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Helen Harcombe, Amy E Richardson, Emma H Wyeth, Sarah Derrett

Injuries occur frequently and are costly to individuals and society. Preventing subsequent injuries from occurring is one way of reducing the overall burden of injury. This qualitative study interviewed people who had themselves experienced multiple injury events about potential opportunities for subsequent injury prevention from their perspectives. Potential opportunities were wide-ranging including aspects relating to individuals, healthcare providers and the health system as well as broader environmental and societal aspects.

Acute otolaryngological presentations in Northland, New Zealand: analysed with respect to geography and rurality

Chelsea L Heaven, Matthew James McGuinness, Subhaschandra Shetty

Ear, nose and throat problems are seen commonly in the emergency department by emergency doctors and rural medicine specialists in Northland, New Zealand. Our paper reports on the numbers and types of problems seen and treated in rural and urban patients in the region. It supports the continuing need to target resources to centres treating rural patients with ear, nose and throat conditions.

Invasive group A streptococcal disease in Hawke's Bay, New Zealand: epidemiology, manifestations and impact

Johanna M Birrell, Bridget Wilson, Susan Taylor, Julie Bennett

Group A streptococcus is a bacterium that can enter the bloodstream and cause serious illness, referred to as "invasive group A streptococcal (iGAS) disease". This study found that, in Hawke's Bay, iGAS disease is more common in people of Pacific, Māori and Asian ethnicities, and those living in disadvantaged areas. Children under 5 years, adults over 65 years, and people with diabetes and/or chronic kidney disease are most at risk. Skin infections were the main source of iGAS disease, and further preventative action on skin health is recommended.

Evolution of sentinel lymph node biopsy for breast cancer patients in a rural setting: 10 years' experience

Anthony W K Lau, Vanessa L Lau, Magdalena M Sakowska

The lymphatic track is one of the most common pathways through which breast cancer can spread. Sentinel node biopsies are undertaken to excise the sentinel node, which indicates the first site the cancer may have spread to if it has expanded from its primary location. Two methods for detecting sentinel nodes were compared here, and a magnetic tracker in addition to blue dye was found to be more effective than blue dye alone. This study shows that the magnetic tracer introduced in 2017 has significantly enhanced early breast cancer care in a rural setting.

Psychosocial care in DHB-based stroke services in Aotearoa: a survey of current practice

Felicity A S Bright, John Davison, Ginny Abernethy

Wellbeing is often affected by stroke and should be supported by stroke services. We conducted a survey of stroke services throughout New Zealand to explore how they identified issues and how they support people with stroke. We found that there is real inconsistency within cities and across regions in New Zealand. There are limited supports available to people who are struggling after stroke. We are now developing resources to help improve services for people with stroke.

The impact of AI and ChatGPT on research reporting

Zubair M Mojadeddi, Jacob Rosenberg

ChatGPT is an AI tool that can help researchers with various aspects of writing scientific articles, such as finding relevant literature, organising ideas and even writing different sections of an article. The quality of its output has not been formally compared to human work and it has some limitations, including occasional incorrect answers. Though it's not yet on par with professional medical writers, AI tools like ChatGPT could potentially change the way research is reported in the future.

Inclusive medical education for students with disabilities: a new guidance document from Medical Deans Australia and New Zealand

Dabrina Issakhany, Peter Crampton, members of the Medical Deans Inherent Requirements Review Working Group

Medical Deans Australia and New Zealand (MDANZ) is the peak body representing all medical schools in Australia and New Zealand. MDANZ reviewed its 2017 guidelines related to selecting and supporting medical students with disabilities, and developed new recommendations. MDANZ recommends that medical schools adopt an inclusive, strengths-based approach to recruiting and supporting medical students with disabilities. A strengths-based and inclusive culture within medical schools is essential. Medical schools should adopt an individualised, context-specific and inclusive approach based on early, open dialogue with students with disabilities. As social norms and technologies evolve, regular re-examination of guidance on how to support potential or current medical students with a disability will be necessary.

Time for New Zealand to ban direct-to-consumer advertising of prescription medicines

David B Menkes, Barbara Mintzes, Joel Lexchin

The New Zealand government is this year developing a new Therapeutic Products Bill to replace the antiquated Medicines Act 1981. Among the many issues at stake is whether direct-to-consumer advertising (DTCA) of prescription medicines will continue to be permitted. Besides the United States (US), New Zealand is the only other high-income country that allows unrestricted DTCA, including both the name of the drug and its indications. Most other countries allow unbranded "disease-oriented" advertising, which falls outside the scope of pharmaceutical advertising regulations.

The nearly universal prohibition of DTCA is widely regarded as a health protection measure, especially for newly marketed drugs. In a survey of 300 new drugs approved in the US during 2002–2014, relatively small numbers of people (median 1,044) were exposed to the drugs pre-market,[1] too few to discover infrequent but significant adverse effects. More generally, drug-related harms are a common, often preventable cause of emergency department visits and hospitalisations,[2] underpinning the rationale to treat prescription medicines differently from over-the-counter and other consumer products.

Despite the New Zealand Labour Party historically opposing DTCA, the current Labour Cabinet has proposed that DTCA should continue based on four key arguments,[3] summarised here in relation to the research evidence:

Claim 1: the existing combination of government monitoring and industry self-regulation of DTCA is adequate.

This claim is manifestly false. The present arrangement is unable to ensure that ads contain accurate information on either benefits or harms of medicines, or on how advertised products compare to other available treatment options, including lifestyle modification.[4] Neither Medsafe, the New Zealand regulatory authority, nor the Commerce Commission proactively monitor DTCA; any monitoring occurs only after ads have appeared. On the industry side, the Advertising Standards Authority (ASA), an amalgam of media and communication agencies and advertisers, has developed the Therapeutic Products Advertising Code, while Medicines New Zealand, a lobby for research-based pharmaceutical companies, covers DTCA in its Code of Practice. The maximum penalty for Code violations is $80,000, unlikely to be a deterrent for multinational companies.

Claim 2: prescribing and drug expenditure triggered by DTCA may be beneficial

While stimulated prescribing may be appropriate and useful in some cases, a key question is the extent to which this is outweighed by the unnecessary or harmful prescribing that also follows DTCA. The best evidence bearing on this question comes from a controlled trial of brand-specific requests to prescribing doctors. Simulated patients were randomised to present scenarios of clinical depression or "adjustment disorder"—temporary distress for which pharmacotherapy is inappropriate. Requests from patients with adjustment disorder stimulated prescribing to a far greater extent than requests from patients with treatable depression.[5] Complementary evidence showing that DTCA-stimulated prescribing can be both inappropriate and harmful comes from a study of patients requesting advertised COX-2 inhibitors rofecoxib or celecoxib.[6] Combining survey data and health records, the authors found that patients responding to advertising were four times as likely as others to receive an inappropriate prescription. Rofecoxib (Vioxx) was heavily advertised for 5 years prior to its worldwide withdrawal in 2004. The VIGOR trial published in 2000 was the first to establish an increased risk of myocardial infarction with rofecoxib;[7] New Zealanders viewing Vioxx advertisements in the years that followed were not informed of this, with avoidable deaths a likely consequence.

Claim 3: people with lower educational status, poorer health or from an ethnic minority are more likely to seek care because of DTCA

While this is presented as a positive attribute, it is taken out of context from a New Zealand study that concludes DTCA may lead to "…*the misuse or overuse of medications for diseases that may otherwise be improved by a healthier lifestyle*",[8] illustrating the importance of accessible and balanced health information for all sectors of the community. This survey found that those tending to rely on advertising reported less healthy lifestyle habits, suggesting that DTCA may have contributed to poorer life and treatment choices. Studies in the US found that exposure to statin DTCA was associated with inappropriate prescription to those at low risk of cardiac events,[9,10] suggesting DTCA can lead to both over-diagnosis and over-treatment.

Claim 4: a more informed society enables better conversations and relationships between patients and prescribers

While a well-informed public is to be encouraged, this argument is undermined by evidence of the poor quality and misleading information typical of DTCA, irrespective of whether it comes from broadcast, print or online advertising.[4] For example, an analysis of 61 ads televised during prime time in the US in 2016 found few (16%) with educational content regarding risk factors, contrasting with almost universal (94%) emotional appeals linking the advertised medicine to recreation and other positive experiences.[11] Only 7% discussed lifestyle change as an adjunct to medicine use, none as an alternative. Another recent analysis of the 81 most heavily advertised drugs in the US found that only 20 (24.6%) were rated as having high therapeutic value.[12] Despite existing regulations, the content and style of televised DTCA undermine industry claims of educational and public health value. Proponents of DTCA also tend to disregard doctors' reports of unwelcome pressure to prescribe advertised medicines[13] and the time it takes to resist inappropriate requests.

Conclusion

In conclusion, the government's main arguments for allowing DTCA to continue in New Zealand are both unsustainable and bear remarkable similarity to those advanced by Medicines New Zealand, a body representing the pharmaceutical industry.[14] This coincidence may reflect the virtually unregulated access that lobbyists have to senior government officials in this country.[15] In any case, available evidence indicates that banning DTCA would help to promote population health by reducing over-diagnosis, over-treatment and iatrogenic harm.

COMPETING INTERESTS

Nil.

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Opportunities for preventing subsequent injuries: a qualitative study exploring perspectives of people who have experienced injuries

Helen Harcombe, Amy E Richardson, Emma H Wyeth, Sarah Derrett

ABSTRACT

AIM: This study aims to examine opportunities for subsequent injury prevention from the perspectives of people who have recently experienced subsequent injury events.

METHODS: This qualitative study involved individual semi-structured interviews with people who had >2 injury events in the previous 12 months. Interviews were audio-recorded, transcribed verbatim and thematic analysis undertaken.

RESULTS: Sixteen interviews were completed with participants who had experienced a range of index and subsequent injury types. Potential opportunities raised were wide-ranging. Some related to individuals, e.g., motivation to carry out prevention strategies. Other opportunities were related to healthcare providers and the health system. For instance, increasing consultation times to allow a focus on subsequent injury prevention, building rapport and tailoring their approach to the individual, proactively referring people to a range of healthcare providers, and ensuring people are aware of resources and supports available following injury. Broader environmental and societal opportunities were also suggested, such as ensuring adequate social support following injury, ensuring accessibility to rehabilitation and community facilities and the modification of built environments.

CONCLUSION: A broad range of potential opportunities to prevent subsequent injuries were raised. These opportunities are promising and future research to trial interventions raised in this study is warranted to determine their feasibility and effectiveness.

People can experience multiple injury events over time. Preventing subsequent injuries (not necessarily the same type or cause as an index injury) is one way to reduce the overall burden of injury which is considerable, comprising 10% of the disability burden globally.[1] The financial burden is also high with injury claims costing the Accident Compensation Corporation (ACC, New Zealand's universal no-fault injury insurer) $5.2 billion NZD in 2020/21.[2] The incidence of subsequent injuries is substantial, making it an important and specific contributor to this burden. In a previous study, 38% of participants had >1 subsequent injury claim in the 12 months following an ACC entitlement claim (involving compensation for >1 week off work or other rehabilitation assistance); by 24 months this had risen to 58%.[3] Other studies examining specific injury types,[4] or population groups such as workers,[5,6] also report a high incidence of subsequent injury.

Importantly, when someone is injured, there may be an opportunity to intervene to prevent subsequent injuries. For specific injury types, particular techniques or treatments may reduce re-injury, e.g., neuromuscular training among those presenting with an ankle sprain helping prevent future ankle sprains.[7] Previously, a range of predictors of subsequent injuries (of any type) have been reported among a general injury population.[8,9] Factors associated with an increased risk of subsequent injury included the index injury being caused by assault,[8] having >2 chronic health conditions,[9] and having a prior injury affecting them.[9] While knowledge of these factors may inform targeted prevention initiatives, the nature of initiatives to address such factors may warrant a wide-ranging approach. A recent study has examined the prevention of subsequent injuries from the perspectives of healthcare providers.[10] However, it is also vitally important to also consider the perspectives of people who have experienced subsequent injuries. This study aims to examine opportunities for subsequent injury prevention from the perspectives of people who have recently experienced subsequent injury events.

Methods

This qualitative descriptive study[11] recruited participants via advertising on community noticeboards and healthcare provider clinics. Potential participants were required to be aged >18 years and to have had >2 injury events requiring some form of treatment in the previous 12 months. Participation involved an individual face-to-face semi-structured interview conducted by AR, who is experienced in conducting qualitative interviews. The interview guide included questions about opportunities for subsequent injury prevention, as well as about actions health professionals could take to prevent subsequent injuries for their patients. Participants received a $20 NZD voucher.

Interviews were audio-recorded, transcribed verbatim and then thematic analysis was undertaken.[12] Initially AR and HH independently developed a draft coding framework based on two interview transcripts. These were discussed with the wider research team to determine a final coding framework that was applied to four transcripts independently by AR and HH. Coding was compared and discrepancies discussed and resolved. The framework was applied to the remaining transcripts by AR. Analyses were carried out using NVivo 12 software.[13] Ethical approval was obtained through the University of Otago Human Research Ethics Committee (Health) (H19/034).

Results

Sixteen interviews were completed, lasting between 23–56 minutes. The majority of participants (n=12) were aged 18–30 years; 12 were female and the majority (n=11) reported sole New Zealand European ethnicity. Participants had experienced a range of injuries including fractures, sprains, low back injuries and concussion.

Participants held a variety of views about subsequent injury prevention. Ideas ranged from asserting that individuals were primarily responsible for preventing their own subsequent injuries, to healthcare providers having a key role in preventing subsequent injuries. Others discussed broader societal and environmental aspects. Potential opportunities have therefore been categorised for discussion as: 1) the individual who has experienced an injury, 2) healthcare providers, 3) healthcare systems and processes, and 4) environments and broader contexts.

The individual who has experienced an injury

Attention to subsequent injury prevention

Some participants recognised that they themselves were not always focused on subsequent injury prevention. A lack of attention occurred particularly when people were busy, had other priorities/competing demands or when they were fatigued or distracted (Quote[Q]1, Table 1). Increased awareness of injury prevention and the consequences of actions was recommended (Q2). However, even when people were aware of prevention strategies, these were not always remembered, and it was suggested it could be beneficial to ensure that prevention advice is visible at times when people are undertaking activities that may cause injury (Q3).

Modification of activity

The idea was raised that to prevent subsequent injuries people could sometimes better recognise their own limits and be willing to not undertake activities/tasks beyond their capabilities (Q4). Correspondingly, there could be increased acceptance of individual's limitations from others (Q5). It was also noted that sometimes people felt they had to, or wanted to, continue with their activities, regardless of injury risk (Q6). A balance between reducing or modifying particular activities to prevent injury and a desire not to restrict activities were also raised (Q7). A desire to know about a range of options for activity was expressed (Q8).

Motivation

Persisting with rehabilitation to prevent subsequent injuries was recommended (Q9); however, it was also noted that people might not be motivated to carry out prevention strategies when benefits may not be immediately obvious (Q10). The nature and severity of the presenting injury and possible consequences were noted to affect injury prevention motivation (Q11).

Attitudes

Overarching attitudes towards injury and injury prevention could also potentially influence subsequent injury prevention with some feeling that injuries "could happen to anyone" (Participant[P]10), while another participant raised that sometimes people would not expect that they would be injured (Q12). The idea was raised that subsequent injury prevention may be dependent on people's attitudes towards the severity of their presenting injury, and that attitudes could vary between people (Q13). Participants noted that negative attitudes towards preventive equipment could be problematic when this was an optional requirement, or when requirements changed over time (Q14, Q15).

Healthcare providers

Focus on subsequent injury prevention

Having healthcare providers specifically focus on preventing subsequent injuries, as well as treating the presenting injury, was felt by some to be an important opportunity (Q1, Table 2). However, this did not always occur (Q2), with a lack of time perceived as a potential contributor (Q3, Q4). Participants noted they did not necessarily know, or think about, preventing subsequent injuries themselves and such information from healthcare providers would be useful (Q5–7).

Relationships/rapport

While interactions with healthcare providers were noted as offering opportunities for preventing subsequent injuries, having a good relationship/rapport between healthcare providers and the person injured was felt to be critical. With good rapport it was suggested those injured might be more likely to be open with their provider, enabling the provider to have a better understanding of the underlying cause of injury. Alongside this, it was felt important that providers took time to get to know the person and their injury to tailor their approach to that person (Q8–10) including gaining an understanding of their attitude towards preventing subsequent injuries (Q11). Good rapport could also mean that people may be more inclined to listen to advice and recommendations from healthcare providers (Q12). Ensuring healthcare providers were not perceived as judgemental was raised as important for helping people access healthcare for their injuries (Q13).

Providing alternatives and taking a proactive approach

Rather than taking a didactic approach, providing people with alternative activities for the rehabilitation/recovery phase was felt important (Q14). Healthcare providers proactively offering support and referring people to other appropriate healthcare providers was also raised as an opportunity for subsequent injury prevention (Q15).

Healthcare systems and processes

To facilitate healthcare provider actions focused on preventing subsequent injuries, a range of aspects relating to healthcare systems and processes were discussed.

Time

Increasing healthcare appointment length was raised as enabling an increased focus on prevention (Q1, Table 3). Correspondingly, increasing the number of healthcare professionals was also mentioned (Q2).

Specific proactive approaches

A targeted focus on those with multiple injury events was suggested (Q3). One idea was that people experiencing multiple injury events could automatically be connected with healthcare providers to help prevent subsequent injuries (Q4). Routinely asking people questions about whether they might need to see an allied health professional within healthcare settings, such as emergency departments (EDs), was also suggested (Q5, Q6). Ensuring people are aware of the resources and supports they may be able to access following an injury was discussed (Q7, Q8), as well as ensuring timely access to equipment (Q9). It was suggested there could be a dedicated person within hospitals to ensure people have the required equipment and other injury prevention aspects in place prior to discharge, as a way of helping prevent subsequent injuries (Q10). It was also suggested that a range of healthcare providers could provide subsequent injury prevention advice (Q11).

