

# NEW ZEALAND TE ARA TIKA O TE HAUORA HAPORI MEDICAL JOURNAL

PUBLISHED BY:

 **PMA** PASIFIKA MEDICAL  
ASSOCIATION  
*Group*

Vol. 137 | No. 1591 | 8 March 2024

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## EDITORIAL

# Cancer outcomes in New Zealand and other countries: how are we doing?



## Publication information

published by the Pasifika Medical Association Group

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The *New Zealand Medical Journal (NZMJ)* is the principal scientific journal for the medical profession in New Zealand. The *Journal* has become a fundamental resource for providing research and written pieces from the health and medical industry.

The *NZMJ*'s first edition was published in 1887.

It was a key asset of the New Zealand Medical Association (NZMA) up until July 2022.

It is owned by the Pasifika Medical Association Group (PMAG).

The PMAG was formed in 1996 by a group of Pasifika health professionals who identified a need for an association with the purpose of "providing opportunities to enable Pasifika peoples to reach their aspirations".

ISSN (digital): 1175-8716

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### Further information

ISSN (digital): 1175-8716  
Publication frequency: bimonthly  
Publication medium: digital only

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Individual		Institute	
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# Summaries

## **Cancer outcomes in New Zealand and other countries: how are we doing?**

*Mark Elwood*

Cancer outcomes in New Zealand are not as good as those in Australia or some other countries for most cancers. Reasons include lower funding, fewer staff and equipment, barriers to investigations from primary care and fewer medicines funded.

## **“Closed books”: restrictions to primary healthcare access in Aotearoa New Zealand—reporting results from a survey across general practices**

*Maite Irurzun-Lopez, Megan Pledger, Nisa Mohan, Mona Jeffreys, Fiona McKenzie, Jacqueline Cumming*

This research looks at how primary healthcare practices in Aotearoa New Zealand are handling new patient enrolments. It found that many practices were not accepting new patients, a situation known as “closed books”, and that this problem has become more common since the COVID-19 pandemic started. The study showed that this is a big issue because it stops people from getting the healthcare they need, and people not enrolled with a practice often had to wait longer for medical appointments and could not access certain services, like COVID-19 care. This research is important because it shows that changes are needed in how general practices enrol new patients, to make sure everyone can get the care they need.

## **A retrospective cohort study of incidental abdominal aortic aneurysms on routine abdominal computed tomography scans in Te Tairāwhiti (2018–2019)**

*Rachel Kee, Kari Clifford, Jay Maloney, Atareta Mangu, Justin Cain, Sameer Memon, Jamie-Lee Rahiri*

This study aimed to seek out incidental abdominal aortic aneurysms (AAAs) picked up on routine CT scans of the abdomen. From here, we aimed to track what follow-up patients received (if applicable) or if any patients died of ruptured AAA (rAAA). No patients experienced a rAAA death, and as a result of this study we present a referral guideline for primary and secondary care referrals.

## **“I lost my first tooth here”: Syrian former refugees' experiences of oral healthcare in Dunedin- New Zealand**

*Zeina Al Naasan, Jonathan M Broadbent, Warwick J Duncan, Moira B Smith*

This paper explored the experiences of accessing and using oral health services by Syrian former refugees resettled in Dunedin. They described factors that hampered or facilitated their access and use of oral healthcare services, including the high cost of treatment, language and culture differences and challenges specific to resettlement. Healthcare providers need to take into consideration the experiences and cultures of former refugees when treating them.

## **Emergency department attendances for persistent pelvic pain are not reduced following laparoscopic surgery for women with or without endometriosis**

*Karen Joseph*

Persistent pelvic pain (PPP) afflicts around a quarter of New Zealand women, and often carries a heavy burden on their lives. Some women experience such severe pain that they need to attend the hospital emergency department (ED). EDs are often very busy and many of these women find the experience

of an ED visit for an exacerbation of their PPP to be dissatisfactory. We do not currently know what the most effective treatments are to relieve this suffering and prevent the need to attend the ED. In this study this need was not reduced following laparoscopic surgery either for women with or without endometriosis, suggesting that research and investment into other treatments is needed.

### **Children's toys no longer: a porcine model study of the lethality of modern air rifles**

*Kevin N Peek, Benjamin JL Black*

Air rifles are common in New Zealand and are legislated for based on the mechanism of the rifle rather than performance. Spring loaded and CO2 air rifles are available to those over 18 without any background checks or license. Our study showed that in a euthanised animal model and a ballistics gel model, a .22 caliber air rifle was able to cause lethal injuries reliably at 10 meters. We believe this should be considered in potential restrictions on these weapons.

### **The lived experience of chronic pain for Māori: how can this inform service delivery and clinical practice? A systematic review and qualitative synthesis**

*Dana Antunovich, Jordine Romana, Gwyn N Lewis, Eva Morunga, Debbie J Bean*

In New Zealand, one in five adults experience chronic (long-term) pain and Māori are more likely to experience chronic pain than non-Māori, and yet little research has looked at how pain services can best provide for Māori. We reviewed previous research that has described experiences of chronic pain and pain management for Māori to make clinical recommendations. We found that Māori emphasised the links between pain and holistic wellbeing, and services need to address these broader dimensions of pain. To improve pain management for Māori, health services need to prevent racism and discrimination, and use tikanga-informed practice. Finally, Māori expressed the importance of having knowledge, choice and autonomy to make decisions about pain management, and services can better serve Māori by supporting these practices.

### **Simulation in New Zealand: what have you done for me lately? New Zealand Society for Simulation in Healthcare (NZASH) White Paper**

*Maggie Meeks, Brad Peckler, Raewyn Lesa, Trish Wood, Tracey Bruce, Michael Sheedy, Chris White, John Dean, Patrick Armstrong, Arthur McTavish, Christine Beasley, Paul Winder*

This white paper on healthcare simulation in New Zealand outlines the uses and capabilities of simulation for education, training, interprofessional learning, licensure and ongoing professional development. This manuscript describes how simulation can help Te Whatu Ora with some of the current challenges our healthcare system faces. The authors provide the first comprehensive list of hospital-based simulation resources for New Zealand.

### **Herpes simplex encephalitis mimicking a primary intracerebral haemorrhage**

*Hulya Erdogan, Musab Eltahir, Gopinath Ramadurai, Tarig Abkur*

It is crucial to recognise and treat viral infections of the brain promptly to avoid severe outcomes. In this paper, we shed light on an unusual presentation of viral infection of the brain tissues caused by herpes simplex virus. Furthermore, we provide some recommendations that can assist doctors in identifying such uncommon features and initiate appropriate therapy in a timely manner to enhance recovery and prevent complications, including death, in untreated individuals.

# Cancer outcomes in New Zealand and other countries: how are we doing?

Mark Elwood

**H**ow are we doing in dealing with cancer? How can we tell? One way is to compare our performance with other countries. The obvious comparator is Australia. We train our healthcare professionals in similar ways, often in combined programmes, and expect them to perform as well as their colleagues in Australia.

The final line in measuring outcomes of cancer care is the number of deaths. The most recent comparison, for diagnoses in 2014–2018, shows that cancer deaths in New Zealand were 11% higher than those in Australia: 17% higher in women, and 5% higher in men. This comparison takes account of calendar year, age and sex distribution.<sup>1</sup> These differences are virtually the same as those shown

over 20 years ago by a similar study,<sup>2</sup> despite some improvement in intermediate years.<sup>3</sup>

The excess deaths in New Zealand are not because there is more cancer: the total incidence of cancer in New Zealand is slightly less than that of Australia.<sup>1</sup> The difference arises because we are not as good at treating cancer.

A simple measure of treatment success is the 5-year relative survival rate; that is, the survival of cancer patients 5 years after diagnosis after accounting for other causes of death. The survival rates in New Zealand are lower than those in Australia for most types of cancer,<sup>4</sup> as shown in Table 1. The smallest differences are in cancers with very poor survival such as pancreas, and

**Table 1:** 5-year relative survival rates for cancers diagnosed in 2006–2010 in New Zealand and Australia, for all cancer and top five types by New Zealand deaths.

Cancer site	New Zealand annual deaths, 2008	5-year survival, 2006–2010, %		Difference	
		New Zealand	Australia		
<b>Females: all cancer</b>	4,005	63.2	67.4	-4.2	
Lung	745	10.6	16.5	-6.0	
Breast	618	86.6	89.4	-2.8	
Bowel	580	62.2	67.1	-4.9	
Pancreas	197	4.3	5.6	-1.3	NS
Ovary	184	35.9	43.3	-7.5	
<b>Males: all cancer</b>	4,561	61.3	65.1	-3.8	
Lung	889	8.5	12.6	-4.1	
Bowel	684	60.4	65.3	-5.0	
Prostate	670	90.3	92.0	-1.7	
Melanoma	202	88.2	88.5	-0.4	NS
Pancreas	176	4.7	4.9	-0.2	NS

All differences significant except those shown as NS.  
Data from Aye et al.<sup>4</sup>

those with very good survival such as melanoma. These differences have increased over time, as the survival rate in Australia improved more between 2000–2005 and 2006–2010.<sup>5</sup> The lower survival in New Zealand is even worse in the Māori population.<sup>6</sup> These differences are also seen in patients diagnosed more recently, in 2010–2014.<sup>7</sup>

One reason for this is that in New Zealand we diagnose cancer later, and so make its treatment more difficult and less successful. For most cancers, the main prognostic factor is the extent to which the cancer has spread when it is diagnosed, summarised as the stage of the cancer. International comparisons of cancer stage need to be very careful to ensure the methods used are truly comparable. The SURVMARK-2 programme has compared staging with great attention to these methods, but only for a few countries and a few cancers. It shows that New Zealand has the most unfavourable stage distribution of the five cancers and seven countries studied.<sup>8</sup>

So why do we have later diagnosis? An international study of primary care in 12 countries or regions has shown that in New Zealand it is more difficult and takes more time for general practitioners to get diagnostic tests done or to get a specialist opinion for a patient with suspected cancer.<sup>9</sup> For example, 45% of New Zealand general practitioners reported that they could get a referral for a suspected cancer patient within 48 hours, compared to 57% in other countries; average times for a colonoscopy were 9.5 weeks in New Zealand, compared to 7 weeks elsewhere.<sup>9</sup>

New Zealand also has higher rates of cancer diagnosed after an emergency department visit, a situation that indicates a failure of normal primary care. In a study of eight selected types of cancers diagnosed in 2012–2017 in 14 jurisdictions, the proportion with emergency presentation was highest in New Zealand.<sup>10</sup> Emergency presentation was strongly associated with high 1-year mortality.

Improving the management of suspected cancer in primary care is a key element in improving cancer care generally. Patients who have private healthcare have more rapid testing and referral in primary care,<sup>9</sup> and where it has been assessed—for example, in breast cancer—patients with private care have better long-term survival.<sup>11</sup>

The management of cancer after diagnosis requires a strong workforce and good resources. A world-wide workforce survey reported 272 cancer cases per “clinical oncologist” in Australia and 525

cases per oncologist in New Zealand;<sup>12</sup> although “oncologist” was defined as a specialist exclusively caring for cancer patients, which will only cover a small portion of the workforce. An Organisation for Economic Co-operation and Development (OECD) report<sup>13</sup> gives data for 2021 on numbers of equipment units per million population, showing lower levels in New Zealand compared to Australia for radiotherapy equipment (28% lower) and CT scanners (35% lower), but no deficit in MRI or mammography. However, the data are derived partially from questionnaires, and may vary in the definitions, in whether private facilities are included and in other ways.

Access to cancer-specific drugs has had more attention. In 2016, there were 89 cancer medicines publicly funded in both countries, with 35 funded only in Australia, and 13 only in New Zealand.<sup>14</sup> An analysis in 2016 by an independent oncologist and authors from Pharmac concluded that most of the cancer drugs only approved in Australia did not deliver clinically meaningful health gains.<sup>14</sup> However, a 2022 report<sup>15</sup> concluded that 18 targeted cancer medicines for 20 indications, available in Australia but not in New Zealand, would be likely to offer substantial clinical benefit.

Most of these things essentially come down to money. Countries with greater total health expenditure per capita have higher relative cancer survival rates.<sup>16</sup> In a 2019 review of 30 developed countries, Australia was ranked fifth in expenditure and second in survival; New Zealand was 15th in health expenditure and 22nd in survival.<sup>16</sup>

If we accept our current level of health expenditure, we could compare ourselves to countries with similar expenditures; however, in the 2019 review we had lower survival rates than the countries closest in total health spending, such as France. We have higher expenditures than the United Kingdom and do a little better in survival rates, but cancer services there are being heavily criticised at present.<sup>17</sup>

The comparison to Australia is realistic but challenging: Australia has among the best cancer outcomes world-wide, along with the United States, Canada and the Scandinavian countries.<sup>7</sup> But it's a comparison we accept for many other aspects of life. If we could emulate the Australian success rates in cancer treatment, we could reduce deaths in New Zealand by some 11%, over 1,000 deaths per year. To do so would require increased investment in health and improvements in both the primary and secondary healthcare systems.

**COMPETING INTERESTS**

Nil.

**CORRESPONDING AUTHOR INFORMATION**

Mark Elwood: Honorary Professor of Cancer Epidemiology, The University of Auckland and University of Waikato.  
E: mark.elwood@auckland.ac.nz

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/cancer-outcomes-in-new-zealand-and-other-countries-how-are-we-doing>

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# “Closed books”: restrictions to primary healthcare access in Aotearoa New Zealand—reporting results from a survey across general practices

Maite Irurzun-Lopez, Megan Pledger, Nisa Mohan, Mona Jeffreys, Fiona McKenzie, Jacqueline Cumming

## ABSTRACT

**AIM:** In Aotearoa New Zealand, primary care is organised by enrolling patients with a primary care provider. However, the benefits of this arrangement are frustrated when providers “close their books” due to insufficient capacity for new patients. We investigated the extent, evolution and impact of this situation on health access and equity in access to primary healthcare.

**METHOD:** We distributed a survey for general practice personnel in 2022, yielding 227 valid responses. We examined responses across respondents’ practice characteristics, including practice size, rural–urban setting, average co-payments, region and ethnic composition of the catchment population.

**RESULTS:** Most general practices are selectively enrolling their patients. In 2022, only 28% of respondents freely enrolled new people. Since 2019, most respondents (79%) had “closed books” or limited enrolments at some point. The situation worsened between 2019 and 2022, compromising equal opportunity and access in healthcare.

**CONCLUSION:** Restricted enrolment poses a widespread barrier to health access and equity, and it worsened since the beginning of the COVID-19 pandemic. Addressing closed books and limited enrolments in general practice could significantly improve health services’ access and equity. The study aims to inform ongoing health reforms.

Primary healthcare (PHC) is key to improving population health and equity in health.<sup>1,2</sup> Countries organise their health systems in many ways. One of them is to have people associated with a particular primary care provider, so that caring responsibilities are clearly assigned to that provider. This system is followed in Aotearoa New Zealand, and common across countries of the Organisation for Economic Co-operation and Development (OECD).

Although enrolling is optional for both patients and practices in Aotearoa New Zealand, it is also highly incentivised. General practices receive government capitation funding for each person enrolled (rather than being funded on a fee-for-service basis), and people who are enrolled benefit from lower consultation fees, prevention initiatives and more coordinated care. We have demonstrated adverse impacts of non-enrolment on healthcare utilisation and outcomes in earlier work.<sup>3,4</sup>

Practices can, and sometimes do, stop accepting new enrollees; this is commonly referred to in Aotearoa New Zealand as “closing the books”.

Closed books have been experienced before.<sup>5,6</sup> However, we suspect the issue has been aggravated in Aotearoa New Zealand by COVID-19, through an increase in demand for health services and the hindering of recruitment of overseas medical personnel. This would bring extra urgency to the need for addressing the challenge of closed books.

Closed books are a fundamental barrier to improving access to care and reducing health inequities, both key goals of Aotearoa New Zealand’s Primary Health Care Strategy.<sup>7</sup> Accessing and maintaining links with a usual practice or practitioner is instrumental in providing healthcare.<sup>7</sup> This is even more so in Aotearoa New Zealand where PHC practitioners are “gatekeepers” into the rest of the health system, e.g., through referrals for publicly financed prescribed medicines, diagnostic tests and specialist services. When closed books impede this connection to PHC, it makes it more difficult for people to access health services when needed, potentially worsening health outcomes. Lack of access to PHC can also place more pressure on hospital services, such as emergency departments (EDs), when people visit EDs when

they cannot access PHC.

Māori experience poorer access to high-quality healthcare.<sup>8</sup> This contravenes the commitment to equity, as guaranteed through Te Tiriti o Waitangi. Our earlier research showed that about 6% of the Aotearoa New Zealand population was not enrolled in 2019, and that enrolment was lower for some population groups, particularly Māori, young people (15–24 years old) and those living in highly-deprived areas.<sup>3</sup> That research suggested that closed books are a key factor associated with this enrolment gap and with inequities, particularly inequities for Māori.

Previous investigations into closed books are limited in scope,<sup>6,9</sup> failing to identify the evolution of the issue over time or the impact on practices. This research investigates and provides evidence on the extent of general practice personnel's perceptions of closed books and its impact and identifies practice characteristics associated with the issue. The purpose is to better understand how enrolment systems may work to assist the reform of the health and disability system.

## Method

We define closed books as the situation where a general practice is not able to enrol any new patients, and limited enrolment as where they enrol only selected new people.

We developed a cross-sectional survey and refined it based on findings from 12 interviews across primary care stakeholders (interview details to be reported elsewhere, in an email from N Mohan [nivalijo@gmail.com] in February 2024). The call for the survey was distributed through the weekly newsletters of the Royal New Zealand College of General Practitioners (RNZCGP, “e-pulse”, about 5,500 recipients) and the Practice Managers and Administrators Association of New Zealand (PMAANZ, “e-blast”, about 1,000 recipients), inviting members to take the survey. The survey included mostly closed-ended questions, but also some open-ended ones, and was tested before launch with the RNZCGP collaborating team.

The finalised survey contained 31 questions (see Appendix 1) and was open for 7 weeks (22 August to 9 October 2022) and accessed via the Qualtrics online platform. The criteria for being included were: answering from within Aotearoa New Zealand or, if answering from outside, that the respondent gave clear evidence of understanding the national context (e.g., being able to correctly match the PHO to which they belonged

with the correct district health board [DHB], giving meaningful text answers) and engaged with the survey (e.g., they had to answer more than two questions after consenting). This strict level of inclusion became necessary when the survey was completed by numerous respondents from overseas over the course of 10 days.

We asked respondents about their practice characteristics and the ethnic composition of the population served by their practice. We used that information to compare responses across different population profiles and practice characteristics. Practice characteristics included size (number of enrolees), rural–urban setting, average co-payments charged (over or below NZ\$40 for an average adult consultation without any targeted subsidies), ownership model (practice owned by GPs [73%] or by other organisations such as corporates, community groups or government agencies) and Very Low Cost Access practice (VLCA) or non-VLCA. VLCA practices are those whose enrolled population includes at least 50% of Māori, Pacific Peoples, or those living in the highest quintile of the deprivation scale, and they opt to receive higher capitation funding in return for capped patient co-payments. The survey sample size was not sufficient for meaningful breakdown across the 20 DHBs; therefore, we aggregated them into four regions: Northern, Midlands, Central and Southern regions.<sup>10</sup>

Practices were called “ethnically enriched” if respondents reported higher than expected percentages of patients of a particular ethnicity. For Māori and other minority ethnic groups, the threshold percentage was 16%, while for European New Zealanders it was 61%, to reflect the 2018 Census population figures.<sup>11</sup> Practices could be enriched for more than one ethnic grouping.

The responses analysed here were all from closed-ended questions, but some had the option of “other” to allow for responses that were wider than the options given. For the purposes of analyses, these “other” responses were either re-classified into the groups given, put in a new classification category or dropped if they were out of scope. For example, the question on waiting time for a GP appointment gave a number of responses that were longer than the initial categories allowed.

Cross-tabulations were performed of the survey variables. If there were missing values for a question, then those responses were not included in the analysis and the results show the specific number of responses for each survey

variable. As this was an opt-in survey, rather than a sample survey, there is no sampling variance and no confidence intervals. However, as a point of reference, a simple random sample of this size would have a margin of error of 6%.

## Results

### Sample description

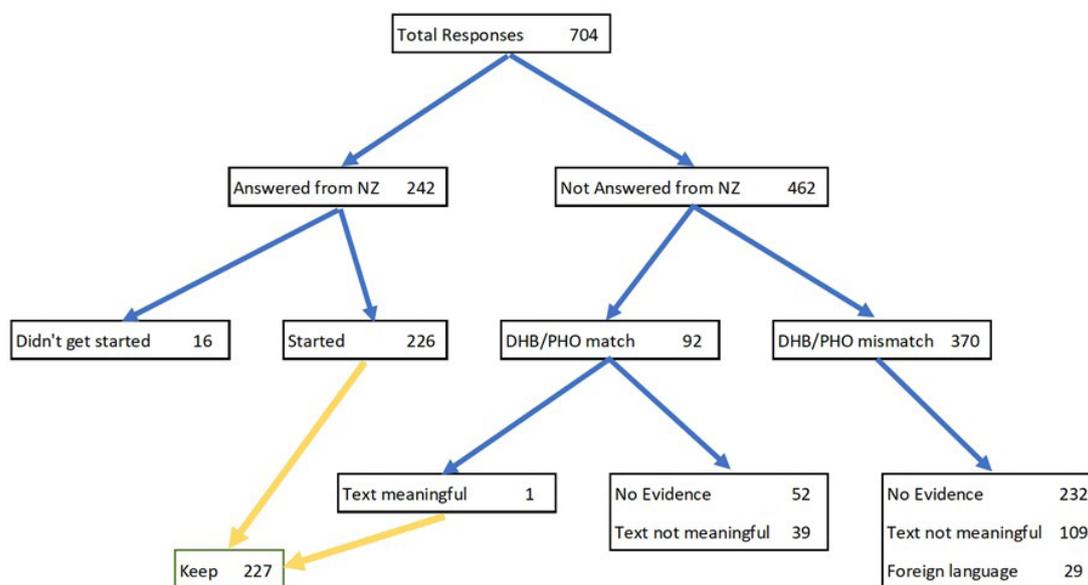
The survey received 704 responses. After examining all the responses to see if they met the inclusion criteria, the final sample was 227 responses (see Figure 1).

Out of the 227 survey respondents, most were Practice Managers (n=119), then general practitioners (GPs, n=85), practice owners (n=52)

and administration/management staff (n=20), some with multiple roles. Assuming the 119 Practice Managers belonged to different practices, the sample covered more than 10% of the approximately 1,070 general practices in the country (Ministry of Health data for June 2022).<sup>12</sup>

Respondents' practices reflected the national practice profile generally. Most respondents were from urban or suburban practices (67%). About 30% of respondents belonged to a VLCA practice. The most common fees for GP consultations for enrolled non-Community Service Card (CSC) adults during standard opening hours were \$41–60 (56%), with more than one third having lower fees (35%) and one tenth having higher (10%).

Figure 1: Survey sample selection.

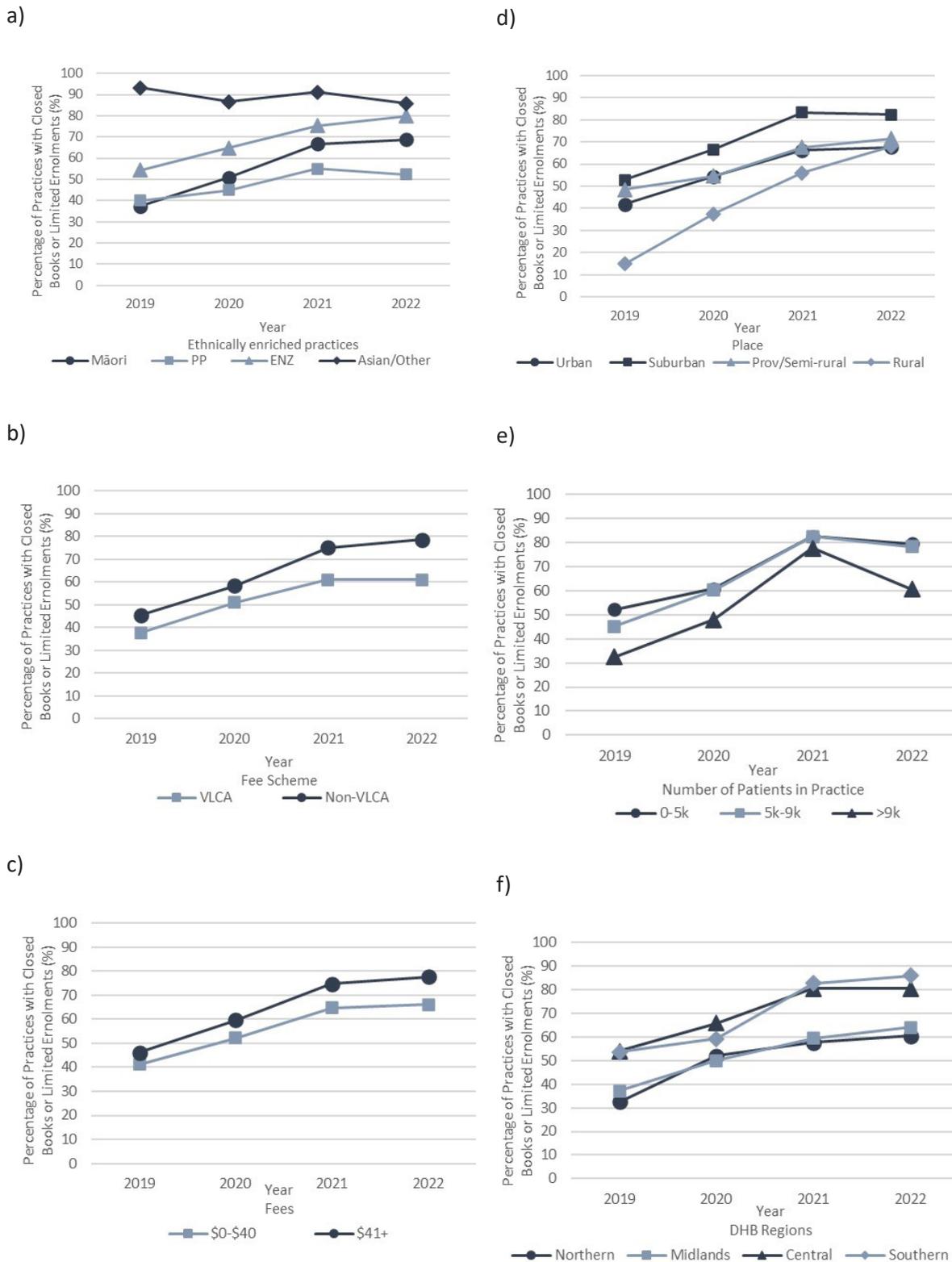


“No evidence” refers to the respondent providing no text responses on which to base a judgement. “Text not meaningful” refers to providing text responses that were either not coherent or not applicable to the Aotearoa New Zealand context.

