social cohesion.⁴⁵ The experience of Alert Level 4 lockdown affirmed two of the perversely dominant structures in the food environment, and should stimulate thinking about how things could be different as we rebuild our economy and communities.

Conclusion

As current medical students we will begin our medical careers in the wake of the impact of COVID-19 on New Zealand society. We hope that our success in limiting the harm from the virus will be sustained throughout the coming months, but our efforts must now turn towards supporting New Zealanders to live well and be healthy during a challenging economic period which will present a variety of physical, mental, and emotional health problems.

In this issue we have explored the extraordinary circumstances of the Alert Level 4 lockdown and its impact on three major contributors to poor health in our Māori communities – alcohol, pokies, and fast food. We suggest some changes which could capitalise on the extraordinary experience of being locked down as a country, and which could aid us in emerging from COVID-19 stronger and healthier than we went in. This includes a fairer system of distribution of the funds from pokies revenue, courageous action in response to alcohol-related harm, and assertion of indigenous food sovereignty as a solution to the obesity epidemic.

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Conflict of interest:

Emma is the Communications Lead for Hāpai Te Hauora, a Māori public health organisation which receives government contracts related to gambling harm prevention and alcohol harm prevention, and she is a named researcher on an HRC-funded project looking at the Māori experience of alcohol-related harm in fetal alcohol spectrum disorder (FASD). This Kaupapa Māori project will interview whānau Māori about their experience of seeking and/or receiving a FASD diagnosis. Nadine Houia-Ashwell has no conflicts to declare. This article has gone through a double-blinded peer review process applied to all articles submitted to the NZMSJ, and has been accepted after achieving the standards required for publication.

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INVITED FEATURE: STATISTICS PRIMER

P values: What are their significance?

Claire Cameron, Ari Samaranayaka, Robin M. Turner

P values are used everywhere — and why not? They are handy at letting us know at a glance whether or not our results are "significant". They are especially useful if our statistical knowledge is not strong and we need an answer to a question. However, there is a lot of discussion about the value of *p* values and their use is even banned or discouraged by some scientific journals.^{1–3} The Consolidating Standards of Reporting Trials (CONSORT) statement (section 17a) discourages their sole use in the reporting of clinical trials.⁴ What is the problem exactly? How could there be an issue about such a simple way of looking at results? The answer lies in the way that they are used and the way they are misunderstood.

At the beginning of our training as biostatisticians, we learn about hypothesis testing. Even those of us who are not biostatisticians may have learnt about it in an introductory statistics course. In hypothesis testing, we start with a null hypothesis and alternative hypothesis. For example, if we are interested in comparing the mean of two groups, then our null hypothesis is that the mean is the same for these two groups and alternative hypothesis is that the means are different between the two groups. We then gather evidence and, on the basis of that evidence, decide about the veracity of the null hypothesis. The evidence that we gather allows us to calculate the sample means for the two groups. We calculate the difference between these observed sample means and compare that difference to zero, our null hypothesis (allowing for variation). The p value represents the probability of observing this difference between sample means (or a more extreme difference) when the null hypothesis is correct. Conventionally, if the p value is less than 0.05 we reject the null and say there is evidence of a difference in the means in this case.

A p value is always associated with a particular hypothesis test.

The null hypothesis might be "these two proportions are the same" or "this regression coefficient is equal to zero" or, less usefully, "this correlation is equal to zero". Whatever the situation, the *p* value is often treated like a switch: yes, the result is "significant" because p < 0.05; or no, the result is "not significant" because p > 0.05. *P* values are everywhere but, in our experience, related hypotheses are seldom mentioned, so it is not immediately obvious which hypothesis has been tested.

P values are calculated using statistical criteria. For example, suppose there are a group of 2000 people chosen from some population, with 50% men and 50% women. The men in the sample have an average height of 175.4 cm (standard deviation (sd) = 9.8) and the women 173.3 cm (sd = 10.2). According to our statistical criteria for comparing means, this difference is statistically significant (p < 0.001), meaning we have statistical evidence to say the population means for men and women are different. However, given the magnitude of the difference (2.1 cm) is very small, the claim that "the mean heights are different between men and women" is not convincing. Very large samples tend to produce significant results. Even though the difference is

statistically significant, that difference may not be big enough to be clinically important (also called clinical significance, but we prefer the term importance to avoid confusion with statistical significance).

Studies with large sample sizes may find statistically significant results that are clinically unimportant (i.e. too small to matter or make any real difference). On the other hand, very small studies may fail to identify large and clinically important effects (such as differences) as "statistically significant" because of large uncertainty inherent from small samples. This leads to the question of how we design studies to be sufficiently large to detect clinically important differences, if they exist. Often, we, as biostatisticians, are asked what difference defines a clinically important difference. This is entirely dependent on what is being measured and should be determined by the experts in the field, alongside (if possible) the literature. We use estimates of the variation and the clinically important difference to determine how big the study needs to be to ensure that if there really is a difference that we will likely find it. In other words, if there really is a difference, our study should give that magic "significant" result. Detecting a difference that is big enough to be clinically important is the key here as we could show any difference as "significant" by using a very large sample size. This leads to a conclusion of statistical significance (according to a p value) and/or clinical importance (according to the knowledge of the area). In an ideal world, a study will find a statistically significant result that is clinically important as well. However, there will be many results in the literature that are statistically significant but clinically unimportant, and results that are not statistically significant but clinically important (particularly small studies that are not large enough to detect important differences).

What do we use if we are not using *p* values?

Often, we are doing simple tests. In the earlier example we were interested in whether there was a significant difference in heights between men and women. A good alternative to using p values is to record the estimate and its 95% confidence interval (CI). This gives the size of the estimate and its precision which is actually more informative than a *p* value. In our example, with 1000 people per group, the estimated difference between the mean height for men and women was 2.1 cm (men taller than women) and the 95% Cl was 1.23 to 2.98. The interval is quite narrow reflecting the precision of the estimate. Suppose our sample size was reduced to 40 per group, and the mean and sd of the new sample were unchanged (in practice, a different sample would also give different means and sds): the corresponding 95% CI is -2.01 to 4.11. This confidence interval is much wider, suggesting that the true difference could be as small as -2.01 cm (women taller than men) through to as large as 4.11 cm (men taller than women). The confidence interval and p value are two different ways of looking at the same information. Therefore, if a 95% confidence interval for the difference between two means excludes zero, then we know that pmust be < 0.05.

So what is the problem with p values?

In 2016, the American Statistical Association (ASA) put together a statement on p values which is relatively brief and still highly relevant.¹ In it, they outline the main issues surrounding the use of p values. The article also provides great references and supplementary material on the topic if you want to read into this further. One of the points they raised is that we teach hypothesis testing and p values because that is what the scientific community uses. We use them because that is what we have been taught. This is the first time the ASA have made a statement regarding "specific matters of statistical practice" and it was driven by increasing concern in the statistical community about the use of p values.