Costs

One participant suggested that if people had to pay for their treatment, if the same injury was occurring multiple times, they might have fewer similar injuries (Q12). However, costs of seeing healthcare providers were also noted as barriers to treatment, with people not completing their rehabilitation negatively impacting on subsequent injury prevention (Q13).

Resources

It was suggested that resources communicating information about preventing subsequent injuries could be provided through a range of approaches, including brochures, posters and websites (Q14); however, these should be engaging and "fun" (P6). It was noted there could potentially be an increase in programmes such as falls prevention programmes and that prevention programmes like these could be advertised across a range of settings e.g., "church groups… or social service agencies" (P13), as well as within

Table 1: Quotes relating to the individual who has experienced an injury theme.

Q1	*"It's always me trying to rush or run out to the car… I need to be much more aware of preventing further injuries. I just forget, you know."* (P8)
Q2	*"Everyone needs to be a little bit more aware of what they're doing, who's around them kind of, you know, just spatially aware and it would make things a lot easier and safer."* (P6)
Q3	*"All of this information is in front of you but at the same time, it's easy to forget… So I guess there should be some kind of like, you know like some kind of preventative measure, like information or notes or like videos or something that's on display."* (P14)
Q4	*"If you can't lift something, you can't lift something."* (P11)
Q5	*"More acceptance maybe that people can't do everything."* (P10)
Q6	*"So I couldn't stop, like just yeah, 'cause I have to keep training."* (P9)
Q7	*"I'd still rather live a good life and risk getting injured and get injured but you know, not wanna live my life kind of wrapped in cotton wool with injury prevention being my number one focus… I think it's, like in some cases, yes we definitely need to be focussing on injury prevention because where it can be prevented 100% but I wouldn't want people to kind of be so scared of getting injured and not do anything fun with their lives."* (P1)
Q8	*"Give someone a few more options because people perhaps don't know."* (P6)
Q9	*"Don't go oh I feel better now so I'm gonna stop everything, you know keep going with the treatment and make lifestyle changes as well 'cause it's the only thing that's gonna prevent it in the future."* (P3)
Q10	*"I would probably be less likely to do the exercise and things… when you're not gonna see… it doesn't give me any problem anyway so it's like why…"* (P2)
Q11	*"Depends on the injury whether or not you're motivated to follow the rules, not the rules but the recommendations given to you… Yeah and whether or not that injury may produce future problems for you… you're gonna be thinking okay well I don't want that."* (P10)
Q12	*"It's very much like ah she'll be right, it's not a problem and yeah I can do that, I'll just do that, that's not a problem, bang off you go."* (P6)
Q13	*"Some people will be like oh ok, I'm not gonna be drinking for a while, it was really silly or some people are like meh, it's just surgery, you know, like no big deal."* (P12)
Q14	*"Like those sort of like optional stuff that I mean, we can prevent it, but a lot of people don't like it."* (P9)
Q15	*"I didn't need [protective equipment] before then why would I need them now and that wasn't like a mandatory thing to wear…"* (P9)

Abbreviations: Q= Quote; P= Participant.

Table 2: Quotes relating to the healthcare providers theme.

Q1	*"Seeing people about your injuries and probably them telling you how you can stop getting further ones, that's probably the best way to sort of really tell people sort of in a one-to-one setting I guess, to stop them getting further injuries."* (P7)
Q2	*"Let's put that on the ACC form and then move on kind of, like there was no like working on ways to prevent it in that case."* (P1)
Q3	*"You've got a lot who focus on just treating what's presented to them rather than preventing but if you go to a GP, it's only a 15-minute consultation…"* (P11)
Q4	*"They do not have that much time for each patient so that's why like they're always in a hurry and stuff but yeah, I can totally understand that and yeah so not quite much of a prevention I guess…"* (P9)
Q5	*"Trying to think about ways I could prevent them, it kind of isn't like front of my mind… so I think if we had that pointed out kind of from day one…"* (P1)
Q6	*"Just letting them know what's going on, like even like if it's, whether it's just preventative… like whether you tell them not to do something or whether you just aid them in doing the right thing, I feel like could make quite a big difference."* (P12)
Q7	*"He was the first doctor to me that actually explained what was wrong… the more information you know about it, the more risks involved, the more likely you are to take care of it."* (P10)
Q8	*"Sometimes they might use the general method, so like they probably have like guidelines where people got their injuries… for some people, it might be too boring and it's not interesting as well."* (P9)
Q9	*"I think that little, extra couple of questions, extra little bit of research just can help that prevention in the future."* (P8)
Q10	*"So I think background and history of when falls happen needs to be forefront as well, you know, you hear of kids all the time oh I fell off my skateboard, it's like ok but then if they say I fell off my skateboard three times in a week..."* (P8)
Q11	*"Getting to know the patient… and also their attitude towards it as well, whether or not they're determined to prevent it…"* (P10)
Q12	*"We were just engaging… straight away I was just like ok I liked him, I think naturally I was just listening to him more."* (P10)
Q13	*"Being able to support people to access health advice in a way that isn't derogatory or judgemental. Injury prevention is mental as much as it is physical."* (P15)
Q14	*"Not just telling people not to do, but providing with the alternatives."* (P5)
Q15	*"I think just offering people that extra support, you know like hey you've had this fall, would you like a visit from an occupational therapist... 'cause you don't think about it, you don't go to the doctor and say I've had a fall, can I have a physiotherapist appointment."* (P8)

Abbreviations: Q = Quote; P = Participant.

Table 3: Quotes relating to the healthcare systems and processes theme.

Q1	*"Making GP appointments longer for the same cost [to the injured person] even would be something that would be great."* (P15)
Q2	*"You know, if you've got one physiotherapist for 1,000 people, they're never gonna be able to put that extra effort into every person…"* (P8)
Q3	*"I think that little bit more time invested into those certain people, especially with repetitive falls and things, there needs to be something happening, it needs to be looked at."* (P8)
Q4	*"Ideally in a great world, every single person that has an injury within six months of having another injury should have a [healthcare professional support]…"* (P8)
Q5	*"They have the big list when they go to ED, you know 'Are you a drinker?', 'Are you a smoker?'… Even just adding onto the bottom of someone's form would you like to see an occupational therapist? Or would you benefit from a physiotherapist appointment may just be the easiest thing to do and it could change that subsequent injury, you know… it's that little question at the end of the bottom of the thing, that's already at ED, it would be so easy to implement and wouldn't really use up a lot of resources, you know, but would make sure that people had that option if they needed it or if they wanted it, you know."* (P8)
Q6	*"Just an offer of, even just hey would you like to spend half an hour with a physiotherapist talking about what you've done and how we can prevent it happening again would be huge. It would, I think, would stop a lot of injuries, a lot of subsequent injuries."* (P8)
Q7	*"They're like ok go and follow this up with physio and then it's you know, one week or whatever, two weeks… you don't know that you're entitled to things… and you go oh gosh I wish I had known about this."* (P1)
Q8	*"You can go home and then that's it, they never kind of see you again or anything like that and then you go home and you're like ok, well now I'm on my own, who can I call if I need anything, like who do I talk to and then you ring ACC and then it takes ages and all of that kind of thing."* (P1)
Q9	*"I think if there was something that we could do, it would be kind of getting, making sure that that kind of equipment, that can prevent re-injury, is available from day one."* (P1)
Q10	*"I know it's like really hard but to have someone in the hospital that kind of can focus on, just making sure that the four patients who are injured are like discharged or whatever, that they do have like the right equipment that they need and like they've got someone there to support them or like if they don't, then some sort of support is arranged for them so that at least they go home feeling kind of, like they can manage because I think otherwise like if you don't know, as well, like how to prevent injuries."* (P1)
Q11	*"I think the nurses probably, they can play a bigger role in educating their patients"* (P13)
Q12	*"If you break the same leg in the same place in the same manner three times, fourth time you're paying for it."* (P3)
Q13	*"Because they're so expensive, they probably don't get people coming back so much, like just to see them for one time and, yeah so just not enough time with the people to really tell them what would be a good thing to do to sort of help improve things I s'pose."* (P7)
Q14	*"All the pamphlets and stuff at the doctors are great. You know, those are prevention, but perhaps they don't need to be pamphlets. Perhaps they can be a little bit um... like a poster that has not many words on it…"* (P6)
Q15	*"Probably from the GP clinics, they've got the most power, they're the most that these people would see of anyway aren't they and they could push that message better."* (P13)

Abbreviations: Q = Quote; P = Participant.

Table 4: Quotes relating to the environments and broader aspects theme.

Q1	*"I think 100% having some sort of support is just so important and I know that a lot of people kind of don't have that because they live alone… especially if somebody's, this is their first injury or they're new to crutches or new to using any of the equipment that they use and anything like that, that's when a lot of re-injuries kind of or different injuries even occur because they've fallen and things like that and then they're by themselves and they don't have the support whereas if you've got the support, I guess either it doesn't happen because somebody's doing the task for you that it's really just too tough or they're helping you do the task or making sure that you don't fall and things like that."* (P1)
Q2	*"Definitely having like support people like you know, can you drive me to… yeah people supporting you so you don't have to push yourself too far 'cause if you push yourself too far, you know, you can injure yourself more, do a different injury."* (P16)
Q3	*"A lot of people who don't have support are often in poverty so like you know, rich people can afford to have, like pay someone to come in but people like below the poverty line don't have that luxury so even like a free service which I know is like not extremely realistic but having like a service that, even just like funded through ACC… workers who come in and shower her in the morning, get her lunch, so something like that but for people who have injuries."* (P16)
Q4	*"You know, if your mental health's bad, you just don't care, so you know I'm gonna walk across the road, I don't care if I get hit."* (P16)
Q5	*"Making sure that the ACC and financial stuff comes in and that making sure they're not, people aren't having to force themselves back into situations where they could be at risk again."* (P2)
Q6	*"You've got a community services card, cool, that's really good for that so I can go to the pool for $4 for that but if… say, it's $6 or $7 a trip and you think that's twice…"* (P6)
Q7	*"I think because it's pricey as well, the equipment, so like not a lot of people want to buy it."* (P9)
Q8	*"There could be more lighting, there could be just better footpaths that are not uneven and sort of broken."* (P15)
Q9	*"Just having those same things somewhere less clinically, like somewhere less, like somewhere visited without a purpose."* (P14)
Q10	*"Like gyms and things where injuries occur and like they all have signs and warnings and you just, a lot of its common sense I guess, but yeah, so it shouldn't be their responsibility to like…"* (P2)
Q11	*"Probably targeting people who are engaging in certain types of high-risk sports."* (P9)
Q12	*"Start focusing your knowledge base on your elderly people and help them out."* (P3)
Q13	*"Work is a big part of everyone's life, they're there nine hours a day, so you're there, that's probably where you're gonna injure yourself the most…"* (P11)
Q14	*"I like the idea of when you've got an employer who goes through… like the two day inductions… and they go through how to prevent injuries and what kinds of things…"* (P11)
Q15	*"Having work places have to have at least enough staff on to facilitate having good breaks and making sure people get their breaks."* (P15)
Q16	*"Making sure there's sufficient staff… more time and more people."* (P11)
Q17	*"It's like people: enforce it, you know… Don't turn a blind eye… No more she'll be right 'cause it won't be right, it's the reality. Enforce what's there and prevent what's there."* (P3)

Abbreviations: Q=Quote, P=Participant.

healthcare settings, particularly through general practitioner (GP) clinics (Q15).

Environments and broader aspects

Social support

Family and social supports were highlighted as being of particular importance following injury, and specifically in helping prevent subsequent injury (Q1, Q2, Table 4). There could potentially be an opportunity for providing funded support if people did not have adequate social support (Q3). Support was noted to provide both practical support such as assisting with tasks, as well as emotional support. Correspondingly, the idea of the importance of mental health in injury prevention was also raised (Q4).

Financial aspects

Participants noted that people's financial situations could mean they returned to work earlier than they should, and that providing adequate financial assistance was an opportunity for subsequent injury prevention (Q5). Cost was noted as a barrier to some prevention activities, such as accessing community facilities like gyms and pools (Q6) and obtaining safety equipment (Q7). Accessibility issues were not just limited to costs, however, with other practical issues such as transport and parking also noted.

Broader environments

Opportunities to prevent subsequent injuries through modification of built environments included addressing slippery and hazardous surfaces and ensuring good lighting (Q8). Opportunities for other settings were also raised e.g., implementing injury prevention education in schools. Gyms were noted as a setting where there may be opportunities to make people aware of injury prevention e.g., by having proactive staff and information available. This also aligned with a recommendation that information (e.g., brochures) about injury prevention be provided in non-clinical settings (Q9). However, others raised the idea that although they felt gyms and other facilities had a certain level of responsibility for prevention, there was also a degree of individual responsibility required in such spaces (Q10). The idea was raised that there could be a targeted approach focusing on high-risk sports (Q11) or among particular population groups, such as the elderly (Q12).

Work environment

The importance of work settings was highlighted, with it noted that work is where many people spend a lot of time (Q13). The idea was raised that there seemed to be an increased awareness and focus on health and safety compared to the past. Participants appreciated employers taking "a proactive approach" (P11) and felt health and safety inductions were important (Q14). An opportunity to prevent subsequent injury in the workplace included adequate staffing levels. This aligns with ideas raised about allowing staff adequate breaks (Q15) and adequate time to carry out work tasks (Q16). The enforcement of health and safety at work was also considered important for subsequent injury prevention (Q17).

Discussion

This study has explored potential opportunities for subsequent injury prevention from the perspectives of people who have had multiple injury events. Suggestions were broad, ranging from those centred on individuals, those that could be implemented by healthcare providers and within health systems, as well as broader societal and environmental modifications.

As with many preventive actions, participants noted the benefits of such actions are, by their nature (i.e., preventing something from occurring), often not immediately obvious,[14] highlighting the importance of effective strategies to enhance people's motivation with preventive activities. Aspects relating to individuals, such as motivation, attitudes and awareness, underscore the importance of the way that subsequent injury prevention strategies are communicated. Participants noted a range of communication approaches could be utilised. This aligns with previous research advocating that the communication of injury prevention strategies be based on communication theory.[15] Suggested guidelines include using a range of media and voices to convey prevention information to reach different groups and populations, focusing on keeping key messages simple and "encouraging the confidence to make change" (p.262).[15] Participants noted they were less cognisant of subsequent injury prevention when they were distracted or fatigued highlighting the importance of being cognisant of the underlying principles of injury prevention more broadly, for example the benefits of also employing passive strategies that do not require specific actions by individuals.[16]

Participants suggested many potential subsequent injury prevention opportunities in people's interactions with healthcare providers and one recommendation was that healthcare providers explicitly include subsequent injury prevention as part of their practice. However, to do this, healthcare providers need to have the time to be able incorporate this into their interactions with patients; they need to feel that it is part of their role and they need to have the skills and knowledge to be able to offer appropriate advice and strategies to their patients. While prevention is within the scope of practice of healthcare providers who treat people following injury such as physiotherapists,[17] emergency physicians[18] and GPs,[19] some participants noted that subsequent injury prevention was not part of their interactions with their healthcare provider and noted that time pressures within clinical interactions may be a barrier to incorporating subsequent injury prevention. As well as addressing underlying issues such as staffing shortages which could affect time pressures for healthcare providers, incorporating subsequent injury prevention strategies that are not only effective, but also time-efficient, may facilitate their incorporation into consultations with healthcare providers.

Thinking beyond individuals and individual healthcare providers, a range of health system level opportunities were suggested. Having a process where those injured multiple times were given additional support/attention from healthcare providers was suggested. Correspondingly, it was noted that healthcare providers should consider the injury history of the person and address/examine any potential underlying causes. However, there can be barriers to people obtaining treatment from healthcare providers, such as cost and accessibility issues. Addressing these barriers are important to enable people to complete their full rehabilitation programme, as raised by participants in this study, and previously by healthcare providers.[10] Having someone within healthcare settings dedicated to injury prevention was recommended. Having a dedicated injury prevention champion is not routine in New Zealand healthcare settings although champions have been recommended in specific areas, such as wound care in aged care facilities,[20] and healthcare navigators have been used in areas such as cancer care.[21] Internationally, trauma prevention co-ordinators are mandatory in some places such as trauma centres in the US, with these centres also required to undertake injury prevention activities.[22] The involvement of a range of healthcare professionals in subsequent injury prevention in different settings was recommended in this study. One suggestion was that a question about whether the injured person should see an allied health professional could be routinely included in consultations. Specific programmes incorporating a range of healthcare providers have been found to reduce subsequent injuries. For example, in Australia, people attending a fracture prevention clinic following a minimal trauma fracture ED presentation were found to have fewer subsequent fractures over the next 24 months.[23] This clinic was co-ordinated by a fracture prevention nurse and involved a rheumatologist and referral to a falls prevention clinic or other relevant programmes as necessary.[23]

While actions at the level of individuals and within the health system are important, as noted by participants, wider societal/environmental/policy opportunities are also important. Ensuring that people have adequate social support following an injury is something that participants recommended. This aligns with findings of a previous study examining the perspectives of healthcare providers,[10] and may be something they could examine in their consultations with injured people. However, there also needs to be processes in place for healthcare professionals to be able to refer people to appropriate places/services if this is to be accompanied by action. In addition to social support being important for subsequent injury prevention, the reach of some interventions provided following injury may also extend beyond the individual who has been injured to those providing social support such as family, friends and colleagues. It was noted that continued cognisance of injury prevention opportunities within the built and natural environment for councils and town planners is also important for subsequent injury prevention.

A strength of this study it that it has considered opportunities for subsequent injury prevention from the perspectives of people who themselves have experienced multiple injury events. However, the study had a small sample, and although participants included a range of ages and ethnicities, most were female, aged between 18–30 years, and none were Māori. It is important that all these perspectives are considered in the development of any future interventions. In particular, it is important that future research and intervention development ensures the perspectives of Māori are included. Māori experience greater injury-related health loss[24] and poorer outcomes following injury compared to non-Māori.[25,26] Subsequent injuries occur frequently with a previous study of 566 Māori who had injury involving an ACC entitlement claim reporting that 62% had at least one subsequent injury ACC claim in 24 months.[27] In addition, this study has examined subsequent injury prevention opportunities in general rather than focusing on a specific injury type, severity or mechanism of injury. Particular injury types or mechanisms may have specific prevention opportunities that are important, however, such as examining specific injury types, severities or mechanisms was not within the scope of this study.