Table 1: Proportion of practices with closed books and limited enrolment 2019–2022 (n=225 respondents).

	2019	2020	2021	2022
<b>Fully closed</b>	7%	14%	21%	27%
<b>Fully open</b>	57%	44%	31%	28%
<b>Limited enrolment</b>	36%	42%	48%	45%

**Figure 2:** Evolution of closed books/limited enrolment prevalence (%) by a) ethnicity-enriched practices (n=193); b) VLCA status (n=197); c) average consultation fees (n=197); d) urban-rural setting (n=193); e) number of enrolees (n=198); and f) region (n=197).



### How prevalent and persistent are closed books/limited enrolment?

About 79% of respondents reported closed or limited enrolments at some point between 2019 and 2022. Table 1 shows the situation has worsened over time; the proportion of practices with fully closed books in 2022 was nearly four times greater than that in 2019, and the proportion of practices with fully open books in 2022 decreased to about half that in 2019. Results were similar when based on data reported by Practice Managers only (data not shown).

### Which populations/practices are most affected by closed books/limited enrolment?

Figure 2a shows the evolution of the prevalence of closed books or limited enrolments according to the ethnicity-enriched profile. Pacific- and Māori-enriched practices show lower prevalence of closed books or limited enrolments than European New Zealand-enriched practices. Practices with large proportion of Asian/Other ethnicity group had the largest prevalence throughout the period; this decreased slightly over time, although caution is needed as the sample size for this group is small (n=32). We obtained similar results for closed books only (i.e., excluding limited enrolments).

When data were categorised by VLCA status (Figure 2b), non-VLCA practices had a higher prevalence (79% over 61% in 2022), and the difference grew over the period.

Practices charging lower fees (<\$40) had a lower prevalence (66% versus 78% in 2022), and the difference increased slightly (Figure 2c).

By settings, the highest prevalence was found in suburban practices (over 80% in 2021–2022), but it is rural practices where the rates of closed books/limited enrolments grew the most, from 16% to 68% between 2019 and 2022 (Figure 2d).

The largest practices (>9,000 enrolees) were more robust to keeping enrolments open; they had the lowest prevalence of closed books/limited enrolments: 61% compared to 78–79% in smaller practices (Figure 2e).

Central and Southern regions had a larger prevalence than Northern and Midlands (approximately 80% to 60%) (Figure 2f).

We also examined prevalence across ownership models and the prevalence rates were almost identical.

### Impact of closed books/limited enrolment on access to primary care and COVID-19 services

About 63% of respondents reported they did not see unenrolled patients, either at all (45%) or only in exceptional circumstances/emergencies (18%). When seen by a GP, unenrolled patients needed to wait longer for an appointment: unenrolled patients were less likely to have an appointment within a week compared to the enrolled (13% vs 44%) and for same/next day (6% vs 26%). Enrolled patients were also affected by the pressures on general practice. Eight percent of respondents said enrolled patients needed to wait longer than 2 weeks for an appointment, and around 19% added the comment that they operated some form of triage system for enrolled patients who needed urgent care.

Most COVID-19 related services offered to enrolled patients were not offered to unenrolled patients by a large proportion of practices, such as vaccinations (50%), telehealth (32%), eligibility for antivirals (25%), COVID-19 related follow-ups (24%) and free consultations for people with COVID-19 (23%).

## Discussion

### Prevalence and persistency

We have shown that closed books/limited enrolment is a common and increasing barrier to PHC provision in Aotearoa New Zealand. Internationally, Canada reported similarly high rates of about only 20% of GPs/family physicians accepting new patients in early 2000, a situation subsequently targeted by policy reforms introducing new models of care.<sup>13</sup>

The situation in Aotearoa New Zealand has clearly worsened over the last 3 years, as expected given the multiple impacts of the COVID-19 pandemic: a higher demand for services for COVID-19 detection and care and of mental health services,<sup>14</sup> longer times required for consultations under COVID-19 protocols, staff getting sick and border restrictions preventing the inflow of the medical workforce, adding to the already existing shortage of GPs and nurses. Aotearoa New Zealand is highly dependent on overseas health personnel, with around 46% of GPs having been trained overseas.<sup>15</sup> This rate is even higher in rural areas, 56% compared to 39% in main urban areas,<sup>16</sup> which may explain the increases in closed books/limited enrolments in rural areas while

Aotearoa New Zealand's borders were closed due to COVID-19 pandemic restrictions.

The prevalence of closed books in 2022 in the survey (27%) is similar but lower than the prevalence of closed books calculated from administrative data as part of the same study (33% in 2022),<sup>17</sup> and lower than two workforce surveys.<sup>6,18</sup> This is probably because those sources only considered open or closed books, excluding limited enrolments as an option. Considering only open or closed books fails to capture the complexity of the issue and overlooks what emerged as the most common situation in 2021 and 2022: general practices are being selective in accepting new enrollees.

From the provider perspective, having closed books/limited enrolment means that practices are left in the difficult position of having to reject people's applications to enrol. This is likely to add to the existing demoralisation and burnout among health personnel. In an earlier study,<sup>15</sup> nearly a third of RNZCGP members reported being burnt out. We also know that the effects of the COVID-19 pandemic linger in general practice through the effects of delayed presentation, interrupted treatments, increases in demand from those who had COVID-19 and who want more care and increases in demands for mental health consultations, adding to the work of primary care providers.<sup>19,20</sup>

### Populations and practices most affected

Despite initial assumptions that Māori populations would be more affected by closed books, a lower prevalence of closed books/limited enrolments was found in Māori- and Pacific-enriched practices. This counterintuitive finding could be due to regional variations and limitations in classifying Māori- or Pacific-enriched practices. Māori are more likely to live in the Northern and Midlands regions where closed books/limited enrolment are lowest.<sup>17</sup> Besides, a recent study shows that the majority of Māori and Pacific populations in absolute terms are enrolled in practices where they would only make up a small proportion of enrollees, thus not being counted as Māori- or Pacific-enriched practices in our classification.<sup>21</sup> This seems also to suggest that Māori and Pacific populations are less likely to experience barriers to enrolment in Māori and Pacific practices than from traditional practice models. This is congruent with reports on the significant advantages of Māori and Pacific providers in providing health and social care to people with COVID-19.<sup>22</sup>

Similarly, despite higher workforce shortages, rural areas had lower rates of closed books (except in 2022), possibly linked to unique local values and financial sustainability concerns. VLCA and lower fees practices may need to keep their books open to remain financially sustainable, particularly as a result of the extra financial pressures in practices serving patients with high needs.<sup>20,23</sup> These findings underscore the need to carefully monitor healthcare access disparities, especially during times of healthcare reforms, to avoid unintentionally exacerbating inequities.

### Impact on health access and ability to care

Survey data indicate that the unenrolled population typically is not seen by a GP at all or only in exceptional or urgent circumstances/emergencies. When they secure a consultation, they need to wait a longer time for an appointment than those enrolled. Primary care wait times have detrimental consequences on continuity of care and on patients' health outcomes, which are precisely what the enrolment system aims to promote, and leads to higher ED utilisation.<sup>24,25</sup>

A new impact we found is that most COVID-19 services like vaccinations and free COVID-19 consultations are often not available to unenrolled individuals. Similarly, a study in Ontario, Canada, found attachment with a PHC provider increased COVID-19 vaccination uptake: 20% of population attached to a PHC provider were not vaccinated, compared to 40% in the "uncertainly attached" population.<sup>26</sup> Restrictions to accessing COVID-19 services not only compromises basic health rights, but it also weakens the national pandemic response.

From a technical perspective, closed books/limited enrolment undermine the enrolment rate as a valid measure of "access to primary care" currently used by Manatū Hauora – Ministry of Health.<sup>27</sup> This is because people may not be able to enrol in their preferred/closest practice, and, thus, even if enrolled, their practice may not be truly accessible when far away or not a real choice. It is important to identify a more accurate proxy for PHC access, potentially modelled after Ontario's "unattached" population metric.<sup>28</sup>

### Equity implications of limited enrolments

The key finding that most general practices are selecting who they enrol raises questions around what enrolment criteria are used, and how this

selection may further exacerbate existing inequities in health. We know that Māori and Pacific Peoples face barriers in access to care, arising from institutional racism, cultural differences and financial burdens.<sup>1,29,30</sup> Hence, we expect that the selection process for enrolments is also likely to affect those who are already most discriminated against.

Patient selection, also termed “cream skimming” of patients, is often found in primary care for multiple reasons, sometimes even as unintended consequences of well-meaning incentives. In California for example, practices disenrolled noncompliant patients to avoid low marks in clinical indicators used for quality assessments.<sup>30</sup> In Aotearoa New Zealand, there is concern that general practices are not enrolling higher-needs people where capitation formula are seen to not sufficiently compensate the higher costs associated with higher-needs enrolees,<sup>20,23</sup> and this experience is echoed internationally.<sup>31</sup>

The study points at the breach of national enrolment policy: “*No individual is to be refused enrolment on the basis of health status, anticipated need for health service or any form of discrimination*” (p 5).<sup>32</sup> Regular audits of Primary Health Organisations (PHOs) are essential for policy compliance. Various international approaches exist to address this issue: the UK’s Primary Care Trust (currently Integrated Care Boards) could mandate patient acceptance; in Denmark, assigning patients to a practice or GP is an option,<sup>33</sup> and a study in Ontario found centralised wait lists effective.<sup>34</sup>

We recommend investigating fairer patient intake methods.

### Limitations and further research

Our study has limitations, including survey size and self-selection; the survey is likely to be less

representative than population data or random samples. Nonetheless, comparisons with other datasets suggest representativeness.<sup>17</sup> The voluntary nature of the survey may attract respondents with stronger opinions on closed books. Resource constraints limited our focus to GPs and Practice Managers; the study would benefit from wider representation of the PHC workforce, including nurses and nurse practitioners, often under-represented in informing healthcare reforms.<sup>35</sup> In hindsight, additional questions on waiting lists, practice care models and disadvantaged populations could have further enriched our findings.

### Conclusions

This study has explored how limiting new enrolments is a widespread barrier to health access in Aotearoa New Zealand. The problem existed previously but has been exacerbated by the COVID-19 pandemic. The most common situation is that practices select which patients they enrol or not, which adds extra concerns for equity in healthcare.

The study adds to the existing body of evidence on the difficulties and pressures experienced by the PHC sector. We believe tackling the issue of closed books and limited enrolment in general practice would lead to significant improvements in access to health services, ability to care and health equity. We hope these findings will contribute to the re-design of a more equitable health system through the ongoing Health and Disability System Reforms. Lastly, we anticipate the evidence generated will be informative for other countries with enrolment systems who are experiencing GP shortages by identifying ways to promote health outcomes and equity.

**COMPETING INTERESTS**

The authors declare that they have no competing interests. Ethics approval was obtained from Te Herenga Waka—Victoria University of Wellington Human Ethics Committee on May 3, 2022 (Approval 30193). All survey participants consented to the study. This work was funded by the Lottery Health Research Funding (Aotearoa New Zealand) (grant LHR-2022-186638). Additional funds from the Health Services Research Centre, VUW to pay for study participants' token monetary compensation. The Lottery did not have any role in the design, collection, analysis, interpretation of data or writing and submission of manuscript.

**AUTHOR INFORMATION**

Maite Irurzun-Lopez, PhD, MPhil, MSc: Adjunct Research Fellow, Te Hikuwai Rangahau Hauora | Health Services Research Centre, Te Wāhanga Tātai Hauora | Wellington Faculty of Health, Te Herenga Waka—Victoria University of Wellington.

Megan Pledger, PhD, MSc, BSc(Hons): Senior Research Fellow, Te Hikuwai Rangahau Hauora | Health Services Research Centre, Te Wāhanga Tātai Hauora | Wellington Faculty of Health, Te Herenga Waka—Victoria University of Wellington.

Nisa Mohan, PhD: Research Fellow, Te Hikuwai Rangahau Hauora | Health Services Research Centre, Te Wāhanga Tātai Hauora | Wellington Faculty of Health, Te Herenga Waka—Victoria University of Wellington.

Mona Jeffreys, PhD, MSc, BSc(Hons): Adjunct Professor, Te Hikuwai Rangahau Hauora | Health Services Research Centre, Te Wāhanga Tātai Hauora | Wellington Faculty of Health, Te Herenga Waka—Victoria University of Wellington.

Fiona McKenzie, PhD: Senior Research Fellow, Te Hikuwai Rangahau Hauora | Health Services Research Centre, Te Wāhanga Tātai Hauora | Wellington Faculty of Health, Te Herenga Waka—Victoria University of Wellington.

Jacqueline Cumming, PhD, MA: Consultant Advisor, Te Hikuwai Rangahau Hauora | Health Services Research Centre, Te Wāhanga Tātai Hauora | Wellington Faculty of Health, Te Herenga Waka—Victoria University of Wellington.

**CORRESPONDING AUTHOR**

Maite Irurzun-Lopez: Te Hikuwai Rangahau Hauora | Health Services Research Centre, Te Wāhanga Tātai Hauora | Wellington Faculty of Health, Te Herenga Waka—Victoria University of Wellington. Rutherford House, Pipitea Campus, Wellington 6011, New Zealand. Ph: 04 463 6565.  
E: maite.irurzunlopez@vuw.ac.nz.

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/closed-books-restrictions-to-primary-healthcare-access-in-aotearoa-new-zealand-reporting-results-from-a-survey-across-general-practices>

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## Appendix 1: Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

### Start of Block: Information and Consent

Q1 The survey will take only 10–15 minutes to complete. Please read the Information Sheet for survey participants for more details.

Do you consent to take part in this survey? By consenting to take part in this survey you agree to the following: You have read the information sheet for survey participants, You understand that you can contact the research team to ask questions and You understand that your information will be kept confidential.

- Yes (3)

### End of Block: Information and Consent

### Start of Block: Closed books Experience

Q2 What is your role in the practice?

*(If you work in more than one practice, or own more than one practice, please answer all the questions based on the information from the practice that you last worked).*

- GP (1)
- Practice owner (2)
- Practice manager (3)
- Other, please specify (4) \_\_\_\_\_

Q3 Have you closed or limited enrolments any time in your practice since 2019?

*(By **closed enrolment** we mean not able to enrol any new patients in your practice. By **limited enrolment** we mean enrolling only some selected new patients in your practice).*

- Yes (1)
- No (2)
- I don't know (4)

*Skip To: End of Block If Have you closed or limited enrolments any time in your practice since 2019? (By closed enrolment w... = No*

*Skip To: End of Block If Have you closed or limited enrolments any time in your practice since 2019? (By closed enrolment w... = I don't know*

### Page Break

Q4 In which of the following years did your practice have closed or limited enrolments for new enrolees?

	Fully open (1)	Limited enrolment (2)	Fully closed (3)
2019 (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

2020 (35)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2021 (36)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2022 until 10 August (37)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5 Is your practice able to enrol new patients at the moment?

- Yes (2)
- Yes, but limited enrolment (5)
- No (1)

Q6 If you have/had limited enrolment in your practice currently or in the past, how did you decide whether to enrol a patient or not? *Please select all that apply.*

- We enrol those who live or work in close proximity to the practice (1)
- We enrol those who are family members of already enrolled patients (2)
- We enrol those with chronic or long-term health needs (3)
- We enrol those with immediate or acute health needs (4)
- We enrol those with few health needs (5)
- Other (6) \_\_\_\_\_
- Not applicable (7)

Q7 What are/were the reasons for not accepting new enrollees currently or in the past?

*Please select all that apply:*

	Yes (1)	No (2)
Too much workload at the time (14)	<input type="radio"/>	<input type="radio"/>
GP retired (9)	<input type="radio"/>	<input type="radio"/>
GP resigned (10)	<input type="radio"/>	<input type="radio"/>
GP moved overseas (13)	<input type="radio"/>	<input type="radio"/>
Nurse left practice (17)	<input type="radio"/>	<input type="radio"/>
Other staff left practice (18)	<input type="radio"/>	<input type="radio"/>
We couldn't recruit GPs (6)	<input type="radio"/>	<input type="radio"/>
We couldn't recruit nurses (7)	<input type="radio"/>	<input type="radio"/>
We couldn't recruit other staff (8)	<input type="radio"/>	<input type="radio"/>
Inadequate capitation funding (3)	<input type="radio"/>	<input type="radio"/>
Insufficient physical space/consultation rooms (4)	<input type="radio"/>	<input type="radio"/>

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

Impacts of COVID-19 (20)	<input type="radio"/>	<input type="radio"/>
Other (19)	<input type="radio"/>	<input type="radio"/>
Please specify (23)	<input type="radio"/>	<input type="radio"/>

Q8 Did you resolve the issue of closed or limited enrolment in your practice by employing new staff?  
Please select all that apply:

	Yes (1)	No (2)
Employed new GP (6)	<input type="radio"/>	<input type="radio"/>
Employed new nurse (7)	<input type="radio"/>	<input type="radio"/>
Employed new pharmacist (9)	<input type="radio"/>	<input type="radio"/>
Employed new manager (15)	<input type="radio"/>	<input type="radio"/>
Employed more administrative staff (10)	<input type="radio"/>	<input type="radio"/>
Other, please specify (4)	<input type="radio"/>	<input type="radio"/>
The issue of closed or limited enrolment still exists (5)	<input type="radio"/>	<input type="radio"/>
The issue of closed or limited enrolment has been resolved partially (20)	<input type="radio"/>	<input type="radio"/>

Q9 Did you resolve the issue of closed or limited enrolment in your practice by any other changes?  
Please select all that apply:

	Yes (1)	No (2)
Acquired more funding (1)	<input type="radio"/>	<input type="radio"/>
Increased fees (2)	<input type="radio"/>	<input type="radio"/>
Decreased consultation time (3)	<input type="radio"/>	<input type="radio"/>
Offered more telehealth services (4)	<input type="radio"/>	<input type="radio"/>
Developed more space/physical consultation rooms (8)	<input type="radio"/>	<input type="radio"/>

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

Developed alternative work processes to allow more enrolments (9)	<input type="radio"/>	<input type="radio"/>
Rearranged staff work roles (10)	<input type="radio"/>	<input type="radio"/>
Other, please specify (5)	<input type="radio"/>	<input type="radio"/>
The issue of closed or limited enrolment still exists (6)	<input type="radio"/>	<input type="radio"/>
The issue of closed or limited enrolment has been resolved partially (7)	<input type="radio"/>	<input type="radio"/>

Q10 What type of support would your practice need to manage the problem of closed or limited enrolment?

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End of Block: Closed books experience

Start of Block: Practices who have not closed or limited enrolments to new patients

Display This Question:

If Have you closed or limited enrolments any time in your practice since 2019? (By closed enrolment w... = No

Q11 Has your practice put any strategies in place to avoid closed or limited enrolments?

- Yes. If so, what were they (4) \_\_\_\_\_
- No (5)

End of Block: Practices who have not closed or limited enrolments to new patients

Start of Block: Questions for Practice Managers

Q12 In your opinion, which AGE groups may have been **more** affected by closed or limited enrolments in your practice?

*Please select all that apply.*

- 0–17 years old (1)
- 18–24 years old (2)
- 25–49 years old (3)
- 50–64 years old (4)
- 65–75 years old (5)
- 75+ years old (6)
- All groups are equally affected (7)

Q13 In your opinion, which ETHNIC groups may have been **more** affected by closed or limited enrolments in your practice?

*Please select all that apply.*

- Māori (1)
- Pacific Peoples (2)

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

- European New Zealander/Pākehā (4)
- Indian (3)
- Chinese (6)
- Other Asian (10)
- Other (9)
- All groups are equally affected (11)

Q14 In your opinion, which INCOME groups may have been **more** affected by closed or limited enrolments in your practice?

*Please select all that apply.*

- Low income (Up to \$25,000 per annum) (1)
- Below middle income (\$25,001–\$50,000 per annum) (2)
- Above middle income (\$50,001–\$75,000 per annum) (4)
- High income (\$75,001 or more per annum) (3)
- All groups are equally affected (5)
- Patient's income unknown (6)

Q15 In your opinion, which NEEDS groups may have been **more** affected by closed or limited enrolments in your practice?

*Please select all that apply.*

- High needs population (many or complex chronic diseases) (1)
- Moderate needs population (few or easily managed chronic diseases) (2)
- Low needs population (regular check-ups and occasional ailments) (3)
- Very low needs population (occasional ailments) (4)
- All groups are equally affected (5)

End of Block: Questions for Practice Managers

Start of Block: Impact of COVID-19 on patient enrolments

Q16 Has COVID-19 impacted on your practice's capacity to enrol new patients?

- Yes. Please explain how: (1) \_\_\_\_\_
- No (2)

Q17 What COVID-19 related services that you provide to enrolled patients in your practice were inaccessible to unenrolled patients?

	Accessible to unenrolled (1)	Not accessible to unenrolled (2)
Vaccination (1)	<input type="radio"/>	<input type="radio"/>
Telehealth (2)	<input type="radio"/>	<input type="radio"/>
Eligibility for antivirals (4)	<input type="radio"/>	<input type="radio"/>
COVID-19 related follow ups (6)	<input type="radio"/>	<input type="radio"/>

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

Free consultations for people with COVID-19 (7)	<input type="radio"/>	<input type="radio"/>
Other (3)	<input type="radio"/>	<input type="radio"/>

**End of Block: Impact of COVID-19 on patient enrolments****Start of Block: Recommendations**

Q18 What would you recommend to the Ministry of Health and new authorities to address closed or limited enrolments?

*Please select all that apply:*

	Yes (1)	No (2)
Increase the number of GP training practices (15)	<input type="radio"/>	<input type="radio"/>
Recruit more overseas trained GPs (9)	<input type="radio"/>	<input type="radio"/>
Make the registration pathways simple for overseas trained doctors (21)	<input type="radio"/>	<input type="radio"/>
Support pay equity for GPs (20)	<input type="radio"/>	<input type="radio"/>
Increase the number of trainee nurses/nurse practitioners (6)	<input type="radio"/>	<input type="radio"/>
Recruit more nurse/nurse practitioners in practices (13)	<input type="radio"/>	<input type="radio"/>
Support pay equity for primary care nurses compared to hospital nurses (7)	<input type="radio"/>	<input type="radio"/>
Place more medical students in primary care (8)	<input type="radio"/>	<input type="radio"/>
Increase the number of medical students (14)	<input type="radio"/>	<input type="radio"/>
Re-orient the curriculum for medical students (10)	<input type="radio"/>	<input type="radio"/>
Increase the number of health improvement practitioners (19)	<input type="radio"/>	<input type="radio"/>
Employ more staff to support admin work of GPs (5)	<input type="radio"/>	<input type="radio"/>
Provide more funding for primary care (17)	<input type="radio"/>	<input type="radio"/>
Provide more government investment in building/resource (18)	<input type="radio"/>	<input type="radio"/>
Provide more software support to do admin work of GPs and practices (11)	<input type="radio"/>	<input type="radio"/>
Provide more telehealth support and infrastructure (16)	<input type="radio"/>	<input type="radio"/>
Other (12)	<input type="radio"/>	<input type="radio"/>

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

Q19 Do you have any other comments/thoughts about closed or limited enrolments?

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End of Block: Recommendations

Start of Block: Practice Profile

Q20 Former DHB your practice belonged to:

*(Please select from the list)*

- Auckland DHB (4) ... Whanganui DHB (23)

Q21 PHO your practice belongs to:

*(Please select from the list)*

- Alliance Health Plus Trust (4) ... Other (34)

Q22 What type of population does your practice typically serve?