They make six points which we have summarised here (please read the full article¹ for more detail):

- 1. *P* values indicate how your data is compatible with a particular hypothesis. Based on your data, you may reject or accept the null hypothesis.
- 2. A *p* value does not give you information on how true your hypothesis is. It can only tell you how consistent your data is with that hypothesis. All a non-significant *p* value tells us is that the result observed in the data is consistent with the underlying null hypothesis, not that the result is due to chance alone, or that the hypothesis itself is correct.
- 3. A single threshold, such as p < 0.05, should not, on its own, be the basis for important decisions. There are many other factors that come in to play in the midst of scientific enquiry. These include the design of the study, knowledge of the area, quality of the data, and validity of the assumptions (all statistical work comes with underlying assumptions). To quote the statement: "the widespread use of 'statistical significance'... as a license for making a claim of a scientific finding (or implied truth) leads to considerable distortion of the scientific process".^(1p131)
- 4. To make good decisions, there should be full reporting and transparency of the statistical work done. Researchers should not just cherry pick the results they want to report. There is a temptation to look for significant results and this can result in questionable science. This is often referred to as "data dredging", "significance chasing", "significance questing", "selective inference", or "p-hacking".^(p132)
- 5. A *p* value cannot give you information about the size of your result or the importance of it. Small studies can produce imprecise estimates and high *p* values. Large studies can produce precise estimates and small *p* values. For this reason, simply comparing *p* values to a threshold to arrive at scientific conclusions is ill-advised. If you have a really small *p* value, for example p = 0.001, it doesn't mean it is more "significant" than if you had, say p = 0.045 - it may just mean that you have a large study.
- 6. A p value on its own is not enough to measure the evidence for or against a hypothesis. As with point three, it should be supplemented by other feasible measures of evidence appropriate to the context. To quote the statement: "...data analysis should not end with the calculation of a p-value when other approaches are appropriate and feasible".^{1(p132)}

Conclusion

The upshot of all this is that a p value can ONLY tell you how consistent your data is with a given hypothesis. P values are overused, often misused, and misunderstood. Perhaps, we could go so far as to say they are overrated. They are often treated as a simple switch: "significant" or "not significant". Apart from anything else, this really dumbs down the scientific method. However, it may be that banning them from publications may be throwing the baby out with the bathwater. On the occasions where you simply want to know if there is a difference in means, for example, between two groups, a p value might be all you need.

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FEATURES ARTICLE

Medical history: First women in medicine

Meghan Scanlan

Today there are female doctors all over the world, yet if we cast our focus back to the beginning of the 19th century, there was not one registered female medical practitioner. The story of the rise of women within medicine is a remarkable one, with considerable challenges, and those who overcame them. My research followed closely the stories of three such women, pioneering the way for women into modern medicine. These women were Dr Elizabeth Blackwell, Dr Elizabeth Garrett Anderson, and Dr Sophia Jex-Blake. While I have focused my attention on these three women, there is no doubt that countless others have contributed to the cause of women in medicine in various ways. I extend my thanks to these intelligent and courageous women of the past; and in the same breath I offer encouragement and blessings to the women of today and tomorrow who will continue to ensure a strong place for women in the world of medicine. Now I will turn to the stories of these three women...

Elizabeth Blackwell was born in Bristol, England in 1821.¹ Her family emigrated to New York City in 1832.¹ Blackwell's interest in a career in medicine began after a friend remarked after having fallen ill, that if she had been able to receive care from a female doctor she might not have suffered so much.² This was the beginning of Blackwell's fight for a medical education, a fight that would eventually see her be the first woman to obtain a medical degree in America.¹ She received her medical degree from Geneva Medical College in upstate New York in January 1849.²

Blackwell was also the first woman on the register of the General Medical Council (GMC) in the United Kingdom (UK), albeit through a clause in the Medical Act of 1858 that allowed doctors with foreign medical degrees who had practiced in the UK prior to 1858 to be recognised.¹ It would be many years before another woman was allowed to appear on the GMC register. Blackwell was also a source of inspiration for those who would eventually lead the way for women to pursue medical degrees in Great Britain; most notably, she became a mentor to a young Elizabeth Garrett Anderson.¹

Elizabeth Garrett Anderson, born in 1836 in London, England³ gained her license to practice medicine from the Worshipful Society of Apothecaries in 1865, making her the first female to do so in Great Britain.¹ By the time Garrett Anderson reached this milestone she was no stranger to rejection. Her bid to become medically qualified saw her apply to several medical schools throughout Great Britain, all of which refused to accept her based on the fact she was a woman. At last she was accepted by the Society of Apothecaries, because a condition of the society's character made it illegal for them to exclude a pupil based on their gender.¹ While Garrett Anderson had earned admittance to the college, she would find obtaining a medical education and clinical experience was another matter entirely. She eventually sat and passed the medical licensing exam, having obtained the vast majority of her education by employing private tutors and professors

that were willing to teach a woman, rather than through classes at the medical school.¹ Garrett Anderson and six men sat the medical licensing exam that day; she and only two others passed, with Garrett Anderson achieving the highest mark.

Unfortunately, the door to the path through which Garrett Anderson rightly obtained her medical license was slammed shut behind her, with the Society of Apothecaries amending its regulations to disallow privately educated students from sitting the exam.¹ So, while Garrett Anderson became the first woman to qualify in Great Britain, the path for those that followed remained treacherous for many more years to come. However, Elizabeth Garrett Anderson would go on to have a very successful career in medicine in her own right, opening her own practice in late 1865, followed quickly by St Mary's, a dispensary for women and children.³ In 1872 St Mary's Dispensary became the New Hospital for Women and Children.³ During 1874, Garrett Anderson, alongside Sophia Jex-Blake, founded the London School of Medicine for Women, of which she was Dean from 1883-1902.¹ Her legacy lives on today in her namesake wing of the University College Hospital in London, England.⁴

Lastly, any story about Elizabeth Garrett Anderson would not be complete without mentioning another of her achievements. In 1908, she was elected mayor of Aldeburgh, making her the first female mayor in England.⁵ Elizabeth certainly was a woman of firsts, truly remarkable.

In January of 1877 Sophia Jex-Blake would, at last, be awarded a medical degree, something she had been striving to attain for close to a decade. Sophia Jex-Blake, born in England in 1840, would go on to play a starring role in women's fight for a place in medicine.¹ She is probably most remembered for her pioneering campaign to obtain admission for herself and several other women to the University of Edinburgh in Scotland to study medicine.