A range of potential opportunities to prevent subsequent injuries have been suggested. Importantly, these are from the perspectives of those who could directly benefit from such interventions—people who have experienced multiple injury events. While there would be a financial cost to implement some of the suggested interventions, the costs (financial and otherwise) of subsequent injuries are high, not only for individuals but also for wider society. Future research to trial interventions suggested in this research is warranted to determine their feasibility and effectiveness.

COMPETING INTERESTS

Nil.

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Acute otolaryngological presentations in Northland, New Zealand: analysed with respect to geography and rurality

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ABSTRACT

AIM: Otorhinolaryngology, head and neck surgery (ORL) diagnoses and treats disorders of the ear, nose, throat, head and neck which can be commonly seen across a range of medical specialities. Rural patients experience a burden of ORL diseases and face greater barriers to healthcare than their urban counterparts. We aim to provide information on the diagnoses of rural patients presenting with ORL symptomatology to provide data that may be useful in targeting resources and training towards rural patients.

METHODS: A 6-year retrospective study was performed between 1 January 2015 to 31 December 2020. The Northland District Health Board (NDHB) data warehouse was searched using ICD-10 codes relevant to ORL. The study included any patient acutely presenting to an NDHB hospital with an ORL diagnosis. Patients with a diagnosis that was not related to ORL, a non-acute presentation, or a diagnosis not usually managed by hospital ORL services were excluded.

RESULTS: Five thousand, five hundred and thirty-four presentations in 4,671 individual patients were included in the study. The mean age of patients was 35.1 years (SD 26.58). Two thousand, three hundred and twenty-six (49.8%) patients were female and 2,345 (50.2%) were male. One thousand, nine hundred and sixty-five (42.1%) were Māori and 2,699 (57.8%) were non-Māori. Median decile was 8 (4 IQR). Two thousand and seventy-seven (44.5%) patients were classified as rural and 2,594 (55.5%) as urban. The most common presentation was epistaxis with 16.8% (n=927/5534) of total presentations. The four next most common presentations were otological. There was a total of 224 complications including post-operative bleed, post-operative infection, and other post-operative complications. There was a significant difference in the rate of discharge with 1,819/2,430 (74.9%) rural patients and 2,518/3,104 (81.1%) urban patients being discharged directly from the emergency department (ED) ($p<0.001$).

CONCLUSION: This retrospective study provides a picture of acute ORL presentations in Northland patients, analysed with respect to geography and rurality. It highlights the large volume of ORL patients who are seen and managed by rural and ED physicians, and the importance of rural provision of care in Northland. These findings support the need for targeting resources and training to centres treating rural patients for the management and treatment of ORL conditions.

Otorhinolaryngology, head and neck surgery (ORL) doctors diagnose and treat disorders of the ear, nose and throat, and head and neck. ORL conditions are common, accounting for one in eight primary care encounters, and make up a large part of the clinical workload of general practitioners, rural physicians, emergency physicians and paediatricians.[1] Rural patients face greater barriers to healthcare compared to those in urban centres.[2] These include long travel distances, lack of access to transport, telecommunication, increased costs, higher levels of deprivation, and wider socio-economic factors.[2,3] As a result, numerous ORL presentations are managed by rural and emergency physicians in rural hospitals. To our knowledge, no study has looked at the type and volume of ORL cases of rural patients in Aotearoa, New Zealand. We aim to provide information on the diagnoses of rural patients presenting with ORL complaints and identify differences between rural and urban patients. These data may be useful in targeting resources and training to centres treating rural patients for the management and treatment of ORL conditions.

Methods

Design

A 6-year retrospective study was performed from 1 January 2015 to 31 December 2020. The Northland District Health Board (NDHB) data warehouse was searched using the ICD-10 codes (Appendix 2) relevant to ORL. Data were retrieved from the data warehouse including age, gender, ethnicity, closest hospital, domicile, decile, rural status, hospital of presentation, outcome of encounter (admitted to hospital, discharged directly from the emergency department [ED], transfer to another hospital, general practitioner [GP] follow-up, ORL outpatient clinic, did not wait in ED) and discharge diagnosis description. Patients' electronic clinical notes including discharge summaries were reviewed to confirm inclusion in the study.

Setting

This study was conducted in Te Tai Tokerau, Northland, which spans from Cape Reinga to Te Hana. The wide geographical spread of Northland means that patients can be more than four hours from specialty services in Whangārei. There is a higher proportion of Māori people compared to the national average.[5,6] The whenua (land) of 12 iwi falls either partly or wholly within Te Tai Tokerau, as shown in Appendix 1.[7] There is an estimated population of more than 178,000 people,[4] and the population is older than the national average, with age brackets of 50+ being over-represented.[5,6] There is a very high proportion of people living in areas of high deprivation.[5,6] There are five hospitals, Whangārei Hospital being the largest and the only one providing secondary care services including access to 24/7 on call ORL services. Kaitaia, Bay of Islands, Dargaville and Rawene Hospitals are rural hospitals. Rural hospitals are staffed by trained generalists who diagnose and treat a diverse range of clinical presentations.[8] They provide variable levels of service to adapt to the needs of the rural communities that they serve.[8] The Royal New Zealand College of General Practitioners (RNZCGP) Division of Rural Hospital Medicine identifies three levels of rural hospital in the 2022 Training Handbook:[8]

1. A hospital with acute inpatient beds and daily visiting medical cover. On call cover outside of these times is provided by appropriately trained nursing and/or medical staff. There are no on-site laboratory services, and limited radiology services.[8]
2. A hospital with acute inpatient beds and medical care on-site during normal working hours with on-call cover outside of these hours. Point-of-care and off-site laboratory services and on-call radiography services are available.[8]
3. A hospital with 24-hour onsite medical cover and 24-hour access to laboratory and radiology services.[8]

Rural and urban

Rural and urban status was retrieved from the NDHB data warehouse. This has been classified using the Stats NZ Urban Rural indicator, based on last known patient address.[9] Categories include "Main Urban Centre", "Secondary Urban Centre, "Minor Urban Area", "Rural Centre", and "Other Rural". This classification system does not differentiate by access to rural or urban healthcare.[9] In our study, "Rural Centres", "Other Rural", and "Minor Urban Centres" were grouped as "Rural", and "Main Urban Centres" was grouped as "Urban". Using the census indicator, areas such as Kaitaia and Dargaville are described as minor urban areas. However, these areas are serviced by rural hospitals as seen in Figure 1. As such, minor urban areas were included in the rural group as this better reflects their access to healthcare.

Inclusion and exclusion criteria

The study included any patient acutely presenting to Kaitaia, Bay of Islands, Dargaville or Whangārei hospitals with an ORL diagnosis. Conditions included are listed in Appendix 2. Patients with a diagnosis that was not related to ORL, a non-acute presentation, or a diagnosis not usually managed by hospital ORL services were excluded. Patients were also excluded if their residential address was outside of Northland. Cases were excluded if they were referred directly by their GP to the ear, nose and throat (ENT) service and were not seen by a rural medicine or ED physician.

Ethics approval

The study was deemed out-of-scope by the Health and Disability Ethics Commission on 5 January 2022. NDHB locality approval was granted on 27 October 2021. The study was reviewed and approved by the NDHB Māori Health Directorate on 27 October 2021.

Statistical analysis

Categorical data were described with the number and percentage. Normally distributed data were described with the mean and standard deviation (SD). Non-normally distributed data were described with the median and interquartile range (IQR). Dichotomous variables were analysed with a Chi-squared test or a Fisher's exact test. A Mann–Whitney U test was used to analyse non-normally distributed data. Data were entered in IBM SPSS (Version 28.0, Armonk, NY) for analysis.

Results

Demographics

Five thousand, five hundred and thirty-four presentations in 4,671 individual patients were included in the study. The mean age of patients was 35.1 years (SD 26.58). Two thousand, three-hundred and twenty-six (49.8%) patients were female and 2,345 (50.2%) were male. One thousand, nine hundred and sixty-five (42.1%) were Māori and 2,699 (57.8%) were non-Māori. Median decile was 8 (4 IQR). Two thousand and seventy-seven (44.5%) patients were classified as rural and 2,594 (55.5%) as urban. Demographic information is shown in Table 1.

Type of presentations

Rural patients were more likely to have rhinology or throat symptoms and less likely to present with an otology presentation than their urban counterparts, as seen in Table 2. The most common presentation was epistaxis with 16.8% (n=927/5,534) of total presentations. Rates were similar between rural (19%, n=462/2,430) and urban (15%, n=465/3,104) patients. The four next most common presentations were otological. Otitis media made up 13.3% of rural, 18.1% of urban and 16.0% of overall presentations. Otitis externa made up 8.3% of rural, 14.3% of urban and 11.7% of all presentations. Otalgia made up for 6.8% of rural, 4.9% of urban and 5.7% of overall presentations. Foreign bodies in ears were seen in 5.3% of rural, 5.0% of urban and 5.1% of all presentations. Following this, sinusitis was diagnosed in 5.1% of rural, 4.9% of urban and 5.0% of all presentations. Nasal fractures were diagnosed in 5.2% of rural, 4.0% of urban and 4.5% of all presentations. A full breakdown of presentations is provided in Appendix 3.

Complications

There was a total of 224 complications including post-operative bleed, post-operative infection, and other post-operative complications shown in Table 3. One hundred and nine complications (48.7%) were in rural patients and 115 (51.3%) in urban patients. The most common complication in both rural and urban patients was a post-operative bleed making up 71/109 (65.1%) complications in rural patients and 72/115 (62.6%) complications in urban patients.

Outcome of presentations

There was a significant difference in the rate of discharge with 1,819/2,430 (74.9%) rural patients and 2,518/3,104 (81.1%) urban patients being discharged directly from the ED ($p<0.001$). Fifty-six rural patients were transferred to another hospital and 21 rural patients seen in Whangārei ED had been transferred from another hospital totalling 77 of 2,430 (3.2%). There was a significant difference in the rate of admission to hospital with 516 of 2,430 (21.2%) rural patients and 457 of 3,104 (14.7%) urban patients requiring admission ($p<0.001$).

Discussion

This retrospective review describes the numbers and types of ORL presentations seen in the emergency department acutely across Northland. The most common presenting diagnosis was epistaxis while the majority of presentations as an overall group were otological. Rural patients were more likely to present with rhinology or throat/laryngology symptoms and less likely to present with otology symptomatology compared to urban patients. Most rural and urban patients were discharged from ED; however, rural patients were more likely to be admitted to hospital than urban patients. Three point two percent of rural patients were transferred to another hospital for ORL admission.

Our results show the significant number of ORL presentations to hospital in both rural and urban patients. Rural ORL care is imperative due to the geographic spread of the region and the limitation of immediate specialty services to Whangārei Hospital. Appropriate resourcing and education opportunities need to be provided to rural health practitioners to ensure they have the knowledge and experience to manage acute ORL conditions.[11] This study suggests that the key areas to target are the management of epistaxis, otitis media, otitis externa, otalgia, foreign bodies in ears, nasal fractures, and post-operative bleeding. While ORL outreach services are important, educational opportunities and formal teaching sessions are crucial to provide high quality care to our rural patients.

We found that admissions to hospital were higher in rural patients compared to urban patients. This may be due to several reasons including greater severity of disease requiring admission, reduced access to primary care, lack of access to specialist review and opinion, or

Figure 1: (a) map of Northland hospitals, (b) map of travel distances in Northland. Sourced from the Northland District Health Board Annual Report.[5]

Table 1: Demographic information stratified by rural or urban status.

	Rural	**Urban**	**Total**	**p-value**
Patients, *n*	2,077	2,594	4,671	
Presentations, *n*	2,430	3,104	5,534	
Age, *mean (SD)*	36.4 (26.9)	34.0 (26.2)	35.1 (26.6)	0.002
Gender, *n (%)*				
Male	1,097 (52.8%)	1,248 (48.1%)	2,345 (50.2%)	0.001
Female	980 (47.2%)	1,346 (51.9%)	2,326 (49.8%)	
Ethnicity, *n (%)*				
Non-Māori	1,255 (60.4%)	1,444 (55.7%)	2,699 (57.8%)	0.001
Māori	819 (39.4%)	1,146 (44.2%)	1,965 (42.1%)	
Decile, *median (IQR)*	7 (4)	9 (2)	8 (4)	<0.001

Table 2: Presentation groups stratified by rural or urban status.

	Rural	Urban	Total	p-value
Otology, n (%)	1,038 (42.7%)	1,618 (52.1%)	2,656 (48.0%)	<0.001
Rhinology, n (%)	807 (33.2%)	860 (27.7%)	1,667 (30.1%)	<0.001
Throat/laryngology, n (%)	224 (9.2%)	213 (6.9%)	437 (7.9%)	0.001
Head and neck, n (%)	181 (7.5%)	232 (7.5%)	413 (7.5%)	0.971
Complications, n (%)	109 (4.5%)	115 (3.7%)	224 (4.1%)	0.137
Oral cavity, n (%)	71 (2.9%)	66 (2.1%)	137 (2.5%)	0.059

Table 3: Complications stratified by rural or urban status.

Complication	Rural	Urban	Total
Post-operative bleed, n (%)	71 (65.1%)	72 (62.6%)	143 (63.8%)
Post-operative infection, n (%)	23 (21.1%)	25 (21.7%)	48 (21.4%)
Other post-operative complication, n (%)	15 (13.8%)	18 (15.7%)	33 (14.7%)
Total, n	109	115	224

Table 4: Outcomes for ENT presentations stratified by rural or urban status.

Patient outcome	Rural patients	Urban patients	Total	p-value
Admitted, n (%)	516 (21.2%)	457 (14.7%)	973 (17.5%)	<0.001
Discharged, n (%)	1,819 (74.9%)	2,518 (81.1%)	4,337 (78.4%)	<0.001
OP ENT clinic, n (%)	71 (2.9%)	104 (3.4%)	175 (3.2%)	0.366
Self-discharge, n (%)	24 (1.0%)	25 (0.8%)	49 (0.9%)	0.473

the need to address socio-economic determinants of health.[2,3] Further research is required to accurately determine the reasons for higher admissions in rural patients. The findings of this study, however, can be used to guide healthcare resources and planning.

This is the first study to explore rural health presentations in ORL in Aotearoa, New Zealand. There is a scarcity of published literature surrounding rural presentations of ORL cases both in Aotearoa and around the world. A prospective audit conducted in a tertiary Belgian hospital found that 20.5% of patients referred to the ENT emergency service over a 1-month period had a nose or sinus complaint, 36.8% an otological or vestibular complaint and 42.6% with a laryngeal or neck complaint; however, this did not focus on rural patients.[12] A recently published scoping review of 79 US based studies examining rural disparities in ORL found that there is low-quality evidence with large gaps in the literature in all subspecialties.[13] There is no consistent definition in the literature regarding rurality.[14] In this study rurality has been defined using the Stats NZ Urban Rural indicator, classified by patient address. This is commonly used in health research but does not consider distance from health services.[10,14] It is for this reason that our study grouped “Rural Centre”, “Other Rural” and “Minor Urban Areas” as rural to better reflect the distance from, and therefore access to, health services. Further study using the newly developed *Geographic Classification for Health* may provide greater insight into disparities between urban and rural populations.[14]

Several limitations exist in this study. First this is a retrospective study and is limited by misclassification bias and missing information. Participant identification relied on accurate diagnosis and clinical coding of patient events. This study did not include patients from Rawene Hospital, which is run under the rural hospital medicine scope of practice by Hauora Hokianga as data systems are not shared with NDHB. It is important to interpret the results of this study with the understanding that only patients presenting to the Hospital ED were included. Patients treated in the community, referred directly to ORL from the community or who were seen in the acute ORL clinic instead of the ED were not included.

Conclusion

This retrospective review provides a picture of acute ORL presentations in Northland, which has been analysed with respect to geography. It highlights the large volume of ORL patients who are seen and managed by rural and ED physicians and the importance of rural provision of care in Northland. These findings support the need for targeting resources and training to centres treating rural patients for the management and treatment of ORL conditions.

COMPETING INTERESTS

Nil.

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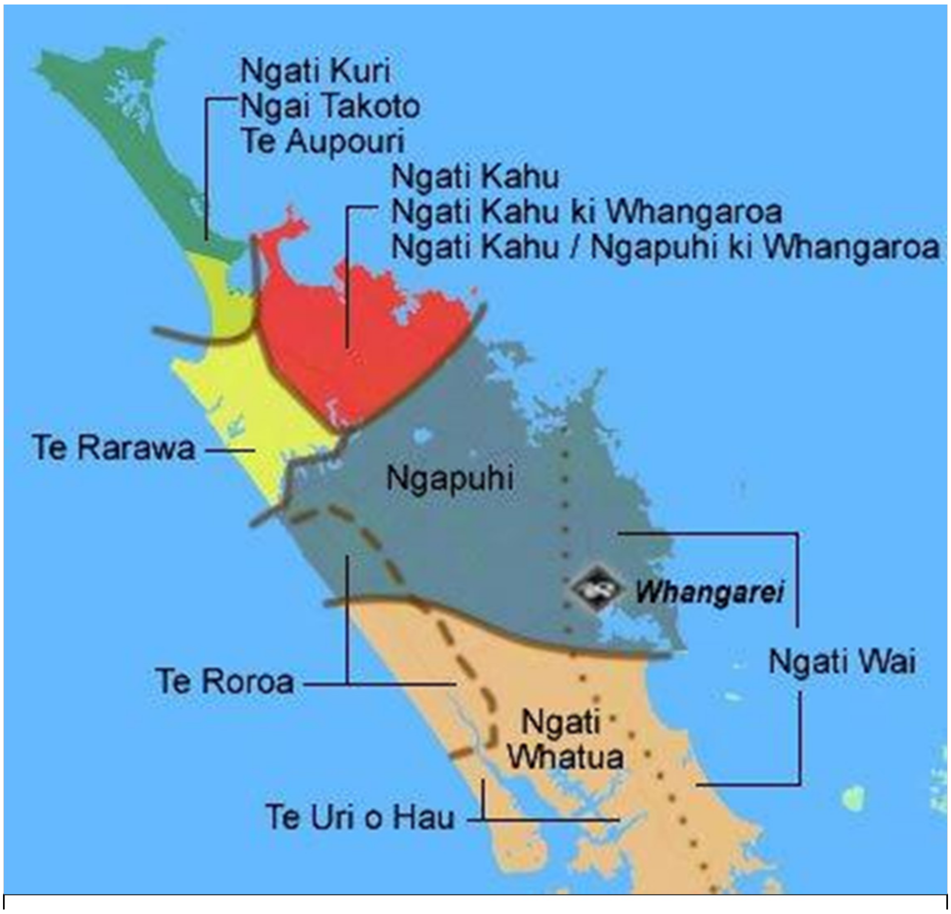
Appendices

Appendix 1: Te Tai Tokerau iwi map sourced from Te Puni Kokiri and the Northland Regional Council.