*Your answer to this question doesn't need to be based on your eligibility for rural funding support.*

- Urban (1)
- Suburban (4)
- Provincial (5)
- Semi-rural (6)
- Rural (2)
- Other, please specify (3) \_\_\_\_\_

Q23 How many patients are enrolled in your practice?

- Up to and including 3,000 (1)
- 3,001–5,000 (2)
- 5,001–7,000 (3)
- 7,001–9,000 (5)
- 9,001–11,000 (6)
- 11,001–13,000 (7)
- 13,001–15,000 (8)
- 15,001 or more (9)

Q24 How many GPs work in your practice?

- 1 (8)
- 2 (11)
- 3 (12)
- 4 (13)
- 5 (14)
- 6 (15)
- More than 6, please specify the number (10) \_\_\_\_\_

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

Q25 How many FTE GPs work in your practice?

- 1 (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - More than 6, please specify the number (7) \_\_\_\_\_
- 

Q26 What is the ownership model of your practice?

- GP owned (1)
  - Community owned or owned by a charity or trust (2)
  - Fully or partially corporate owned (3)
  - Fully or partially owned by a PHO or a GP organization (4)
  - Fully or partially owned by a DHB (5)
  - Fully or partially owned by an iwi (6)
  - Owned by a university (7)
  - Other, specify (8) \_\_\_\_\_
- 

Q27 Is your practice:

- VLCA (1)
  - Non-VLCA (2)
- 

Q28 What is the fee for a standard GP consultation in your practice for an enrolled non-Community Service Card holding adult (18–64 years) during standard opening hours?

- Free (1)
  - Up to \$20 (2)
  - \$21–\$40 (3)
  - \$41–\$60 (4)
  - \$61–\$74 (5)
  - \$75–\$89 (6)
  - More than \$90 (7)
- 

Q29 How soon can a typical ENROLLED patient get an appointment with a GP in your practice?

- Usually the same day/next day (1)
  - Usually within a week (2)
  - Usually more than a week (3)
  - We have walk-in consultations only (4)
  - Other (5) \_\_\_\_\_
- 

Q30 How soon can a NON-ENROLLED patient get an appointment with a GP in your practice?

- Usually the same day/next day (1)
  - Usually within a week (2)
-

**Appendix 1 (continued):** Survey about closed books or limited enrolments in primary care in Aotearoa New Zealand

- Usually more than a week (3)
- We have walk-in consultations only (4)
- Other (5) \_\_\_\_\_

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Q31 What is the ethnicity profile of the population served by your practice?

	0–15% (1)	16–30% (2)	31–60% (3)	61–100% (4)
Māori (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pacific Peoples (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
European New Zealander/ Pākehā (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indian (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chinese (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle Eastern (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Latin American (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
African (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Practice Profile

Start of Block: Prize Draw

Q32 Would you like to enter into the prize draw or receive summary of the findings?

*If you select yes, you will be directed to a separate site where you can enter your contact details. You will have a chance to win a \$100 voucher as a token of appreciation for your time. None of those identification details will be linked to the answers you have provided for the survey questions.*

- Yes (25)
- No (24)

End of Block: Prize Draw

# A retrospective cohort study of incidental abdominal aortic aneurysms on routine abdominal computed tomography scans in Te Tairāwhiti (2018–2019)

Rachel Kee, Kari Clifford, Jay Maloney, Atareta Mangu, Justin Cain, Sameer Memon, Jamie-Lee Rahiri

## ABSTRACT

**AIM:** Ruptured abdominal aortic aneurysm (rAAA) is associated with a high mortality rate which, is especially significant in rural and provincial regions. In Aotearoa New Zealand, Māori experience higher rates of AAA and worse overall medium-term survival following AAA repair. This study aimed to understand the prevalence of incidental AAA on routine abdominal computed tomography (CT) scans over 12 months.

**METHOD:** A retrospective review of all abdominal CT scans performed on patients  $\geq 50$  years at Gisborne Hospital between 1 December 2018–1 December 2019 was performed.

**RESULTS:** A total of 811 scans were reviewed, with 42 incidental AAA detected (5.2%). The majority of incidental AAA were in males aged  $\geq 65$  (65.8%), with a higher prevalence for Māori compared to New Zealand European (NZE) (16.2% vs 8.1%,  $p=0.052$ ). This pattern was also seen in females, aged  $\geq 65$  (10.9% in Māori vs 3.8% in NZE,  $p=0.047$ ).

**CONCLUSION:** The detection of AAA on routine abdominal CT scans appears to be a useful adjunct in lieu of targeted AAA screening in our region. A high prevalence of incidental AAA (5.2%) over 12 months, with a significantly higher prevalence noted in Māori males and females  $\geq 65$  years (16.2% and 10.9%), was observed.

Ruptured abdominal aortic aneurysm (rAAA) is associated with a very high mortality rate, which is especially significant in rural and provincial centres where vascular surgical resources are scarce.<sup>1</sup> In Aotearoa New Zealand, it has been reported that Māori experience higher rates of AAA and worse overall medium-term survival following AAA repair.<sup>2–4</sup> Importantly, the majority of studies investigating disparities in AAA prevalence and outcomes following surgical repair for Māori have not yet examined the potential structural issues that may contribute to these ongoing differences.<sup>3,5,6</sup> A pilot AAA screening programme for Māori was performed in the Waitemata and Auckland regions, where Māori comprise approximately 10% of the population in both catchment areas.<sup>2,7</sup> In this pilot study, 2,503 Māori patients were screened, with age-standardised prevalence rates of AAA detected for 3.8% of Māori men and 1.5% for Māori women. Aside from this pilot, targeted screening for AAA has not yet been instituted in Aotearoa New Zealand.

Screening programmes for AAA remain controversial and have been discussed at length in the literature.<sup>8,9</sup> Countries such as the United Kingdom (UK) and Sweden have introduced targeted ultrasound (USS) based screening programmes in patients at increased risk of AAA.<sup>10,11</sup> The United States has also recommended that one-time USS screening for AAA be performed in men aged between 65–75.<sup>12</sup> While Aotearoa New Zealand does not have a national AAA screening programme, it is recommended that opportunistic screening in those at increased risk should be considered; however, this target group is not well-defined.<sup>13</sup> Aside from the obvious fiscal challenges presented when establishing and maintaining a screening programme, Chan et al. (2019) notes that evaluations of AAA screening programmes appear to focus largely on case detection and process measures, without linkage studies examining the possible impacts of a AAA screening programme on overall mortality at a population level.<sup>9</sup> This sentiment has seen recent growth in epidemiological studies reporting the

prevalence of AAA in Aotearoa New Zealand.

Two studies in Aotearoa New Zealand have examined the use of computed tomography (CT) to identify a AAA cohort for surveillance.<sup>14,15</sup> However, the use of CT for AAA screening is neither cost-effective nor feasible in Aotearoa New Zealand. Where there is high clinical suspicion of AAA among New Zealanders, it is most important that healthcare providers factor in that Māori experience AAA rupture at earlier ages, with a standardised mortality rate double that of NZ Europeans (NZE).<sup>3,6</sup>

Te Tairāwhiti (the East Coast) extends from the south border of Te Urewera to the Wharerātā Hills, north of Wairoa, encompassing the iwi boundaries of Ngāti Porou, Rongowhakaata, Ngāi Tāmanuhiri, Te Aitanga-ā-Māhaki and Te Wairoa Iwi and Hapū (Figure 1).<sup>16</sup> Māori comprise 53.5% of the population in Te Tairāwhiti, and thus far no local investigation into AAA prevalence has been conducted.<sup>17</sup> Additionally, Te Tairāwhiti is geographically isolated from its tertiary provider (Te Whatu Ora Waikato), with both inpatient and outpatient vascular services provided out of district, further compromising the outcomes of an acute rupture. As an initial inquiry in Te

Tairāwhiti, this study aimed to assess the prevalence of incidental AAA on routine abdominal CT scans performed acutely and electively in Te Tairāwhiti.

## Methods

### Context

Te Whatu Ora Tairāwhiti provides public secondary hospital services to Te Tairāwhiti, serving a population of 49,100. Approximately half of the population identifies as Māori, and two thirds of the population (65%) in Te Tairāwhiti live in areas of high deprivation.<sup>17</sup> As such, health outcomes for the people of Te Tairāwhiti reflect some of the poorest in Aotearoa New Zealand with minimal understanding of equity in access to surgical services in Te Tairāwhiti.<sup>18,19</sup> The Department of Surgery of Te Whatu Ora Tairāwhiti is based at Gisborne Hospital, a rural hospital of 110 beds, providing General Surgical, Orthopaedics and Otorhinolaryngology (Ear, Nose and Throat) surgical services. With no vascular surgeons in Te Tairāwhiti, minimal vascular surgical services are able to be provided in Te Tairāwhiti. Where patients require major acute or elective vascular

**Figure 1:** Iwi boundaries of Te Tairāwhiti (acquired from Te Puni Kōkiri).<sup>16</sup>



surgical care, on-referral to Waikato Hospital, a tertiary centre 377 kilometres away, is necessitated. Urgent patient transfers to Waikato Hospital are provided by a local flight team.

### Design and participants

A retrospective cohort review of all routine abdominal CT scans performed on patients at Te Whatu Ora Tairāwhiti between 1 December 2018–1 December 2019 was performed in line with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist and guidelines. The eligible population included patients aged  $\geq 50$  years who had an abdominal CT scan performed at Gisborne Hospital over the previously defined study period. Eligible patient national health index (NHI) numbers were identified by a local hospital data analyst and retrieved from the picture archiving and communication system (PACS). Exclusion criteria included abdominal CT scans ordered for planning of AAA management and follow-up, abdominal CT scans of poor image quality and abdominal CT scans where the infrarenal aorta was not entirely visualised. Patients who had multiple scans during the time period were analysed at the point of their last scan during the time period. This study was approved by the Hauora Tairāwhiti Ethics Committee (2020/Memon).

### Variables

Data were collected with the key variables of interest being patient demographics (age, sex, comorbidities and ethnicity), indication for abdominal CT scan and AAA diameter. The slice of each CT scan demonstrating the largest maximum diameter of the infrarenal aorta on the axial plane was visually identified on PACS and thrice magnified in the field of view. These slices were measured using the electronic callipers tool. All measurements were taken from the outer adventitia to the directly opposite outer adventitia, with the line of measurement passing through the centre of the aortic lumen. All eligible scans were measured on PACS first by one author (RK) and then again by a second author (JM) to ensure accuracy. These measurements were analysed for inter-observer consistency with a Bland–Altman plot comparing aortic measurements. Infrarenal aortas with measured diameters  $\geq 30$ mm were diagnosed with an AAA.<sup>13</sup> Where disagreement between the two measurers occurred, on aortic measurement  $\geq 10$ mm or at the 30mm cut-off for a AAA, adjudication by a third measurer (SM) was employed.

Accompanying radiologist reports were also analysed to determine if AAA were reported, and whether appropriate recommendations were made for ongoing surveillance and referral. Clinical records for patients with an incidental AAA were reviewed by a consultant general surgeon (SM) regarding clinical relevance. The diagnosis of an AAA was deemed clinically irrelevant if a patient was thought not to benefit from surveillance or be a suitable candidate for surgical intervention. This occurred in the context of advanced age, frailty, multiple comorbidities and metastatic disease. Data were last collected 11 August 2023 and patient outcomes reported retrospectively (i.e., deceased and cause for death).

### Statistical analyses

Descriptive statistics were collated, and Wilcoxon Rank-Sum tests or Student's *t*-Tests were used to compare continuous variables between demographic groups, with Fisher's *t*-Tests and Chi-squared tests used for categorical data. The association between age and incidence of axial AAA was analysed using logistic regression. Analysis was performed in R (4.0.0) and JASP (0.16.2). Results were considered significant at  $p < 0.050$ .

### Responsiveness to Māori

This research was performed in accordance with the Te Ao Māori Framework to ensure a non-deficit and anti-racist approach to research involving Māori and, specifically, Māori data.<sup>20</sup> Given that Māori comprise nearly half the population of Te Tairāwhiti and that recent research has reported that Māori experience higher prevalence of AAA and higher rates of mortality after AAA repair, it was important that this study had local Māori oversight (J-LR and AM) to ensure that this research is responsive to Māori from and residing in Te Tairāwhiti.<sup>21</sup>

## Results

### Eligible patient cohort demographics

A total of 1,100 abdominal CT scans were performed in patients  $\geq 50$  years at Gisborne Hospital over the study period. Figure 2 shows the flow of patients from the eligible population through to the final number of patients included and excluded in this study. The final eligible cohort consisted of 811 patients, with a median age of 68 years (range 50–99) at the time of scanning. This cohort was predominantly male (52.3%) and NZE (62.6%), with a mean (sd) axial aortic diameter

of 22.2(4.5)mm (range 13.3–100.2). Furthermore, four patients were admitted with a ruptured AAA over the study period, with one transferred to Waikato for AAA repair and the remaining patients palliated at Gisborne Hospital.

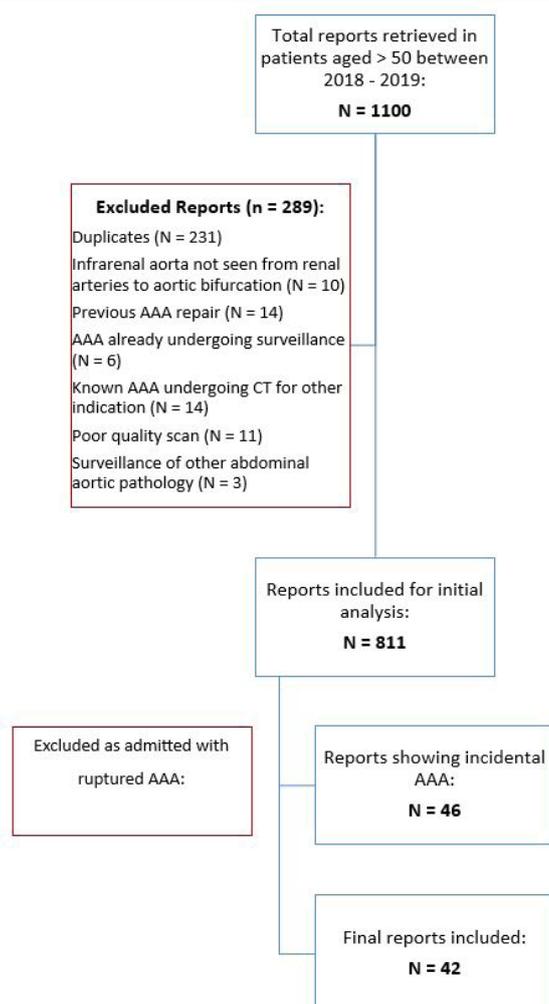
### Incidental AAA patient demographics and outcomes

Incidental AAA were detected in 42 patients via CT imaging, yielding a total prevalence of 5.2%. The prevalence was higher in males, in comparison to females (7.1% cf 3.1%  $p=0.011$ ), and for every year of age increased by 4%, OR (95% CI) 1.04 (1.00, 1.09),  $p=0.024$ . Abdominal CT scans requested for acute indications were also noted to have significantly higher rates of AAA compared to elective CT scans (8.2% cf 3.5%  $p=0.004$ ). Most patients were males aged  $\geq 65$  (69.2%), with

Māori experiencing a higher prevalence than NZE patients (16.2% cf 8.1%  $p=0.052$ ). Similarly, a significantly larger proportion of Māori females aged  $\geq 65$  were diagnosed with incidental AAA compared to their NZE counterparts (10.9% cf 3.8%  $p=0.047$ ). Over 55% ( $N=23$ ) of patients resided in areas of high deprivation (New Zealand Index of Deprivation [NZDep] 2018 score 8–10) and eight patients lived rurally, with an average distance of 155km from Gisborne Hospital.

Thirteen (30.9%) patients had their incidental AAA reported in the final report. This was associated with size, as all AAA  $>40$ mm were reported by radiologists, but only 9.3% of AAA measuring 30–40mm were reported ( $p<0.001$ ). There was no significant difference in AAA reporting rates for gender, age, ethnicity and acuity. Upon review of patients' clinical records, 18/42 (43%) were deemed

**Figure 2:** Flowchart of incidental AAA diagnosed in Te Tairāwhiti (2018–2019).



to be clinically relevant. The identification of an AAA in the remaining 24 patients was considered not to confer a clinical benefit primarily due to advanced age (37.5%) and multiple comorbidities (42.7%). This appeared to be affirmed by the high number of deaths observed over the next 4 years due to non-AAA related events.

### Inter-observer measurement bias

Diagnostic accuracy between the two measurers was confirmed with an acceptable  $\kappa$  index statistic of 0.91 and a Bland–Altman plot demonstrating that the majority of measures lay within the 95% confidence intervals.

## Discussion

This study presents an initial inquiry into the prevalence of incidental AAA in Te Tairāwhiti for patients presenting for routine abdominal CT scans. Of 811 abdominal CT scans that met the criteria for inclusion in our study, 42 patients had an incidental AAA, conferring an overall prevalence of 5.2% in our 12-month study period. In this period, four patients presented with a ruptured AAA, with one patient transferred to Waikato Hospital

for surgical intervention. This specific study arose due to our observation of recent studies examining the prevalence of AAA, opportunistic screening and outcomes following AAA repair for Māori. As Te Tairāwhiti has the highest proportion of Māori residing in this region, we wanted to investigate incidental AAA detection on routine abdominal CT scans over a 12-month period.

Population-based studies reporting the prevalence of AAA in Māori remain scarce. However, epidemiologic studies of AAA hospitalisation and mortality have reported that Māori experience higher rates of AAA hospitalisation and mortality compared to NZE people in Aotearoa New Zealand.<sup>3,5,6,22</sup> Sandiford et al. (2019) measured population prevalence of AAA in Māori men and women in the Auckland Region and reported a high prevalence of undetected AAA among Māori, with men experiencing rates 2–3 times higher than current prevalence rates in screened male European white populations in the UK and Sweden.<sup>2</sup> Our study revealed an overall incidental AAA rate of 5.2%, which was higher than the aforementioned study. In addition, Māori experience hospitalisation for AAA at 1.5 times that of NZE patients, with an age-standardised mortality

**Table 1:** Initial eligible patient demographics.

Characteristic	Total (N)	Prevalence of AAA, N (%)
<b>Sex</b>		
Male	424	30 (7.1)
Female	387	12 (3.1)
<b>Ethnicity</b>		
NZE	508	24 (4.7)
Māori	285	18 (6.3)
Other	18	0
<b>Acuity of CT scan</b>		
Elective	518	18 (3.5)
Acute	293	24 (8.2)
<b>Age</b>		
<65	329	3 (0.9)
≥65	482	39 (8.1)

**Table 2:** Incidental AAA patient characteristics and outcomes at 4 years.

	AAA Size		
	30–40mm	40–50mm	>50mm
<b>Total incidental AAA, N (%)</b>	36 (86%)	5 (12%)	1 (2%)
<b>Reported by radiologist (%)</b>	4 (9.4%)	5 (100%)	1 (100%)
<b>Acuity of scan</b>			
Acute	18	1	1
Outpatient	18	4	0
<b>Gender, N (%)</b>			
Female	11	2	0
Male	25	3	1
<b>Ethnicity, N (%)</b>			
NZE	22	3	0
Māori	14	2	1
<b>Comorbidities</b>			
HTN	26	4	1
T2DM	10	-	-
Hyperlipidaemia	17	2	-
<b>CCI score</b>			
Mean (range)	6 (2–14)	5 (3–6)	6 (6)
<b>NZDep2018 score,* N</b>			
1–4	7	-	-
5–7	8	4	-
8–10	21	1	1
<b>Rurality</b>			
Rural	6	2	-
Mean (range) distance from Gisborne Hospital (km)	38 (0.5–271)	15.4 (1.8–132)	5.8 (5.8)
<b>Ever smoked</b>			
Yes	28	3	-
No	8	2	1

**Table 2 (continued):** Incidental AAA patient characteristics and outcomes at 4 years.

<b>Median follow-up time from CT scan (years)</b>	4.2	4.3	3.7
<b>Mortality outcomes</b>			
Deceased	17	3	1
AAA-related cause of death	-	-	-
<b>Surveillance</b>			
Active surveillance	1	2	-
Referred to vascular Waikato	2	1	-
Not under surveillance before institution of referral pathway in 2020	24	-	-

\*NZDep2018, deprivation score where 10 = high deprivation and 1 = low deprivation.

AAA = acute aortic aneurysm; CCI = Charlson Comorbidity Index; HTN = hypertension; T2DM = type 2 diabetes mellitus; NZE = New Zealand European.

rate approximately double that of NZE patients.<sup>3</sup> Khashram et al. (2017) showed that Māori had higher rates of deprivation (low socio-economic status), but regardless of this, Māori still had worse overall medium-term survival following AAA repair.<sup>4</sup> This study further showed that socio-economic status and Māori ethnicity were markers of increased exposure to risk that negatively impact upon survival after AAA repair. These dire statistics that face Māori in terms of prevalence of AAA and perioperative mortality, accompanied with a higher rate of incidental AAA on routine abdominal CT scans, support the need for early intervention and screening for AAA. This is especially indicated in Te Tairāwhiti, where Māori comprise more than half of the population and rates of socio-economic deprivation are among the highest in Aotearoa New Zealand.

Regarding opportunistic CT measurement of AAA, one study reported an AAA prevalence of 5.8% in routine abdominal CT scans in people aged  $\geq 50$ , and the second reported a prevalence of 6.1% in CT colonography for men aged  $\geq 55$ .<sup>14,15</sup> The AAA prevalence for all patients in this study was also higher than that in targeted screening programmes. An AAA prevalence of 4.4% was reported in Aotearoa New Zealand patients aged  $\geq 50$  years with increased cardiovascular risk, while the prevalence in the UK's national screening programme was 1.2%.<sup>23,24</sup> The higher prevalence

in our study may be partially explained by the inclusion of patients that had a symptomatic AAA as the reason for their CT, as detection of an AAA in these cases is not incidental. However, the majority of AAA in this study were incidental (90.5%) and unrelated to the primary diagnosis. A higher prevalence of AAA in Māori men and women aged  $\geq 65$  years compared to NZE patients was observed. In Te Tairāwhiti alone, the use of CTs has increased 46% since 2015, with similar findings in other Aotearoa New Zealand hospitals.<sup>14</sup> The increasing numbers of CT scans being performed will continue to improve the utility of CT for detection of incidental AAA. Opportunistic detection of AAA on CT as a method of population screening has several advantages. Firstly, it focusses on at-risk cohorts not traditionally targeted by screening programmes, such as females, who are often thought to be low risk.<sup>25</sup> Our study demonstrated a 3.1% prevalence of AAA in females, which is higher than rates of AAA in most targeted screening programmes, with rates of prevalence ranging from 0.7–1.8%.<sup>25,26</sup>

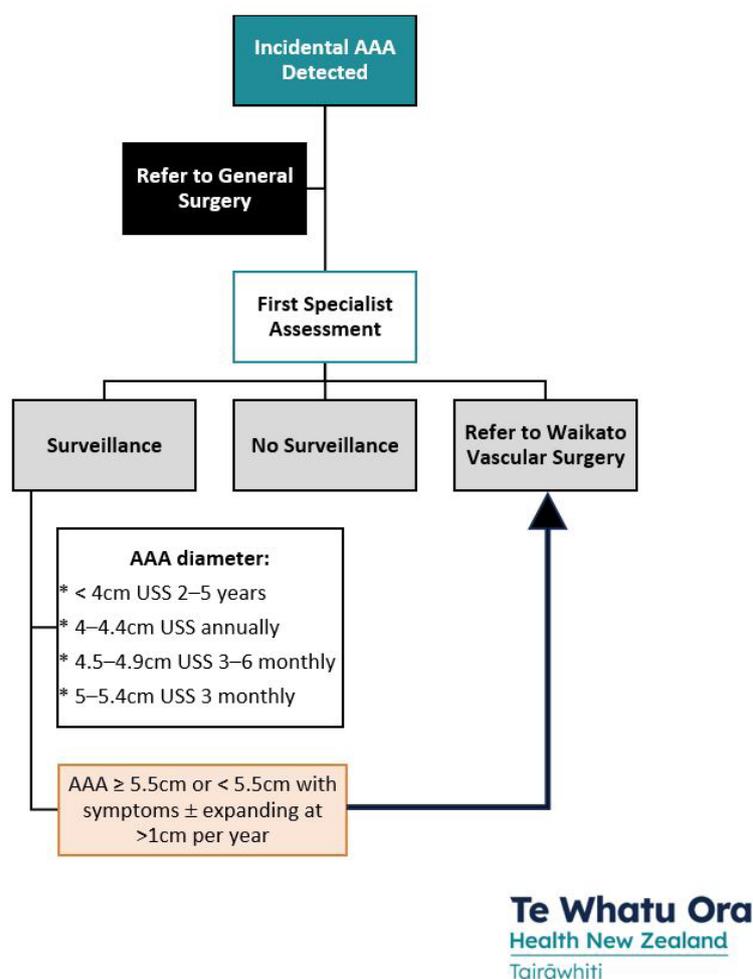
Perhaps the most notable finding in our study was the high prevalence of AAA in Māori women  $\geq 65$  years (10.9%). This is relevant in the context of female AAA outcomes, with research demonstrating a faster growth rate and three times greater likelihood of fatal rupture in comparison to males.<sup>25</sup> Another advantage of this method of AAA

identification is the economy of resources in implementation. Due to its opportunistic nature, no recruitment or imaging costs are required. In addition, it does not rely on high patient adherence to implement, which is often a major barrier to the success of screening programmes. In order to optimise identification of AAA on routine abdominal CTs, improvements in reporting AAA are needed. Although AAA  $\geq 40\text{mm}$  were reliably read, 90.3% of AAA  $< 40\text{mm}$  were not reported. This was likely due to the large number of small borderline aneurysms around the cut-off of 30mm. The reliance on visual recognition of enlarged aortas to prompt measuring of the aorta with electronic callipers likely accounted for the majority of these overlooked AAA. As suggested by others, we recommend a lower size threshold for visual recognition prompting earlier use of electronic callipers for objective measurement.<sup>14</sup> In the future, computerised reporting of CT scans and synoptic reporting

may increase the incidental diagnosis of AAA. In addition, a greater awareness of the 30mm cut-off defining an AAA and defined institutional pathways to clarify responsibility for ongoing management are required to facilitate ongoing surveillance.