The campaign began with Jex-Blake applying to study medicine at the University of Edinburgh in 1869.¹ The medical faculty actually voted in favour of her entry, on the condition that special arrangements would be made by the university to facilitate separation of her from the male students.¹ However, the university court rejected her application stating it was not willing to make such arrangements "in the interest of one lady".⁶ If the changes could not be made in the interest of only one woman, then would they be made in the interest of several? Jex-Blake advertised in newspapers for other women to join her and so the "Edinburgh Seven" was formed.⁶ This was a group of seven women including Jex-Blake who became the first women to be admitted to a university in Great Britain.⁶ Unfortunately, this success did not last and in 1873 they would be refused the right to graduate, with the court ruling they should never have been admitted entry to the university in the first place.¹

While the Edinburgh Seven campaign failed to result in the women being awarded medical degrees, in many other ways it was a brilliant success. The plight of women entering medicine had garnered great public attention during the campaign, and meant the women had earned themselves some key supporters.¹ Most of the Edinburgh Seven, including Jex-Blake, went on to complete their studies at other European universities outside of Great Britain.⁶ Jex-Blake obtained her medical degree from the University of Berne in January 1877.⁶

Although Jex-Blake and the six other women ultimately did not receive medical degrees from a university in Great Britain, the Edinburgh Campaign was no doubt a catalyst for the Medical Act of 1876.¹ This new Act allowed British medical authorities to license all qualified applicants irrespective of their gender, replacing the Medical Act of 1858 which forbade women with a medical degree being registered. This was an enormous step forward for women in medicine and signaled the beginning of their recognition within a workforce that had for so long been accessible only to men.

The courage and passion that these three women displayed during those pioneering years and in their careers that followed, is something that to this day is worth reading about. There is much that can be gained from knowing even a small amount of history from the path we find ourselves walking. Learning the stories of these pioneering women serves, I think, as a reminder to us that progress towards meaningful change is not always a series of successful steps forward. The greatest progress is often made in the step we take forward after we have taken one back, and the story of women in modern medicine is a testament to this.

About the author

Megan Scanlan is a final-year medical student (Trainee Intern) based at the Dunedin School of Medicine. Her research into this topic began after being an avid attender of the History of Medicine lecture series here in Dunedin. A public lecture is held once each month with someone presenting on a medicine-related topic in history. Having always been interested in history and in particular the Victorian England period, she was inspired to pursue the topic of women in medicine.

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FEATURE ARTICLE: INTERVIEW SERIES

The hidden specialty: Military medicine

Michaela Rektorysova

Introduction

The role of the medical officers (MOs) is to provide medical care on land, at sea, or in the air to defence personnel in New Zealand (NZ) and overseas on operations. This role combines aspects of primary care, musculoskeletal medicine, occupational medicine, expeditionary medicine, and acute care. The following is an interview with an MO in the NZ Army, who wishes to remain anonymous.

What is a typical day like?

Most of an MO's time is spent in garrison on primary health care. This is similar to civilian general practice but for military personnel, and so is focused on high performance medicine with a slightly narrower range of conditions. The rest of the time is spent in the field, training medics and practicing military skills (e.g. fieldcraft, weapon skills etc.).

How does the job compare to being a General Practitioner (GP)?

The job is similar to being a GP on most days, with some time spent on military skills. In camp, the health care is performance-focused and your population is predominantly younger and more male-dominated than in a standard civilian GP practice.

How does it compare to when you were working in the hospital?

In a hospital, junior doctors have regular out-of-hours shifts, long days, nights, and weekends. In the New Zealand Defence Force (NZDF), MOs don't have regular out-of-hours requirements. This changes when on deployments or field exercises. At those times, MOs will work very long shifts and be away from home. Overall, this out-of-hours time works out to be similar per year to what a doctor would get in a hospital, but where hospital out-of-hours time involves a regular small amount each week, in the NZDF these larger periods of out-of-hours time are interspersed through regular working weeks of 8am to 4pm. The working days also include an hour of paid physical training (PT).

What is the work-life balance like?

There are opportunities in the NZDF to participate in sports and social events. A hospital also offers this, but the NZDF will let you participate in sport during your working hours.

What are the hours like? Are there long days, nights, on call or weekends?

There are no long days. There is an on-call roster at most bases but this does not result in many calls, and fewer call-outs. Weekends on call are rare so far but are likely to become more common at Waiouru Military Camp, which doctors from other bases must intermittently cover.

What is the initial training comprised of and what is it like?

- > Initial Induction Training (IIT): an eight week course in Waiouru to learn the basics of being a soldier, including weapons handling, drill, and basic fieldcraft. This course is not confined to specialist officers so will include a mixture of ages and educational levels.
- Specialist Officer Induction Course (SOIC): a six week course in Waiouru that is focused on being an officer, covering delivering orders, introductory military planning exercises, and leadership skills. It also enhances some of those more Army specific skills of bushcraft etc. This is for Army specialist officers only, so will be with doctors, nurses, psychologists, padres, lawyers, and education officers. Most evenings will be free for personal time, as well as occasional weekends.
- > Health Officers' Development Programme: a two week course in Palmerston North (Linton Camp) and Auckland, which is focused on introducing health practitioners to the specifics of health in the Army with some orientation to the other services' Defence Health Centres (DHCs).

This will all take about four months. It is entirely non-clinical and starts in early January so will often put your practicing certificate on hold temporarily. However, the medical council is good at reinstating it once you return to clinical practice. If going through the medical officer cadet scheme (MOCS), you will be paid the equivalent of a minimum wage salary during this time, so doctors with mortgages should be aware of the reduction in weekly pay. The MOCS is a bonding scheme for medical students. Doctors who don't join through the MOCS will be paid their full salary during these courses.

Is there opportunity for involvement in research?

There is a lot of scope for research in NZDF. However, NZDF's priority is deployments and garrison health care delivery. As such, with the current staffing of doctors, the priority for MO time will be on those areas ahead of carrying out research.

What are the main advantages and disadvantages compared to working in the public sector?

Advantages: NZDF soldiers receive a high level of health care. This is because they do not pay to see primary care practitioners, and they get good referral for secondary care, great rehabilitation opportunities, and close monitoring of their conditions. This makes practice more rewarding because as a military doctor you can provide the best care for your patients without as much concern for financial limitations. There is also a focus on high performance rather than just meeting an average standard for health outcomes.

Disadvantages: NZDF has bases in Christchurch, Blenheim, Wellington, Manawatū, Waiouru, and Auckland. As such, MOs will be required to work in one of these geographical locations. While NZDF will try to accommodate everyone's preferences, it is not always possible for all MOs to get their first preference for location. This means you may have to move to a region you would prefer not to go to and this can be for either a short or longer period. It should be noted, however, that this is no different to what doctors will experience while training under specialist colleges, although it is more geographically restrictive than civilian general practice training.

What is the likelihood of a deployment?

Deployments on field training exercises such as to Australia, Pacific Islands, Papua New Guinea, or Brunei are highly likely. Expect around one to two months of this within the first two years working for the NZDF. Deployment on combat operations is more variable but will likely occur as a six month deployment (preceded by three months of pre-deployment training) sometime within your first four years working for the NZDF. Deployment on Humanitarian Aid and Disaster Relief (HADR) operations is more difficult to predict, for obvious reasons, so if HADR is what you are interested in, then the NZDF will not be the best avenue for specialising in this work.