Appendix 2: ICD-10 codes relevant to ORL.

Otitis media	Rhinitis	Salivary glands	Laryngitis	Goitre	Post-operative complications
Otitis externa	Sinusitis	Ankyloglossia	Epiglottitis	Tracheostomy	
Ear injuries	Epistaxis	Glossitis	Laryngomalacia	Anterior neck infections	
Vertigo	Nasal fractures	Peritonsillar abscess	Globus		
Foreign body ear	Foreign body nose	Oral cavity injuries	Stridor		
	Facial injuries		Dysphagia		
	Facial infections		Laryngeal spasm		
			Vocal cord disorders		
			Oropharyngeal burns		
			Foreign body throat		

Appendix 3: Breakdown of presentations.

	Rural		**Urban**		**Total**	
Ear	**1,038**	**42.7%**	**1,618**	**52.1%**	**2,656**	**48.0%**
Abscess/cellulitis/ perichondritis outer ear	31	1.3%	57	1.8%	88	1.6%
Foreign body in ear	128	5.3%	156	5.0%	284	5.1%
Hearing loss	18	0.7%	16	0.5%	34	0.6%
Impacted cerumen	41	1.7%	92	3.0%	133	2.4%
Labyrinthitis/vertigo	71	2.9%	51	1.6%	122	2.2%
Otalgia	166	6.8%	151	4.9%	317	5.7%
Otitis externa	202	8.3%	443	14.3%	645	11.7%
Otitis media	323	13.3%	561	18.1%	884	16.0%
Other	42	1.7%	59	1.9%	101	1.8%
Tympanic membrane perforation	16	0.7%	32	1.0%	48	0.9%
Head and neck	**181**	**7.4%**	**232**	**7.5%**	**413**	**7.5%**
Bell’s palsy	85	3.5%	87	2.8%	172	3.1%
Disorder of salivary gland	13	0.5%	31	1.0%	44	0.8%
Facial/neck swelling	46	1.9%	68	2.2%	114	2.1%
Lymphadenopathy	18	0.7%	31	1.0%	49	0.9%
Other	19	0.8%	15	0.5%	34	0.6%
Nose	**807**	**33.2%**	**860**	**27.7%**	**1667**	**30.1%**
Abscess nose	14	0.6%	26	0.8%	40	0.7%
Epistaxis	462	19.0%	465	15.0%	927	16.8%
Foreign body in nostril	59	2.4%	62	2.0%	121	2.2%
Nasal fracture	127	5.2%	124	4.0%	251	4.5%
Nasal injury	13	0.5%	17	0.5%	30	0.5%
Rhinitis	9	0.4%	13	0.4%	22	0.4%
Sinusitis	123	5.1%	153	4.9%	276	5.0%

Appendix 3 (continued): Breakdown of presentations.

	Rural		**Urban**		**Total**	
Oral cavity	**71**	**2.9%**	**66**	**2.1%**	**137**	**2.5%**
Ankyloglossia	27	1.1%	1	0.0%	28	0.5%
Cellulitis and abscess of mouth	27	1.1%	39	1.3%	66	1.2%
Disease of lip	9	0.4%	17	0.5%	26	0.5%
Glossitis	8	0.3%	9	0.3%	17	0.3%
Post-operative	**109**	**4.5%**	**115**	**3.7%**	**224**	**4.0%**
Post-operative bleed	71	2.9%	72	2.3%	143	2.6%
Post-operative complication	15	0.6%	18	0.6%	33	0.6%
Post-operative infection	23	0.9%	25	0.8%	48	0.9%
Throat	**224**	**9.2%**	**213**	**6.9%**	**437**	**7.9%**
Acute laryngitis	19	0.8%	34	1.1%	53	1.0%
Disorder of larynx	16	0.7%	10	0.3%	26	0.5%
Epiglottitis	9	0.4%	15	0.5%	24	0.4%
Foreign body in pharynx	58	2.4%	51	1.6%	109	2.0%
Peritonsillar abscess	88	3.6%	62	2.0%	150	2.7%
Stridor	15	0.6%	11	0.4%	26	0.5%
Other	19	0.8%	30	1.0%	49	0.9%
Total	**2,430**		**3,104**		**5,534**	

Invasive group A streptococcal disease in Hawke's Bay, New Zealand: epidemiology, manifestations and impact

Johanna M Birrell, Bridget Wilson, Susan Taylor, Julie Bennett

ABSTRACT

AIMS: To describe the epidemiology, clinical features and healthcare impact of invasive group A streptococcal (iGAS) disease in Hawke's Bay from 2016 to 2021, to inform public health efforts.

METHODS: The case definition of iGAS for this study was isolation of group A streptococcus (GAS) from blood culture. "Severe iGAS" included cases that required intensive care admission or died within 60 days. Cases were identified retrospectively from the Te Whatu Ora Te Matau a Māui Hawke's Bay laboratory database. Clinical data were obtained from inpatient electronic health records.

RESULTS: A total of 93 cases of iGAS were identified in Hawke's Bay during the 6-year study period. The overall age-standardised incidence of iGAS was 5.6 per 100,000 (95%CI 4.1–7.4). The incidence was significantly higher among people of Pacific, Māori and Asian ethnicities than European/Other ethnicities, and higher in areas of socio-economic disadvantage. Skin infections were the most common source (70% of cases). Thirty-seven cases (41%) were classified as severe, including 11 deaths (12% case fatality rate).

CONCLUSIONS: Further action is required to address inequities in social determinants of skin health in Hawke's Bay. Mandatory national notification of iGAS would provide opportunity for improved surveillance of GAS-related disease, and consideration of a public health response to iGAS disease in New Zealand.

Group A streptococcus (GAS) can cause a range of clinical syndromes, including superficial infections such as pharyngitis and impetigo, post-streptococcal immunological complications such as acute rheumatic fever and glomerulonephritis, and invasive infections. The direct costs of GAS-related disease in New Zealand have been estimated at almost 30 million NZD (2015 costs) per year.[1]

Invasive GAS (iGAS) infections occur when GAS infects a normally sterile site, such as joints, deep tissues, pleural fluid, cerebrospinal fluid or, as in this study, the bloodstream. Such infections can be severe and sometimes life-threatening and thus require early recognition and treatment. In high-income nations the incidence of iGAS typically ranges from 2 to 4 cases per 100,000.[2] In contrast, a much higher incidence of iGAS has been observed in some disadvantaged populations (106 cases per 100,000 in Indigenous Australian people in the Northern Territory,[3] 46 cases per 100,000 in Native American people in Arizona) and lower income nations (12 cases per 100,000 in Fiji, 13 cases per 100,000 in children under 16 years in Kenya).[2] Mean case-fatality rates from iGAS in high income countries range from 8% to 16%.[2]

In New Zealand, iGAS is not currently notifiable, despite being nationally-notifiable in a number of other countries including Australia, the United Kingdom (UK) and Canada.[4–6] Recently in the UK (2022), this notification system has led to detection of a spike in iGAS incidence and mortality, with a nationwide public health response.[7,8] A New Zealand study estimating the incidence of iGAS reported a significant upward trend from 3.9 per 100,000 in 2002 to 7.9 per 100,000 in 2012.[9] Due to the lack of notification, the more recent incidence of iGAS is uncertain. Current surveillance is primarily laboratory-based, relying on individual laboratories voluntarily sending clinically relevant GAS isolates to the Institute of Environmental Science and Research (ESR) for further typing.[10] Therefore, this study aimed to describe the epidemiology, demographics, clinical features and healthcare impact of iGAS disease in Hawke's Bay over six years (2016 to 2021), to inform public health efforts.

Methods

Definitions

The case definition for iGAS disease in this study was isolation of GAS from blood culture. Severe iGAS disease was defined as cases requiring intensive care unit (ICU) admission or with death from any cause within 60 days of diagnosis.

Study design and data collection

Cases of iGAS disease were identified retrospectively from the Te Whatu Ora Te Matau a Māui Hawke's Bay microbiology laboratory blood culture database, including specimens collected from 1 January 2016 to 31 December 2021. Further clinical information was obtained from patients' electronic health records (Clinical Portal).

Data analysis

Population data from the 2018 New Zealand Census (the approximate midpoint of the study period) were used for incidence calculations.[11] Haemodialysis population data were obtained from Australia and New Zealand Dialysis and Transplant Registry (ANZDATA) Annual Reports for 2016–21, and included Hawke's Bay Hospital, satellite and home prevalent haemodialysis patients.[12] Age-standardisation was calculated using the 2001 New Zealand Census total Māori population data as the standard population.[13] New Zealand Index of Deprivation (NZDep) 2018 data were used for assessment of socio-economic deprivation.[14] Residential address at diagnosis was used to epidemiologically screen for household clusters of iGAS cases. Data analysis was performed using Microsoft Excel®.

Ethics approval

Ethics approval was sought from the New Zealand Health and Disability Ethics Committees. The study was deemed out of scope and not requiring ethics review. The study was approved by the Hawke's Bay Clinical Research Committee (2023/01/371).

Results

A total of 93 cases of iGAS disease were identified in the Hawke's Bay Region between 2016 and 2021. The median age of cases was 64 years (interquartile range [IQR] 42–76 years). Table 1 shows that the overall age-standardised incidence of iGAS disease in Hawke's Bay was 5.6 per 100,000 (95% confidence interval [CI] 4.1–7.4). People of Pacific ethnicity had the highest age-standardised incidence at 14.5 per 100,000, followed by Māori and Asian peoples (see Table 1). However, case numbers were small in the Asian and Pacific cohorts.

Approximately half of all iGAS cases occurred in people aged 65 years and over (n=50, 53%). Within the 65 to 79 year olds age group, there was an incidence of 80.4 per 100,000 in Māori (13 cases, 95% CI 42.8–137.5), compared to 10.5 per 100,000 in the European/Other ethnicity group (13 cases, 95% CI 5.6–18.0).

In children under five years of age there was an incidence of 9.4 per 100,000 population (eight cases, 95% CI 4.1–18.5), with Pacific, Asian and Māori children disproportionately affected (see Figure 1). Cases in children under five years were caused by cellulitis (six cases), pneumonia (one case) or bacteraemia of unknown source (one case).

In the 15 to 34 year olds age group, there was an incidence of 4.4 per 100,000 in females (five cases, 95% CI 1.4–10.3), compared to 0.8 per 100,000 in males (one case, 95% CI 0.0–4.6). Cases in females in this age cohort were caused by postpartum endometritis (two cases), lactational mastitis and pneumonia. There was also no statistically significant difference in incidence of iGAS disease between males and females in the under 5 or over 64 year olds age groups.

No household clusters of iGAS were epidemiologically identified, including in mother-baby pairs. There were two possible clusters in aged residential care facilities (each with two cases diagnosed in residents from the same facility within 7 days). However, no molecular typing results were accessible for laboratory confirmation.

There was a significantly higher incidence of iGAS in areas of greatest socio-economic deprivation (NZDep score 9–10; 14.9 per 100,000 population [95% CI 10.7–20.2]) than in the least deprived areas (NZDep score 1–2; 4.0 per 100,000 [95% CI 1.5–8.7]) (see Figure 2). Nine of the 11 children under 10 year olds that developed iGAS were living in NZDep score 8–10 areas (82%).

The annualised incidence of iGAS disease ranged between 3 and 9 per 100,000 over the study period (see Figure 3).

Table 1: Age-standardised incidence of iGAS disease in Hawkes Bay, 2016–21.

Population	**Number of cases**	**Incidence per 100,000 population**	**95% CI**
All persons	93	5.6	4.1–7.4
Sex			
Female	44	6.1	3.8–8.9
Male	49	5.3	3.3–7.7
Ethnicity			
Māori	40	10.5	7.2–14.6
Pacific peoples	8	14.5	6.2–28.6
Asian	6	10.5	3.4–23.7
European/Other	39	2.1	1.1–3.4

Figure 1: Crude incidence of iGAS disease by age group and ethnicity in Hawke's Bay, 2016–21.

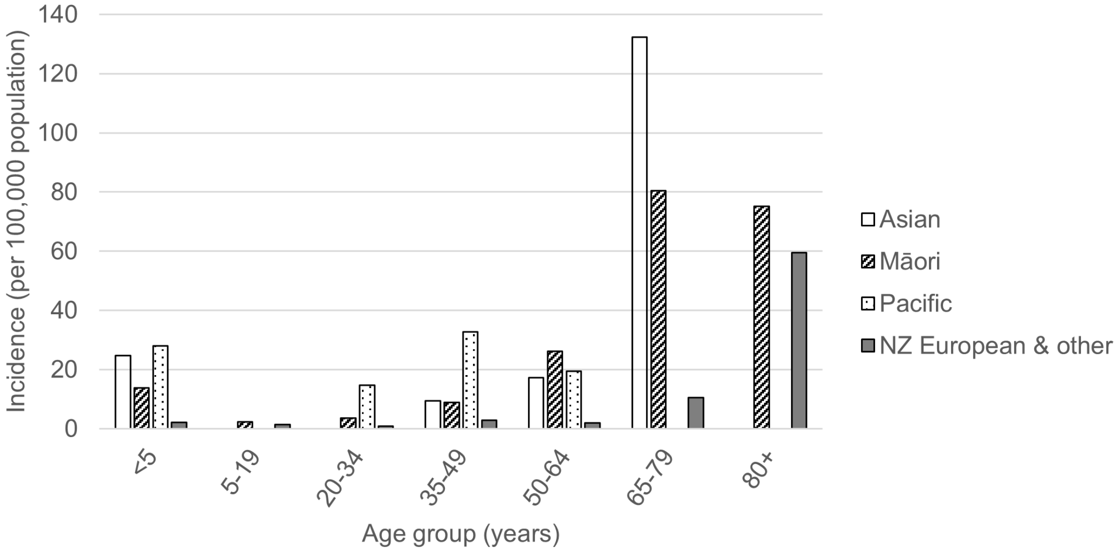


Figure 2: Crude incidence of iGAS disease by socio-economic decile in Hawke's Bay, 2016–21.

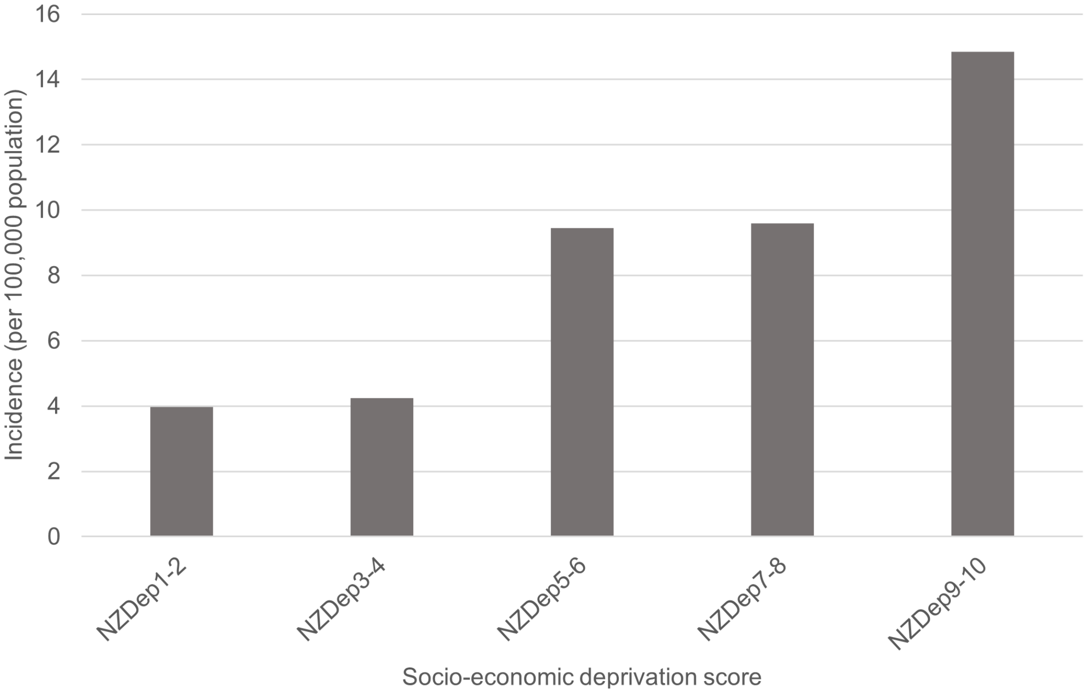


Figure 3: Trend in age-standardised incidence of iGAS disease over time, 2016–21.