There are several limitations to this study. Firstly, the retrospective design, as well as the limited 12-month period of observation, considerably limits the strength of this study. The purpose of this study was to inspect and amend our local processes in regard to incidental AAA diagnoses and how they are managed in Te Tairāwhiti. We also acknowledge that the implications of detecting AAA in patients are far more complex than deciding if they will benefit from repair by reviewing the medical records, and that patients with aneurysms should have their risk factors and cardiovascular assessment performed. Lastly, we acknowledge that we have utilised the traditional

**Figure 3:** Incidental AAA referral pathway Te Tairāwhiti.<sup>27</sup>



size criteria for diagnosis and treatment of AAA and note that others have suggested these criteria be revisited, particularly for females.<sup>25</sup>

In conclusion, the detection of AAA on routine abdominal CT scans appears to be a useful alternative or adjunct in lieu of targeted AAA screening in our region. This study revealed a high prevalence of incidental AAA in the Te Tairāwhiti population (5.2%) over 12 months, with a significantly higher prevalence noted in Māori males and females ≥65 years (16.2% and 10.9%) compared to their NZE counterparts (8.1% and 3.8%). Given the findings

of this study, and that our people in Te Tairāwhiti face some of the highest levels of deprivation, as well as having the highest proportion of Māori in Aotearoa New Zealand, we have advocated for and established a formal referral pathway for patients who have incidental AAA diagnoses made on routine imaging for other indications (Figure 3). Alongside this pathway, we advocate for formal AAA screening to be undertaken in our region for the same reasons our incidental AAA referral pathway was instituted.

**COMPETING INTERESTS**

Nil.

**AUTHOR INFORMATION**

Rachel Kee: Department of Surgery, Te Whatu Ora Tairāwhiti, Gisborne, New Zealand.

Kari Clifford: Department of Surgical Sciences, Dunedin School of Medicine, University of Otago, New Zealand.

Jay Maloney: Department of Surgery, Te Whatu Ora Tairāwhiti, Gisborne, New Zealand.

Atareta Mangu: Whānau Engagement Manager, Te Puni Kōkiri Ikaroa-Rāwhiti, Gisborne.

Justin Cain: Department of Vascular, Endovascular and Transplant Surgery, Te Whatu Ora Capital, Coast and Hutt Valley.

Sameer Memon: Department of Surgery, Te Whatu Ora Tairāwhiti, Gisborne, New Zealand.

Jamie-Lee Rahiri: Department of Surgery, Te Whatu Ora Tairāwhiti, Gisborne, New Zealand; Te Piringa Kōtuku Research, Tuhauora Medical Associates, Auckland, New Zealand.

**CORRESPONDING AUTHOR**

Dr Jamie-Lee Rahiri: Department of Surgery, Te Whatu Ora Tairāwhiti, 421 Ormond Road, Lytton West, Gisborne 4010, New Zealand.

E: JamieLee.Tuhoe@tdh.org.nz

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/a-retrospective-cohort-study-of-incident-abdominal-aortic-aneurysms-on-routine-abdominal-computed-tomography-scans-in-te-tairawhiti-2018-2019>

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# “I lost my first tooth here”: Syrian former refugees’ experiences of oral healthcare in Dunedin, New Zealand

Zeina Al Naasan, Jonathan M Broadbent, Warwick J Duncan, Moira B Smith

## ABSTRACT

**AIM:** Oral health conditions are highly prevalent among former refugees; however, little is known about their experiences of accessing dental care. We aimed to explore Syrian former refugees’ experiences of oral healthcare in New Zealand.

**METHOD:** Thirty-nine Syrian former refugees resettled in Dunedin, New Zealand participated in nine focus group discussions. The interviews were audio-recorded, transcribed verbatim and thematically analysed.

**RESULTS:** Almost all participants reported motivation to care for their teeth but multiple factors facilitated or hindered their ability to address their oral health needs, including financial factors, communication issues and dental care provider cultural safety. Most participants arrived with high expectations of New Zealand’s health system.

**CONCLUSION:** Oral healthcare providers and policymakers need to expect and accept their patients’ past experiences and emotions, and consider their cultures, languages and backgrounds.

The high prevalence of oral health conditions among former refugees considerably affects their quality of life.<sup>1-4</sup> Former refugees face substantial—and unique—obstacles when accessing oral healthcare services and this can persist for years following resettlement. Moreover, traumatic events refugees experience can cause ongoing stress, further contributing to avoidance of oral healthcare. Their access to oral healthcare is also challenged by the lack of familiarity with the host’s healthcare system, and by financial instability, language and cultural barriers.<sup>4,5</sup>

Developing oral healthcare services that are responsive to the needs of former refugees requires understanding of their knowledge, experience and expectations of oral healthcare.<sup>2,6</sup> Prior to December 2022, former refugees were eligible for limited public funding for oral healthcare that was offered to adults on low incomes, including that available for emergency dental care. This was principally for relief of pain—predominantly, tooth extraction. They are also eligible for the government-funded insurance scheme for dental-related injuries. Former refugees also have access to specific financial support for dental treatment. However, it appears that they may not be fully utilising the support available; the reasons remain unexplored.

This study aimed to investigate the experiences

of Syrian former refugees settled in Dunedin, New Zealand in accessing oral healthcare and to determine the factors that enable them to or prevent them from accessing good oral health.

## Methods

This paper presents the findings from a component of a larger mixed-method study<sup>7</sup> and analyses the participants’ experiences of using oral healthcare services in New Zealand.

Former Syrian refugees aged 18 and over who had arrived in Dunedin, New Zealand since 2016 were recruited through organisations that provide services for former refugees, as well as through snowball sampling. Those interested were provided with an information sheet and a consent form. Recruitment for the focus groups stopped when no new themes emerged in discussions (theoretical saturation).<sup>8</sup>

In total, nine focus group discussions of about 1-hour durations were held via Zoom™ (Zoom Video Communications Inc., San Jose, California, United States). Interviews took place during New Zealand’s COVID-19 lockdown (25 March to 13 May 2020). Participants were assembled on a family and/or friendship basis and were interviewed in their homes in the Arabic language by an Arabic-speaking dentist.

A semi-structured interview schedule was

designed, informed by a previous study,<sup>2</sup> to gather information on the participants' experiences in accessing dental care in New Zealand. Participants were given multiple opportunities to confirm they reported everything. Interviews were recorded (with permission) using the recording feature in Zoom™ and transcribed verbatim in the Arabic language, and then were translated into English by two native Arabic speakers. Each participant received oral health-care products, sufficient for the whole family for 6 months.

### Data analysis

Transcripts were analysed thematically according to Braun and Clarke.<sup>9</sup> First, the interview recordings were listened to several times, then the English language transcripts were read and coded on an Excel spreadsheet (Microsoft Corporation,

Redmond, Washington, United States). Major themes that emerged from the data were organised in the columns; the data coded for that theme were copied into the relevant column. Two senior members of the research team reviewed data from transcripts, and all three researchers discussed the codes until a consensus was reached.

### Results

There were nine focus groups, each comprised of four or five participants (N=39). Participants were aged from 18–54 years (mean 37 years) and both sexes were equally represented. Most participants (n=19) had arrived in New Zealand in 2016 and 2017 (Table 1). One third of the participants had some level of tertiary education, one third had primary school education and one third had secondary school education. The majority

**Table 1:** Demographic characteristics.

	<b>Males</b> N (%)	<b>Females</b> N (%)
<b>Education</b>		
Primary school education only	4 (25.0)	3 (15.8)
Incomplete high school education	5 (31.3)	5 (26.3)
Completed high school education	0	3 (15.8)
Incomplete tertiary education	6 (37.5)	4 (21.1)
Graduated tertiary education	1 (6.3)	4 (21.1)
Did not answer question	1	3
<b>Employment</b>		
Employed—full-time	6 (40.0)	3 (15.0)
Employed—part-time	2 (13.3)	4 (20.0)
Unemployed	0	3 (15)
Studying	6 (40.0)	8 (40.0)
Disabled	1 (6.7)	2 (10.0)
Did not answer question	2	2
<b>Total</b>	<b>17</b>	<b>22</b>

\* Numbers in brackets denote part-time employment

were in part-time or full-time employment (Table 1).

Nearly all participants had received dental care at the University of Otago School of Dentistry. Almost all participants reported challenges in accessing the care they needed, although a few also reported some positive experiences. Participants' experiences were founded on a range of factors, which could be categorised into two domains—structural and socio-cultural. Some factors were common to both categories and are presented according to “best fit”.

## Structural factors

### Financial

All participants agreed that the high cost of dental treatment in New Zealand was a major barrier to receiving oral healthcare. Many expressed frustration at their inability to afford dental care: for instance, one participant said a *“refugee’s income is barely enough for food.”* (A130) Consequently, participants said they would endure the pain or not seek treatment until it became necessary—for example, *“I suffer a lot. I wait to the end until I go”* (A134)—or would choose cheaper, rather than the ideal but typically more expensive, treatment options.

Paying for dental treatment in instalments or placing deposits were options available at the Faculty of Dentistry to some participants, which they said enabled them to complete their treatment: for example, *“You can install the payments no matter how large the amount is and depending on how much you can pay. This has helped me!”* (A125)

Most participants expressed gratitude for the funding available to support their dental treatment. However, when prompted, many felt that because it was only available for a limited range of services, clinicians only offered them services that matched the available funding rather than what would be consistent with best practice or that were aligned with the participants' wishes:

*“A hole can be fixed with a filling or nerve removal treatment or with a crown. Because there is no time or maybe because it is very expensive, they give you the easiest option, which is extraction for most of the people. You see most of the Syrians have extracted teeth.”* (A157)

To improve support, all participants suggested increasing the amount of support available and ensuring treatment was planned appropriately.

## Language and communication

All participants agreed language differences were a major barrier to accessing dental treatment, particularly for newly arrived refugees. Interpreters were important, even for those who could speak English, as they helped to explain complex dental jargon; for instance, a participant said that *“during treatment, you face medical terminology that you do not understand.”* (A155) However, some participants said interpreters were difficult to get at short notice for urgent appointments, and the consequences were often long waits for care. Further, another participant mentioned that privacy might be compromised with interpreters who might not adequately convey all the information: *“The interpreter does not deliver everything ... they would cut it short.”* (A159)

There were also communication issues with administrative processes. For instance, some reported missing dental appointments owing to an inability to understand the English language reminders: *“You get letters and you do not understand anything. These letters give warnings, for example if you missed the first or second appointment, you’d lose the appointment.”* (A125) One experienced difficulties in completing paperwork prior to receiving dental care: *“Filling out papers and forms to start at dental school can be a little difficult ... I mean, they certainly will need someone to help them.”* (A137) To overcome language barriers, some participants suggested providing printed information, and sending reminder texts and letters in Arabic, or assigning former refugees with Arabic-speaking practitioners, if possible: *“If the letters are translated it would be better.”* (A125)

## Practitioners' cultural competency

The attitudes of attending dental practitioners had an adverse bearing on the oral healthcare experience for many participants. They spoke of feeling undeserving—*“A second-class citizen”* (A144)—or being judged or stereotyped by their practitioner for having poor oral health. Many had received care from a dental practitioner who they believed did not understand the impact of war experiences on their oral health and their specific treatment needs. One participant said:

*“We came after siege for 3 and 4 years we could not go to a dentist and use the toothbrush and there was no toothpaste! I wish they do not judge us in the wrong way that we are people who do not care about the cleanness of our teeth.”* (A124)

Several groups discussed how lack of continuity of practitioner had made it difficult to establish good rapport and a trusting relationship with a dentist: for example, *“The most important thing is to have one dentist so they can understand the patient and the patient would understand them.”* (A132) A few said their experiences—or the experiences of others they had heard about—meant they were reluctant to go to the dentist even if they had pain.

However, some participants attributed having positive experiences to being familiar with their practitioner and having a kind dentist who understood their background, culture and language. They suggested that former refugees *“find a good dentist that understands the pain and the situation that we are going through”* (A131) and that practitioners *“treat them [refugees] just like any other person not as poor and have nothing.”* (A143)

### Processes

While many participants acknowledged that it was easy to arrange urgent dental care, they were frustrated by the difficulty of making appointments for routine or non-urgent dental treatment. Several participants commented on how these delays had resulted in disease progression, requiring urgent care or higher costs, as this participant explained:

*“When you have a small problem like a small hole, they tell you to wait until there is someone available to fix it. By the time they called us, the problem became bigger and the hole as well.”* (A158)

Treatment delays had also impacted several participants’ engagement in the community:

*“I was supposed to get a lower denture and still waiting. You know that this affects the appearance, speech and eating. When one goes out, they feel embarrassed that his teeth look like this.”* (A145)

Difficulties in understanding how to access care was a common discussion topic across the groups: for example, *“Many people who do not know the system in the country here and how to book an appointment.”* (A124) There was agreement among most groups that being better informed about the system was key: *“Once you understand the system it will be easier for treatment.”* (A125)

They suggested that information on accessing oral healthcare should be more readily available

early on as part of the orientation “On-Arrival Programme” all New Zealand quota refugees experience.<sup>10</sup> Some recommended that former refugees should take action themselves: *“Follow up your appointment. If you have not heard anything for a few months, ask them why I didn’t get one.”* (A122)

### Socio-cultural factors

#### Oral health attitudes and behaviours

All participants highly valued their teeth and desired to keep them for as long as possible: *“It is very important for me to keep my teeth ‘til the end of my life.”* (A122) Many participants who were parents also described a desire for their children to have good oral health: for instance, *“Our children need more awareness, so that they don’t do the mistakes we used to do when we were young.”* (A140)

A majority also reported infrequent tooth brushing, not flossing, and consuming sweetened beverages, often despite knowing their harms. Many who were smokers also reported either no intention to quit or an inability to quit. Typical comments included, *“I brush but honestly I do not like floss it is very difficult”* and *“I drink tea, fizzy drinks, and juices. They all have sugar and damage teeth, but I cannot stop it.”* (A125) In addition, many participants had misconceptions about oral health such as smoking harms being alleviated by brushing—*“A smoker has to smoke less or brush their teeth after smoking”* (A124)—or that sugar can be safely replaced with honey: *“We are trying like the honey and similar things. But the other chemical alternatives like sweeteners did not suit us.”* (A123)

#### Previous experiences and expectations

More than half reported having chewing, nutrition or digestion issues that affected their quality of life: *“When I eat, I chew half of the food and the other half gets swallowed.”* (A145) Differences between the New Zealand and Syrian oral health-care systems, such as cost, processes and ease of access to services, were raised in most groups. Previous experiences of oral healthcare in Syria appeared to set up assumptions and expectations among most participants about how the New Zealand oral health system worked.

Typical comments included: *“The system they have differs from that in Syria. Sometimes, I do not understand them.”* (A137)

Settlement in a country with seemingly well-developed systems, including healthcare systems,

also raised the expectations of most participants of the quality of care they would receive. Several participants suggested that they had expected oral healthcare services in New Zealand to be of better quality or more accessible than what they had in Syria. Their expectations may have been further heightened by the promises made to them on their arrival: for example, *“On arrival, dental school will look after your teeth ... they said that Dunedin had the top dental treatment.”* (A134)

### Resettlement challenges

In addition to war and displacement trauma, participants spoke of the resettlement challenges in accessing oral healthcare, such as prioritising essential activities that facilitated their resettlement. This left little—if any—opportunity to attend to their dental problems. For instance, one participant explained, *“Until today I have not been for dental treatment. First, I was busy studying the language and then I started work and I am busy. Otherwise, my teeth need urgent care.”* (A158) Thus, most participants wished their dental treatment had been completed early after their arrival before they started work.

Many participants reported missing their family and the social support they had in Syria, and they often struggled to understand New Zealand’s community values: *“They [dentists] are wonderful when treating people. But we are not from New Zealand so that we would know the system, they should take this into consideration.”* (A122) However, there was general agreement across all groups that local volunteers or friends were a valued key source of information and to understanding how to work through the system, as this participant recounted:

*“I didn’t go to dentist, I stayed in pain for two to three days. I waited until my volunteer came and took us to the dentist.”* (A126)

## Discussion

Former refugees in New Zealand have poor oral health, poor oral health-related quality of life and poor access to care.<sup>1,2,11,12</sup> Consistent with former refugees elsewhere,<sup>3,13–18</sup> structural and socio-cultural factors hindered the participants’ abilities to address their oral health needs.

Communication barriers hamper former refugees’ (including our participants) abilities to access and navigate healthcare systems. Individual

and systemic challenges reduce motivation and proactivity in seeking treatment.<sup>14,18</sup>

Trust between provider and patients is critical to acceptable and accessible healthcare.<sup>19</sup> In addition to a lack of routine care and having to accept tooth loss, study participants recounted the oral health system challenged their access and willingness to engage with services. Supporting the findings of previous studies,<sup>4,17,18</sup> the low level of cultural competence generally displayed by the participants’ oral healthcare providers resulted in sub-optimal experiences. Participants highlighted a dental workforce that lacked the capacity or preparedness to work with former refugees. Further contributing to erosion of trust were participants’ expectations, a lack of continuity of care, the ambiguity of the New Zealand healthcare system and the lack of organisation between services,<sup>20</sup> and a sense of helplessness and a loss of control<sup>21</sup> due to language and financial barriers.

Feelings experienced while resettling in new countries are almost always neglected when talking about former refugees; rather, the focus is usually on past trauma and PTSD manifestations. Nostalgia in particular may belie the participants’ outward feelings of frustration and confusion when trying to address their oral healthcare needs. The findings of this study support recent research<sup>22</sup> that suggests a longing for things past, especially among former refugees who lack resilience, may result in reduced optimism and inspiration. The participants in this study frequently reflected on the Syrian system or highlighted the easiness of navigating it in comparison with the system in New Zealand. In addition, former refugees (including participants in this study) often have unrealistically high expectations of their host country’s health system.<sup>23</sup> Those supporting former refugees in their resettlement, including oral healthcare practitioners, should anticipate and be sensitive to these feelings and expectations, and take into account the multiple layers and complexity of the resettlement process.

This study is one of the first to explore the oral healthcare experiences of former Syrian refugees settled in New Zealand. The qualitative approach applied in this research enabled an in-depth exploration of the lived oral healthcare experiences of former Syrian refugees settled in New Zealand. The interviews were conducted by a native Arabic speaker allowing trust and rapport between the interviewer and participants.

Owing to COVID-19 pandemic constraints, the focus group meetings had to be conducted

online rather than the planned in-person meetings. However, the quality and quantity of data collected online appears similar to face-to-face interviews.<sup>24</sup> Moreover, online focus groups may have provided a safer and a more confidential setting for participants.

Although one researcher analysed the data, the transcripts were reviewed and coded data and themes were discussed with two senior research team members until consensus was achieved. The findings may have limited transferability given they were generated from a homogeneous group of Syrian former refugees resettled in one city. Nevertheless, key factors that affected their oral healthcare are likely to be similar to those faced by former refugees living elsewhere in New Zealand and globally.

This research suggests that changes are needed to the way oral healthcare is made available and

delivered to former refugees. Clinicians need to have appropriate training about cultural safety at undergraduate and graduate levels.

At a systems level, information about services and funding, along with oral health promotion material, should be provided in a range of languages. The weeks or months following arrival may be an ideal opportunity to address former refugees' oral health.

## Conclusions

New Zealand's former refugees have diverse and specific oral healthcare needs. Oral healthcare providers and policymakers need to expect and accept their patients' past experiences, emotions, vulnerabilities, cultures, backgrounds and the complexity of the resettlement process. A culturally safe system and practitioners can facilitate former refugees' access to care.

**COMPETING INTERESTS**

Nil.

**AUTHOR INFORMATION**

Zeina Al Naasan, DDS, MDS, DipClinDent, DCLinDent:  
Lecturer, Periodontology, Oral Sciences, Sir John  
Walsh Research Institute, University of Otago, New  
Zealand.

Jonathan M Broadbent, BDS, PhD, PGDipComDent:  
Professor, Dental Public Health, Oral Sciences, Sir  
John Walsh Research Institute, University of Otago,  
New Zealand.

Warwick J Duncan, BDS, MDS, PhD: Professor,  
Periodontology, Oral Sciences, Sir John Walsh  
Research Institute, Faculty of Dentistry, University of  
Otago, New Zealand.

Moiria B Smith, BDS, PhD, PGDipSci, DPH Health:  
Senior Research Fellow, Health Promotion and  
Policy Research Unit, Department of Public Health,  
University of Otago, Wellington, New Zealand.

**CORRESPONDING AUTHOR**

Zeina Al Naasan: Lecturer, Periodontology, Oral Sciences,  
Sir John Walsh Research Institute, University of  
Otago, New Zealand.  
E: zeina.alnaasan@otago.ac.nz

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/i-lost-my-first-tooth-here-syrian-former-refugees-experiences-of-oral-healthcare-in-dunedin-new-zealand>

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# Emergency department attendances for persistent pelvic pain are not reduced following laparoscopic surgery for women with or without endometriosis

Karen Joseph

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## ABSTRACT

**AIM:** To explore the change in emergency department (ED) attendances for persistent pelvic pain (PPP) following laparoscopic treatment of endometriosis.

**METHODS:** A retrospective service evaluation was conducted on a convenience sample of 1 calendar year of elective gynaecological laparoscopies for PPP. Data were collected on ED visits for surgical complications, and for PPP in the 12 months prior to and following surgery.

**RESULTS:** Of the 195 women undergoing laparoscopy, 30 had attended the ED owing to their PPP in the preceding year. Endometriosis was found and treated in 51% of the cohort and no cause for pain was found in the other 96 women. Eighteen women suffered post-operative complications. In the subsequent 12 months, 31 of the cohort attended the ED for PPP. Likelihood of unscheduled hospital visits for post-operative complications and for exacerbations of pain in the year prior to and following surgery was independent of the presence of endometriosis lesions.

**CONCLUSIONS:** In a cohort of women living with PPP, laparoscopic surgery failed to reduce the need to attend the ED owing to their pain. Further investigation into interventions that can reduce the burden of pain on these women and the healthcare system is required.

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Persistent pain perceived in structures related to the pelvis affects around one in four women, and is commonly associated with negative cognitive, behavioural, sexual and emotional consequences.<sup>1</sup>

Persistent pelvic pain (PPP) is recognised internationally as posing a high burden on health services.<sup>2,3</sup> Women living with PPP commonly experience flare-ups of pain and these may lead to presentation to acute hospital services. Abdominal pain is the presenting concern for around half of high frequency users of emergency departments (ED) and approximately 40% of acute hospital gynaecological presentations are for pelvic pain for which no cause is found during the visit.<sup>4-6</sup>

EDs are specialist services for those with acute illness or injury, and the complex difficulties associated with chronic pain are not well managed in this setting.<sup>7,8</sup> Women attending ED for PPP often undergo numerous investigations with high cost and low probability of finding any abnormality, and report dissatisfaction with their care.<sup>6,9</sup>

Initiatives such as Choosing Wisely encourage

consideration of healthcare resources in clinical decision making.<sup>10</sup> There is, however, a paucity of evidence on cost effectiveness to guide these decisions.<sup>11</sup>

Surgery to diagnose and treat presumed endometriosis lesions is often seen as the mainstay of management for PPP. Such surgery is widely anticipated to reduce acute healthcare use—either by removing the “pain generator” or, in the case of a negative laparoscopy, providing reassurance and allowing engagement with persistent pain services. This hypothesis, however, has not been proven, with some evidence that healthcare costs increase following surgical intervention.<sup>12,13</sup>

This study aimed to explore the change in use of acute hospital services by women with PPP in the year prior to and following a laparoscopy intended to treat their pain.

## Population

The Christchurch Women’s Hospital (CWH) provides services to a population of 288,000 females within north and central Canterbury,

New Zealand. This includes 134,000 women in the reproductive age group (15–49) who are most commonly affected by pelvic pain. New Zealand data indicate a PPP prevalence of 25%; therefore, approximately 33,000 women live with PPP in this region.<sup>14</sup>

As the COVID-19 pandemic has had substantial influence on surgical waiting lists since 2020, the calendar year 2019 was selected to provide a convenience sample.