Is further education (e.g. Master of Public Health) supported and/or sponsored by the NZDF?

MOs are assigned a Continuing Professional Development (CPD) allowance and study leave which can be used towards post-graduate qualifications. Currently this is \$16k every two years, and ten days of CPD leave per year. Defence will generally support upskilling in any areas that are applicable to your work, and because military MOs are expected to maintain a wide range of skills, this means that most further education is likely to be supported.

Does it make a difference whether I join as a Navy, Army, or Air Force MO?

The Medical Officer Cadet Scheme (MOCS) is currently only for Army. Availability of positions for fully qualified doctors will depend on the service, with the recent trend being availability in Navy and Army. Because of the small number of military MOs, there is a high likelihood that at some stage you will have to cover one of the other services regardless of which uniform you are wearing. There are some variations in clinical practice between the services, with Air Force MOs managing the complexities of aviation medicine or aeromedical retrieval, Navy MOs dive medicine, and Army MOs tactical or austere medicine.

Who is in the multi-disciplinary team?

In field / deployed environment: doctors, registered nurses, and medics. In garrison:

- > Nurses: a combination of civilian and uniformed nurses. The civilian nurses cover primary care while the uniformed nurses have a greater focus on emergency management and deployable medicine.
- > Medics: will mostly work in the field but will come to primary care to maintain their competence. These are individuals who have been trained by the NZDF in primary care and emergency management. Sometimes they will have civilian paramedic qualifications. Your job is largely leadership, supervision, and continuing their clinical education. While in the DHC you will help medic trainees as they get clinical experience.
- > Social worker: one to two per camp. Assist in managing mental health cases as well as social and welfare issues.
- Complex case coordinator: for the protracted injuries or post-surgical patients, or for the sporadic cancer cases that we see. Similar to case managers in the public hospital system.
- > Padre: high level pastoral care. Padres are similar to the chaplain in the hospital in that they will cover the religious and spiritual aspects but they also cover a lot of functions that a social worker does too.
- > Physiotherapists: there are some uniformed physios but most of the rehabilitation in the garrison is done by civilian contractors.

They have various skill sets and a lot of experience. They are based on camp for ease of access by soldiers and the soldiers do not have to pay for therapy.

- > Exercise rehabilitation instructors: physical trainers who undergo extra training / qualifications to fulfil a similar role to physios. They tend to be the step between extensive physio and back to full duties.
- > Practice managers and health administrators: manage the day to day running of garrison health.
- > Generalist officers: military officers who are assigned to Defence Health to cover the military and leadership aspects that clinical medicine sits within.

What are the specific pay scales and how do they increase over time/seniority?

Current MO starting salary is ~\$125,000 NZD p.a. This will increase by about \$3000–4000 NZD per year of experience and with accumulation of post-graduate qualifications and vocational training etc. Step up in pay is by seniority, vocational registration, experience, and leadership roles, and is benchmarked against civilian sector doctor pay scales.

What is something you wish you knew before you started?

The NZDF is focused first on military and combat deployments. I had hoped to work in humanitarian aid deployments but these are less frequent than I had thought. Additionally, MOs coming through the MOCS should not expect their vocational training to begin as soon as they begin their return of service. There will be a delay of at least one to two years at this time, and possibly up to three. However other educational opportunities such as post-graduate qualifications are supported as there are a wide range of applicable military medical skills that are valuable as an MO.

What is the biggest selling point?

For me, the best part of this job is seeing a patient get back to full fitness. In the civilian hospital system it often felt like whatever I did wasn't ever really making a lot of difference to the final outcome. In the NZDF, managing an injury well means maintaining the patient in the top 10% of physical ability in the country. It is a performance-focused environment which is an exciting space to work in. You get to support New Zealanders who are going into harm's way to serve their country and you train to be able to provide them the best possible health care before they deploy, during their deployment, and when they come home. Other MOs have expressed that the best thing is the experiences and lifestyle. What other medical jobs would mean you have dedicated time for physical training and learn things like off-road driving or marksmanship principles for shooting?

What is the medical officer cadet scheme (MOCS)?

The MOCS is an assistance scheme from the army for medical students. Medical students can join from second year, starting as third years on the scheme, however they can also join in later years. Medical school fees for the year will be paid in full by the army and the student will also be paid an annual salary (currently ~\$37,000 NZD p.a.). There will be a limited amount of military training during summer holidays within the military camps in the third to sixth years of medical school. For the first two years as a house officer, there is no requirement for any military training. After two years, you will join the NZ Army as a medical officer. The return of service is a year for year plus one e.g. if a student joins for third to sixth year (four years), their return of service will be five years.

What is the incentive scheme?

Doctors who join the army are eligible for a reimbursement of up to \$50,000 NZD. The duration of this incentive scheme is four years. This is up to \$5000 in the first year, \$10,000 in the second year, \$15,000 in the third year, and \$20,000 in the fourth year.

If people are interested or would like more information, who do they contact?

For any further information about opportunities in the NZDF please contact the recruiting coordinators on 0800 1 FORCE (0800 136 723) or visit a recruiting office in your location.

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Author's blurb

> Michaela is a fifth-year medical student in Whangarei hospital and a medic in the New Zealand Army. In her free time she enjoys collecting plants, running various distances and trying new recipes.

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I would like to thank you to the Medical Officer who had kindly agreed to this interview.

Conflicts of Interest

Michaela Rektorysova is the 2020 Media Reviews Editor for the New Zealand Medical Student Journal. This article has gone through a double-blinded peer review process applied to all articles submitted to the NZMSJ, and has been accepted after achieving the standard required for publication. Michaela is also a medic in the New Zealand Army.

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Top left: While attempting to clear the enemy position, soldiers from Task Group Black encounter a mine field. NZ Engineers are called in to clear pathways to the infantry casualties, which allows the attached medic to triage the patients.¹

Left: Tested in training. Medics and supply technicians from our Army and the Australian Army conduct a combined Air Medical Evaluation (AME) demonstration during Exercise Talisman Sabre. The complex scenario included mass casualties, wounded, prisoners of war, and vehicle recovery.²

Top Right: Some of our medical staff practise aeromedical evacuation, using a Royal New Zealand Air Force NH90 helicopter to evacuate a 'patient' at Landguards Bluff, Whanganui.³

FEATURES: ELECTIVE REPORT

Floating Doctors, Bocas del Toro, Panama

Natalie Bell

The Floating Doctors is a non-governmental organisation which was set up and initiated by a man from America, who recognised the health adversities experienced by the Ngäbe population in Panama. The definition of "floating doctor" is a doctor who provides temporary medical coverage when normal services are otherwise unavailable.¹ The idea of the Floating Doctors is to deploy medical teams to remote underserved areas, where ongoing health services and community projects can occur.