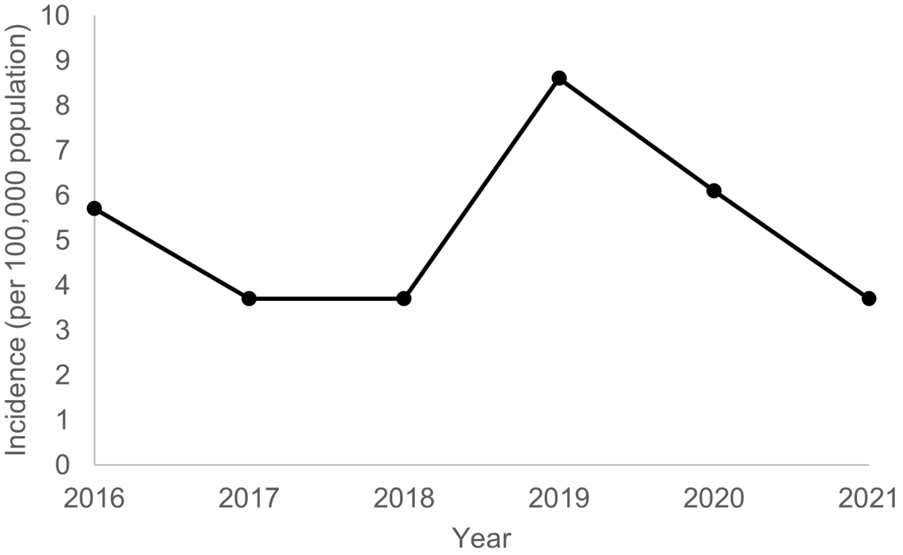
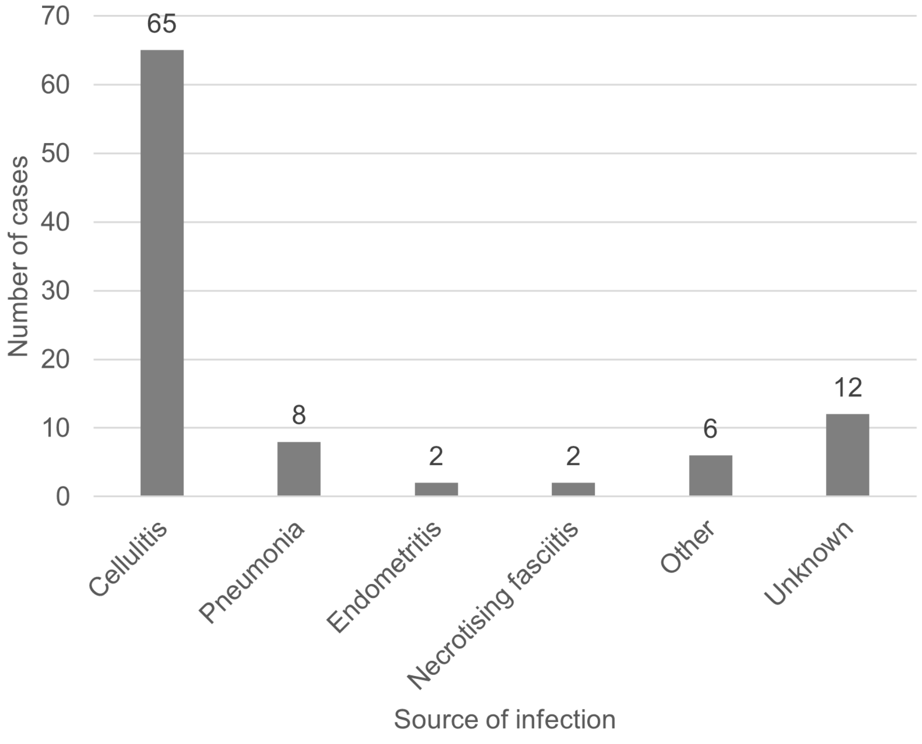


Table 2: Medical co-morbidities of people with iGAS disease.

Co-morbidities	Number of cases	% of total
Diabetes mellitus (type 1 or 2)	29	31%
Chronic kidney disease (eGFR <60)	27	29%
Diabetes mellitus AND chronic kidney disease	17	18%
Injecting drug use	1	1%
Surgery in past 30 days	1	1%
Postpartum (within 6 weeks)	4	4%
Immunosuppressant medication	7	8%
None of the above co-morbidities identified	46	49%

Figure 4: Number of iGAS cases by source of infection.



Clinical features, severity and management

Common pre-existing medical risk factors for iGAS disease included diabetes mellitus (31%), chronic kidney disease (29%) (see Table 2). One patient (included in the chronic kidney disease cohort) was receiving haemodialysis.

Skin infections were the most common source, with cellulitis diagnosed in 65 cases (70%) (see Figure 4). Of the 93 cases, 37 (41%) met criteria for severe iGAS disease. ICU admission was required for 29 patients (31%). Median length of hospital stay was 6 days (IQR 3–11) and the total combined length of hospital stay for all patients was 991 days over the 6-year study period. The 60-day all-cause mortality was 12% (11 deaths). The age range of people who died following iGAS infection, was 42 to 96 years (median 75 years, IQR 67–86). Of these deaths, eight cases were associated with skin infections (cellulitis or necrotising fasciitis), and three with bacteraemia of unknown source.

Discussion

Invasive GAS disease is an important source of morbidity and mortality in Hawke’s Bay, particularly in children under five years of age and adults over 65 years. When compared to people of European or Other ethnicities, the age-standardised incidence of iGAS disease was 7-fold higher in Pacific peoples and 5-fold higher in both Māori and Asian populations. As with other GAS-related disease, people residing in areas of high socio-economic deprivation were significantly over-represented.[15] The annual incidence of 5.6 cases per 100,000 population (95% CI 4.1–7.4) described in this study is similar to rates previously reported in New Zealand, but higher than findings from other high income countries such as the UK and Canada.[1,9,16,17] As shown in Figure 3, the incidence of iGAS disease was lower in 2020–21 than in 2019. This trend may have been influenced by the COVID-19 pandemic, with public health measures to prevent COVID-19 concurrently reducing transmission of GAS.

Skin infections are the most common source of iGAS disease in Hawke’s Bay (including in both peak age groups of under five and over 65 years), providing further evidence for the importance of action on the social determinants of skin health in prevention of GAS-related disease. Previous studies have demonstrated an association of GAS-related disease with household overcrowding and socioeconomic disadvantage.[15,18] The Child Healthy Housing Program (part of the national Healthy Homes Initiative), which commenced in Hawke’s Bay in 2015, provides an example of a successful prevention strategy addressing underlying social determinants of health. This program has since received additional funding and been expanded nationally.[19,20]

The Hawke’s Bay School Skin Program is an equity-driven primary prevention program that commenced in 2020 in response to the high local rates of serious skin infections.[21] Given the significant burden of disease attributable to skin-related iGAS infections in those aged under five years, work is underway to further extend this Program into the early childhood education sector, particularly focussing on children living in areas of socio-economic disadvantage.

Known predisposing factors for iGAS disease in children include varicella zoster virus infection, influenza infection, trauma, burns, surgery, immunocompromisation, malignancy and age under one year.[22] Scabies infection has been shown to be a contributing factor to skin infections among children in remote Indigenous Australian communities and could be further studied in New Zealand.[23] In our study, the most frequent comorbidities in the older age cohort with iGAS disease were diabetes mellitus and chronic kidney disease.

There were higher rates of severe iGAS disease (41%), requiring ICU admission or causing death, in this study than found in other jurisdictions that used a broader definition of severe disease.[3,24] Possible explanations may include a lower local case detection rate for non-severe cases, receipt of antibiotics prior to blood cultures, or delayed diagnosis and treatment. Review and optimisation of blood culture collection practices is recommended. Improving access to primary care, particularly for high-risk population groups, may help to reduce disease severity through earlier detection and treatment of GAS infections.

This audit will have underestimated the true burden of iGAS disease in Hawke’s Bay, as cases were only identified if GAS was isolated from blood culture and not from other sterile sites. Other sterile sites were not included as these data were less accessible and would require detailed review and clinical judgement against a broader case definition. However, research from regions with active iGAS surveillance (including non-blood sterile sites) have found blood cultures to be positive in 94% of cases.[3] Cases may also have been missed if blood cultures were collected after antibiotic exposure or less than the recommended volume of blood was collected.

Small case numbers in some sub-groups is an important limitation of the incidence data. The high incidence of iGAS in people of Asian ethnicity (10.5 per 100,000) is driven by only six cases, with a wide 95% confidence interval (3.4–23.7). The high incidence of iGAS in people of Pacific ethnicity was less apparent in crude (Figure 1) than in age-standardised results (Table 1) because of the comparatively young age distribution of the Pacific population in Hawke's Bay.[11]

Further action is required to address the underlying social determinants of skin health and inequities in access to primary care in Hawke's Bay, particularly in the highest-risk population groups.[15,18] Mandatory national notification of iGAS disease would provide the opportunity for improved surveillance of GAS-related disease, and consideration of a public health response to iGAS disease in New Zealand.

COMPETING INTERESTS

Nil.

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Evolution of sentinel lymph node biopsy for breast cancer patients in a rural setting: 10 years' experience

Anthony W K Lau, Vanessa L Lau, Magdalena M Sakowska

ABSTRACT

Sentinel lymph node (SLN) biopsy is the standard axillary staging procedure of early breast cancer. Superparamagnetic iron oxide (SPIO) nanoparticles have been found to be comparable to, while overcoming many of the limitations associated with, the current standard of care for SLN biopsies (dual localisation with radioisotope and patent blue dye). Here, SPIO dual localisation (Sienna+® and blue dye) is compared to blue dye alone for SLN biopsies in a rural centre where radioisotope techniques are not readily available. Sienna+® dual localisation is shown to be more likely to detect nodes (detection rate of 99% compared to 90% when using blue dye alone), and detect more nodes, than blue dye alone. The use of Magseed, a magnetic tracer, was not found to influence node detection. The results from this work show that Sienna+® dual localisation is superior to blue dye alone for detecting SLN, suggesting that it is an excellent alternative to dual localisation of radioisotope and blue dye for small centres lacking easy access to a nuclear medicine department.

Sentinel lymph node (SLN) biopsy is the standard axillary staging procedure for early breast cancer and is undertaken when a patient is clinically and radiologically lymph node negative.[1–4] Dual localisation of SLN with both radioisotope and patent blue dye is superior to single agent and has a lower false-negative rate.[2,5] Its universal uptake, however, is limited as it requires access to a nuclear medicine department or a radioactive licence. Its short half-life (approximately six hours for Tc 99) also reduces its utility for rural patients as they need to travel to a large centre for its administration,[6] making its use impractical for many rural centres within New Zealand.

Superparamagnetic iron oxide particles (SPIO) have introduced an accurate and efficient alternative that overcomes many of the disadvantages of the traditional dual localisation techniques for SLN biopsy.[1,3–5,7,8] Clinical use of SPIO is common for magnetic resonance imaging intravenous contrast injections.[4] The SPIO tracer (Sienna+®) is a dextran coated nanoparticle 60 nanometres in diameter. Once injected subareolarly, it drains into the lymphatic system and accumulates in the sentinel lymph nodes just like radioactive colloid and blue dye. It is detected intraoperatively using a handheld magnetometer. The surgeon detects the location by the audible pitch of the detector and numerical signal range. There have also been reports of lymph nodes found to be stained brown or black.[1,4,5,7,8] When comparing SPIO to dual localisation of radioisotope and blue dye, the identification rate has been found to be comparable,[1,4,8] suggesting that it is an excellent alternative for centres not equipped to use radioactive isotope.

Timaru Hospital is the only facility in New Zealand where all practising breast surgeons use dual localisation of Sienna+® and blue dye for sentinel lymph node biopsies. Sienna+® and blue dye was first used in June 2017, with blue dye alone being used prior. This retrospective study compares the use of both techniques over the last ten years showing their utility in a rural setting.

Materials and methods

Patient population

Data were analysed for all patients who had clinically and radiologically node negative breast cancer and had undergone SLN biopsy for breast surgery (invasive carcinoma or ductal carcinoma *in situ* [DCIS]) at Timaru Hospital, New Zealand between 1 January 2011 and 31 December 2021. Data collated from the electronic health record included demographics, type of surgery, tumour size and type, staging, lymph node status, lymph node detection rate and hormone receptor status. Comparison was made between the patients who underwent SLN biopsy using patent V blue dye localisation alone and those using dual localisation with Sienna+® super paramagnetic iron oxide particles and blue dye (Sienna+® dual localisation).

Technique

Single agent blue dye localisation was carried out with a 2ml periareolar subcutaneous injection of patent V blue dye administered after induction of general anaesthesia for surgery. The injection site was massaged for two minutes. Dual localisation Sienna+® dual localisation involved 2ml of Sienna+® injected into the periareolar subcutaneous tissue in clinic approximately a week prior to each operation. Patent V blue dye was injected at induction, as outlined above.

Magseed, a magnetic guide used during surgery when there is no palpable mass, was used to help locate the tumour in some wide local excision (WLE) procedures. After the tumour of interest had been excised and all metal instruments had been removed from the operating field, a handheld magnetometer was used for localisation of the sentinel lymph node. The blue node and/or “hot” (magnetic) nodes were identified and excised for histological analysis. After removal of the sentinel nodes, the axilla was checked with magnetometer probe to ensure minimal residual magnetic count. Non-sentinel nodes may have been sampled at surgeon discretion. Lymph nodes were evaluated by an onsite pathologist using local protocols.

Statistics

Fisher Exact tests was used for demographic comparisons between the two groups and to determine statistical difference between the number of sentinel nodes harvested between groups (Sienna+® dual localisation vs blue dye alone, and Sienna+® dual localisation with and without Magseed).

Ethics

This study was a retrospective clinical audit of patient information from a single unit’s practice and therefore was exempt from patient informed consent. Local hospital board ethics committee approval was granted.

Results

Between 1 January 2011 and 31 December 2021, 226 patients underwent SLN biopsy at Timaru Hospital. All patients were female. One patient was excluded due to incomplete documentation detailing their treatment, leaving 129 (57.3%) patients who underwent SLN biopsy Sienna+® dual localisation and 96 (42.7%) using blue dye alone. Demographics, surgical approach and tumour details of the two groups are summarised in Table 1. Sienna+® dual localisation was offered from June 2017. Blue dye alone was used up until March 2020, after which time all surgeons adopted the universal dual tracer technique. The number of patients per technique per year is summarised in Appendix 1.

SLN were successfully harvested in 99% (128/129) of patients using Sienna+® dual localisation and 90% (86/96) of patients when using blue dye alone ($p=0.001$). Three or more sentinel nodes were detected in 34% of patients (44/129) using Sienna+® dual localisation, and 13% (12/96) of patients when using blue dye alone ($p=0.0002$) (see Table 2). Non-sentinel nodes were taken from six Sienna+ dual localisation patients, one of which was node positive with isolated tumour cells. In the blue dye group, there were 11 patients with non-sentinel nodes harvested based on the operative decision at the time. All of these nodes were negative. The observed difference was not significant ($p=0.0739$).

In the Sienna+® dual localisation cohort, no difference was identified for the number of sentinel node harvested between Magseed ($n=15$) and non-Magseed groups ($n=29$) ($p>0.05$) (Appendix 2). No significant differences ($p<0.01$) were identified between the two cohorts when comparing tumour type, grade and stages, surgery type, age or ethnicity between the treatment groups (Table 1).

Sienna+® tissue staining was recorded in 82% (36/44) of WLE cases, ranging from 5 to 43 months follow-up.

The clinical management of DCIS has evolved at Timaru Hospital in line with its referring tertiary centres’ practice and its multidisciplinary meeting reviews. SLN biopsies is still offered for some high-risk patients with DCIS or those undergoing mastectomy for DCIS; however, the decline in the number of DCIS patients treated with sentinel node biopsies over the study period does not reflect a decline in patients presenting with DCIS (Appendix 1).[9]

Discussion

This study shows that Sienna+® dual localisation is superior to blue dye alone for detecting sentinel lymph nodes in rural women with breast cancer, and it is a safe alternative to use where access to radioisotope use is limited by distance required to

Table 1: Patient and tumour characteristics of study cohort.

		Sienna+® dual localisation counts (percentage)		Patent V blue dye counts (percentage)		P-value*
Number of patients		129		96		
Age	**Median (range)**	67	(33–90)	61	(33–87)	
Ethnicity	**NZ European**	107	(83%)	90	(94%)	0.015
	Māori	15	(12%)	6	(6%)	
	Other	7	(5%)	0	(0%)	
Surgery type	**Mastectomy**	85	(66%)	63	(66%)	1.000
	WLE	44	(34%)	33	(34%)	
Grade	**G1**	28	(22%)	29	(30%)	
	G2	61	(47%)	35	(36%)	0.1801
	G3	38	(29%)	32	(33%)	
	Unknown	2	(2%)	0	(0%)	
Stage	**Tis**	10	(8%)	16	(17%)	
	T0	4	(3%)	0	(0%)	0.0302
	T1	82	(64%)	67	(70%)	
	T2	31	(24%)	13	(14%)	
	T3	1	(1%)	0	(0%)	
	Unknown	1	(1%)	0	(0%)	
Side	**Right**	71	(55%)	47	(49%)	0.42
	Left	58	(45%)	49	(51%)	
Tumour type	**Invasive ductal**	95	(74%)	64	(67%)	
	Invasive lobular	10	(8%)	9	(9%)	
	Invasive mucinous	6	(5%)	4	(4%)	0.4889
	Invasive tubular	5	(4%)	2	(2%)	
	Invasive papillary	1	(1%)	1	(1%)	
	Invasive micropapillary	1	(1%)	0	(0%)	
	DCIS	11	(9%)	16	(17%)	

Notes: * Two-sided Fisher Exact tests to calculate difference between two sentinel lymph node biopsy techniques (Sienna+® dual localisation and blue dye alone) with at least one observation in each cell.

Table 2: Number of lymph nodes harvested using Sienna+® dual localisation or blue dye alone.

		Sienna+® dual localisation counts (percentage)		Patent V blue dye counts (percentage)		P-value*
Nodes detected	0	1	(1%)	10	(10%)	0.001
	1	49	(38%)	50	(52%)	0.042
	2	35	(27%)	24	(25%)	0.761
	3+	44	(34%)	12	(13%)	0.0002

Notes: * Two-sided Fisher Exact tests to calculate the difference between two sentinel lymph node biopsy techniques (Sienna+® dual localisation and blue dye alone).

Table 3: Initial set up cost and per patient personal and procedure cost analysis, as estimated by Sreedhar et al. 2021.