## Methods

Elective operation booking records were obtained from the CWH surgical waiting list office for all planned surgical procedures between 1 January and 31 December 2019. Procedures listed as laparoscopy for the investigation or treatment of PPP without abnormality on pre-operative imaging were identified.

A hand search of the electronic patient records was undertaken for each individual identified. Variables collected included: indication for procedure; surgical findings and intervention including

histopathology; post-operative complications requiring hospital treatment; and ED visits for PPP in the 12 months prior to and following surgery.

A Chi-squared test of association was performed using MedCalc Software (MedCalc Software, Ostend, Belgium) to determine whether there was a difference in ED attendances. A p-value of 0.05 was considered significant.

On application to Health and Disability Ethics Committee, it was deemed that as an audit this study was out of scope for needing review.

## Results

Two hundred and three elective laparoscopies were performed for the investigation or treatment of pelvic pain in 2019. Eight were removed from data analysis, leaving a dataset of 195. Reasons for exclusion were: the procedures were part of a planned staged operation (4), listed indication also included infertility (3), and missing operative note (1).

Endometriosis was visually identified (E+) and treated in 99 cases (51%). The lesions were histo-

**Table 1:** Presentation to ED by endometriosis lesion status.

	E+ (n=99)	E- (n=96)	P-value
<b>Unplanned admission for post-operative complications</b>	12 (12%)	6 (6.3%)	p=.16
<b>Presented to ED in 1 year prior to operation</b>	15 (15%)	15 (16%)	p=.93
<b>Presented to ED in 1 year post-operation</b>	13 (13%)	18 (19%)	p=.28

ED = emergency department; E+ = endometriosis identified and treated at laparoscopy; E- = no endometriosis identified; X<sup>2</sup>, p-value of 0.05 considered significant.

**Table 2:** Presentation to ED in the year prior to and following surgery.

	Pre-operation year ED attendance for PPP	Post-operation year ED attendance for PPP	P-value
<b>E+</b>	15 (15%)	13 (13%)	p=.17
<b>E-</b>	15 (16%)	18 (19%)	p=.57
<b>Whole cohort</b>	30 (15%)	31 (16%)	p=.89

ED = emergency department; PPP = persistent pelvic pain; E+ = endometriosis identified and treated at laparoscopy; E- = no endometriosis identified; X<sup>2</sup>, p-value of 0.05 considered significant.

logically confirmed in 86, not confirmed in 5, and in 7 cases ablation only was performed with no histology taken. In 96 cases (49% of the cohort), no endometriosis was found (E-).

One hundred and sixty-four women were discharged on the day of surgery and 31 women required an inpatient stay post-operatively (total 33 bed-nights). Costings provided by the hospital estimate a total of NZ\$2.3 million for surgery and post-surgical stay for this cohort.

Eighteen women suffered surgical complications requiring unscheduled hospital care: 12 who had received treatment for endometriosis and six who had a normal pelvis at laparoscopy. Complications were all minor and included uncontrolled pain (10), wound infection (4), bleeding (3), urinary retention (1), and port site endometrioma (1). There was no difference in likelihood of complication requiring hospital care by lesion status,  $X^2$  (1 N=195) = 2.0,  $p=.16$

There was no change in number of women from the study cohort presenting to the ED for their PPP between the 12 months pre-operatively (30 women, 15 E+, 15 E-; totalling 44 visits) and the 12 months following their surgical intervention (31 women, 13E+ and 18E-; totalling 42 visits)  $X^2$  (1 N=195) = 0.02,  $p=.89$ .

The proportion of women who attended the ED for their PPP did not differ by endometriosis lesion status at surgery during the pre-operative year  $X^2$  (1 N=195)=0.01,  $p=.93$ ; or post-operative year  $X^2$  (1 N=195)=1.2,  $p=.28$ .

## Discussion

This study aimed to explore the impact of laparoscopic surgical intervention on the requirement to attend the ED for PPP. The results identified that NZ\$2.3 million (excluding management of complications) invested into elective laparoscopic surgical intervention did not reduce this healthcare burden on the acute hospital services in the following 12 months. This finding is consistent with a study in the United Kingdom, which found that reduced access to surgery for PPP during the pandemic lockdowns did not result in increased ED attendance for exacerbations of pain.<sup>6</sup>

Endometriosis was identified in 51% of the women, which is concordant with published literature that states endometriosis lesions are found in 40–60% of those with PPP.<sup>15</sup> A growing volume of evidence supports that, for women with PPP, the presence of endometriosis lesions does not predict the amount of pain or suffering experienced.<sup>16,17</sup> In

this study, the presence of lesions did not predict likelihood of attending ED for PPP either pre- or post-operatively. This is consistent with a British study, which found that half of women presenting to the ED with a flare-up of PPP have a diagnosis of endometriosis.<sup>6</sup>

As need for ED attendance for PPP in the year pre-operatively was independent of lesion status it is perhaps unsurprising that surgical removal of these lesions did not alter this in the subsequent year for the E+ cohort. The evidence base supporting surgical management of PPP or pain attributed to endometriosis is limited, and typically utilises reduction in pain intensity scores as outcomes.<sup>18,19</sup> Pain by definition has both sensory and emotional components not captured in such unidimensional outcome measures. Change in pain intensity alone has been shown to be a poor predictor of future disability and quality of life in persistent pain conditions.<sup>20</sup>

The impact of pain on functioning and the decision to attend acute services is, however, predicted by psychosocial factors. Those with high levels of symptom-related anxiety and worry are more likely to attend healthcare.<sup>21</sup>

An audit of attendees to the CWH gynaecology clinic with pelvic pain found a strikingly high level of catastrophic worry about pain and other psychosocial yellow flags.<sup>22</sup> Surgical intervention is unlikely to improve these factors. There is, however, evidence that multidisciplinary (MDT) pain clinics where interventions address such psychosocial domains improve quality of life and reduce healthcare costs by over 90% for those living with musculoskeletal pain.<sup>23</sup> Specialist MDT interventions for women living with PPP have shown comparable outcomes across a range of domains including reduction in pain-related worry,<sup>24–26</sup> and have also been shown to reduce subsequent attendances at the ED.<sup>25,27,28</sup> Currently, however, there is very limited access to such MDT pain services in New Zealand.<sup>29</sup>

## Limitations

This retrospective study has limitations. It was not possible to establish if there was any change in attendance at non-hospital healthcare including community or private sector services, or to explore the decision making behind the ED attendances. The data also lack detail on differences between ED attenders and non-attenders, aside from endometriosis lesion status. As patient-reported outcome or experience measures are

not obtained following surgery at CWH it was not possible to determine if there were any changes in pain experience or other outcome measures such as quality of life.

The follow-up period of this study includes March–May 2020 when New Zealand was under COVID-19 “lockdown” restrictions. It is possible that this event influenced decision making behind ED attendances during this time.

### **Conclusions and future directions**

While the data have limitations, this study adds further information on the costs and implications of current healthcare for PPP. Further prospec-

tive research is required to explore the efficacy and cost effectiveness of current management approaches, including systematic collection of patient-reported outcome measures across a number of domains including quality of life measures. Such information would allow individuals and funders to make informed treatment decisions, and also provide baseline data to compare with alternative models of care.

A move from the current high-cost biomedical-focussed model of care to a wider socio-psycho-biomedical approach via MDT services carries potential for benefits to both those living with PPP and the health services that provide them with care.

**COMPETING INTERESTS**

I received no funding for this work and have no conflicts of interest to declare.

**ACKNOWLEDGEMENTS**

I would like to thank Dr Isabelle Lewis for her assistance with the data collection.

**CORRESPONDING AUTHOR INFORMATION**

Karen Joseph: Gynaecologist & Specialist Pain Medicine Physician, Christchurch Women's Hospital, Christchurch, New Zealand.  
E: Karen.joseph@cdhb.health.nz

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/emergency-department-attendances-for-persistent-pelvic-pain-are-not-reduced-following-laparoscopic-surgery-for-women-with-or-without-endometriosis>

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# Children's toys no longer: a porcine model study of the lethality of modern air rifles

Kevin N Peek, Benjamin JL Black

## ABSTRACT

**AIMS:** We observed modern spring-loaded air rifles reaching velocities similar to small-bore rifles, raising concerns about their potential lethality. After encountering two life-threatening thoracic injuries in our practice, we conducted a study to assess the injuries that a commonly available air rifle could cause in a porcine cadaver model.

**METHODS:** We conducted shooting experiments from 5 and 10 metres away using a .22 calibre spring-loaded airgun, firing five shots into the anterolateral chest on the left side at both distances. Additionally, we repeated the experiment with ten shots into 10% ballistics gel behind an explanted chest wall to evaluate chest wall penetration reliability.

**RESULTS:** Out of the ten combined shots, six resulted in lethal or potentially lethal injuries, including multiple cardiac injuries. Moreover, we observed chest wall penetration in 9 out of 10 shots, with an average penetration depth of 106mm. Non-life-threatening injuries appeared to be influenced by shot location rather than an inability to penetrate the chest wall.

**CONCLUSION:** Our study raises significant concerns about the potential lethality of unrestricted air rifles in New Zealand. With muzzle velocities comparable to small-bore rifles, these firearms should be reconsidered in terms of regulation and possibly restricted to gun license holders.

Air rifles have been long thought of as beginner's or children's guns in New Zealand and around the world with no significant lethal potential.<sup>1,2</sup> However, modern air rifles can reach muzzle velocities analogous to small-bore rifles such as a .22 calibre long rifle (.22LR). Recent incidents of potentially lethal thoracic injuries with homicidal intent in the authors' practice sparked the need for an assessment of the lethality of these weapons that are available with no licensing requirements in New Zealand.<sup>1</sup>

Determining the range at which these weapons can cause a lethal injury is important because this has significant effect on what harm can be done to the public with them and differentiates them from other non-restricted weapons. If these weapons are reliably lethal at more distant ranges they can be potentially used in a wider range of criminal activities, as well as the more expected accidental injuries.

Air guns can be classified based on their means of providing propulsion into compressed gas, spring loaded and pneumatic mechanisms. Compressed gas guns typically use cartridges of compressed carbon dioxide and are usually less powerful than spring-loaded or pre-charged pneumatic (PCP) weapons. Spring-loaded guns rely

on the manual coiling of a spring, which usually requires a break barrel mechanism for higher powered weapons, while lower powered weapons such as BB guns and airsoft weapons also use a weaker spring-based system that can be manual or battery powered. The reservoir in PCP rifles can be pressurised by an external air source and many are able to be fired in a semi-automatic fashion.<sup>2</sup> In New Zealand, legislation was enacted in 2010 following the death of a police officer that made ownership of PCP rifles require a firearms licence.<sup>3,4</sup>

We designed a porcine model study to assess the severity of injuries caused at intermediate ranges into a torso. Porcine models have been used in ballistics research extensively and in air rifles specifically. Porcine models are an effective approximation of human anatomy and can be used to determine the likely injuries that can be inflicted by these weapons.<sup>5</sup> We aimed to produce qualitative data on what injuries were possible in the first instance by testing a complete porcine model. To further assess reliable lethality and to control for anatomical differences in the model, as well as misplaced shots, we designed a second model to quantitatively assess penetration through a chest wall into a 10% ballistics gel medium,

which has likewise been assessed as an effective model of human tissue.<sup>6</sup> We hypothesise that contemporary spring-loaded air guns can reliably cause lethal injuries at an intermediate range.

## Methods

Two porcine cadavers were obtained that had been used previously for basic biological research under The University of Auckland Animal Ethics Committee, approval 25159. They were euthanised with an intravenous overdose of sodium pentobarbitone while under anaesthesia. They were then transported and secured on an outdoor shooting range. The cadavers were measured at 46 and 48 kilograms respectively prior to starting the experiment. A Gamo Swarm Fusion 10X Gen3 Air rifle that was chambered in .22 calibre was utilised for testing (Figure 1). This is a spring-loaded rifle with a reported muzzle velocity of 975ft/s and a muzzle energy of up to 40J. Testing was performed with H & N Hornet pellets, which are 16.2grain (1.05g) with a brass pointed tip (Figure 2).

Five pellets were fired at the anterolateral chest at 5 metres into the first cadaver, and five pellets were fired at 10 metres into a second cadaver. The pigs were shot in a variety of locations of the thorax to simulate realistic shooting conditions. Necropsy was then performed, and the injuries assessed and recorded. Specifically, whether the projectile breached the chest wall or internal organs. In addition, the likelihood of a lethal injury based on an assessment of the injury pattern was recorded.

Following this, a segment of the chest wall was harvested that had not been injured in the initial shooting and was secured in place behind 10% ballistics gel. This construct was then shot five times at 5 and 10 metres respectively. The penetration through the chest wall and then

through the ballistics gel was measured and recorded.

## Results

Shots taken from 5 metres caused two likely lethal injuries, two potentially lethal injuries and one non-life-threatening injury. At 10 metres there was one likely lethal injury, one potentially lethal injury and three non-life-threatening injuries (Table 1) (Figures 3, 4). The chest wall was breached in 4/5 shots and 3/5 shots at 5 and 10 metres respectively.

On the ballistics gel component, the chest wall was measured at 45mm, which was added to the penetration through the gel to give a total penetrance. The chest wall was penetrated 5/5 times at 5 metres and 4/5 times at 10 metres (Table 2, Figure 5). The fifth shot at 10 metres fractured a rib, which deformed the ballistics gel component, but the projectile did not enter the gel. The range of total penetrance was 55–140mm and 45–125mm at 5 and 10 metres respectively.

## Discussion

Air rifles have had significant proliferation in New Zealand in recent years. According to the New Zealand Customs Service, from 2012–2016 over 130,000 airguns were imported compared to 97,855 powdered rifles and 39,991 shotguns.<sup>1</sup> While this number includes low-energy air rifles such as BB guns, it sheds light on the magnitude of how many are coming into the country. Non-powdered weapons also make up a significant portion of weapon sales in the USA, with 2–2.5 million units purchased annually.<sup>7</sup> According to the Accident Compensation Corporation (ACC) there was a mean of 235 active claims for air rifle injuries annually in New Zealand over the last 10 years.

A porcine model has previously been used to assess thoracoabdominal wounds from air rifles

**Figure 1:** Gamo Swarm Fusion 10x Gen3.



**Figure 2:** .22 Hornet Pellet.**Table 1:** Injuries sustained in initial model.

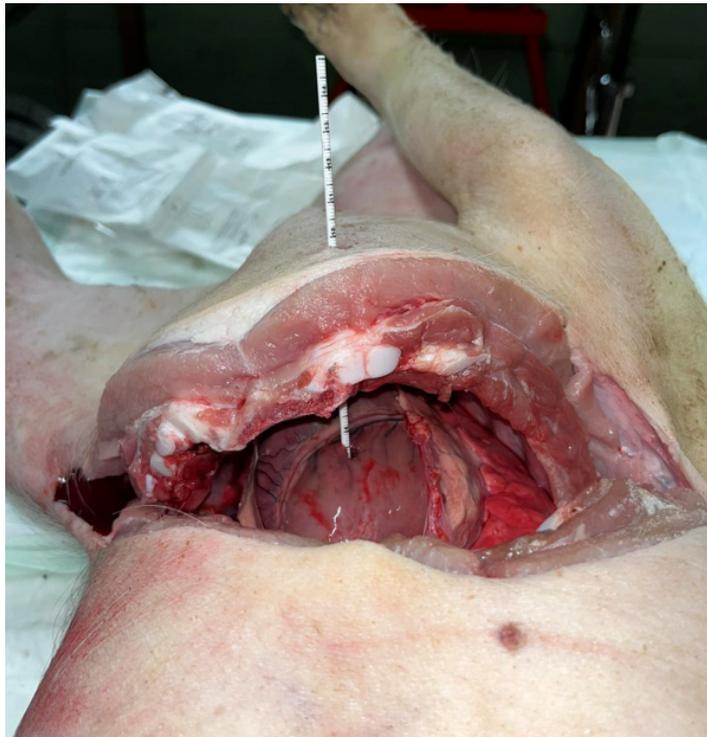
5 metres	Shot	Breach of chest wall	Injuries sustained	Lethality of injury
	1	Yes	Left ventricle and atrium penetrated, and pellet found in left atrium	Likely
	2	Yes	Left ventricle laceration and pellet found in oblique sinus within pericardium	Likely
	3	Yes	Lung laceration with pellet in pleural cavity	Potentially
	4	No	Skimmed chest wall, embedded in scapula	Non-life threatening
	5	Yes	Lung laceration with pellet traversing mediastinum into contralateral pleural space	Potentially
<b>10 metres</b>	1	Yes	Major SVC laceration just superior to right atrium	Likely
	2	Yes	Lung laceration with pellet in the thoracic cavity	Potentially
	3	Yes	Found just superficial to endothoracic fascia after passing through rib	Non-life threatening
	4	No	Embedded in sternum, fracturing both tables of bone	Non-life threatening
	5	No	High shot, with glancing blow to superior ribs and found in the chest wall	Non-life threatening

in 1995.<sup>5</sup> The authors compared a common air rifle and air pistol fired into the thoracic wall, showing a breach of the wall in 8/18 shots between 0 and 5 feet from the target and causing a variety of significant injuries. The rifle used in this experiment used a smaller calibre (.177 vs .22) and slower velocity projectile (700ft/s vs 975ft/s),

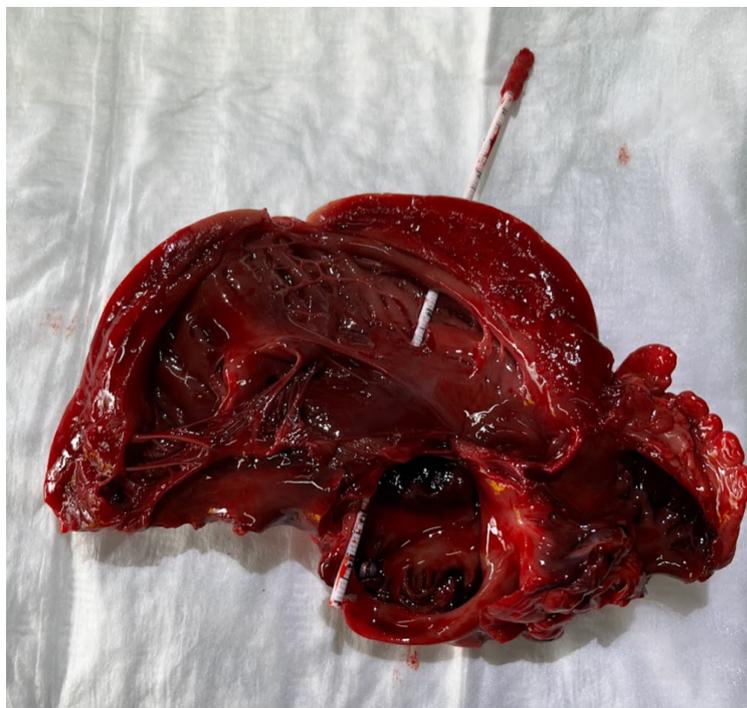
as well as the model being shot at a much closer range (1.5 vs 10 metres) compared to our study. Our study, however, builds on this with data on contemporary rifles at longer range that appear significantly more lethal.

Lethality or “stopping power” of a projectile is a multifactorial concept based on factors such as

**Figure 3:** Cardiac injury with tract through the anterior chest wall.



**Figure 4:** Cardiac injury showing tract from left ventricle to left atrium with pellet at proximal end of probe.



**Table 2:** Results of chest wall + ballistics gel construct.

5 metres	Shot	Breach of chest wall	Depth of combined penetration (mm)
	1	Yes	110
	2	Yes	110
	3	Yes	140
	4	Yes	55
	5	Yes	80
10 metres	1	Yes	105
	2	Yes	125
	3	Yes	100
	4	Yes	75
	5	Partial	45

**Figure 5:** Tracts through the ballistics gel at 5 metres.

mass, composition, velocity and behaviour of the projectile.<sup>8</sup> With increasing velocity and mass of contemporary projectiles we can expect increased lethality, which was demonstrated in our study.

Our research was inspired by observed cases in our professional practice that were notable for being attempted homicides using air guns. This

is rarely reported in the literature, with unintentional discharges being the most common cause of severe injury.<sup>2,9,10</sup> As these weapons become more refined and other firearms become more restricted, it would be reasonable to assume that wounding with criminal intent may also become more common.

The most common air rifle pellet comparison is to a .22LR cartridge, which is commonly a 36–40gr projectile and fires at approximately 1,000–1,300ft/s with standard ammunition.<sup>11,12</sup> Air rifle pellets in .22 range from 16–32gr, which in high-end model spring air rifles can also be fired at 1,000–1,300ft/s.<sup>13</sup> While .22LR is superior in terms of stopping power, modern air rifles are not dissimilar.

Previous lethal and potentially lethal injuries from air rifles have been reported in numerous case studies from around the world, including developing and developed countries.<sup>14–16</sup> Approximately one fatality is reported annually in the UK, and 33 were reported over a study of a 5-year period in the 1990s in the USA.<sup>10,17</sup> These injuries are across multiple anatomical regions, including great vessels, cardiac, pulmonary and cranial regions.<sup>10,14,14,18</sup> Children appear to be at particularly high risk of serious injuries from air weapons, which is likely a combination of easier access as well as less durable bony structures to penetrate.<sup>7,19</sup>

Our air rifle was able to reliably penetrate the chest wall at 5 and 10 metres. Once the chest wall is breached, further life-threatening injury becomes possible and relies only on a shot placed over a vital organ in these regions. In that sense, this weapon is very likely to cause potentially lethal injuries at 5–10 metres with a thoracic shot.

The range of fire that homicides occur within can be estimated with powdered weapons based on the powder burn and residue on pathological samples to point blank, close (<1m) and distant (>1m) ranges.<sup>8</sup> With the addition of crime scene data more specific ranges can be inferred, but this remains an inexact science. A study of gunshot homicides in Denmark over 14 years gave a percentage of combined point blank and close-range homicides at 31%, with the majority of injuries either indeterminate (41%) or at a range of >1m (28%).<sup>20</sup> We suspect that high-powered air rifles could be used in a significant portion of

homicides, even with a conservative lethal range of 10 metres.

Legalisation around air rifles is variable around the world, with some countries considering them the same as firearms regardless of power, such as Australia or Singapore.<sup>21</sup> Other countries have a variable muzzle energy limitation at which the weapons are considered firearms, such as the UK, which restricts above 16J.<sup>17</sup> Canadian restrictions are based on a muzzle velocity of >500ft/s, with weapons below that velocity not requiring licensing.<sup>22</sup> The USA does not consider air guns a firearm on a federal level, but has variable restrictions placed on them depending on the state. Twenty-eight states in the USA have regulations on air rifles, ranging from outright bans on sales in certain city limits to minimum age of purchase requirements and velocity restrictions.<sup>2</sup> If further restrictions for these weapons were to be considered, further data on lower calibre (.177) and lower powered weapons might be required, which is beyond the scope of this study.

The medical voice in trauma and harm prevention has sometimes been lost in recent times when it comes to major programmes, like road traffic safety, as we move to a more punitive approach where the focus is on the legal strife you may enter if you do not comply with rules. Our study adds some medical validity to the opinion that these higher velocity air weapons should be considered more like a small-bore rifle in terms of the lethality. Thus, we believe it would be reasonable to restrict them in a similar way to this level of weapon as appropriate within different countries' legal framework. This would not affect the members of the public that use these guns for legitimate recreational purposes but would potentially have the effect of keeping them out of the hands of unsuitable people, such as those who would fail background checks for gun ownership and would potentially use these weapons for unsavoury purposes.

**COMPETING INTERESTS**

The authors declare that they have no conflict of interest.

**AUTHOR INFORMATION**

Kevin N Peek, MBChB, PGDipSurgAnat: Trainee Registrar – Cardiothoracic Surgery, Te Whatu Ora Capital, Coast and Hutt Valley.

Benjamin JL Black, MBChB, FRACS: Fellow – Trauma and General Surgery, Te Whatu Ora Te Toka Tumai Auckland.

**CORRESPONDING AUTHOR**

Benjamin JL Black: Trauma and General Surgery, Te Whatu Ora Te Toka Tumai Auckland, Auckland City Hospital, Private Bag 92 024, Auckland Mail Centre, Auckland 1142, New Zealand. Ph: +64 27 082 82346. E: benjlblack@hotmail.com

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/childrens-toys-no-longer-a-porcine-model-study-of-the-lethality-of-modern-air-rifles>

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# The lived experience of chronic pain for Māori: how can this inform service delivery and clinical practice? A systematic review and qualitative synthesis

Dana Antunovich, Jordine Romana, Gwyn N Lewis, Eva Morunga, Debbie J Bean

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## TUHINGA WHAKARĀPOPOTO, ABSTRACT

**AIM:** To synthesise the literature describing experiences of chronic pain and pain management for Māori, and to understand how this experience could inform service delivery and clinical practice.

**METHOD:** We systematically searched for qualitative research on Māori chronic pain experiences (Scopus, Medline, APA PsycINFO, NZ Research, Research Square). Data extracted were coded and synthesised using thematic analysis.