During my time with the Floating Doctors I was able to play a role in providing medical care to four different remote communities. The isolation of these villages meant that their medical care was subpar. The people living in the villages experienced an absence of sanitation, electricity, clean water, and other infrastructure. This has led to poverty as well as poor health literacy. Getting to these communities was a challenge in itself: it could involve up to eight hours of boating, often busing, and up to a three-hour trek. We had to take all the equipment, paperwork/notes, and medications with us which was difficult, especially in the extreme heat. The main health issues I observed were worms, other parasitic infections such as scabies, fungal infections, machete wounds and other infected wounds, malnutrition, dehydration, sexually transmitted infections including HIV, pregnancy, and poor prenatal health. Each day with the Floating Doctors held new challenges and experiences, and I never knew what I was going to see next. This was a huge contrast to the first part of my elective in Miami.



Our boat ride to Salt Creek, Bocas Del Toro, Panama

I could not decide what I wanted to use my elective for and contemplated many ideas. I spoke with some older students and decided to look for an elective which would challenge my current experiences as a medical student. I wanted to make a positive contribution and use the skills I had acquired over the past five years of medical school to help other people and do something useful. During my elective research I stumbled across an organisation called the Floating Doctors whose mission is "to reduce the present and future burden of disease in the developing world, and to promote improvements in health care delivery worldwide".² They run a volunteer programme in Bocas del Toro, Panama, Central America which looked like a once in a lifetime opportunity in a very unique healthcare setting.

To be honest, this was a bit outside my comfort zone and I questioned whether I could embark on the challenge. I am not much of an outdoors person and reading about the Floating Doctors initiative online informed me it involves a lot of activities such as sleeping in hammocks, lack of access to showers, and living off very basic foods in extremely remote villages. It appeared safe and the reviews were nothing but positive. After much contemplation I decided I would like to use my elective for something I would not ordinarily or easily experience, as well as assist in some way and help an under-resourced population.

I applied for the Floating Doctors online through their website, which was an extremely easy process. It involved few administrative questions as well as a short paragraph on why you wanted to volunteer. There was also a compulsory \$100 USD donation which was counted as part of your total fee and showed commitment. The total cost associated with the programme includes accommodation, meals, and



Arriving at Río Caña, Bocas Del Toro, Panama

travel expenses around the Bocas Del Toro province which was \$550 USD per week. I decided to do the programme for four weeks as I felt this would allow me to gain a good understanding of medical accessibility and care in the remote Ngäbe (indigenous Panamanian) populations. The money you pay to participate in the programme goes directly towards the resources and costs of running the clinics. The programme is mostly funded by volunteers' fees which was reassuring for me as I knew my money was being put to good use. I was accepted within a week and was sent the Floating Doctors handbook which contained extremely useful information about the programme itself and also travel recommendations to get to Bocas Del Toro. They were very efficient with communication and if I had any questions they were quick to respond. I spoke with my friend from the Christchurch campus of Otago Medical School who expressed interest as well and we decided to do our placement at the same time. We flew into San Jose in Costa Rica and got a public bus down the east coast of Costa Rica, across the border to Panama, and down to Almirante which was very easy and cheap (about \$10 NZD). From Almirante we got a boat across to Bocas del Toro and met the other volunteers. The Floating Doctors organises a boat every Sunday from Bocas town to base camp which takes about half an hour.



Patient I saw with external fixation rod.

The Floating Doctors base is located on an island called Isla Colon which is part of the Bocas del Toro archipelago in the north eastern region of Panama. The only inhabitants on the island of Isla Colon are the Floating Doctors volunteers and staff, usually around 50 people. The area consists of many small islands, so most villages are only accessible by boat. A standard week on the Floating Doctors would consist of either a day clinic week or a multi-day clinic week. My friend and I did four multi-day clinic weeks during our stay in the area. This consisted of getting up on Monday and travelling to our destination; Tuesday to Thursday are clinic days where a clinic would be set up within the village - usually in a Rancho or whatever was available. We would return to base camp on Thursday afternoon and Friday was used for setting up the pelican packs for the next week's clinic. Clinic days would run from 8am until all the families had been seen by a doctor. Sometimes this could be until after dark and we could be working right up until we went to bed. Meals were black beans and rice for lunch and dinner, and fried bread with condensed milk for breakfast. During these multi-day clinics we slept in hammocks tied between trees or whatever we could find. It was a really unique experience and I have never done anything like it. I was truly out of my comfort zone which is why I think I came out feeling like I had really changed my views on health care in general. Being in a situation where you are not always comfortable is challenging but rewarding and I think this is why I took so much from the experience.

The Floating Doctors was an incredible experience and I would strongly recommend it to any future medical students looking for something to do with their electives. You are exposed to many specialties, which was very beneficial for me as I am still unsure about what I want to specialise in. In saying that, the programme would still be beneficial even if you have already decided on a career as it outlined many other health issues among remote populations. It was very hands on, and I got a lot of clinical time as well as independence. Working in the remote Ngäbe populations of Bocas Del Toro gave me a more global perspective of healthcare and a greater appreciation of poverty as well as the developing world, especially in relation to medicine. It allowed me to experience different cultures and learn how to work effectively with limited resources.

We all worked with translators which made communication guite difficult between us as health care workers and the patients. I don't know how much information would actually get through or if we were understanding their main issues or concerns. On my first day I saw an 18 year-old girl who had had a tumour in her radius removed by the local hospital. She presented with an external fixation rod, which had been in place for four months. She had been told she needed a bone transplant, but we were unsure on where or how. The communication was extremely difficult, as neither her nor her mother knew her diagnosis or the type of surgery she had. In this case we took down all the information we could as well as the hospital name and the surgeon who operated on her. Our assessment of her was inconclusive but the plan was to get in contact with the surgeon and find out what was going on. We arranged a follow up with her after a month time and gave her mother money to catch a boat to the clinic so we could see them again. Another interesting experience I had was on a day when I was working with a general surgeon from Cuba, who was also a volunteer. We saw a man who came in with multiple abdominal complaints, which were likely to be attributed to parasitic worms. At the end of the consultation he mentioned a skin lesion on his cheek. The surgeon looked at me and said, "We are going to cut it out." It was very interesting to see the working conditions of the surgeons and the tools they use given the limited resources.

Relating back to the healthcare system in New Zealand, I was able to recognise similarities in health disparities experienced by both the Ngäbe people and Māori despite them being very different indigenous populations. I realised that the skills we learnt in Māori health during medical school were interchangeable and relevant when I was working with Ngäbe people. These skills allowed me to create and enhance the doctor-patient relationship.

Having only been exposed to health care in New Zealand, I now realise how sheltered I have been. I have never appreciated the Millennium Development Goals of health care as much as I did in Panama. Being in New Zealand and learning about these concepts and health strategies makes it difficult to appreciate their importance when you have not seen the problems for yourself. The contrast to the first part of my elective was notable. I am very happy with my elective and the different aspects of medicine I got to experience. I would highly recommend the Floating Doctors to anyone who is unsure about what they want to do for their elective.