			Sienna+	Radioisotope
Setup costs			SentiMag	Gamma probe
			$44,275	$41,400
Personal costs	Travel		-	$130
	Hotel		-	$100
Procedure costs	Magnetic tracer		$557.7	-
	Radioactive colloid injection	Injection	-	$600
		Lymphoscintigraphy	-	$588
Cost per patient*			$558	$1,418
Cost for 100 patients*			$55,770	$141,800

Note: *excluding set up cost

travel. It also highlights that when dual tracers are used, fewer women will require random axillary sampling, as a SLN is highly likely to be found with this technique.

Dual localisation using radioisotope and blue dye has been the gold standard for locating sentinel lymph nodes in breast cancer patients;[1,4,7] however, its utility in rural centres is limited. Smaller centres lack the nuclear medicine department required for the use of radioisotope. The isotope could be administered by a licensed surgeon or clinical nurse specialist without mapping but administration around the use of radioactive materials makes its uptake prohibitive. Additionally, due to its short half-life, surgery needs to occur on the same day or as soon as possible within 24 hours after injection with the radioisotope. For rural women who need to travel to metropolitan centres with nuclear medicine departments this is made logistically impractical, especially if it needs to be co-ordinated with hook-wire placement with breast conservation surgery.

Timaru Hospital introduced Sienna+® dual localisation for SLN biopsies after SPIO was shown to be as effective as radioisotope and blue dye dual localisation at detecting SLN.[1,4,7,8] All breast surgeons at this centre have adopted this technique and it is now the standard of care. Sienna+® dual localisation detected more nodes than blue dye alone. When both techniques were used, it was unlikely that no SLN would be found. Additionally, a higher number of SLN was found using dual technique. These findings are consistent with previously published work where Sienna+® dual localisation was found to have a 98% detection rate, while blue dye alone was only 86–90%.[4,8,10]

Sienna+® dual localisation provides a good alternative to radioisotope dual localisation. While a formal cost analysis is beyond the scope of this paper, Sreedhar et al. (2021) estimated Sienna+® to be to be the more affordable option to administer in New Zealand, with an estimated cost of $558 NZD per patient. Radioisotope dual localisation costs around $1,188 for the procedure, with patient travel and accommodation costs additional to this sum, indicating that Sienna+® would save approximately $86,000 per 100 patients (see Table 3). This suggests that the up-front costs of the SentiMag machine ($44,275 NZD) would have been covered by its use for only 52 patients after implementing Sienna+® at Timaru Hospital. In addition to the financial benefits, Sienna+® is not a radiation-based procedure and so is not restricted to access to a nuclear medicine facility, making it suitable for use in a rural setting.[6] This means patients do not need to travel out of town for their procedure, while staff and patients are not exposed to radiation. Timing of surgery is also less pressured as Sienna+® injection can be administered by a clinical nurse up to three weeks prior to surgery allowing for flexibility in theatre planning especially if hook-wire placement is also planned.[1,7]

As a magnetic-based procedure, the main limitation of Seinna+® utilisation is the presence of any metalware in the ipsilateral side of the SLN biopsy.[7] Metal retractors and equipment are therefore not able to be used during SLN detection, while patients with metal implants such as pacemakers or orthopaedic metal prostheses need to undergo SLN detection with other non-magnetic techniques. Disposable plastic retractors are available; however, some products can be bulky and brittle making their design inferior to metal retractors for the delicate work required of them.

Conventional dual localisation using radioisotope detects extra-axillary sentinel nodes or high infra-clavicular nodes by lymphoscintigraphy. While SPIO with blue dye is a more targeted approach that focuses solely on detecting the axillary level 2 and 3 nodes, this method is adequate as these nodes are where the most common pathway of metastases are located.[8] No pre-operative mapping is available with SPIO, and while lymphoscintigraphy may show extra-axillary nodes like internal mammary or supraclavicula—few centres would pursue these operatively due to limited oncological benefit and risk of retrieval.

The same SentiMag machine is also used for wide local excision technique for non-palpable lesions as an alternative to hook-wire localisation with its associated timing logistics. While Sienna+® can be used alongside Magseed localisation, it is recommended that care is taken to remove the tumour and the Magseed prior to undertaking the SLN biopsy to limit magnetic interference. Magseed was used *in situ* to locate the tumour in 15 Sienna+® dual localisation patients. No significant difference was found between in the number of nodes detected with or without the use of Magseed. This is consistent with similar studies published in New Zealand and overseas,[6,11,12] suggesting that Magseed can be utilised alongside SPIO SLN procedures without interference. While allergy when using Sienna+® is infrequent,[1,4,8,13] a much more common side-effect is tissue staining. Light brown staining of the breast tissue was detected in 82% (36/44) of women undergoing breast conservation surgery, ranging between 5 to 43 months follow-up. The number of patients that reported staining was similar to what has been reported previously and this staining is known to not be permanent.[14] This light brown staining containing SPIO has been shown to cause void artifacts and potentially obstruct key findings in post operative MRI for up to 25 months. [15] However, none of the women in this study needed MRI scanning after surgery as the threshold is low to obtain an MRI as part of the pre-operative workup.

Conclusions

This is the first study to show that Sienna+® dual localisation is superior to blue dye alone for detecting SLN and is an excellent alternative to dual localisation of radioisotope and blue dye for small centres without good access to a nuclear medicine department. This technique could also be offered in larger centres allowing for more flexible operating list planning.

COMPETING INTERESTS

Nil.

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Appendices

Appendix 1: Number of DCIS cases where SLN biopsies were performed by year within the study period.

	SIENNA+® dual			**Blue dye**		
Year	**DCIS cases**	**Total cases**	**% DCIS**	**DCIS cases**	**Total cases**	**% DCIS**
2011	-	-	-	1	5	20%
2012	-	-	-	1	5	20%
2013	-	-	-	1	4	25%
2014	-	-	-	1	11	9%
2015	-	-	-	4	16	25%
2016	-	-	-	1	22	5%
2017	2	13	15%	6	16	38%
2018	4	16	25%	0	8	0%
2019	1	25	4%	0	8	0%
2020	2	33	6%	0	1	0%
2021	1	42	2%	-	-	-

Appendix 2: Number of nodes harvested with and without the use of Magseed for location of impalpable tumours.

Nodes harvested	**WLE with Magseed**	**WLE without Magseed**	***P-value**
1	7	12	1.000
2	3	6	
3	3	6	
4+	2	5	

Note: * Two-sided Fisher exact tests to calculate the difference between WLE performed with and without Magseed.

Psychosocial care in DHB-based stroke services in Aotearoa: a survey of current practice

Felicity A S Bright, John Davison, Ginny Abernethy

ABSTRACT

aim: Stroke has significant psychosocial impacts which contribute to burden for the person with stroke and affect stroke outcomes. The Psychosocial Working Group of the National Stroke Network (NSN) sought to survey current practices for assessing and supporting psychosocial needs within district health board (DHB) based stroke services to inform national service delivery initiatives.

methods: The survey was conducted in 2021. It was distributed to senior clinicians in all DHBs via the NSN.

results: Thirty-seven responses were received from stroke services, representing 90% of DHBs. Sixty-three percent of services reported some process for screening for psychosocial needs. Of these, only 11% used validated screens. Variability in the type of psychosocial support was evident. Seven percent of services had routine access to psychology, while 53% could access psychology on referral. There was limited evidence of specific screening and support processes for Māori, Pacific peoples, or those with communication impairments. Respondents identified training and resources needs to enable better psychosocial care.

conclusion: Stroke services are not consistently meeting national guidelines which require all services have a process for screening for psychosocial needs. This survey has informed a work programme to support psychosocial care practices in stroke services in Aotearoa New Zealand.

Stroke is increasingly common in Aotearoa New Zealand. It is the third most common cause of death and disability, with around 9,000 New Zealanders being affected by stroke each year.[1] Despite the incidence of strokes declining, as the population ages, the number of strokes is anticipated to increase, with a corresponding increase in the number of people living with stroke.[1] Many people with stroke live with ongoing psychosocial impacts of stroke which affect their quality of life and stroke outcomes. While the term "psychosocial" can be understood in many ways, for this work, we use it to refer to the psychological, social and emotional impacts of stroke. Rates of psychological diagnoses are high, with one in three stroke survivors experiencing depression,[2] and with one in five experiencing anxiety after stroke.[3] These can develop at any time post-stroke, with two-thirds of people with depression developing it at least 3 months after stroke.[4] Rates are higher in those with communication impairments.[5] People experience changes in roles and social networks.[6] Emotional impacts include grief, hopelessness, apathy, personality changes and loss of identity.[7,8] Depression, anxiety, and perceived social isolation are associated with poorer outcomes after stroke[9–11] while social support is associated with positive outcomes.[11] There are clear associations between social supports, depression, and quality of life.[12] Given that psychosocial wellbeing is a priority outcome for people with stroke,[13] that psychosocial factors are associated with poorer rehabilitation outcomes[9–11] and many are modifiable,[14] it is important to identify impacts early and intervene in a timely manner to facilitate recovery after stroke.

In Aotearoa, research and policy documents have identified that psychosocial needs should be a priority area for services.[15,16] The National Stroke Network (NSN) developed a stroke rehabilitation strategy in 2018 to specify core standards for rehabilitation.[15] This requires services to "*ensure that all patients with suspected psychosocial needs are screened and where needs are identified, are offered appropriate timely interventions*".[15] In 2020, *Take Action for Stroke Rehabilitation* was developed to support the enactment of the strategy,[17] and details high-level practice recommendations and priorities for action.[17] With regard to psychosocial screening, it requires services have a documented process or protocol to ensure that *all* patients are screened for psychosocial needs—which reflects that all people with stroke are likely to have psychosocial needs.[18] To help services to meet the standards in

Take Action for Stroke Rehabilitation, a psychosocial working group was established to develop a model of care and produce resources to support services to meet the NSN standard. This working group incorporates service providers across the continuum of care and non-governmental organisations, people living with stroke and whānau, and academics. This paper reports the outcome of the first action of the working group: a 2021 survey conducted to understand how psychosocial care is currently provided by stroke services in Aotearoa.

Method

The purposes of the survey were to: (a) collect information on current psychosocial screening and intervention practices, and (b) gather clinician and service perspectives on resources needed to improve psychosocial care. The survey questions are provided in Appendix 1. The survey was designed by the authors before being trialled with members of the working group; questions were refined after their feedback. Within the survey, nine questions were asked relating to six topics:

- Disciplines available
- How psychosocial needs are identified
- Current practices for supporting psychosocial needs
- Resources used to support wellbeing
- Services available beyond organised stroke care
- Identified resource and training needs.

The survey was circulated to clinical leads across medical, nursing and allied health disciplines using the mailing list of the NSN in July 2021. This included staff from every district health board (DHB). Recipients were requested to complete the survey (online via Survey Monkey) with their teams; it was suggested that it should be completed at a service level (e.g., with one response from the acute stroke unit) rather than by multiple individuals within the service. In the instance of multiple services across one DHB, it was suggested that each service should provide a response as staffing and care practices and processes may differ across services or sites.

Data management presented challenges due to variability in the responses received. This reflects the different ways stroke services are structured across Aotearoa, and reflects how each organisation provided its responses. Some DHBs provided one response on behalf of all stroke services (hyperacute, acute, inpatient and community rehabilitation) while others provided responses for each service. For the purposes of analysis, if the responses only discussed the continuum and it was not possible to identify what related to each type of service, this was classified as “continuum of care”. When it was possible to identify which responses related to specific services (e.g., acute or inpatient rehabilitation), then the data were analysed with like data. Many DHBs operated hybrid stroke services (e.g., integrated acute care and inpatient rehabilitation); in these instances, data were analysed alongside other acute data *and* inpatient rehabilitation data. Some responses addressed some, but not all questions.

Data were analysed using descriptive statistics and content analysis of qualitative responses.

Results

Thirty-seven responses were received from stroke services within 18 of the 20 DHBs. Of the responding DHBs, 14 were North Island DHBs and four were South Island. They represented DHBs in urban, regional and rural settings. The New Zealand clinical guidelines for stroke management[19] define DHBs as large, medium and small, based on population catchment and stroke occurrence. Responses were received from seven out of seven large DHBs, six out of six medium DHBs and five out of seven small DHBs. Of the 37 responses, 11 responses described the continuum of care within a DHB, six were from an acute service, two from a combined acute/inpatient rehabilitation service, eight an inpatient rehabilitation service, two from combined inpatient rehabilitation and community services, and eight from a community service.

Psychosocial screening practices

Respondents were asked to say how psychosocial needs are identified, and if routine screening occurs, how this occurs, including details of screening approaches and/or tools used. We received 35 responses to these questions, from 16 DHBs, and results are summarised in Table 1.

Forty percent of respondents (n=14) reported there was no routine screening of psychosocial needs within their service. In services that reported *some* approach to screening, initial disciplinary assessments were the primary occasion for identifying psychosocial issues. Free-text responses described this with phrases

Table 1: Current screening practices.

Service type	No routine screen	Screened within disciplinary or transdisciplinary assessment	Screened using validated psychosocial screening tool
Continuum of care (n=5)	80% (4)	20% (1)	-
Acute (n=10)*	27% (3)	70% (7)	10% (1)
Inpatient rehabilitation (n=11)*	45% (5)	45% (5)	18% (2)
Community rehabilitation (n=9)*	22% (2)	56% (5)	33% (3)

Notes: * Percentage given is greater than 100% as some services use multiple screening approaches.
Variation in screening processes was evident.

Table 2: Intervention approaches.

	Examples
Universal care for most people with stroke	• Building therapeutic relationships • Individualising rehabilitation for people’s mood, personality and fatigue • Exploring values and priorities and incorporating into care • Goal-setting • Supporting social interactions on the ward (e.g., groups) • Encourage active patient involvement in rehabilitation • Relaxation and breathing exercises • Education (individual and group interventions, written and verbal) • Regular discussion with the patient about wellbeing • Whānau engagement including regular whānau hui • Whānau room • Monitoring mood and discussion at team meetings • Involvement of cultural support services
Targeted psychosocial supports for people with possible or identified psychosocial needs	• Allied health team with experience in positive psychology, Motivational Interviewing and Cognitive Behavioural Therapy • Referral to social worker • Identify individual risks and issues and develop intervention plans (e.g., sleep—side room) • Clinical psychology advice to staff to support work with patients • Support from Clinical Psychology for joint sessions • Referral to GP for community-based patients for possible referral to health improvement practitioners or similar located within primary care
Specialist input for people with identified psychological needs	• Psychiatry involvement in diagnosis, medical management, treatment planning, liaison with mental health services • One-on-one Clinical Psychology sessions including shared formulations, psychoeducation, counselling, psychological interventions, sleep or pain management

Table 3: Disciplines in stroke services.

	Acute % (n=8)			**Inpatient Rehabilitation % (n=13)**			**Community rehabilitation % (n=11)**		
	Routine	Referral	None	Routine	Referral	None	Routine	Referral	None
Social work	63% (5)	37% (3)	-	92% (12)	8% (1)	-	81% (9)	9% (1)	-
Psychology	13% (1)	50% (4)	37% (3)	15% (2)	54% (7)	31% (4)	9% (1)	55% (6)	36% (4)
Māori cultural support	50% (4)	50% (4)	-	46% (6)	46% (6)	8% (1)	-	55% (6)	45% (5)
Pacific cultural support	25% (2)	63% (5)	12% (1)	15% (2)	31% (4)	54% (7)	-	45% (5)	55% (6)
Asian cultural support	25% (2)	50% (4)	25% (2)	15% (2)	15% (2)	69% (9)	-	27% (3)	73% (8)

such as "*asked by MDT in subjective assessments*" in acute care or "*medical and nursing screen*" in inpatient rehabilitation. As such, what was screened was not clear for most services. Several services described comprehensive and holistic screening processes. One inpatient service considered multiple domains of wellbeing such as motivation, behaviour, sleep, whānau support and carer stress, which then were discussed and addressed within daily rapid rounds and weekly multidisciplinary team meetings. Several community services described gathering information about wellbeing on the referral form, asking specific questions relating to holistic domains of wellbeing in initial transdisciplinary assessments (holistic assessments covering different domains relevant to stroke, completed by one team member) such as asking about mood, social supports, finances, sexuality, relationships, and in some instances, also completing validated screening. These examples reflect clear processes for reviewing and addressing wellbeing. Five services used validated psychosocial screening tools. These included the Patient Health Questionnaire-4 (PHQ-4) or the Patient Health Questionnarie-9 (PHQ-9), Generalized Anxiety Disorder Scale (GAD-7), Depression Intensity Scale Circles (DISCs) or the Stroke Aphasic Depression Questionnaire (SADQ) for those with communication impairments. Even with specified screening policies and tools, screening did not consistently occur. In the free-text box, one respondent identified that while they had a DHB-wide policy and screening process using a validated tool, in practice "*this does not always occur*". No services used culturally specific tools, or described screening processes which reflected Māori models of hauora.

In the absence of routine screening (37% of responses), respondents described psychosocial needs being identified through staff observations and conversations with patients and families. However, free text responses indicated this could be "*ad hoc*" or "*hit and miss*".

Interventions to support wellbeing

Three patterns of support were identified through free-text responses to the question, "*How is the psychosocial wellbeing of people with strokes currently supported within the service?"*, a question answered by 32 of the 37 respondents.

The first pattern (n=3 responses; one each from acute, inpatient and community rehabilitation services) was that respondents stated psychosocial wellbeing supports were limited, with responses such as "*it is not supported*", "*poor*", and "*not supported beyond general enquiry*".

The second pattern (n=24 responses) predominantly described referrals to different providers: psychologists or social workers within the team, chaplains, cultural support services, liaison psychiatry within hospital services, or external supports such as general practitioners (GPs) or stroke-centred non-governmental organisations. These respondents provided little detail regarding everyday psychosocial supports provided by multidisciplinary members of the stroke team.

The third pattern (n=5 responses; three joint acute/inpatient services, one acute, and one community rehabilitation service) reflected multi-layered approaches to psychosocial care provided by multidisciplinary team members within the stroke service. A variety of interventions were described, from universal approaches with all patients through to specialist input for identified psychological needs, shown in Table 2. These respondents also described models of care that prioritised holistic care, which included regular staff training on wellbeing, a ward environment that supported whānau involvement, and attending to staff wellbeing, seeing this as a core aspect of them supporting patient and whānau wellbeing.