**RESULTS:** Seven studies were included. Three themes encapsulated the data: 1) *a multidimensional view of pain and pain management:* Māori expressed a holistic and integrated understanding of the multiple factors that influence pain and its management, 2) *a responsibility: respectful tikanga-informed care:* the experiences of Māori participants with healthcare highlight a need for anti-racist approaches, and a clinical responsibility to practice manaakitanga and tikanga, and 3) *tino rangatiratanga: a desire for knowledge, choice and autonomy in pain management:* Māori valued the empowering nature of knowledge about pain, and information and support to make decisions about treatment, including considerations regarding Western and traditional Māori medicine.

**CONCLUSION:** Health services need to understand and respect the multidimensional aspects of pain, minimise racism and discrimination, use whakawhanaungatanga, manaakitanga, and tikanga-informed practices, and provide appropriate information to support tino rangatiratanga for pain management.

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In Aotearoa New Zealand, 22.6% of the adult population live with chronic pain, and Māori are 1.4 times more likely to experience chronic pain than non-Māori.<sup>1</sup> Te Tiriti o Waitangi sets out the basis of Māori rights to health equity in Aotearoa New Zealand. The Pae Tū: Hauora Māori Strategy (Pae Tū)<sup>2</sup> guides health entities in how to uphold Te Tiriti o Waitangi and is a part of a wider health strategy for improved health outcomes (Pae Ora | Healthy Futures Strategy). Pae Tū outlines several requirements for services, including empowering Māori to exercise authority over their health and wellbeing, equitable access to health services and enabling Māori to live, thrive and flourish as Māori.<sup>2</sup> Therefore, all services providing pain management are required to acknowledge and update current practices in line with Pae Tū recommendations.

Despite a higher prevalence of chronic pain and greater impact on quality of life for Māori,<sup>3</sup> only a small body of research has investigated how Māori experience pain and whether services

currently provide culturally responsive treatment that addresses the pain experience for Māori. One previous attempt to review this literature was limited to the inclusion of two studies and was unable to develop clinical recommendations.<sup>4</sup> A recent review of strategies informed by Māori to support adjustment to chronic health conditions more broadly made several recommendations, including culturally safe practices, active participation in treatment, whānau involvement, building trusting therapeutic relationships and commitment from clinicians to develop skills for supporting Māori.<sup>5</sup> Established treatments that exemplify these factors have demonstrated meaningful engagement in treatment for Māori.<sup>6</sup> The aim of the current review is to provide a more inclusive summary of the existing literature describing Māori experiences of chronic pain in order to understand how this experience could inform culturally responsive service delivery and clinical practice in services providing pain management.

## Ngā Tapuwae, Method

This review recognises Te Tiriti o Waitangi as it sets out the basis of respect between Māori and non-Māori in this country. The principles of Te Tiriti guided the work, which utilised research completed by and with Māori to tell the story in this review. In doing so, it ensured Māori voices were at the centre of the research. The authors of the paper are Māori (JR, EM) and non-Māori (DA, GL, DB) and have worked collaboratively throughout the review, with a focus on the Māori researchers' voices at all stages of the project. Additionally, four of the researchers (DA, JR, EM, DB) are health psychologists who have worked with people who have chronic pain. The research team are a collaborative group who strongly advocate for Te Ao Māori values being

incorporated into mainstream clinical practice.

This systematic review was conducted and reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.<sup>7</sup> Additionally, the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) checklist was completed.<sup>8</sup> Ethical approval was not required.

### Search strategy

A computer-based search was completed on the following databases: SCOPUS, Medline, APA PsycINFO, NZ Research (the Universities of New Zealand theses databases) and Research Square (preprints database) using the search terms "Māori" or "Maori" and "pain". A hand search of the reference lists of included articles was also conducted. To be included in the review, studies

**Table 1:** Inclusion criteria for studies in the systematic review.

1. Empirical qualitative research design
2. Written in English
3. Participants need to be adult Māori
4. The study addressed the lived experience or interpretation of pain for Māori, experiences of healthcare for pain, or preferences for pain management

**Table 2:** Characteristics of the included studies.

Study	Participants	Methodology	Participant demographics		
			N Total	Age (mean or range)	Gender (% female)
Awatere 2018 <sup>9</sup>	Kaumātua with osteoarthritis	Kaupapa Māori	20	55+	not stated
Baker 2018 <sup>10</sup>	Urban Māori adults with long-term musculoskeletal pain	Kaupapa Māori	6	40–60	4 (67%)
Devan et al. 2021 <sup>11</sup>	Kaiāwhina who support whānau Māori with chronic pain	Kaupapa Māori	13	23–65	13 (100%)
Magnusson and Fennell 2011 <sup>12</sup>	Kaumātua and Māori health-care providers	Qualitative descriptive	33	33–87	23 (70%)
McGavock 2011 <sup>13</sup>	Māori with chronic pain	Kaupapa Māori	7	26–52	5 (71%)
McGruer et al. 2019 <sup>14</sup>	Māori with osteoarthritis	Kaupapa Māori	7	44–71	7 (100%)
Morunga et al. <sup>15</sup>	Kaumātua	Kaupapa Māori	14	60–83	11 (79%)

needed to meet the requirements outlined in Table 1. To meet inclusion criteria 4, studies had to focus on pain experiences. Some studies were about specific medical conditions that are typically associated with pain (e.g., arthritis, gout). For these studies, the results sections were assessed, and they were included only if they focussed on pain rather than other aspects of the health condition. Published articles as well as theses and dissertations were included. After removing duplicate records, the initial screen of titles, abstracts and keywords was conducted by two authors independently with discussion with a third author where necessary. Full texts were then screened by the same two authors independently, and with a third author when indicated.

### Data extraction

Two authors independently extracted the data for each study (DA and DB, or DA and JR). The variables extracted were the study aim, setting, methodology, number of participants and participant age and gender. Each study's results section was then coded with unique meaningful codes, and these codes and the associated quotes were extracted (see below). One of the studies included in this review was authored by some of the authors of this review; the authors implicated did not extract data from their own research.

### Assessment of study quality

The quality of included papers was not assessed using a specific tool, as the studies used a broad range of methodologies and this was not considered appropriate for Indigenous research. This decision is in line with other systematic reviews of Māori health experiences.<sup>16</sup> However, when using the Te Ara Tika framework as a lens,<sup>17</sup> all of the studies included aspects of whakapapa (Māori involvement initiation, meaningful partnerships), mana (outcomes for Māori, recognition of knowledge), tika (incorporation of tikanga and Mātauranga Māori), and manaaki (whānau Māori involvement throughout process).

### Synthesis of results

The review followed Thomas and Harden's thematic synthesis process for qualitative research in systematic reviews.<sup>18</sup> Study findings were defined as all data in the results/findings section that pertained to the concept of interest. Other sections of the manuscript (e.g., abstract, discussion) were also checked for relevant findings. First, two authors (DA and JR, or DA and

DB) independently coded the findings line-by-line, generating unique codes for each statement of interest. Codes were transferred to Miro software (Thought Industries). Four authors independently created initial descriptive themes (DA, JR, GL and DB). Next, the whole research team (DA, JR, EM, GL, DB) generated their own analytical themes based on the descriptive themes using separate Miro boards. The research team then met and discussed their analytical themes and agreed upon the main themes and related sub-themes. Two authors (DA and DB) wrote the draft theme synthesis and the research team provided feedback until all team members were satisfied with the analytic themes. In generating recommendations for practice, a strengths-based approach similar to that used in appreciative inquiry was implemented,<sup>19</sup> as it focussed on shifting from problems to solutions in healthcare.

## Ngā Hua, Results

### Study selection

The search was initially completed in January 2022, then repeated in August 2023 to ensure currency. During the secondary search one additional article was added. The final search retrieved 298 articles (Figure 1), and one further thesis was added based on word of mouth (from authors' own records or libraries). After duplicate removal, 218 publications remained. The initial screening of titles and abstracts excluded a further 171 publications. Full texts of the remaining 48 articles were screened, resulting in a final set of seven publications that were included in the review. Of these seven publications, three were original research articles, three were theses and one was an unpublished preprint of an article in submission. Six of the studies utilised Kaupapa Māori research methodologies. Table 2 details the included publications.

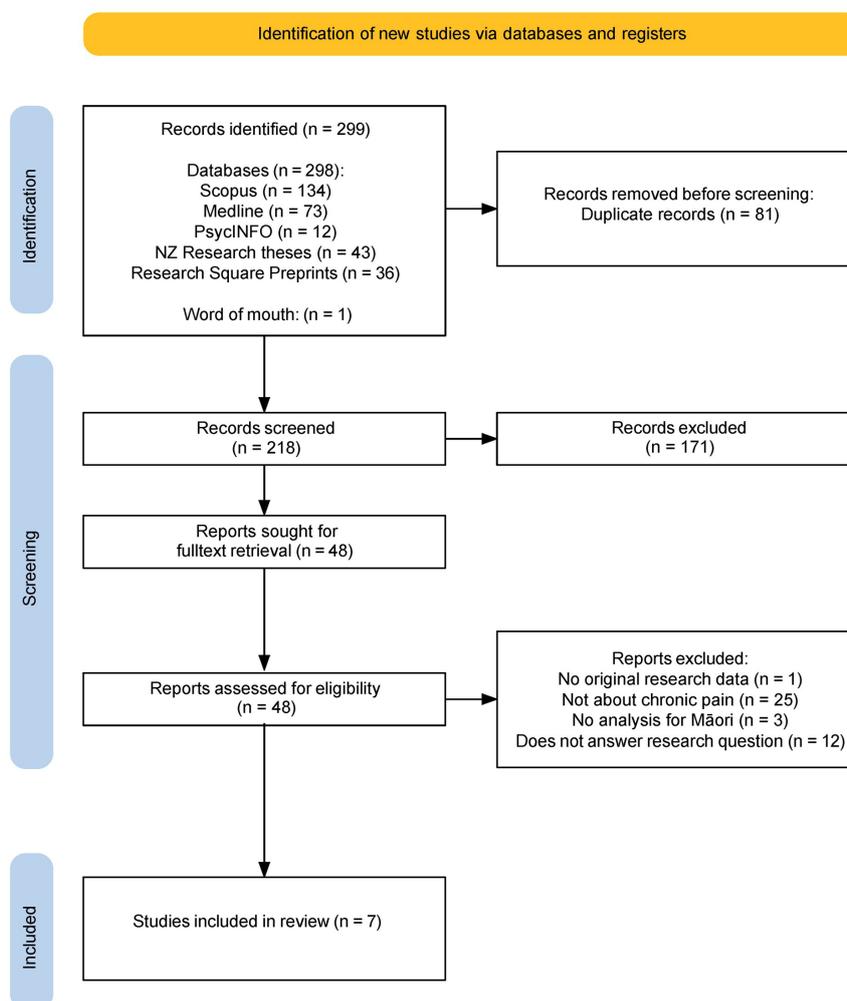
### Qualitative synthesis findings

The qualitative synthesis resulted in three themes which describe a Māori worldview of pain and pain management, highlight the responsibility for services to develop tikanga-informed care and illustrate a desire from Māori to further their understandings of pain and have autonomy in pain management.

#### *Theme one: a multidimensional view of pain and pain management*

Theme one describes the breadth of factors

**Figure 1:** Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram documenting literature search and study selection.



that may contribute to pain, including historical socio-political factors, and the wide-reaching effects of pain on wellbeing. The implications of this multidimensional understanding of pain for assessment and treatment are discussed, emphasising that traditional treatments and use of broad coping strategies address the multidimensional aspects of pain.

Studies described how Māori considered pain a multidimensional holistic experience, not merely a physical sensation.<sup>10-13,15</sup> Spiritual and cultural factors, thoughts and emotions held in the body, whānau relationships, environmental factors and historic events were all noted to influence pain. For example, for kaumātua “*there was little distinction between physical and other kinds of pain*” and “*pain was sometimes seen as a manifestation*

*of emotional or mental trauma.*”<sup>15</sup> The multi-dimensional factors influencing pain were not seen as distinct but highly intertwined. For example, the grief of losing loved ones, hurtful relationships, trauma or violence and breaches of tikanga influenced pain via effects on taha wairua, whānau and hinengaro.

Pain was described as intergenerational. Intergenerational mamae was associated with the historic loss of whenua, te reo Māori and connection to one’s whakapapa. The term “*embodied historical trauma*” was used to describe the way in which the trauma experienced by one’s ancestors influences parenting, childhood and adult experiences, and becomes embedded in people’s lives and bodies, thus influencing the pain they experience throughout life.<sup>10</sup>

Studies found that pain may disrupt many dimensions of life and wellbeing. Examples of pain impacting work and social activities, engagement with cultural activities and whānau relationships were evident. These contributed to loss of mana, identity and sense of belonging. For example, McGruer et al.<sup>14</sup> explained “*In some cases, pain precluded participants from carrying out required tasks at the marae, such as kaikaranga, custodian and kitchen duties. Some participants had stopped attending their marae as a consequence.*” Pain was noted to contribute to feelings of whakamā and affect relationships, as individuals required support from whānau but did not wish to burden those around them. Studies also identified that pain could cause feelings of frustration, powerlessness and low self-worth, which impacted taha hinengaro. Thus, not only did multidimensional factors contribute to pain, but pain caused significant disruption to many aspects of life.

The multidimensional understanding of pain was also reflected in the holistic nature of traditional pain treatments and positive coping strategies that were reported. McGavock described how “*Experiences with complementary and alternative medicine [including rongoā Māori] were described as useful for general wellbeing, treating the person as a whole, and treating not just physical but psychological, emotional and spiritual aspects of living with chronic pain.*”<sup>13</sup> One participant described the broad benefits of traditional mirimiri: “*She felt awesome, because it didn’t just mirimiri her tinana [body], but her wairua [spirit] as well, and hinengaro [mind]. She just felt really, really good.*”<sup>11</sup> Many traditional treatments address multiple components of the pain experience simultaneously. For example, rongoā includes spiritual components, caring relationships and elements of nature along with a physical intervention. The broad range of positive coping strategies to manage pain reported further emphasised its multidimensional nature for Māori. Participants described the benefits of karakia and kōrero to strengthen connections with the spiritual realm and people, the use of exercise and regular movement such as music, laughter and dance, the use of natural elements including heat and wai, as well as a positive attitude and acceptance of pain. These demonstrate not only a strong resilience, or a “*kei te pai attitude*” towards pain,<sup>13</sup> but also an understanding of the multiple approaches necessary to manage pain. Finally, several studies also described how pain assessment tools need to be multidimensional.

McGavock noted that pain scales are inadequate and kaumātua indicated that broader models of health need to be included in pain measures.<sup>12,13</sup>

### ***Theme two: a responsibility—respectful tikanga-informed care***

Theme two describes the negative experiences of participants in healthcare and pain settings and the need for these settings to take responsibility for ensuring anti-racist approaches. The theme highlights the importance of establishing meaningful therapeutic relationships through whakawhanaungatanga, manaakitanga and practising tikanga-informed care in order to be mana-enhancing.

Studies demonstrated how current practices in healthcare and specialist pain settings can lead to a loss of mana and experiences of discrimination and racism. A participant said, “*Just because you’re brown right, they think you’re dumb*”; “*Don’t treat me ... like I’m a dumb Māori, or some hypochondriac who’s been Googling diseases I think I have?*”<sup>13</sup> describing how Māori may feel disrespected or disbelieved by healthcare professionals. Studies also explained how system gatekeeping may occur, preventing Māori from having access to optimal pain treatments. For example, kaiāwhina “*unanimously reported that, to their knowledge, primary healthcare providers were not referring whānau Māori to pain management services*”.<sup>11</sup> One participant explained this further,<sup>13</sup> stating “*A doctor will think, ‘I won’t refer them on to a specialist because they won’t turn up to the appointment, you know, why should I bother my time with this type of person’, it’s those type of perceptions on access as well.*” The studies also acknowledged the complexity of access and historical experiences of insensitive care or mistreatment likely influenced engagement in health services for pain.

Alongside common effective clinician practices, the studies reported that whakawhanaungatanga (building connection) is essential for establishing a therapeutic relationship and promoting better outcomes for Māori. Kaumātua said that “*Within therapeutic relationships, aroha/compassion, listening, and connecting were key to healing.*”<sup>15</sup> Taking time to listen to whānau about their concerns and build a therapeutic relationship was spoken about by kaiāwhina,<sup>11</sup> who explained, “*It was vital to spend the time needed and listen to whānau to get a complete understanding of their health situation.*”

Mana-enhancing care was more likely to be achieved when clinicians practised tikanga. Tikanga-informed care provided a safe space for

patients to heal, as Baker explained: *“Findings suggest that collective whānau values, respect for tapu and the use of karakia keep participants safe.”*<sup>10</sup> Such practices may create a space for patients to maintain and assert their Māori identity, which was identified as an important part of pain management: *“Processes that restore Māori identity and ways of being and knowing may be crucial to addressing the long-term pain.”*<sup>10</sup> Environments that support whānau to express themselves openly were lacking. For example, Magnusson and Fennell stated *“Māori were reluctant to disclose their health worries in doctor–patient interactions as these settings were often found to be inhospitable or insensitive of cultural practices.”*<sup>12</sup> This study discussed several points of culturally appropriate practices that are mana-enhancing, including: involving whānau in treatment, using whānau or nominated cultural advisors as health advocates and ensuring seating arrangements do not limit whānau presence in appointments. Several other studies also described the importance of whānau-centred care, reflecting the collectivist view of Māori that prioritises the wellbeing of the whānau.<sup>10,11,14</sup> Overall, using tikanga practices in care is essential for Māori experiencing pain.

### **Theme three: tino rangatiratanga—a desire for knowledge, choice and autonomy in pain management**

Theme three describes participants’ desire for knowledge to further understand pain, as well as a desire and ability to make their own treatment choices.

Across several studies, whānau actively expressed a desire to learn why pain occurs and how services support people in pain. McGruer et al. found that *“Almost all participants felt that more education on the condition and available treatments was needed.”*<sup>14</sup> Similarly, a desire to discuss factors contributing to the pain experience was noted by Awatere: *“I would like to talk to someone about my joint pain: what is causing it? I would also like to talk to someone, especially about my diet. I wonder if I should be taking anything special for my knee, it’s so frustrating I’ve spent a fortune visiting the doctor and still don’t bloody know what the arthritis [osteoarthritis] actually is.”*<sup>9</sup> Inherent was the idea that once a person understands their pain and the factors that may influence it, they are empowered to manage it.

This empowerment was viewed as very important. Studies reported that whānau wanted tino rangatiratanga by making their own health

decisions, choosing their pain treatment pathways and identifying their own solutions for pain. Kaumātua described *“rejecting Western medicines due to side-effects and ineffectiveness, and utilising rongoā/traditional medicine or other strategies.”*<sup>15</sup> Additionally, a kaumātua stated *“I think I wanna be my own doctor. I don’t mean to be rude to the doctors here, but, you don’t know my body, only me, and I’ll tell anyone that, you don’t know my body.”*<sup>15</sup> Some studies indicated that Māori may value using Western healthcare for certain aspects of treatment, e.g., medical certificates and blood tests, while also engaging in more holistic therapies for healing. This choice should be respected and supported, and patients should be encouraged to make choices based on what is best for their whānau.

Linked to this, studies indicated that Māori may approach pain with considerable autonomy, mana and personal strength. They may, therefore, be stoical and choose not to complain about pain and not to burden others. Stoicism may reflect the influence of whakapapa on pain. One participant described *“I come from a long line of strong women. Yeah, I think that has everything to do with it, everything to do with the way I was brought up ... The women run everything in my family, not the men. We just put up with it.”*<sup>14</sup> Pain was understood as something that is commonly endured, and this stoical approach can be empowering to move forward with pain. For example, *“Delia described stoicism as a way of ‘trying to grab some self-worth back from the powerlessness imposed on her by chronic pain.’”*<sup>13</sup> Studies noted that stoicism may prevent Māori from engaging in health services and receiving support. However, if participants had sufficient knowledge to confidently manage their pain independently, stoicism was associated with positive aspects of resilience.

## **Kōrero, Discussion**

This review found that a truly holistic view of pain is needed to understand, treat, and āwhi whānau Māori choices in pain management. Certain clinician characteristics, including a deep understanding and practice of tikanga and fostering manaakitanga by building connections with the patient and whānau, and certain service characteristics, including anti-racist approaches and offering Te Ao Māori based treatments, are required for effective pain management outcomes for Māori.

The finding from theme one that Māori experience pain as multidimensional is also

reported in cancer pain,<sup>20</sup> and likely reflects the holistic perspective Māori have on health more broadly.<sup>21,22</sup> Although chronic pain services may include multidisciplinary teams and be less biomedically oriented than other health services, they may still not adequately acknowledge the holistic nature of pain for Māori. For example, spiritual and social/whānau factors may receive little attention compared to medical or individual psychological factors. This also pertains to pain assessment, as a literature review of the standardised pain assessment tools currently used in Aotearoa New Zealand pain services was unable to identify any that capture Māori experiences of pain.<sup>4</sup> It ensues that pain may not be screened or assessed appropriately, leading to inequitable opportunities for treatment. Recent work has provided initial validation of a verbal and visual tool as a culturally appropriate and meaningful assessment instrument for Māori experiencing chronic pain,<sup>23</sup> and also supports recent adaptations to traditional pain management programmes and resources.<sup>24</sup> In other areas of health, culturally appropriate measures that have been designed for Māori include Hua Oranga (a measure of mental health outcomes),<sup>25</sup> Te Waka Kuaka (a needs assessment tool for traumatic brain injury)<sup>26</sup> and Mahi Oranga (a measure of occupational health).<sup>27</sup> Therefore, future research and funding should support the ongoing development of culturally appropriate and holistic pain assessment tools and treatments or work on adapting other relevant measures to be pain focussed.

Consistent with theme two, studies have found that respectful, tikanga-informed care can lead to better clinical outcomes.<sup>28</sup> For example, research on human papillomavirus (HPV) screening for Māori women found that a culturally competent introduction of HPV self-testing resulted in a greater willingness for screening and follow-up.<sup>29</sup> Other research has revealed that whānau Māori find it difficult to be involved in their healthcare more generally and attributed this to the discrimination and related fatigue Māori have from previous healthcare engagements.<sup>30</sup> The findings in this review and wider literature confirm that health providers urgently need to take responsibility for anti-racist services,<sup>16</sup> to ensure that Māori are referred to services appropriately, that gatekeeping and barriers to access services are removed and that Māori are welcomed with manaakitanga and supported by tikanga-informed practices.<sup>16,28</sup> One established approach clinicians can use is the hui process.<sup>31</sup>

This process steps through four stages (mihi, whakawhanaungatanga, kaupapa and poroporoaki) and aims to promote mana-enhancing care through improved clinician cultural competency. Table 3 also provides some examples of how pain services and clinicians could implement the findings from the current study. To facilitate the incorporation of tikanga-informed care into practice, monetary incentives could be implemented. For example, clinic funding could be dependent on practising respectful and tikanga-informed care. Incorporation of such practices would facilitate health service delivery that is responsible to governing documents such as Pae Tū.<sup>2</sup>

Theme three revealed that whānau Māori actively wanted more information about pain and desired an active role in their treatment planning. Our findings indicate that facilitating tino rangatiratanga, or self-determination over one's own health decisions, should be a major focus for pain services. This could be achieved by incorporating the highly multidimensional view of pain, listening to preferences for treatment and promoting a range of treatment options, including traditional ones. Given the inherent holistic nature of rongoā Māori and its ability to make use of cultural strengths, we encourage open discussion for such options alongside Western approaches. It is possible that traditional Māori treatments are incorporated into mainstream pain services, or that pain services refer to local providers for elements of traditional Māori healthcare depending on the local situation and availability of providers. Additionally, pain clinicians could work in a supportive role with services whānau Māori are already actively engaged with. This would aim to āwhi both clinician and patient pain knowledge and would allow whānau Māori to make informed decisions about their own treatments and pain management strategies. Linked to this need for autonomy and self-determination, theme three also emphasised that Māori approach pain with mana and therefore may be reluctant to express pain to others. This stoical approach means that Māori may underreport pain, especially outside of trusted relationships. Therefore, clinicians need to gain trust prior to assessing pain, take pain reports seriously and ensure that the mana of patients is upheld throughout the process, in keeping with Pae Tū/Pae Ora strategies.