Their website is here for more information: https://floatingdoctors.com/

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Author's blurb

> Natalie is a First-Year House Officer currently working in Auckland City. She is an Otago University graduate and has a special interest in women's health and health inequities.

Acknowledgments

Consent was gained for the photographs in this report

ASSAURATEL BAST BAST

Connor walking to clinic at Salt Creek, Bocas Del Toro, Panama

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Podcasts: Making the most of your ride home

Natasha Smyrke

Introduction

Listening to medical podcasts is a welcomed break from traditional methods of study. Podcasts offer the opportunity to pull your eyes away from the screen but to still remain productive. Medical students may be familiar with previously reviewed podcasts like IMreasoning. In this article I review five others. Each of these offer their own unique teaching style and objectives allowing students to tailor their learning to their needs.

1. Sharp Scratch

Sharp Scratch¹ is a series of podcasts from the United Kingdom (UK) run by medical students, for medical students. It is sponsored by the British Medical Journal (BMJ) and takes us behind the scenes and into the relatable minds of five enthusastic characters whose experiences range from medical student to Foundation Year Two (F2; equivalent to New Zealand's postgraduate year two or PGY2) doctor. Ths podcast aims to address the fears, expectations, and questions that we may have entering life on the wards and the scary world of employement. The episodes cover topics that that vary from the very heavy (e.g. death, dying, and mistakes) to the lighter and more practical side of being a juniour (e.g. sick and holiday leave, and dating). If you have an appetite for some non-medical advice about being a medic then this is the podcast for you. From across the ocean, Sharp Scratch creates a sense of community by reminding us that we are all in this together. Listen to the episode about coronavirus disease 2019 (COVID-19) if you want to hear about how other medical students are coping with the disruption and the shared feelings of uncertainty. Although this podcast does not provide any specific biomedical education, it aims to address the hidden curriculum and practicalities of employement by asking the questions you might not have thought to ask or were too afraid to ask. The similarities between the UK and New Zealand (NZ) curriculum and model of healthcare makes this podcast still relevant to NZ-based medical students.

When to listen: When you have burning questions about what it's like to be a junior doctor.

2. Ward Calls

Ever wondered what you might do if you were holding the pager and it went off? Having nightmares about your first ward call? Worry no more. Auckland-based doctors, Dr Vani Chandran and Dr Sam Holdford, talk us through common ward call presentations, what to do, and what is expected of us as house officers.² Every time I listen to an episode I feel like I am inching closer to being a competent and confident doctor. These podcasts are not for the detail-orientated photographic memory student in you. Stepwise approaches, basic investigations, and when to call for help are all advocated here as they aim to turn you into a great junior doctor. The podcast also has an associated website which provides a summary of each episode and acts as a great reference if you want a quick go-to guide for study purposes. The great benefits of this podcast lie in the fact that it is New Zealand-based so you can be assured that the information you are receiving is relevant in a New Zealand context.

When to listen: You would like some practical tips on what to do in common ward call presentations.

3. MedConversations

The words "interstitial lung disease" or "glomerulonephritis" are enough to give any medical student the heebie-jeebies as you try to rack your brain to link up the information you have rolling around up there. Well, thanks to MedConversations³ this no longer needs to be a concern. MedConversations is an Australian-based podcast offered by advanced trainees who package a variety of disease presentations into neat little systems of information that are easy to understand and learn, arming medical students with just the right level of knowledge to impress even the scariest of consultants. No longer should you feel like you need to spend your time forming disease scripts; these guys have done it for you with a healthy dose of humour sprinkled in between. Car rides no longer need to be wasted, as listening to these podcasts on your way home is just as good as reading any textbook. Occasionally the information can be a little overwhelming but have a second listen to the podcast and you'll be feeling like an expert. They've even gone the extra mile to create flashcards too so that you can solidify your knowledge. Go you, smart kid!

When to listen: This podcast is a great adjunct to studying when you've grown tired of reading as your sole study tool.

4. Goodfellow Podcast

If you're looking for a podcast series that covers just about any disease presentation with a strong focus on the New Zealand context and cultural competency, look no further than the Goodfellow series.⁴ *Goodfellow Podcast* interview experts in their field, covering a diverse range of topics. If you are curious about something, they probably have a podcast about it. Some of the podcasts focus on the psychosocial aspects of medicine which provides much needed insight into this area and shifts focus from solely relying on applied medical science. The podcasts even vary in length from about five minutes to sixty minutes offering something for every attention span. To add greater value these podcasts are often paired with courses that you receive a certificate for when you complete them. The courses do

not take long and if you're a certificate kind of person then this is a great motivator.

When to listen: Another great adjunctive study tool.

5. The Clinical Problem Solvers

The Clinical Problem Solvers podcast⁵ is an internal medicine podcast that aims to improve clinical reasoning through articulating the thinking process that helps doctors in improving their differential diagnoses. They take complex concepts and present them in ways that are easy to understand, focusing on approaches rather than explicit information. This is a great podcast to help young doctors come to grips with working through clinical scenarios and differentials. This podcast takes real life cases presented to doctors who are blinded to the outcome and allows the audience to work towards the diagnosis with them. The schema that emerge from the cases are discussed in detail and summarised on their website, allowing the audience to remain engaged through following along with each case. This is a great podcast for those wanting to learn how to think like a doctor. The podcast does a great job of keeping the audience involved and the occasional antedotal stories about errors in the workplace do a lot for enourgaging transparency in medicine. This is an American-based podcast but their focus on how we learn and think is still applicable in the New Zealand context.

When to listen: When you would like to take your learning to the next level through case based analysis.

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About the author

> Natasha Smyrke is in her fifth-year of medical school at Auckland Hospital. Prior to medical school, she did a degree in optometry and then worked Rotorua for two years. She is looking forward to returning there in sixth-year so that she can spend more time outdoors.

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Stepwise clinical examination handbook (2nd edition) by Matthew D. Mackey

Karen Suresh



Developing proficiency in clinical examination techniques is integral for any medical student not only for passing objective structured clinical examinations (OSCEs), but also for the purpose of becoming a capable physician. This can be one of the more overwhelming aspects of the student journey and there are a myriad of resources to choose from to ease this process. The modern student may be drawn to the plethora of digital resources available online. With their variety in format and ease of access, these can be useful for simplifying difficult ideas. Howev-

er, it can be difficult to distil specific information from the vast archives available online, and often the full wealth of information is hidden behind paywalls. In contrast, textbooks are a one-off investment that usually have a defined structure and purpose, enabling their use as reliable references.

The Stepwise Clinical Examination Handbook (2nd edition)¹ can aid the reader in developing skill in clinical examination techniques. This concise handbook is useful for all levels of medicine — from the medical student learning the basics of correct examination technique, all the way to the qualified physician looking for a convenient and quickto-read refresher on the various clinical examinations.