The survey prompted some services to identify how they supported the psychosocial needs of Māori and Pacific peoples. Responses predominantly specifed referring to cultural support services; several specified whānau involvement through regular communication between staff and whānau, whānau rooms, and longer visiting hours as strategies in supporting wellbeing. One non-urban community service described connecting with visiting kaumatua and supporting connection with valued community activities.

While specific disciplines and services were reported to be instrumental in providing psychosocial support (specifically social work, psychology, and cultural support services), limited availablity was also reported. This is summarised in Table 3. Some free-text responses suggested that the *actual* availability of these disciplines may be less than what the numbers suggest. For instance, one DHB with two acute services stated that at one hospital, social work was available one-to-two times a week, while in the larger hospital, social work was routinely available. Another acute service indicated that the only specialist mental health support was from liaison psychiatry but was difficult to access as psychosocial responses were considered a normal reaction to stroke, rather than something requiring specialist input. One DHB-wide community service highlighted geographical differences within the service, stating "*psychology (almost entirely non-existent) can only be accessed on referral*" in one part of the DHB that only 10% of patients resided within. The other 90% of stroke patients in the DHB had no access to psychology or social work. The nature of their involvement was rarely specified, for instance, whether services were stroke-specific or if staff were resourced and able to provide comprehensive psychosocial support.

Resource needs to improve psychosocial screening and care

Using open-ended questions, we asked respondents to identify training and resource needs. Respondents sought a national approach to screening that was culturally appropriate, reflected holistic understandings of wellbeing such as addressing identity, values, whānau and adjustment, and incorporated Māori models of health. Alongside this, respondents identified the need for better training in understanding and identifying psychosocial needs, and the need for care pathways so that there were clear processes and supports available and accessible if psychosocial issues were identified. To equip clinicians to provide comprehensive psychosocial support, a number of needs were identified:

1. Education addressing:

- The importance of providing psychosocial support. Respondents suggested this education should be provided to the whole team, including support and ward-based staff.
- Specific interventions such as Motivational Interviewing.
- Specific psychosocial issues such as risk assessment, emotional changes, supporting engagement in people who are depressed or anxious, managing difficult behaviour, knowing when specialist support is required.

2. Resources for patients and family on the different impacts of stroke.
3. Improved staffing within the team, including routine access to social workers and psychology, and ensuring that staff with specialist psychosocial skills and knowledge have capacity to support patients, whānau and teams.

Discussion

This survey sought to identify current psychosocial screening and intervention practices in Aotearoa New Zealand, and to resource needs to support service development.

Clear variability in screening was evident, both *within* DHBs and *between* DHBs. Current approaches to screening are inconsistent. Five services reported routine screening using a validated screening tool and/or psychosocial assessment. This is an improvement on 2014 research that showed only 7% of services completed screening for >90% of patients.[20] However, there is still progress to be made. Screening processes should be universal, attend to different domains likely to be impacted by stroke, and be embedded throughout the continuum of care to ensure issues are identified in a timely manner.[18,21] This includes ongoing review in primary care.

No services identified using culturally informed screening processes for Māori or people of other cultural groups. It is imperative that screening processes are culturally responsive, reflect cultural perspectives on wellbeing, and are culturally safe.[22] Additionally, all clinicians and services are able to be culturally safe, responsive to and supporting people's cultural needs and broader sense of oranga (wellbeing), to avoid perpetuating inequities in experience and outcome.[23,24]

When psychosocial issues are identified, timely, evidence-based intervention is important.[25] A wide variety of approaches to supporting wellbeing were evident. Some respondents identified psychosocial care was an area that was not addressed well—this reflects patients' experiences of services.[26] Some responses focused on referrals to specialist support (cultural support, social work, psychology); however, there were also comprehensive examples of holistic psychosocial care within services. These examples reflect best practice approaches such as the Stepped Care Model,[27] and may provide a useful model for clinicians and services wishing to enhance practice.

All staff working in stroke care, across the continuum of care, should be able to provide support for common post-stroke psychosocial changes.[27] Specialised support should be available from appropriately trained staff, and from specialist psychologists and psychiatrists for those with more significant psychosocial and psychological difficulties. This is important as best-practice guidelines recommend talking therapies are a first line treatment for depression; medical teams can also consider a trial of antidepressants.[18] It is clear from survey results, however, that access to specialist psychological services is limited.

This survey indicates there is a need for better and wider access to specialist psychological support; however, it also highlights there is a need and appetite for building the knowledge, skills and supports for stroke-specialist staff. Building capability within the stroke team is likely to improve psychosocial care and better meet the needs of patients.[5,27] The creation of Te Whatu Ora and larger localities may offer more opportunities for providing education for multidisciplinary staff, and collaboration and connection with specialist support across hospitals and services and between tertiary and primary care.

The results of this survey have led to the development of a resource to support services to identify and address psychosocial needs after stroke.[28] It provides scripts for asking about wellbeing, and recommends that specific validated screens are completed at transition points, or if staff have concerns. These are PHQ-9 and GAD-7, or the HADS. If the person has communication impairments, clinicians could consider the SADQ-10 or DISCs, and Behavioural Observation of Anxiety (BOA). It also identifies a range of strategies clinicians can use to support wellbeing. Ongoing professional development will occur throughout 2023.

The findings of this survey do have some limitations. There were inconsistencies in how services responded, limiting our ability to draw conclusive findings from comparisons within and across service types; this would require a different research approach. Responses to open-ended questions varied significantly in the depth provided. This does not reflect that one represents a better approach to care than others. Instead, it reflects the nature of the survey design and possibly respondent time.

There is clear recognition of the need for improved psychosocial care for people with stroke in Aotearoa New Zealand. The high rate of responses to this survey indicate a wide-spread interest in enhancing care. This survey provides a valuable platform for future practice and policy development, which should aim to better equip clinicians to support wellbeing. It is vital that services improve psychosocial care to enable better experiences and outcomes for people impacted by stroke.

COMPETING INTERESTS

Nil.

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Appendix

Survey questions.

Service information

1. Please indicate in which DHB your service is located
2. Please indicate which services you work within (options: Hyperacute, acute, inpatient rehab, community rehab, primary care, NGO, other)
3. Please indicate which disciplines/roles are represented within your team (as routine or by referral only) (options: medical, nursing, occupational therapy, physiotherapy, speech-language therapy, social work, assistant, psychologist, community stroke advisor, Māori cultural support, Pacific cultural support, Asian cultural support, other)

Current service provision

1. How are psychosocial needs identified in your service?
2. If routine screening occurs, please provide details of this
3. How is the psychosocial well-being of people with stroke currently supported within the service
4. For stroke survivors
5. For family and whānau
6. For Māori and Pacific People
7. What resources do you use to support your patients and whānau (e.g., educational material, community support groups)?
8. What psychosocial supports are available once a person has left the DHB stroke service?

What needs to change?

1. There are a number of groups who report limited psychosocial support from services e.g., Māori, people with communication/cognitive impairments, residential care. What would help your service better support the psychosocial needs of these groups?
2. What would help increase the confidence and competence of your team when supporting people’s psychosocial needs?
3. Do you have any other comments or reflections that would be helpful for the working group who are developing a model of psychosocial care for stroke services?

The impact of AI and ChatGPT on research reporting

Zubair M Mojadeddi, Jacob Rosenberg

Abstract

ChatGPT and the newest GPT-4 are AI language models developed by OpenAI that have gained attention for their potential applications in biomedical research reporting. The models can assist researchers in various stages of writing scientific articles, including literature search, outlining, writing different sections, formatting, and translation. The use of ChatGPT or GPT-4 in research reporting has the potential to speed up the writing process, but its limitations, such as incorrect answers and biases, should also be considered. There is ongoing debate over the issue of AI authorship in scientific papers, with some publishers allowing it to be listed as a contributor in the acknowledgements section, while others do not allow it to be listed as an author. The use of ChatGPT or GPT-4 in research reporting is a recent development, and further studies and discussions are needed to determine their potential and limitations in this field.

The idea of artificial intelligence (AI) was first introduced in the 1950s.[1–4] A subfield of AI is Natural Language Processing (NLP), which is the ability of a computer program to understand the human language.[1,5] However, the concept of large language models (LLM) as we know them today is a type of NLP[6] that is a program capable of producing human language and answers based on large data.[7] In recent years, many language models such as Google Neural Machine Translation (GNMT)[8] and the Bidirectional Encoder Representation from Transformers (BERT)[9] have been created. In 2018, OpenAI launched its first model, the Generative Pre-trained Transformer (GPT),[10] which was followed by further development resulting in GPT-2 and GPT-3.[6,11] In November 2022, OpenAI introduced ChatGPT, which is currently freely available online.[12] The latest version, GPT-4, was made publicly available for a user fee in March 2023. GPT-4 is currently the most advanced system available to the public, as it is based on more background information, with more advanced problem solving and greater accuracy.[13]

Since the launch of ChatGPT, it has garnered the attention of many people worldwide, including biomedical researchers, as it appears to be able to substantially assist in the reporting process of biomedical research (article writing). This raises questions such as: how should AI be understood in the context of research reporting? What can AI help researchers with? How should the implementation of ChatGPT be used in the world of research? Could this mean that a paradigm shift in the field of research reporting is on the horizon?

The capabilities of ChatGPT

ChatGPT can help researchers in various phases of writing scientific articles (Figure 1). We verified the answers given by the robot in Figure 1 and also tried other possible features in multiple sessions. It turned out that the robot can:

- Identify relevant literature, information, and potential collaborators such as researchers and institutions.
- Identify relevant topics and trends in the respected research fields.
- Organise ideas and create an outline for an article.
- Conduct a literature review, such as providing relevant articles and studies.
- Write different sections of an article, such as the introduction, methods, results, and discussion.
- Produce an abstract that fits the article.
- Help with grammar, syntax, and style.
- Format the manuscript according to the journal's guidelines.
- Give ideas as to how charts, graphs, and figures could be constructed if data is explained in text format (the answer would then also be in text format).
- Assist with the communication for research through blogs and social media by writing laymen's descriptions and giving ideas as to what type of post could be relevant on social media.
- Write conference abstracts.
- Translate manuscripts into other languages.

- Write a covering letter.
- Produce title pages.
- Format references to specific citation styles.

These are some of the ways ChatGPT can assist researchers; however, the quality of the AI output has not yet been formally tested against corresponding human work. Nevertheless, it is obvious that the robot can provide substantial help for the researcher in the reporting phases of scientific work. This means that a paradigm shift may be on the way for how research is reported in the future, potentially making it possible to produce an astonishing number of scientific articles within a short time frame once we have learned the potential of the robotic platform and how it can assist the researcher without compromising on quality.

Even though AI can help researchers in numerous ways, it is not free from limitations. For example, ChatGPT sometimes provides incorrect answers, and it may reference an article that does not exist.[14] Furthermore, the possibility of bias in the responses is unknown as the end-user has no control of the input data sources for the robot. Thus, there is a theoretical risk that some information regarding a topic can be left out, which could possibly lead to misinformation being spread about a topic. An example could be that some controversial articles or data would be left out of the AI's data. Finally, every researcher using AI should, of course, check the output information for credibility.

There has been concern that answers by the robot are so well-formulated and intelligent that it could be difficult to distinguish them from text produced by humans. However, new software can now detect AI-generated text such as GPTZero[15] and the AI classifier,[16] although they have not yet been tested systematically.

The issue of authorship

When a robot assists in the writing process of a scientific paper, it is necessary to consider whether the AI assistant should be accredited as a co-author in the byline. Another possibility would be to mention it in the methods section or give credit for the contribution in the acknowledgements section.

Since the launch of ChatGPT, publishers have been trying to create authorship policies for the new chatbot.[14,17] Currently, three articles and two preprints have an AI robot as a co-author.[18–22] Publishers and preprint servers typically agree that ChatGPT does not fulfill the authorship criteria because it cannot take responsibility for the content of the scientific paper.[14,17] Furthermore, the editors of Nature[17] and Science[14] will not allow AI to be listed as an author, and the publisher Taylor and Francis prefers that the AI be mentioned in the acknowledgements section as a contributor.[17] Due to increased use of AI, publishers will need to decide on authorship issues for this new player in the field. *Nature*, along with *Springer Nature* journals, have formulated two rules in their author guidelines[23]: "*Large Language Models (LLMs), such as ChatGPT, do not currently satisfy our authorship criteria. Notably, attribution of authorship carries with it accountability for the work, which cannot be effectively applied to LLMs. Use of an LLM should be properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript*." This is fully compliant with the authorship criteria described by the International Committee of Medical Journal Editors (ICMJE)[24]: "1) *Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND* 2) *Drafting the work or revising it critically for important intellectual content; AND* 3) *Final approval of the version to be published; AND* 4) *Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved*."

Thus, since the robot cannot be accountable for all aspects of the work, byline authorship is not an option for an LLM such as ChatGPT. Depending on the amount of contribution, it would be appropriate to mention ChatGPT in the methods section or as a formal contribution in the acknowledgements section.

Discussion

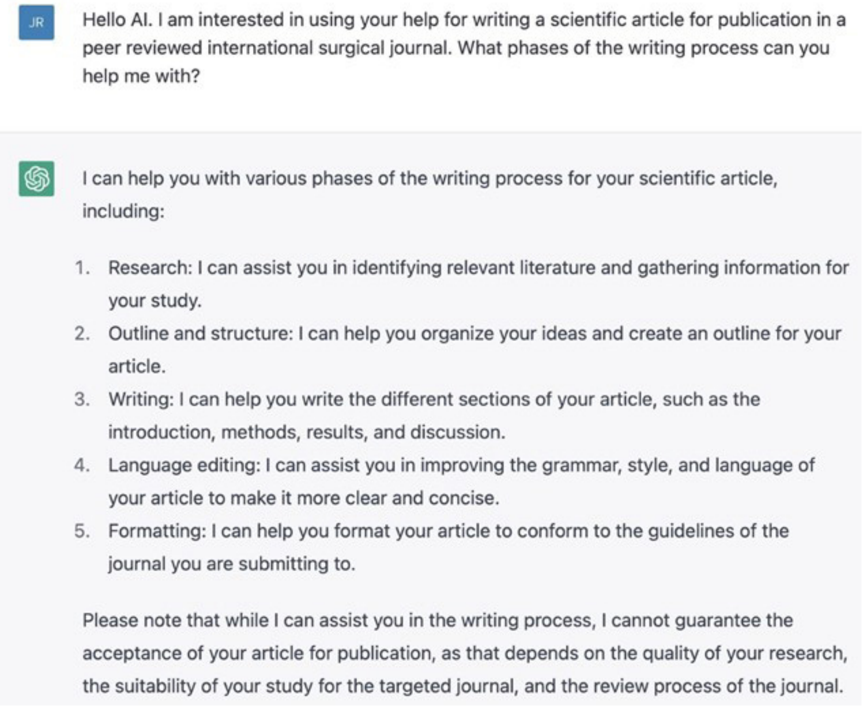
In its current version, the AI chatbot can, in principle, be seen as a medical writer. A medical writer is a professional author with skills in language and writing,[25] and they can provide grant writing, laymen descriptions, scientific articles, and more. [25,26] When outsourcing parts of the research process is already normal, why not outsource part of the writing process to a medical writer or an AI robot? We already use research assistants for data collection and statisticians for statistical analyses, so maybe it's time to use AI for various phases of manuscript production. The cost for researchers using AI is substantially lower than paying for a medical writer, so maybe we could consider the AI robot as a low-cost medical writer.

An important issue, however, is the quality of the AI output. We don't yet know if it is as good as a professional medical writer. With our limited experience at present, we seriously doubt that the AI quality is good enough, but since AI has learning capability and since the current versions of these models are still in their infancy, we don't know what the future will bring.

Some researchers may be concerned that the ease of use and low cost may trigger research misconduct with fabricated results, unintentional errors, or deceptive publications. However, misconduct can occur with or without AI, and with our current knowledge of these systems, we don't believe that it would become worse or better with AI for research reporting. Rather, AI in research reporting should be seen as a "low-cost medical writer", although we are not fully there yet regarding quality.

In conclusion, AI could probably be used as a medical writer for at least some parts of the article production phases, but in our opinion, this does not mean that the AI should be listed as a co-author. Depending on the contribution, the AI could be thanked in the acknowledgements section or mentioned in the methods section of the paper. Documenting where the AI has assisted will heighten the transparency and credibility of the work. Furthermore, it should be noted that ChatGPT or GPT-4 are not yet at the level of a professional medical writer, and further investigation and research need to be conducted with AI to fully understand its capabilities. These interesting new developments could mean a drastic paradigm shift in the field of research reporting, where various tasks may soon be taken over by AI platforms. AI is available to every researcher, whereas a medical writer is only available with sufficient funding, so AI could potentially become more widespread than the use of a professional medical writer. These AI systems are still in their infancy, and the development is exponential. Therefore, we are facing substantial changes in research reporting where tasks other than article writing may become the main focus for researchers in biomedicine in the near future.

Figure 1: We asked the robot how it could help if we wanted to write a scientific paper. The question and answers are shown in the figure.



Hello AI. I am interested in using your help for writing a scientific article for publication in a peer reviewed international surgical journal. What phases of the writing process can you help me with?

I can help you with various phases of the writing process for your scientific article, including:

1. Research: I can assist you in identifying relevant literature and gathering information for your study.
2. Outline and structure: I can help you organize your ideas and create an outline for your article.
3. Writing: I can help you write the different sections of your article, such as the introduction, methods, results, and discussion.
4. Language editing: I can assist you in improving the grammar, style, and language of your article to make it more clear and concise.
5. Formatting: I can help you format your article to conform to the guidelines of the journal you are submitting to.

Please note that while I can assist you in the writing process, I cannot guarantee the acceptance of your article for publication, as that depends on the quality of your research, the suitability of your study for the targeted journal, and the review process of the journal.

COMPETING INTERESTS

Nil.

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The ChatGPT suggested a title and an abstract for this article after giving the full text to the robot (the full text was written by the authors).