### Strengths and limitations

This review synthesised existing literature on pain experiences for Māori to inform more

**Table 3:** Clinical recommendations based on review findings.

Theme	Clinical recommendations
1. A multidimensional view of pain and pain management	<p>Use culturally appropriate pain assessment tools that explore the physical, emotional, spiritual and social aspects of pain experience.</p> <p>Provide treatments that address the multidimensional (e.g., emotional, social and spiritual) aspects of the pain experience.</p> <p>Provide appropriate access to traditional Māori therapies (e.g., Rongoā).</p>
2. A responsibility: respectful tikanga-informed care	<p>Identify and remove barriers to referral and attendance at pain services. Establish links and inform possible referrers about pain services.</p> <p>Welcome patients with manaakitanga and use whakawhanaungatanga and/or the hui process (mihi, whakawhanaungatanga, kaupapa and poroporoaki) to build relationships.</p> <p>Incorporate tikanga into clinical practice (e.g., karakia, use of te reo Māori, respect tapu/noa, manaakitanga, provision of kai, welcoming whānau, recognising patient/whānau strengths and enhancing mana).</p>
3. Tino rangatiratanga: a desire for knowledge, choice and autonomy in pain management	<p>Develop and provide culturally appropriate and empowering pain education resources/strategies.</p> <p>Provide patients and whānau with treatment options to empower autonomy in treatment decisions.</p> <p>Respect stoicism and mana by taking patients' pain reports seriously, be aware of underreporting of pain.</p>

equitable delivery of pain management. One limitation is that the review used a colonial process to tell Indigenous stories. Systematic reviews are considered to be high-quality evidence and we followed published guidelines;<sup>18</sup> however, these processes evolved from Western world views and may not be appropriate for synthesising mātauranga Māori. Therefore, we incorporated tikanga into our research process. All five authors worked cohesively to understand and synthesise the information in a mana-enhancing approach. The strengths of this review are the thorough search strategy, use of multiple coders and all five authors' involvement in analysis and construction

of themes. Additionally, the study included a mix of authors with clinical and research experience related to pain, and the inclusion of several unpublished documents that provided meaningful information and were previously not reported in the published literature.

## Conclusion

Health services need to understand and respect multidimensional aspects of pain, minimise racism and discrimination, use manaakitanga and tikanga-informed practices and provide culturally inclusive information to support tino rangatiratanga for pain management for Māori.

**COMPETING INTERESTS**

All authors declare that they have no competing interests.

**AUTHOR INFORMATION**

Dana Antunovich, MSc: Health Psychologist, Psychological Medicine, Te Whatu Ora Te Tai Tokerau, Northland.

Jordine Romana, MSc: Health Psychologist, Psychological Medicine, Te Whatu Ora Counties Manukau, Auckland.

Gwyn N Lewis, PhD: Associate Professor, Health and Rehabilitation Research Institute, Auckland University of Technology, Auckland.

Eva Morunga, MSc: Kaiarahi, Health Psychology Practitioner Programme, Department of Psychological Medicine, The University of Auckland, Auckland; Pou – Clinical Lead Awhinatia Te Tangata, Health Psychologist, Cancer Support Service, Te Whatu Ora Te Toka Tumai.

Debbie J Bean, PhD: Senior Research Fellow, Health and Rehabilitation Research Institute, Auckland University of Technology, Auckland; Department of Anaesthesia & Perioperative Medicine, Te Whatu Ora Waitematā, Auckland.

**CORRESPONDING AUTHOR**

Dr Debbie Bean: Auckland University of Technology, Private Bag 92006, Auckland 1142, New Zealand.  
Ph: +64 9 921 9999. E: debbie.bean@aut.ac.nz  
<https://academics.aut.ac.nz/debbie.bean>

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/the-lived-experience-of-chronic-pain-for-maori-how-can-this-inform-service-delivery-and-clinical-practice-a-systematic-review-and-qualitative-synthesis>

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## Appendix

**Appendix Table 1:** Kuputaka Māori, glossary of te reo Māori terms.

Te Reo Māori	English
Aotearoa	New Zealand
Āwhi	Support, surround, embrace
Kaiāwhina	Māori community health workers
Kaikaranga	Caller—the woman/women who make the ceremonial call onto a marae
Karakia	Prayer, blessing
Kaumātua	Elder, a person of status within the whānau, hapū and iwi
Kaupapa Māori	Māori approach and research methodology
Kei te pai	I'm fine/good
Kōrero	Discussion, conversation
Mamae	Ache, pain, injury, wound
Mana	Status, spiritual power, prestige
Marae	A traditional Māori meeting place
Mātauranga Māori	Traditional Māori knowledge
Mirimiri	Traditional Māori massage holistic therapy
Ngā Hua	Results
Ngā Tapuwae	Method
Pae Ora	Healthy Futures health strategies for New Zealand
Pae Tū	Hauora Māori Strategy (Māori Health Strategy)
Romiromi	Traditional Māori massage holistic therapy
Rongoā	Natural remedy, traditional treatment, Māori medicine
Taha hingengaro	Mental and emotional wellbeing
Te Ao Māori	Māori world
Te Reo Māori	Māori language
Te Tiriti o Waitangi	The Treaty of Waitangi
Te Whatu Ora	Health New Zealand (Health Authority)
Tinana	Body
Tino rangatiratanga	Self-determination, sovereignty, autonomy
Tuhinga Whakarāpopoto	Introduction

**Appendix Table 1 (continued):** Kuputaka Māori, glossary of te reo Māori terms.

Wai	Water
Wairua	Spirit, soul
Whakamā	Shame, embarrassment
Whakapapa	Genealogy
Whakawhanaungatanga	Process of establishing relationships, relating well to others
Whakatakinga	Introduction
Whānau	Extended family, family group
Whenua	Land

# Simulation in New Zealand: what have you done for me lately? New Zealand Association for Simulation in Healthcare (NZASH) white paper

Maggie Meeks, Brad Peckler, Raewyn Lesa, Trish Wood, Tracey Bruce, Michael Sheedy, Chris White, John Dean, Patrick Armstrong, Arthur McTavish, Christine Beasley, Paul Winder

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## ABSTRACT

Medical simulation has become an integral aspect of modern healthcare education and practice. It has evolved to become an essential aspect of teaching core concepts and skills, common and rare presentations, algorithms and protocols, communication, interpersonal and teamworking skills and testing new equipment and systems. Simulation-based learning (SBL) is useful for the novice to the senior clinician. Healthcare is a complex adaptive system built from very large numbers of mutually interacting subunits (e.g., different professions, departments, equipment). These subunits generate multiple repeated interactions that have the potential to result in rich, collective behaviour that feeds back into the organisation. There is a unique opportunity in New Zealand with the formation of Te Whatu Ora – Health New Zealand and Te Aka Whai Ora – Māori Health Authority and the reorganisation of the healthcare system. This viewpoint is a white paper for the integration of SBL into our healthcare system. We describe our concerns in the current system and list our current capabilities. The way SBL could be implemented in pre- and post-registration phases of practice are explored as well as the integration of communication and culture. Interprofessional education has been shown to improve outcomes and is best done with an interprofessional simulation curriculum. We describe ways that simulation is currently used in our system and describe other uses such as quality improvement, safety and systems engineering and integration. The aim of this viewpoint is to alert Te Whatu Ora and Te Aka Whai Ora of the existing infrastructure of the simulation community in New Zealand and encourage them to invest in its future.

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As the 2023 Rugby World Cup kicked off, most Kiwis hoped for a strong performance from the All Blacks. While many had faith in the experiences and skills of the players, it was also taken for granted that the players received expert coaching, performance feedback and team training. We also accepted (almost) that their performance may not always meet expectations. We need to employ the same realistic expectations of healthcare, as the delivery of healthcare is far more complex than playing a team sport. It demands that individuals engage in multiple complex interactions with one another, while demonstrating proficiency with information technology and medical equipment across various healthcare settings. Healthcare professionals fulfil these diverse roles as they collaborate to address the needs of multiple patients within the complex socio-technical healthcare system, and it is time to recognise the need to empower them for success.

Simulation is a term with a broad definition that can be summarised as “A technique that is

designed to ‘imitate’ the operation of an **existing familiar or proposed unfamiliar systems.**” Simulation has been fully integrated into industries such as nuclear power production, military and commercial aviation (high reliability organisations that have a very low failure rate considering their inherent risks).<sup>1</sup> These organisations would not consider functioning without it—indeed, we fly with Air New Zealand because we have confidence that their pilots have practised emergency situations and have received debriefings on their communication and teamwork in these simulated scenarios. Simulation-based learning (SBL) in healthcare is an educational method with a substantial evidence base for its use in a wide range of situations. For example, preparing for real clinical situations, practising for rare events, practising or testing algorithms, developing teamwork and communication skills, learning to master technical skills and testing systems.

Perhaps most significant is the opportunity to practise without patient risk.

In New Zealand, we are privileged to have

the opportunity to fully integrate our bicultural heritage into healthcare with the newly created Te Whatu Ora – Health New Zealand and Te Aka Whai Ora – Māori Health Authority. Their stated kaupapa includes embracing partnership, collaboration and community partnerships to celebrate health and wellbeing. In support of this, and building on the work of others, simulation needs to be embedded into healthcare.<sup>2</sup> The development of robust simulation curricula would empower our own healthcare community to improve their competence, confidence and wellbeing to breakdown cultural and equity barriers. This is likely to contribute to employee wellbeing and culture with improved recruitment and retention facilitating the ability of staff to deliver in line with Te Tiriti o Waitangi and Te Aka Whai Ora's kaupapa.<sup>3,4</sup>

## Our concerns

Currently, New Zealand's healthcare system possesses the foundational infrastructure for high-quality simulation and in some places there are examples of gold-standard practice. Although there is an existing infrastructure of personnel and equipment (as shown in Table 1), we are still some way from establishing a nationally agreed-upon simulation-based framework among tertiary organisations and professional colleges. The integration of SBL into undergraduate, graduate and postgraduate education for healthcare professionals is crucial. Equally essential is the recognition that interprofessional education (IPE) is foundational for ensuring that healthcare professionals share a common language, possess a clear understanding of their roles and can foster high-quality teamwork.<sup>5,6</sup> Tertiary organisations should also foster stronger collaboration with healthcare providers at the practical level to reduce the gap between being a student and being a professional. The healthcare system has historically left most clinical training to a relatively informal apprenticeship process that relies on expert colleagues sharing their own knowledge and skills while also providing the service to patients. Unfortunately, there are two main concerns with this: the first is that workload is increasing clinicians' cognitive load and, consequently, facilitating learning falls away; the second is that the emphasis is on individual knowledge and skill rather than on the performance of clinical teams. We need to re-establish a community of practice among healthcare workers and break down barriers between specialties that

include the existence of unhelpful stereotypes.<sup>7,8</sup>

Healthcare is a complex socio-technical system<sup>9</sup> (also referred to as a complex adaptive system) and as such has significant differences from the nuclear and airline industries. It is a complex and intricate system that requires both integration at the micro level (between professions and between departments) and adaptability. There is general agreement on what we want from a fully integrated healthcare system developed around the needs and safety of patients (right care, right time, with equity and efficiency). Simulation highlights redundancy as well as professional and system vulnerability. It allows us to aspire to more than just safety, using measures such as effectiveness, efficiency, equity, appropriateness, affordability and accessibility with real-time evaluation of processes and performance.

## Our staff, our teams' SBL

SBL (Table 2) has gained significant recognition as an effective educational technique to be applied within the wider educational curricula for healthcare professionals.<sup>10-12</sup> SBL enables the practice of critical thinking and decision making in the healthcare setting, promoting logical, systemic and deliberate thinking while considering bias or assumptions.<sup>12</sup> It includes skills such as interpretation, analysis, evaluation, inference, explanation and self-regulation. Undergraduate and postgraduate specialties (emergency medicine, paediatrics, surgery and some surgical subspecialties, medicine and anaesthetics) require mandatory courses that are simulation based. Some require simulation as part of their regular curriculum as dictated by the individual colleges and a few use some form simulation in their qualification and exit exams.

With this plethora of simulation techniques available, it is important that educators have a strong grasp of how to maximise the efficiency and effectiveness of learning. They need to be expert "coaches" working within a well-defined educational framework, drawing insights from prior theorists to guide their practice.

## Pre-registration (undergraduate)

There is an obvious role for SBL in undergraduate health professional education (including allied health, paramedic, nursing and medical) to efficiently enable the graduation of a technically competent practitioner with empathic

communication and teamwork skills. There is also evidence to suggest simulation can be used to substitute a proportion of mandated clinical placement hours in pre-registration nursing programmes without compromising patient outcomes.<sup>13</sup> Physiotherapy has also generated evidence supporting the substitution of clinical placements with SBL in Australia.<sup>14</sup> Clinical placements are a precious commodity and for students to fully leverage the potential opportunities, they should engage in simulation-based preparation. At a time of increasing pressure on clinical placements, it is important that students are adequately prepared to maximise their learning by practising technical and non-technical skills in simulation without risk to themselves or the patient. Well-conducted SBL with skilled debriefing can be utilised to scaffold students' learning in the most efficient and effective way. There is also the possibility that conventional training may not offer enough clinical contacts/situations to attain adequate competency in all clinical areas.<sup>15</sup> High-quality simulated experiences can also be used to upskill students to manage situations they may not commonly be exposed to in the clinical setting, such as managing deteriorating patients with complex decision making or leading a resuscitation. This training would be enhanced if it is interdisciplinary and can occur with investment in the existing simulation infrastructure.

### Post-registration (postgraduate)

Post-registration simulation is vital for consolidating undergraduate learning and for orientating students into their professional roles. It can also serve as way to test, maintain and learn new skills. SBL provides staff with opportunities to practise and refine their clinical skills. It allows them to gain confidence in making rapid decisions, performing critical procedures and recognising and managing medical emergencies.

Simulated learning environments are also an ideal educational tool for the situated learning of professionalism as they involve both the observation of practice that can be controlled for specific environmental and psychosocial stressors and debriefing with an opportunity to view video recording of one's own behaviours and encourage reflection.<sup>16</sup> SBL allows staff to explore ethical and cultural dilemmas and challenging situations that may arise in clinical practice. It should create a psychologically safe space for students or staff to be vulnerable in their reflections on

decision making, ethical reasoning and professional behaviour. By engaging in simulations, staff can effectively develop the necessary skills to navigate complex ethical and cultural issues and maintain professional standards.<sup>17</sup>

Table 2 demonstrates the inconsistency in New Zealand in the availability of simulation training in postgraduate practice. There are many reasons this may exist, such as availability of resources (time, space, equipment and expertise). Managers may lean towards clinical service demands over training responsibilities but they both are important. Clinicians are busy but like other professionals they need to be able to "practise or train" in their craft to strive for excellence. Te Whatu Ora needs to acknowledge this and make use of the existing simulation infrastructure to improve healthcare.

### Communication, collaboration and culture

Simulation has a role in developing non-technical skills, which include those communication skills such as active listening, negotiation and de-escalation that are essential in healthcare. A high proportion of patient complaints to the Health and Disability Commissioner have poor communication at their core. Unfortunately, healthcare also continues to have concerns with episodes of incivility within and between professional groups;<sup>18</sup> this has the potential to impact on the provision of patient care as well as the mental and physical wellbeing of individual healthcare practitioners.<sup>19</sup> Inter-professional socialisation as a first step in developing collaboration is well known and can have a positive contribution to collaboration within healthcare.<sup>20,21</sup> IPE has been shown to improve performance, morale, satisfaction and ultimately outcomes.<sup>22,23</sup> SBL fosters inter-professional collaboration and communication among healthcare teams. It encourages staff to work effectively together, delegating tasks appropriately and communicating collaboratively in high-stress scenarios.

The Institute of Medicine strongly recommends that teams working together should train together and the argument for teamwork in healthcare has also been summarised in New Zealand literature.<sup>7</sup> Individual teaming skills, in conjunction with teamwork, have been extensively studied and should be applied to a wide range of healthcare activities that include ward rounds and meetings, as well as situations such as the deteriorating

rating patient. These scenarios can be rehearsed in simulation and debriefed using skilled facilitators to enhance the effectiveness of teamwork in the real situations of healthcare. The ability to work effectively as a team is influenced by a variety of external factors including psychosocial factors such as culture and psychological safety.<sup>24</sup> The practise of effective teamwork requires working to a unified goal (shared mental model) as well as a core language of communication, effective leadership and a clear understanding of roles.<sup>13,25</sup> By practising teamwork in simulations and receiving feedback, staff can improve coordination, reduce errors and enhance patient safety.<sup>26,27</sup> Furthermore, simulation can be employed to both explore and teach cultural competency. Involving stakeholders in scenario designs can effectively address different cultural safety issues. Thus, simulation and provision of “safe” debriefing processes have the potential to breakdown cultural and equity barriers and teach and uphold the principles of Te Tiriti o Waitangi.<sup>28</sup>

## Our healthcare system

Healthcare is a dynamically adaptable system. At any given moment, there are physical environments that are immediately familiar to long-serving staff but unfamiliar to recently employed staff. There will be IT programs and equipment that have been in use for some time and others that are being newly implemented, and a few patients that are known and familiar to staff but many for whom this is their first experience in a hospital environment. All of this contributes to the complexity of the healthcare role and the cognitive load for each individual healthcare worker. Embedding regular simulation practice constantly evaluates current and new processes to ensure they remain fit for purpose, and simulation can also be used to evaluate new physical spaces, IT programs, equipment and policies. The use of simulation at key stages of a new hospital build may also identify potential issues with physical spaces or process errors before they result in patient or staff harm; ideally, before any issues identified become irreversible without incurring significant financial cost or impacting patients. We are aware of some real examples within New Zealand (resolved after simulation) that included doors between theatres constantly cycling open because of the sensitivity of the infrared “no touch” access, and lack of signage for wayfinding in long similar-

looking corridors delaying attendance of staff in emergencies and hindering their ability to rapidly locate equipment in a crisis. With current plans to rebuild many key tertiary centres throughout New Zealand, such as the Nelson and Dunedin hospitals, simulation could play a vital role in making sure these massive new projects are well designed, practical and well implemented.

The geography of Aotearoa can also lead to specific challenges in providing equitable care and telehealth is an expanding area that can be used both to provide support and to create simulation experiences from a distance. There have been recent developments in tele-simulation protocols fostered by the pandemic that may be applicable in the New Zealand context.<sup>29</sup>

## Quality improvement and safety

Simulation techniques have been used throughout history to improve patient care and should be considered as instruments of quality improvement.<sup>30</sup> They allow healthcare workers to practise perfecting routine aspects of their roles, such as communicating with colleagues and patients in complex stressful situations as well as practising technical procedures. When simulated patient scenarios are conducted in the clinical environment, it is possible to identify “near misses”. These risks can then be reported using a clear process, enabling them to be reviewed and managed appropriately. It is important to recognise that “work as imagined” is not always “work as done” and “work as done” processes should be continually evaluated. Many research projects have focussed on evaluating the impact of simulation to improve quality improvement processes and patient safety. Findings show that SBL enabled staff to identify and rectify errors within a controlled environment, allowing them to comprehend the consequences of their actions and learn from their mistakes. By addressing potential risks through simulation, staff can develop a proactive approach to risk management, ultimately reducing adverse events. This, in turn, can foster a culture of safety and improvement within healthcare.

There should be a close relationship between those responsible for developing healthcare environments, mapping processes, creating policies, staff wellness and SBL and those leading quality and patient safety at the governance level.<sup>2</sup> Human factors (defined as all those factors that influence people and their behaviour) is a

core component of quality and safety and simulation programs.<sup>31</sup>

## Systems engineering and integration

Systems engineering, an interdisciplinary field of engineering, focusses on how complex projects should be designed and managed. Logistics, coordination of teams, modelling, automatic control of machinery and human factors become more challenging when dealing with complex and high-stakes healthcare provision. Systems integration refers to planned, collaborative, integrated and iterative application of SBL, assessment and research activities using systems engineering and risk management principles. The goals of systems integration include excellent bedside clinical care, enhanced patient safety and improved outcomes across the healthcare system. The process involves engaging all relevant stakeholders, including healthcare professionals, educators, administrators and patients, in the redesign process. Their input is crucial in understanding the current challenges and finding innovative solutions. An example of this simulation principle, clear in most healthcare practitioners' minds, is the effective and widespread use of simulations to test systems and processes during COVID-19. The COVID-19 pandemic was a unique time, when physical environments, procedures and processes had to be modified rapidly to adapt and readapt to the evolving demands, all aimed at minimising risks to both and patients.

Simulation techniques can help implement a system for continuous improvement by regularly evaluating the effectiveness of redesigned processes and training programmes. They can also be used to explore the integration of technology, such as electronic health records, telemedicine and artificial intelligence, while keeping in mind human factors. It cannot be emphasised enough that the aim would be to enhance the efficiency and effectiveness of healthcare delivery while maintaining the wellbeing of healthcare employees, which would enable them to focus on patient care.

## Limitations

Simulation is a versatile technique with broader applications in healthcare than some might imagine. However, it is not a silver bullet. It cannot address all healthcare challenges

or completely replace every clinical experience. Embedding simulation wisely within healthcare is essential, as is recognising current constraints such as equipment availability, expertise, training, time, space, and service-related issues in our healthcare system.

## Conclusion

Developing a national strategy for the implementation of simulation is of utmost importance. As our healthcare system is redesigned, simulation techniques need to be integral in ensuring that the redesign is fit for purpose. It must be understood that simulation goes beyond being merely an advanced educational tool. Simulation has a role in highlighting issues in current systems and processes as well as helping to develop and test new processes and systems. In the context of quality and safety, it's crucial to maximise the utilisation of simulation along with ergonomic designs to create an environment where healthcare staff find it difficult to make mistakes, rather than relying solely on human intervention to uphold a system that might be faltering. Te Whatu Ora and Te Aka Whai Ora should provide a sustainable and quality simulation agenda nationally and there needs to be resources set aside at both national and local levels. This means budgeting for simulation providers/educators, equipment and training facilities. It should be factored in (budgeted for) as part of core business, not just a "nice to have" provided by enthusiasts who often do it over and above their regular jobs. We suggest the formation of a national steering committee to do a more in-depth stocktake of simulation services and make recommendations of future directions.

As healthcare organisations continue to prioritise patient safety and staff competence, SBL should be considered an essential component of professional development programmes. The current shortage of healthcare providers is an area where simulation can offer significant benefits. In response to Te Whatu Ora's call for innovative clinical placement models, we would like to draw attention to SBL environments. Partial substitution of mandated clinical hours with SBL could be a potential solution.

Extensive and authentic organisational collaboration is a must among educational institutions, healthcare providers and regulatory bodies. In the evolving healthcare and education landscape, continuous improvement and

compliance with regulatory standards will be of paramount importance. The authors hope that this paper will draw attention to the existing simulation infrastructure and initiate a dialogue regarding the place of simulation

techniques within the organisation. Finally, we hope that there will be an acknowledgement of the need of our healthcare staff for expert coaching, performance feedback and team training—just like the All Blacks.

**Table 1:** Te Whatu Ora simulation capabilities.

Hospital	Physical space	Dedicated sim FTE, #	Community outreach	Equipment	Activities	Funding staff	Funding equipment
<b>North Island hospitals</b>							
<b>Whangārei</b>	Y	None .5 fellow	Peripheral hospitals Medical centres Universities	Task trainers Paed low fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Communication education Interprofessional training Quality improvement Systems Governance	None	Hospital
<b>Auckland City</b>	Y	7.0	Peripheral hospitals Medical centres	Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Communication education Interprofessional training Quality improvement Systems Governance	Hospital	Hospital Charities Course revenue Mixed
<b>Waitematā Northshore Waitakere</b>	N	None	None	Paed low fidelity Paed high fidelity Adult high fidelity	Service specific Response to adverse events Interprofessional training	Hospital	Hospital

**Table 1 (continued):** Te Whatu Ora simulation capabilities.

<b>Starship</b>	N	4.6	Peripheral hospitals Medical centres	Task trainers Paed low fidelity Paed high fidelity Adult high fidelity Augmented reality Virtual reality	Service specific Compliance training Response to adverse events Communication education Interprofessional training Research Quality improvement Systems Facilities design Governance	Charities	Charities
<b>Middlemore</b>	Y	3.8	Ambulance Te Pūkenga Universities Peripheral hospitals Medical centres	Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Interprofessional training Systems	Hospital Course revenue	Hospital Charities Course revenue
<b>Tairāwhiti</b>	N	None	University	Adult low fidelity Adult high fidelity	Service specific Compliance training Communication education Interprofessional training	Mixed	Mixed
<b>Taranaki</b>	Y	None	None	Paed low fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Communication education	Hospital	Hospital

**Table 1 (continued):** Te Whatu Ora simulation capabilities.

<b>Lakes</b>	Y	None	Peripheral hospitals Medical centres	Task trainers Paed low fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Interprofessional training	Hospital Course revenue	Hospital Course revenue
<b>Waikato</b>	Y	2.75	Peripheral hospitals Medical centres	Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Interprofessional training Quality improvement Systems	Hospital Course revenue	Hospital
<b>MidCentral</b>	Y	1	Peripheral hospitals Medical centres	Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Communication education Interprofessional training Research Quality improvement Systems Governance	Hospital Course revenue	Hospital Course revenue
<b>Tauranga Whakatāne</b>	Y	.6	University	Task trainers Paed low fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Interprofessional training Quality improvement Communication education Systems	Hospital University	Hospital

**Table 1 (continued):** Te Whatu Ora simulation capabilities.

<b>Whanganui</b>	Y	None	Peripheral hospitals Medical centres	Task trainers Paed low fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Communication education Interprofessional training Systems	Hospital	Hospital
<b>Wairarapa</b>	N	None	None	Adult high fidelity	Service specific Interprofessional training	Hospital	Hospital
<b>Capital, Coast and Hutt Valley</b>	Y	11.1	Ambulance Te Pūkenga Universities Peripheral hospitals Medical centres International learner	Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity Augmented reality Virtual reality Moving/handling Aeroplane simulator	Service specific Compliance training Response to adverse events Communication education Interprofessional training Research Quality improvement Systems Facilities design Governance	Hospital Course revenue	Hospital Charities
<b>Hawke's Bay</b>	Y	None	Peripheral hospitals Medical centres	Paed low fidelity Adult low fidelity	Service specific Compliance training Response to adverse events Communication education	Hospital	Hospital

Table 1 (continued): Te Whatu Ora simulation capabilities.