This book is succinct and easy to read. As a result of its brevity, the handbook is lightweight and portable, making it a convenient resource for the busy physician. With its compact form, it can easily be transported around with the reader to look up techniques as the need arises. However, those in search for a comprehensive textbook will be disappointed as only so much information can fit within the book's 108 pages. Often details such as the pathophysiology behind the various signs and symptoms mentioned is not included, and thus the best use of this book would be in conjunction with other sources of information. Additionally, of note to visual learners, the book does not contain any photos or diagrams.

The book is divided into three sections, providing a clear, easy-to-navigate structure. The layout of the book offers the reader a systematic approach to the organisation of information, aiding longterm retention.

Part I comprises a series of step-by-step guides for the physical examination of the various body systems, along with subspecialty examinations. Each examination manoeuvre is described briefly with the

use of simple sentences. Diamond symbols accompany some of the more difficult examination techniques, indicating that detailed descriptions can be found in the glossary. A blank checklist is included with each physical examination guide for use by peers during the feedback process, permitting the reader to keep track of their performance and identify aspects of their own examination technique that may require fine-tuning.

Part II presents differentials for various clinical signs in an easy-toread format. For certain conditions, mnemonics are included, which can be useful for long-term retention. This section is clear and concise with the use of tables and lists. Throughout the first two parts of the book, the colour of the page is associated with the body system its contents cover. This expedites the process of information retrieval.

Part III is a glossary of specific examination techniques which expands upon some of the more difficult components of physical examination from the first section. It guides the user through the purpose of the examination, the ideal positioning of the patient, the standard technique, and the interpretation of examination findings. This section condenses a large amount of information into a concise 30-page chapter. An index can be found on the very last page, which contains a list of examination techniques and their corresponding page numbers in alphabetical order, allowing the reader to reach information quickly.

Overall, the Stepwise Clinical Examination Handbook (2nd edition) is a worthwhile addition to your collection. There are many different resources for clinical skills, but long-winded textbooks are not always the best option when you need to look something up on-the-fly. It is useful for anyone searching for a supplement to lengthy textbooks. Overall, this book is intended to be a "guide-on-the-side", and, as stated in the book itself, it is not a definitive guide on the physical examination of an adult patient. Therefore, readers will at times need to draw information from other sources. Overall, the book is excellent, and succeeds in presenting a vast array of information in a concise and attractive format.

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1. Mackey, MD. Stepwise clinical examination handbook: Your stepwise guide to clinical excellence. New Zealand: MedEdPRO; 2019.

About the author

> Karen Suresh is a third-year medical student at the University of Otago.

Conflict of interest

Karen Suresh was provided with a copy of the Stepwise Clinical Examination Handbook (2nd edition) in exchange for the completion of this book review.

The body keeps the score: Brain, mind, and body in the healing of trauma by Bessel van der Kolk

Patrick Macaskill-Webb

I found the recommendation for

The body keeps the score¹ from

multiple different places before

engaging with it. I discovered

that this book ties together two

parts of humanity that deserved-

ly require connection: mind and body. Bessel van der Kolk, the author, uses fresh metaphors to flesh out his interesting commentary on the field of psychiatry. A particularly insightful metaphor was how van der Kolk compares psychological trauma to a splinter,

because when a "splinter... causes an infection, it is the body's re-

sponse to the foreign object that becomes the problem more than



the object itself."1(p246-7)

As a reader, I was guided to have a deeper empathy for traumatic experience by being shown how post-traumatic stress disorder (PTSD) was first recognised as an illness. The author gained a lot of professional and academic understanding from PTSD sufferers early in his career. As a reader, I too was taken through the discoveries that have developed current-day trauma therapy. Van der Kolk stops to point out the scientific and societal hurdles that needed to be cleared before trauma as a medical issue could be appreciated as it is now. At the same time, future hopes and likely breakthroughs in psychiatry are frequently earmarked to be expanded upon later. Overall, the tone was surprisingly positive and honest about the human stories involved. Trauma is an otherwise very inaccessible and indescribable subject that was spelt out with care in this book.

After reading this book, I found that I had greater respect for the invisible stories which others may hold close. An alienating side effect of this was wondering about the possible hidden stories and trauma of those around me, such as friends and family. Overall, I learned an incredible amount and plan to come back to the fascinating potential of neurofeedback therapy that was touched on toward the very end of the book. To anyone with a curiosity for human psychological potential and the diligent advance of psychiatric science, I am now passing on a passionate recommendation to commit to this fantastic read.

References

1. van der Kolk B. The body keeps the score: Mind, brain and body in the transformation of trauma. United Kingdom: Penguin Books; 2015.

About the author

> Patrick Macaskill-Webb is a second-year medical student at the University of Auckland.

Also human: The inner lives of doctors by Caroline Elton

Uma Sreedhar



What motivates some people to pursue medicine or leave it? What happens to the medical student who dreads the prospect of a doctor's responsibility or the junior doctor who took maternity leave and was no longer respected professionally? What about the international medical graduate who is repeatedly declined by the training programme of their choice or the registrar who believes they have chosen the wrong specialty for themselves? These are just some of the individuals that Dr Caroline Elton has encountered in 20

years of working with students and doctors in the United Kingdom National Health Service (NHS). Dr Elton shares their powerful stories and more in her book *Also Human: The Inner Lives of Doctors*¹ so future students and clinicians can learn from them.

By virtue of her role as an occupational psychologist to NHS staff, Dr Elton is able to experience the medical profession intimately while remaining an objective outsider. After spending much of her professional life offering career support, counselling, and evaluating clinical education, this book frequently touches on strategies for vocational problem-solving. However, Dr Elton predominantly provides insights into the very human individuals that make up the workforce.

Also Human handles delicate topics with consideration while offering a distinctly psychological perspective to many of the concepts we are taught in medical school. One such discussion is about empathy and the relationship not just between clinician and patient, but also between clinician colleagues. Dr Elton delves into psychological theory about the roots of human empathy in our childhood attachments to make sense of a consultant who treats a newly immigrated junior doctor on her team with disregard, sending her to certify a death by herself with little instruction.

Dr Elton also describes the decline in empathy experienced by those in medicine, as they progress through training, from the combination of stressors in their environment. As such, the mental health of medical students and doctors is a recurring theme throughout the book. The issue of transitions is an area where Dr Elton feels the medical system often fails its doctors and leaves them vulnerable. An example of a poorly managed transition, such as the transformation from student to doctor, is illustrated in the harrowing story of a doctor put in charge of an entire ward by herself on her first day as a graduate. In this vignette, Dr Elton also discusses the New Zealand model of having final year medical students become Trainee Interns as a better way to bridge the gap than the more abrupt $\ensuremath{\mathsf{NHS}}$ transition of clinical student to doctor.

Amongst the many meaningful conversations that Also Human offers, a large proportion are those that deal with discrimination in the workforce. The challenges of being female in certain specialties and the biases against women who wish to take time out of their careers for their families are portrayed through the stories of several doctors. Dr Elton describes the attrition of female doctors from hospital roles in this environment as "leaky pipes" and she discusses in-depth how the culture of discrimination also extends to students and doctors who fall into minority ethnic groups. This is a topic that Dr Elton illustrates with a significant body of research and personal stories to leave the reader in no doubt how important this issue is. She also goes to great lengths to demonstrate how strongly embedded this culture of discrimination is around the world. Building the awareness and advocacy needed to tackle these pervasive issues as the pipeline flows is the only way to create a culture shift away from discrimination, and this is relevant to all medical students, including those in New Zealand.

This collection of narratives is a window into the often-hidden side of practising medicine that we may not encounter as students. Dr Elton's clear writing style, varied delivery, and the connection to honest human experience make this a compelling text to reflect on for both pre-clinical and clinical students. Anyone who wishes to gain insight not only into the challenges of a medical career, but also the diversity of medical systems internationally and the experience of navigating career change in medicine, would enjoy this book.

References

1. Elton C. Also human: the inner lives of doctors. London: Basic Books; 2018.

About the author

> Uma is a fourth-year medical student at the University of Auckland, based at North Shore Hospital this year. She is passionate about health advocacy and the intersection between medicine and technology.

Conflict of interest

Uma is a current peer reviewer for the NZMSJ. This article has gone through a doubleblinded peer review process applied to all articles submitted to the NZMSJ, and has been accepted after achieving the standard required for publication. The author has no other conflict of interest to declare.

CREATIVE ARTS: POEM

Something good had to happen that day

Harry Di Somma

Something good had to happen that day, The day that terror came. As we closed our eyes and watched with horror: The names, the screams, the pain.

Something good had to happen that day, The day the guns were fired. A day so evil, so rife with malice, Division, and hatred transpired.

Something good had to happen that day, As our country feared in dismay. With phone calls, and texts, and hugs, and tears, For terror had made us afraid.

A baby was born that day, A day as dark as can be. A little light, so small, so bright, Amidst the horrid debris.

A baby was born that day, Despite loss of life so vast. As that tiny face wriggled and cried, Some joy and hope was cast.

Something happened that day, As I looked at the world in shame. I refused to go home until I could say, "Something good happened today."

About the author

> Harry is a final-year medical student at Auckland City Hospital. He has a wide range of interests including haematology, nephrology, and obstetric medicine. Outside of medicine, Harry enjoys singing, poetry, politics, and spending time with friends and whānau. Harry is one of the Creative Arts Competition winners for Issue 31.

Acknowledgements

This piece is dedicated to the victims of the Christchurch Terror Attack at Al Noor Mosque and the Linwood Islamic Centre, to their beloved friends and families, to our wider Muslim community, and to the first responders and healthcare professionals involved in the aftermath of this tragedy.

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CREATIVE ARTS: POEM

To be seen

Dan leremia

Alone, we make you to "reduce the risk of transmission", we say, isolated, labelled as *red*, and without support.

And we watch.

Daily there are references to you in hospital, a number read by a government official, your suffering and identity, without expression. We know that you are a minority, being old or ethnic in hospital makes your death more likely.

And we watch.

We observe mass graves being filled, elsewhere, "other countries", we say, not ours, a fate not allowed for our patients. To put patient care first is our imperative; to respect *dignity*, an equal and ultimate worth, we are taught is fundamental.

And we watch.

Yet doing so seems difficult, when we allocate another to that ICU bed. We weigh your claim to a right to life to be less. We deny you family, social interaction, a funeral, and medicalise your final days. The care of the patient, a casualty to the "good for the many".

And we watch.

Alone, you are, insisting your worth, and, in our treatment, have been made less.

And we watch.

About the author

> Dan is a Trainee Intern at the Dunedin School of Medicine with interests in psychiatry, palliative medicine, and bioethics research. In his spare time, he keeps sane and timestressed by directing multiple secondary school choirs in Dunedin. Dan is one of the Creative Arts Competition winners for Issue 31.

Acknowledgements

Associate Professor Neil Pickering and Dr Simon Walker – Bioethics Centre, University of Otago

CREATIVE ARTS: PAINTING

Together

Jocelyn Lim



About the author

> Jocelyn is a Trainee Intern currently based at Waitematā DHB. This piece was painted during the nationwide lockdown. It was inspired by United States nurses Mindy Brock and Ben Cayer, whose image trended on social media: a symbol of hope and love in the fight against Coronavirus disease 2019 (COVID-19). Jocelyn is one of the Creative Arts Competition winners for Issue 31.

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Information for authors

General information

The New Zealand Medical Student Journal (NZMSJ) aim to support medical student development, be a forum for opinions and discussion, and publish the academic writing of medical students. To this end, the Journal accepts the following submissions for its issues: original research articles, academic review articles, case reports, clinical audits, and feature articles relevant to the theme of the upcoming issue. All other submissions (other feature articles, media review articles and winning Creative Arts Competition entries) will be published on the NZMSJ Blog. The Journal commits to rigorous peer review and freedom from commercial influence.

Format requirements

- > Use Microsoft Word
- > Include figures, legends and tables
- > Save as a word document (*.docx, doc)
- > Photographs are to be included as separate files (jpeg, jpg, png or tiff)

Types of submission

- > Original research articles (<3000 words)
- > Academic review articles (<3000 words)
- > Case reports (<1500 words)
- > Clinical audits (<3000 words)
- > Feature articles (<3000 words)

Criteria for submission

- > Submissions are of interest to medical students
- > Written approval from research supervisors is required
- > Manuscripts must not have been published elsewhere prior to submission, including on online or social media pages
- Completed article cover sheet and title page, available from: http://www.nzmsj.com/how-to-submit-my-manuscript.html

Style

- > The British Medical Journal house style is to be followed.
- > This is available at: http://resources.bmj.com/bmj/authors/bmj-house-style
- > Use the Vancouver referencing style, insert numbers within the text using superscript, do not use brackets around the numbers
- > Abstracts are required for research articles, including case reports

Submission

> ALL MANUSCRIPTS: Submit online here: https://nzmsj.scholasticahq.com/for-authors

Process

All submissions will be reviewed for spelling, grammar, and clarity. Academic articles will then be sent for expert reviews. Authors will be required to revise their articles during this process. Final article selection for publication will be made in conjunction with our academic advisors and Editorial Board once the review and revision process is completed to a professional publishing standard.

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 as a graduate.

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> We are current looking for submission for Issue 32 with the theme of "politics and medicine", due for publication in April 2021.

Introducing the Verrall Award

We are proud to introduce the Verrall Award for the best academic research article published in the NZMSJ each year.

This annual prize is valued at \$500 and is named after Dr Ayesha Verrall who was instrumental in leading the student committee that founded the journal in the early 2000s.

All original academic articles (including systematic and literature reviews) will be eligible and judged by the NZMSJ team.

Visit **nzmsj.com** to find out more and submit your article.



New Zealand Medical Student Journal Te Hautaka o ngā Akongā Rongoā

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We are proud to introduce The RANZCOG Award for the best blog post published on the NZMSJ Blog each year.

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