South Island hospitals							
Hospital	Physical space	Dedicated sim FTE, #	Community outreach	Equipment	Activities	Funding staff	Funding equipment
<b>Nelson</b>	N	.6	Peripheral hospitals Medical centres	Task trainers Prem infant low fidelity Paed high fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Communication education Interprofessional training Quality improvement Systems	Hospital	Hospital Charities
<b>Wairau Blenheim</b>	N	None	None	Paed low fidelity Adult low fidelity	Service specific Compliance training	Hospital	Hospital
<b>Greymouth Te Nīkau</b>	N	.1	Ambulance	Paed low fidelity Adult low fidelity	Service specific Compliance training Interprofessional training Quality improvement Systems	Hospital	Hospital
<b>Waitaha Canterbury</b>	Y	1.5	Ambulance Te Pūkenga Universities Peripheral hospitals Medical centres	Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity Augmented reality Virtual reality	Service specific Compliance training Response to adverse events Communication education Interprofessional training Research Quality improvement	Hospital	Hospital

**Table 1 (continued):** Te Whatu Ora simulation capabilities.

				Locally developed	Systems Facilities design Governance Training equipment governance		
<b>Queenstown</b>	N	None	Universities Peripheral hospitals Medical centres	Task trainers Adult high fidelity	Service specific Interprofessional training	Hospital	Hospital
<b>Dunedin</b>	Y	2	Universities	Task trainers Paed high fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Response to adverse events Interprofessional training Quality improvement Systems Facilities design	Hospital	Hospital University
<b>University of Otago Simulation Centre</b>	Y	2.46	University	Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity	Service specific Compliance training Communication education Interprofessional training Research Facilities design	University	University Charities Course revenue

**Table 1 (continued):** Te Whatu Ora simulation capabilities.

<p><b>Invercargill</b></p>	<p>Y</p>	<p>1</p>	<p>Te Pūkenga Universities Peripheral hospitals Medical centres</p>	<p>Task trainers Paed low fidelity Paed high fidelity Adult low fidelity Adult high fidelity Simulated monitors</p>	<p>Service specific Compliance training Response to adverse events Communication education Interprofessional training Research Quality improvement Systems Facilities design Governance Training equipment governance</p>	<p>Hospital</p>	<p>Hospital</p>
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**Table 2:** Types of SBL.

<p><b>Tabletop exercises</b></p> <p>Disaster and mass casualty exercises</p> <p>Process mapping</p> <p>Paper-based simulation exercises, escape rooms</p>
<p><b>Task trainers for learning specific technical skills</b></p> <p>Airway heads</p> <p>CPR trainers, AED trainers</p> <p>IV and central venous access, interosseous</p> <p>Urethral catheterisation</p> <p>Lumbar puncture trainers</p> <p>Ultrasound identification and procedure models (echocardiography, nerve blocks, access)</p> <p>Chest drain models</p> <p>Obstetric and gynaecological task trainers</p> <p>Paracentesis trainers</p> <p>Cricothyroidotomy trainers</p> <p>Models with specific exam findings (prostate, testicle, breast, Mr Hurt, otoscopy)</p>
<p><b>Simulation manikins (high and low fidelity)</b></p> <p>ALS trainers</p> <p>Advanced simulators</p> <p>Birthing manikins</p>
Standardised patients
Animal procedure labs
Role-play
E-learning
Virtual reality
Augmented reality
Serious games
<b>Hybrid combinations of any of the modalities</b>

**COMPETING INTERESTS**

Nil.

**AUTHOR INFORMATION**

Maggie Meeks: Simulation Medical Lead for the Chief Medical Officer's Office, Waitaha Canterbury; NZASH Board Member.

Brad Peckler: Emergency Medicine Specialist and Clinical Lead Wellington Simulation Centre, Wellington Hospital; NZASH Chair.

Raewyn Lesa: Senior Lecturer and Registered Nurse, University of Otago; NZASH Board Member.

Trish Wood: Registered Nurse and Operations Manager, Douglas Starship Simulation Programme, Starship Child Health; NZASH Board Member.

Tracey Bruce: Registered Nurse, Nurse Educator and Child Health Clinical Coordinator, Waitaha Canterbury; NZASH Board Member.

Michael Sheedy: Bioengineering Team Leader, Medical Physics and Bioengineering, Te Whatu Ora – Waitaha; NZASH Board Member.

Chris White: Emergency Medicine Specialist, Taranaki Base Hospital Emergency Department; NZASH Board Member.

John Dean: Senior Professional Practice Fellow, Department of Primary Care and Clinical Simulation, University of Otago, Christchurch Campus; former NZASH President.

Patrick Armstrong: Emergency Medicine Specialist, Hutt Valley Hospital.

Arthur McTavish: Registered Medical Officer, Nelson Marlborough Hospital; NZASH Board Member.

Christine Beasley, MHealSc: Registered Nurse, Manawa Simulation Centre Manager and Simulation Lead Waitaha Canterbury, Waitaha Canterbury.

Paul Winder: Nurse Specialist and Resuscitation and Simulation Training Officer, Southern Hospital.

**CORRESPONDING AUTHOR**

Brad Peckler: Emergency Medicine Specialist and Clinical Lead Wellington Simulation Centre, Wellington Hospital; NZASH Chair.  
E: peckler1@gmail.com

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/simulation-in-new-zealand-what-have-you-done-for-me-lately-new-zealand-association-for-simulation-in-healthcare-nzash-white-paper>

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# Herpes simplex encephalitis mimicking a primary intracerebral haemorrhage

Hulya Erdogan, Musab Eltahir, Gopinath Ramadurai, Tarig Abkur

A previously healthy, right-handed 52-year-old woman developed a 2-day history of a constant generalised headache and confusion. She then had a generalised tonic-clonic seizure, which self-terminated after 2 minutes.

Her vital signs were normal. She was disoriented but lacked lateralising signs. Blood tests including glucose, complete blood count, renal function and inflammatory markers were normal.

Computed tomography (CT) of the brain showed acute left anterior temporal haematoma (Figure 1). The CT-angiogram showed no vascular abnormality and the venous phase showed completely patent dural venous sinuses.

She was admitted for observation and further investigations given the unclear aetiology of the bleed, and was commenced on levetiracetam 500mg b.d. She deteriorated further with increasing confusion and agitation. This was partly attributed to the intracerebral haemorrhage and the effect of the seizure.

Magnetic resonance imaging (MRI) of the brain performed on the second day revealed an asymmetric bitemporal T2 hyperintensity (affecting the left side more than the right), suggestive of herpes simplex virus (HSV) encephalitis (Figure 2). Subsequently, lumbar puncture (LP) confirmed the radiological suspicion with detection of a positive polymerase chain reaction (PCR) for type 1 HSV. There were 895 white cells (95% lymphocyte), elevated protein at 1.59g/l in the cerebrospinal fluid (CSF) and a normal CSF-to-serum glucose ratio.

She received intravenous acyclovir for 14 days and a repeat CSF following completion of treatment showed no evidence of active HSV infection with a negative PCR result. A reduction in the degree of pleocytosis (115 cells, 100% lymphocytes) and protein level (0.50g/l) was also noted.

She has had no further seizures. She has regained orientation and has demonstrated an improved ability to engage in a lengthier, more meaningful conversation. She scored 16/30 on the Montreal Cognitive Assessment with deficits noted in short-

term memory, verbal fluency and attention reflecting the function of the structures involved.

There are limited reports of HSV encephalitis presenting with acute hemorrhage.<sup>1,2</sup> In contrast to our patient, all the reported cases demonstrated some clues for the presence of an underlying infection including a high temperature, raised peripheral white cell count or other inflammatory markers at presentation. Due to the delay in making an accurate diagnosis in these cases, prognosis is often unfavourable with increased morbidity and mortality.<sup>3</sup>

LP may be contraindicated in patients with a large haemorrhage due to risk of uncal herniation, and diagnosis may only be confirmed with a brain biopsy after decompressive hemicraniectomy or at post-mortem examination.<sup>4,5</sup>

In our patient, the absence of infective symptoms, normal body temperature and blood test results, coupled with the acute anterior temporal haematoma seen on initial CT, diverted our thinking from considering an underlying infection.

Provided it is considered safe, we propose that LP could be considered in people presenting with cerebral haemorrhage of unclear aetiology when there is a clue for an infective aetiology. LP should also be considered in the acute phase when there is a clinico-radiological mismatch. Our patient had a small-size, early subacute haematoma at presentation (dark on T2, with a bright edge on T1), and in the absence of non-convulsive status, the imaging finding would not be expected to cause her worsening clinical picture without a hidden parenchymal involvement. Hence, in patients with unexplained cerebral haemorrhage, an MRI could be helpful by assessing the presence of any concealed disease and guiding further management. Periodic lateralised epileptiform discharges (PLEDs) are highly consistent with HSV in the appropriate clinical settings, and therefore an electroencephalogram can be extremely helpful in supporting the diagnosis of HSV encephalitis.<sup>6</sup> However, intravenous acyclovir must be administered

immediately for all suspected cases of HSV encephalitis without waiting for the results of imaging or CSF.

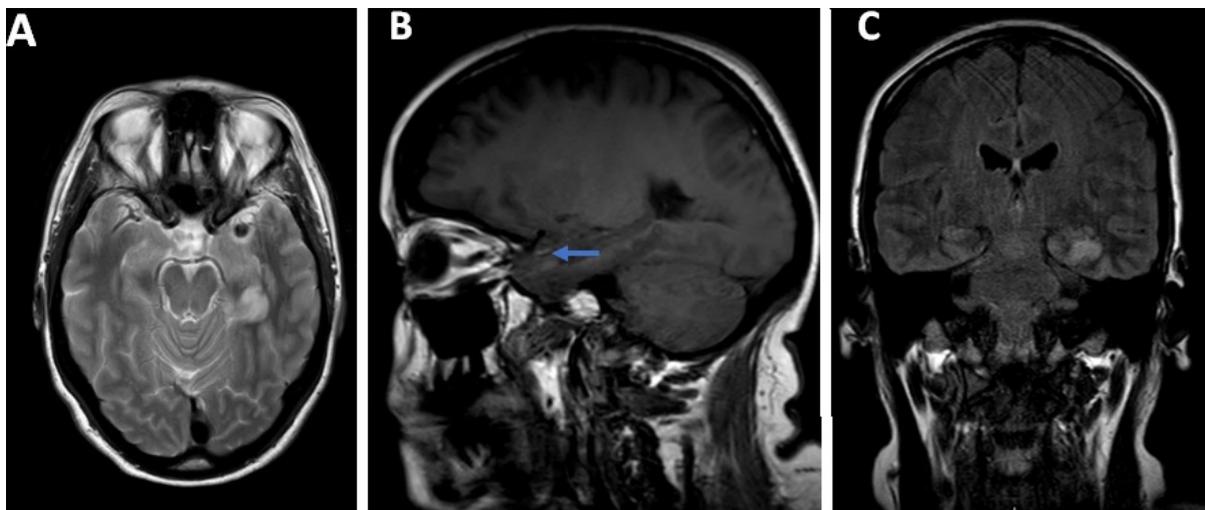
Clinicians should consider HSV encephalitis as a possible underlying aetiology for cerebral haemorrhage affecting the typical locations of

HSV encephalitis, involving primarily the medial temporal lobes but also insular cortex, inferior frontal or cingulate gyrus. Swift recognition and initiation of appropriate antiviral therapy are crucial to reduce morbidity and mortality.

**Figure 1:** CT of the brain. Axial non-contrast CT head shows a small-size left anterior temporal haematoma.



**Figure 2:** MRI of the brain: a) axial T2 MRI of the brain shows a bilateral hyperintensity in the medial temporal lobes more pronounced on the left side, and a left anterior temporal hypointensity in the area of the previously demonstrated haematoma; b) sagittal T1 shows a linear hyperintensity at the edge of the left anterior temporal haematoma (arrow); c) coronal fluid attenuated inversion recovery (FLAIR) sequence shows bitemporal hyperintensity more pronounced on the left side.



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**COMPETING INTERESTS**

The authors report no competing interest.

**AUTHOR INFORMATION**

Hulya Erdogan: Specialist Neurology Registrar,

Department of Neurology, Southmead Hospital,  
Bristol, United Kingdom.

Musab Eltahir: Specialist Neurology Registrar,

Department of Neurology, Southmead Hospital,  
Bristol, United Kingdom.

Gopinath Ramadurai: Consultant Stroke Physician,

Department of Neurology, Southmead Hospital,  
Bristol, United Kingdom.

Tarig Abkur: Consultant Neurologist, Department of

Neurology, Southmead Hospital, Bristol, United

Kingdom; Division of Neurology, Department of

Medicine, University of Toronto, Toronto, Canada.

**CORRESPONDING AUTHOR**

Tarig Abkur: Division of Neurology, Department of

Medicine, University of Toronto, Toronto, Ontario,

M5S 3H2, Canada. Ph: 001 416 603 6422;

E: Tarig.Abkur@uhn.ca

**URL**

<https://www.nzmj.org.nz/journal/vol-137-no-1591/herpes-simplex-encephalitis-mimicking-a-primary-intracerebral-haemorrhage>

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# Cancer of the Uterus.

NZMJ, 1924

By Ralph Worrall, M.D., M.Ch., *Honorary Consulting Gynaecologist to the Sydney Hospital, Surgeon to the Coast Hospital.*

*Paper to open the discussion at the Medical Conference at Auckland, February, 1924.*

**O**f knowledge of cancer it may be truly quoted:

*“How little have we gained;  
“How vast the unattained.”*

Only by pooling individual experience, by world-wide co-operative research can we hope to gain an insight into the nature, causation and means of controlling this mysterious and devastating disease. The public in all countries is impressed by the alarming increase in the death rate from cancer, and we may therefore assume it will be correspondingly easier from henceforth to raise the funds necessary for research in all directions.

It would be a mere waste of time for me to reiterate the various theories of the causation of cancer as set forth in the text-books.

My own experience supports the view that hereditary is a factor. In over 20 per cent. of my cases a family history of cancer was elicited. In one of the most recent the mother and grandmother of the patient had died of cancer uteri.

That injury and chronic irritation are powerful provocative to cancer is admitted throughout the world.

This is seen in the remarkable frequency of cancer of the skin of the abdomen in the natives of the North-West of India from wearing a copper brazier of live coals in that situation as a protection against the cold, or the unusual incidence of cancer of the œsophagus amongst Chinese in certain districts who are in the habit of swallowing almost boiling rice.

We all warn people against allowing a rough decayed tooth to remain to constantly irritate the tongue and thus favour the development of tongue cancer as in the case of General Grant, but a large proportion of medical practitioners fail to realise the danger of leaving untreated a lacerated cervix with the chronic degeneration which almost invariably follows such an injury.

This should be regarded as a pre-cancerous condition no more to be ignored than leucoplakia of the vulva or tongue.

I have seen only three cases of cancer of the cervix in nulliparæ. *Cullen* gives 2 per cent. of the victims of cervical cancer as nulliparæ, whereas in cancer of the body of the uterus over 50 per cent. are unmarried or childless.

This relatively greater frequency of cancer of the body in the unmarried or childless may be partially explained by the greater frequency of myomata in this class and the admitted power of myoma to excite cancer or undergo transformation into myosarcoma. Studying my case sheets for only the past four years I find cancer of the body and myomata associated in four patients.

Erosions of the os uteri should not be allowed to remain, whether the lesion be an infective process causing a shedding of the squamous epithelium of the vaginal portion and a proliferation downwards of the columnar epithelium of the cervical mucosa or an eversion of the cervical canal resulting from injury with proliferation as a consequence. In the former case the treatment should be three or four applications of picric acid in spirit (saturated solution), or similar agent and in the latter by plastic operation.

In the out-patient department of the Sydney Hospital there are records of three women who ignored the advice that they needed the repair of a torn cervix uteri, and who several years afterwards presented themselves suffering from cancer.

The preventative treatment of cancer of the uterus then should consist in conducting obstetric practice with such care and skill that injuries are as far possible avoided and when such injuries do occur in repairing them without undue delay.

Secondly that all sources of irritation such as erosions, cysts, neoplasms, should be treated and removed.

In dealing with the prophylaxis of cancer

of the cervix one should mention to condemn the too prevalent practice of performing sub-total, instead of total, hysterectomy when removal of the uterus is called for in such conditions as chronic metritis (bleeding uterus) or myoma associated with injured or degenerated cervix.

I hope a unanimous opinion will go forth from this Congress that to remove part of the uterus which is wholly diseased is reprehensible. Such an operation can but half cure the patient and will leave her exposed to the danger of cancer.

I have reported three cases of cancer attacking the stump of the cervix left after sub-total hysterectomy (*The Medical Journal of Australia*). Since then I have seen two other similar cases. My colleague, *Dr. Cedric Bowker*, has had one, while a considerable number have been reported in the medical journals.

**SYMPTOMS.**—Students should be taught that there are no symptoms absolutely characteristic of cancer, but that unnatural hæmorrhage and unnatural discharge are cardinal symptoms which it is the duty of the physician to explore with a thoroughness which leaves nothing to chance.

If unnatural hæmorrhage and unnatural discharge should occur at the menopause it should be at once assumed that cancer is present until the contrary is proved. Even now one hears from patients that “the doctor told them the bleeding was due to change of life.” “He made no examination.” One might justifiably use very strong language regarding such neglect of duty; it is not following the golden rule “to do as we would be done by.”

Unnatural hæmorrhage and unnatural discharge are the only symptoms which count from a curability point of view.

The string of symptoms which the student has impressed on him, such as of pain, wasting, interference with the urinary and bowel functions, cachexia, etc., are really terminal symptoms; when these are present one may abandon hope of a cure.

Diagnosis of cancer of the cervix is usually easy because it is not early. It is not early owing in some degree to the remissness of medical practitioners and largely to the ignorance of the public.

Early diagnosis being the very foundation of successful treatment this Congress might appropriately recommend the Government to give the widest publicity to medical views by inserting periodically in the public press and by posting in every post office and railway station some such notice as this:

#### CANCER.

“Curable in the early stages. Do not delay a moment in consulting a doctor if you have a lump or sore in or on any part of the body; or if you have stomach or bowel trouble, or if there is any bleeding or discharge.”

The cardinal signs of cancer of the cervix are:—  
(1) Hardness and induration throughout, even on the surface, conveying the feel of wet indiarubber; (2) friability; (3) vascularity out of all proportion to the injury inflicted by the examining finger. With this combination present the diagnosis of cancer may be confidently made.

In cancer of the body one is guided by the hæmorrhage and discharge and perhaps some slight enlargement.

Examination of the curette scrapings is unreliable and curettage dangerous. The curette is very liable to perforate the uterus owing to its softened and thinned-out condition, and apart from this risk I am inclined to think curettage favours spread. The mortality rate of ordinary complete hysterectomy is very small and justifies the performance of the operation in elderly women suffering from hæmorrhage and discharge without waiting for certainty of diagnosis. The improvement in the general health which follows the operation in such cases is very striking even when the lesion present is benign.

**CANCER OF THE BODY OF THE UTERUS.**—Since 1908 I have performed complete hysterectomy for cancer of the body of the uterus nineteen times, for sarcoma once and for chorio-epithelioma once.

In operating for malignant disease of the body of the uterus I have removed the appendages but not the parametrium or the glands.

In the series there was one post operative death (embolism)—5 per cent.

Two are known to have died within two years. Seven (15.5 per cent.) are known to be well five years or over after operation, one after four years, two after three years, four after two years and two after one year. None of the others replied to letters.

In cancer of the body then it appears that the primary mortality rate after operation is small and the prospect of permanent cure fairly good; better than that offered by radiology or any other treatment at present known.

**CANCER OF THE CERVIX.**—In moving to new offices some twenty years of my records of *Wertheim's* operation were lost. These were my earlier cases. Speaking from memory, there were

five fatalities in the series (25 per cent.).

I have notes of 40 *Wertheim's* operations since then with three deaths.

Of the 37 who survived the operation one is known to have died within the first year, three within two years, three within three years, three within four years. Two are known to be well after one year, two after three years, three after four years, three after five years, two after six years, one after seven years, and one after thirteen years. Assuming that all those of whom no tidings could be gleaned have died of a recurrence, which is unlikely, seven cases have a fair chance of cure and seven (17.5 per cent.) in all probability have been cured.

No case operated on could be said to have been in an early stage.

Operation was never refused if there seemed to be the slightest chance of success.

Those patients who died of the operation had a relatively merciful ending.

Of the survivors I know of only one who was probably worse off than before. This was a young Russian, in whom there was a recurrence or continuance of the disease and such rapid growth that colostomy for the relief of obstruction of the pelvic colon became necessary a few months after operation.

In two cases the recurrence took place in the scar of the vaginal vault. All the others in whom recurrence took place were spared the fœtor of the discharge which renders the cancer victim abhorrent to herself and those around her.

Three had a ureteral fistula following operation. One had vesical fistula from sloughing of the bladder wall off which growth had been dissected. It would have been better to have resected the wall in this case as I did in two others, in which the bladder wall was similarly affected.

Both ureters were implanted after division into the bladder in one case. The patient after recovering from an attack of pyelitis suffered no disability from the procedure. The pelvic glands were ostensibly enlarged in only three cases.

One patient was single; three were nulliparæ.

The oldest patient was 65 and the youngest 30. The pathologist reported the growth to be adeno-carcinoma six times, cylindrical celled carcinoma six times, all the others squamous celled. Two were typical papillary (cauliflower) growths; fifteen were entered as excavating (crater-like). The papillary form is the most favourable and "the boring" (intra-cervical) carcinoma the most insidious, difficult and dangerous.

The technique employed was *Wertheim's*, except that peritoneal gauze drainage into the vagina was used instead of the sub-peritoneal advocated by him. The latter appeared to me to favour ureteral fistula.

On opening the abdomen one takes a bird's eye view of the parts. A thickening and wrinkling at the junction of the bladder and uterus is ominous, indicating probable invasion of the bladder wall; if extensive this precludes hope of cure by operation.

Enlarged glands may be removed unless very fixed. In my last case *Dr. K. Inglis* reported the enlarged glands showed no evidence of cancer.

The ureters are most likely to be injured at their junction with the bladder but unceasing vigilance is necessary throughout the entire operation. After dividing both round ligaments and the peritoneum between them it is a good plan to bore the finger down between uterus and bladder exactly in the middle line, a relatively less vascular area, and then separate each side from below and outwards.

I have also practised this manœuvre which I learnt from *Professor Watson*, in separating the gall bladder when it is decided to begin at the fundus.

The handled needle which I show is of value in passing ligatures beneath deep lying veins and in securing the cervico-pelvic folds on each side.

The greatest care should be taken in handling the ureter and in separating it only to the extent necessary to remove the parametrium, thus minimising the risk of ureteral fistula from necrosis of a small area cut off from its blood supply.

A fistula may not occur for a week and is a complication producing great misery.

The operation is begun by applying the sharp spoon and cautery to the growth in the vagina; yet not too vigorously lest the bladder or bowel be perforated or the junction of body and cervix be so thinned that in the course of the operation making traction, the body comes away from the cervix, thus greatly increasing the danger of implantation of cancer cells. Disinfection of the vagina follows and care is taken to exclude the possibility of pyometra.

The *Victor Bonney* vaginal clamp is easily applied and securely segregates the growth.

In cancer of the cervix uteri dogmatic statements as to the prospects from operation are as much out of place as they are when speaking of cancer in most other regions.

There is not a surgeon who would not gladly

surrender whatever earnings he may derive from operations for cancer if only it were made clear to him that a method of treatment had arrived which gave better end results than surgery could offer.

My experience and study impel me to regretfully say "this time is not yet." I have used all the radium in the Sydney Hospital and that belonging to *Drs. McMurray and Langlow Johnson* without being able to satisfy myself that the march of the disease had been materially delayed. I have seen deep X-ray therapy tried once (inoperable cancer of cervix following sub-total hysterectomy eight years previously)—it caused much suffering and collapse and, I am informed, no real benefit.

During my medical career I have seen various treatments for cancer come and go; only surgical methods have survived. Surgery does undoubtedly cure a considerable number, while a larger number are by surgical means restored for

a time to life and hope.

By educating the people to immediately apply for treatment on the appearance of the first unnatural symptom or sign and by better technique our present results will surely improve.

Unfortunately in Australia, and in a lesser degree in Great Britain, cancer patients are split up amongst many surgeons, so that no one surgeon acquires a wide experience such as is the rule in the great clinics of Vienna, Paris, Berlin.

War experience has shown that concentration of similar cases has greatly aided successful treatment.

The best substitute for this is that pooling of individual experience which it is the object of this Congress to effect.

I have given you, I hope, a plain tale of mine, and am confident that in listening to yours I shall well be repaid for my journey of seas and lands.