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Inclusive medical education for students with disabilities: a new guidance document from Medical Deans Australia and New Zealand

Dabrina Issakhany, Peter Crampton, members of the Medical Deans Inherent Requirements Review Working Group

ABSTRACT

This paper outlines: 1) the work undertaken by Medical Deans Australia and New Zealand (MDANZ) to review and update its 2017 guidelines related to selecting and supporting students with disabilities, and 2) the resulting new recommendations. The review group considered common approaches to supporting medical students with a disability through an inclusive, strengths-based lens. The outcome was a guidance document that centres the importance of a strengths-based and inclusive culture within medical schools, and emphasises an individualised, context-specific and inclusive approach based on early, open dialogue. Strong project governance and broad consultation were critical to achieving this outcome. As social norms and technologies evolve, regular re examination of guidance on how to support potential or current medical students with a disability will be necessary.

In both New Zealand's medical schools, and in medical schools in Australia, there are ongoing efforts to increase the representativeness of medical student cohorts, with the aim of ensuring that they better reflect the different communities they will serve, particularly in terms of ethnicity, rural background and socio-economic background.[1,2,3] The current health reforms in New Zealand place emphasis on health workforce development as a means of achieving equitable health outcomes.[4] The focus of this article is on students with a disability, and how to increase the representativeness of the medical workforce for people with a disability. We summarise the main recommendations of a new guidance document from Medical Deans Australia and New Zealand (MDANZ), which argues that the culture of medical schools is of central importance in ensuring that students with a disability are welcomed into medical schools, feel safe and are valued for their strengths and perspectives.[5] This principle applies equally to students who acquire a disability while they are at medical school.

Medical schools in New Zealand and Australia have a history of educating graduates who meet the accreditation standards of the Australian Medical Council and are, theoretically, capable of pursuing any branch of medicine.[6] Unlike many other university courses, medical education is outcomes based and closely linked to the expectation that the majority of graduates will practice as doctors. These factors, along with the regulatory context and the requirement for patient safety during medical school training, add layers of complexity to medical education in relation to how medical schools select, support and educate students.

People with disabilities have long faced challenges in studying medicine.[7] It is likely that people with a disability have historically been under-represented in the medical profession.[7] Contributing factors include the heterogenous nature of disabilities, and students' fear of disclosing their disability because of stigma and concern that doing so might have negative consequences for future training and career opportunities.[7,8,9,10,11]

We recognise that there are differing views within the disability community about how people with a disability prefer to be acknowledged. We have chosen to refer to "students with a disability" as this language is reflective of the "person first" approach in the United Nations Convention on Rights of Persons with Disabilities, which both Australia and New Zealand have ratified. We have consulted widely and acknowledge our use of language may not be consistent with preferences among some disability stakeholders.

Recently, MDANZ reviewed its 2017 guidelines *Inherent requirements for studying medicine in*

Australia and New Zealand.[12] The term "inherent requirement" refers to "*the fundamental components of a course or unit that are essential to demonstrate the capabilities, knowledge and skills to achieve the core learning outcomes of the course or unit, while preserving the academic integrity of the university's learning, assessment and accreditation processes*".[12] The 2017 guidelines were intended to aid medical schools' selection processes and enable greater access for students with a disability to study medicine, while maintaining safe clinical care.[12] This paper outlines the process and outcome of the review of the 2017 guidelines.

Process of the review

A working group was established by MDANZ in 2019 to lead the review process, which is presented in Figure 1. Members included representatives from 13 medical schools, regulators of primary medical programs and medical practitioners in Australia and New Zealand, and representatives of student and disability peak bodies. Evidence was gathered through a literature review and two separate and extensive consultation processes. The group explored the impacts of the 2017 *Inherent requirements* document and its equivalent in other jurisdictions, factors to consider when developing and assessing the ability to demonstrate achievement, including reasonable adjustments, and the statutory and regulatory landscape where these assessments take place. "Reasonable adjustments" refers to the provision of supports that are considered reasonable to enable students who have a disability to participate on the same basis as students without a disability.[13]

The final guidance document was fully endorsed by MDANZ and released in 2021.

Outcome of the review

The review resulted in the new MDANZ guidance document, *Inclusive Medical Education: guidance for applicants and medical students with a disability.*[5] It proposes a strengths-based approach to supporting students with a disability to study medicine and identifies seven key elements for medical schools to consider in facilitating an environment that supports potential or current students with a disability to study medicine, presented in Figure 2. This strengths-based approach places value on the perspectives and experiences that students with a disability bring to medical training and to the practice of medicine.

The new document presents a shift in thinking away from a medical model of disability, towards

Figure 1: Review process of the 2017 guideline statement.

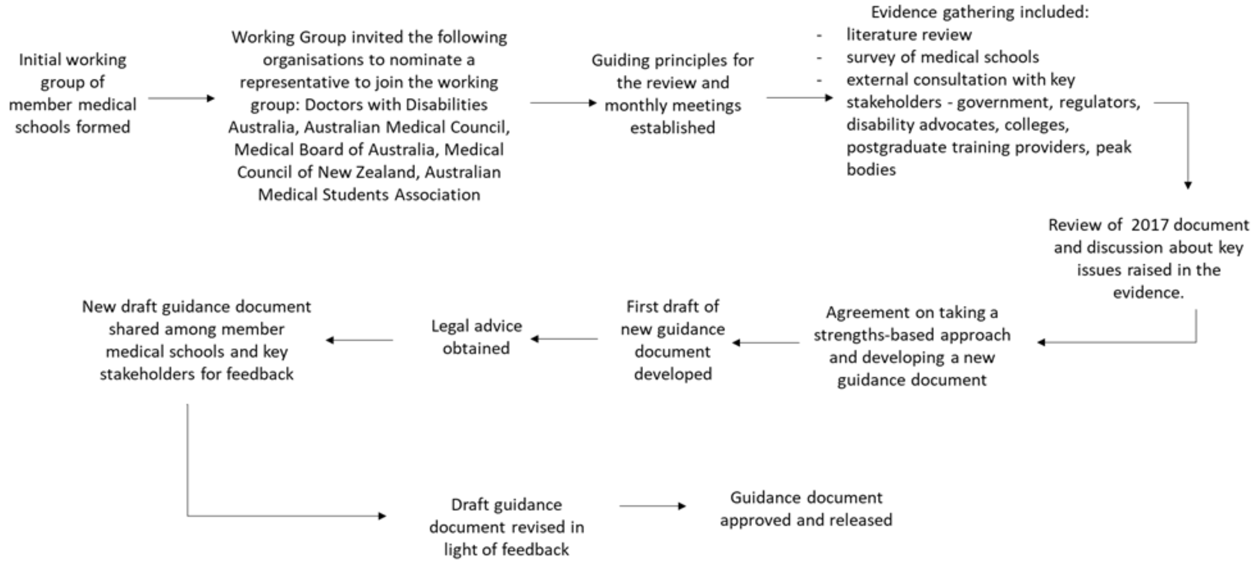

Figure 2: Key areas to promote an inclusive culture and support students with a disability.

Source: Medical Deans Australia and New Zealand. Inclusive Medical Education – guidance on applicants and students with a disability. Sydney, Australia; 2021.

a social model of disability, which recognises that a person's ability to complete a task is influenced by their interaction with their context (the environmental and personal factors unique to their situation).[14]

Medical schools operate in an area of some tension. There are times when regulatory requirements, the law, and the expectations of students, those who employ medical graduates or fund medical training may be in conflict. In addition, medical education is both theory and practice based. It requires active participation in diverse workplace environments to develop the skills necessary to meet regulatory standards and to become a competent doctor. In providing outcomes-based education and involving patients in learning and assessment activities, medical schools sit at the intersection of these factors.[10,15,16]

Given the individual nature of each person's abilities and circumstances, a guidance document cannot resolve all the tensions. Rather, principles-based guidance was developed to support decision making by medical schools and potential or current students with a disability. To this end, students with a disability should be provided with early and ongoing information about their career options, and clear expectations about what can and cannot be assured by a medical school so that students can be empowered to make decisions about their own future. This process may include early consultation with the Medical Council of New Zealand to ensure the student and medical school have a shared understanding of any possible limitations or challenges to registration, internship or future employment. Matters of fitness to practice and competency are separate and may only in specific circumstances be related to a person's disability. Assessing the capacity of a student with a disability to progress through a medical degree should not be conflated with their fitness to practice or competency, without first assessing whether adjustments required are reasonable.

The review also demonstrated how a narrow or broad interpretation of a single regulatory standard can determine whether a person is eligible to train as a doctor. For example, does "performing CPR" require a student to physically perform the task themselves or can they direct others to do so? In this sense, regulatory standards can be seen as a powerful enabler or barrier to inclusion, depending on how learning outcomes are phrased.

The working group, which included members with a disability, disability rights advocates and representatives from regulatory bodies, made the decision to steer away from providing scenarios and examples in the guidance document. The basis for this decision was that examples would necessarily need to be abbreviated and simplified for inclusion in the new guidance document, running the risk of taking the emphasis off the need for positive cultural settings within medical schools and the centrality of good processes (as illustrated in Figure 2), the risk of essentialising different aspects of disability and the risk of not properly conveying the complex, interdependent variables that go into decision making. Reasonable adjustments are made at different points in a medical degree in the context of diverse assessments and learning and working environments where students are assessed. In addition are the highly individualised natures of individuals' disabilities and the varied facilities available at universities and health services. Instead, the working group recommended the formation of a Special Interest Group for Australian and New Zealand medical school staff to share experiences and learnings to better support applicants and students with a disability. Establishing this network provides an ongoing community of practice for discussion and debate acknowledging that, because of the individualised nature of disability, it is not possible or desirable to construct strict "rules" in relation to students with a disability.

Discussion

The new guidance document was underpinned by the following principles:

- Adopt an inclusive, strengths-based approach.
- Problematise the learning environment rather than the disability.
- Adopt a social model for disability that considers each person's abilities on an individualised, context-specific basis.
- Encourage early and open dialogue through inclusive practices and culture.

The guidance acknowledges that: no two students are the same, even if their conditions appear similar; context matters; people with less-visible disabilities often face different challenges compared to those with more visible disabilities;[17] and a person's abilities also change depending on their learning or working environment, or the activities expected of them.[17]

Facilitating an inclusive culture in medical schools, one that values and proactively enables the participation of diverse students, was identified as fundamental to implementing a strengths-based approach. Supporting students relies on early disclosure by students with a disability. To do this, students need to feel confident that disclosing their disability will not have an adverse effect on their application or progression. An inclusive culture not only enables this, it also makes students with disabilities feel seen and valued for their abilities.

The approach set out in Figure 2 demonstrates how achieving an inclusive culture requires an active, deliberate and multifaceted approach across all stages of a medical program. This approach seeks to work with students with a disability and empower them to feel confident seeking adjustments where required. It also sets out the opportunities for medical schools to be proactive in developing learning environments that are inclusive for all students, with or without disabilities. This includes empowering and motivating staff to actively seek opportunities to support and enable students with a disability to study medicine if they desire, and to meet the relevant selection criteria. In this sense the onus on facilitating an inclusive culture and environment is shared between both students and the medical school. The process of the review provided insights into the challenges faced by students with a disability and medical schools in supporting them, and the necessity of ongoing reflections on the progression of social norms in the area of disability. The review also required an examination of the assumptions, biases and preconceptions of those engaged in the review process. For example, should a student with limited mobility in their arms be automatically considered ineligible for studying medicine if they could not undertake a physical examination without assistance? The working group consistently challenged assumptions that, by default, people with a disability should be excluded from medical education because they cannot undertake a task in an identical manner to a person without a disability. While the guidance document acknowledges that, even with reasonable adjustments, there may be cases where a student will not be able to meet the requirements of the medical program, this should not be the default or primary assumption. Rather, the emphasis is on early discussion between the medical school and applicant or student about what alternative means are available and reasonable to enable the student to undertake the programme's components and demonstrate their achievements in all key areas.

A broadly representative working group, extensive consultation and inclusion of people with a disability were critical to creating a new, widely accepted document. The diverse mix in the working group of senior leaders from medical schools and regulatory bodies, university support staff, students and people with lived experience of completing medical school with a disability made challenges to traditional thinking more likely and welcome. The inclusion in the working group of people with the experience of completing medical school with a disability provided insights about what matters to people with a disability and the challenges they face in medical school and in employment. Targeted and extensive consultation provided insights from stakeholders who play a role in the accreditation, design, delivery and funding of medical education, as well as from those responsible for registration and employment. Consultation also highlighted challenges that cannot be solved by guidance alone, but can be mitigated through open dialogue between medical schools and applicants and students.

Social norms will continue to evolve, requiring careful and frequent re-examination of both new technologies that will enable greater participation and biases related to who can and should be our doctors. How these biases are manifested in our policies, processes and regulatory standards related to the education and registration of future doctors will change over time, and constant vigilance will be required.

Navigating through the practicalities of providing support that meets students' environmental and personal needs—and the legal, regulatory and policy framework in place—poses challenges. While centralised disability services provide university-wide support, identifying and tailoring adjustments that meet the specific, and often unique, demands of the medical programme is resource- and time-intensive for medical school staff. This process may require extensive and ongoing consultation with a range of stakeholders, including supervisors and coordinators at different clinical placement or workplace locations, and potentially engagement with regulatory bodies as well as with the student themselves. Additionally, medical schools do not determine a student's eligibility for registration as a medical practitioner after graduation—this decision is made by the Medical Council of New Zealand based on regulatory requirements. This division of responsibility adds a layer of complexity when assessing the reasonableness of adjustments in both learning and workplace environments.

The COVID-19 pandemic has only exacerbated resource constraints across the university sector and in some instances has significantly reduced capacity in the hospital sector to support the essential education and training of medical students. These pressures add further complexity to ensuring the preparedness of graduates for practice, and the breadth of potential adjustments required to achieve this.

Areas for future work could include the sharing of good practice examples of reasonable adjustments that enable a range of people with a disability to study medicine, and also sharing experiences of the limitations of reasonable adjustments.

Conclusion

The review explored evolving medical, health and social attitudes in relation to people with disabilities, resulting in a strengths-based guidance document that is reflective, we hope, of our aspirations for inclusiveness. An inclusive approach to medical education is essential to achieving equitable representation of doctors with a disability in the medical workforce. This work is never complete—as social norms and technologies evolve, re-examination of our expectations and approaches will continue to be necessary.

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Medical Deans Australia and New Zealand would like to acknowledge the work of the authors in reflecting in this article the process, outcomes and opportunities created through Medical Deans' work, and also their contribution as IRRWG members to the development of our guidance document on Inclusive Medical Education for students and applicants with a disability.

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Vernix caseosa peritonitis: a novel case with colonic perforation

Alexander Hart, Andrew MacLachlan, Louise Bright, Matthew James McGuinness, Ming Yu, Lena Clinckett, Paul Manuel, Mavis Orizu

Vernix caseosa peritonitis (VCP) can occur following contamination of the peritoneum with amniotic fluid containing vernix caseosa, a white paste found on foetal skin. It is a rare condition with 35 cases reported since first described in 1976.[1]

Case report

A 32-year-old primigravida Caucasian woman underwent a caesarean section at 41+3 weeks for foetal distress. Meconium-stained liquor was noted. She was discharged two days later. The pregnancy was otherwise uncomplicated, with close monitoring required for her quiescent ulcerative colitis controlled with infliximab.

On day 5, she presented with severe abdominal pain, fever, and raised inflammatory markers. Antibiotics were administered for presumed endometritis without initial improvement. Ultrasound showed no retained products of conception. Computed tomography (CT) demonstrated features of ileus and possible peritonitis without perforation or other clear cause. She began improving and was discharged 1 week later on oral antibiotics.

Eight days later she represented in near identical fashion. CT now showed multiple small disseminated intra-abdominal abscesses and a probable contained ascending colon perforation. Multiple blood cultures were negative. Despite trialling conservative management with antibiotics for five days, she remained febrile and an interval CT showed no improvement (see Figure 1). Laparoscopy converted to midline laparotomy was performed. Findings included a large collection beneath the Pfannenstiel incision with adherent omentum, small bowel and sigmoid colon; multiple diffuse inflammatory adhesions, multiple whitish peritoneal nodules (biopsied; see Figure 2), uterine fundus defect and a pinpoint colonic perforation near the hepatic flexure. Interventions involved suture repair of the colonic perforation, loop ileostomy formation, appendicectomy, uterine fundus repair and extensive washout. The patient gradually clinically and biochemically improved. Culture of intra-operative aspirates were negative. She discharged 16 days following surgery. Histology findings were consistent with VCP as seen in Figure 3. At 6-month clinic review, she remains asymptomatic and awaits ileostomy reversal.

Discussion

Most VCP cases occur after caesarean section where spillage of amniotic fluid occurs routinely. However, the true aetiology is not understood, given that VCP develops rarely and hypersensitivity reactions may play a role.[1] Patients commonly present 3–35 days postpartum with abdominal pain, peritonism, fever and leucocytosis.[2] Investigations for an infective source are negative and imaging findings are initially normal or non-specific. Typically, these unexplained unwell patients proceed to exploratory laparotomy where cheese-like white plaques are found diffusely on peritoneal surfaces.[2] Underlying organ pathology is not identified. However, due to erroneously attributing peritoneal findings to their involvement, unnecessary appendicectomy, colectomy, hysterectomy and salpingo-oophorectomy have occurred.[3,4] Biopsy later confirms VCP by identifying inflammatory infiltrates commonly with foreign-body giant cell reaction associated with anuclear squamous cells and lanugo hair shafts.[5]

In most respects, this case is classical of those described. However, this appears to be the first case to report an associated colonic perforation, though the exact timing and aetiology are unclear. In three cases who underwent segmental colectomy for suspected perforation, no perforation was identified.[6–8] An adherent inflammatory reaction causing focal erosion remains possible. Iatrogenic injury is considered unlikely from the caesarean section or laparotomy given prior CT findings of possible perforation. Any ulcerative colitis contribution is uncertain given unknown disease activity, though she remained symptomatically controlled.

Like most cases, the underlying pathology was not initially suspected by the treating teams.

This is undesirable, as early diagnostic surgical exploration and washout is the mainstay of management in the non-improving patient.[1,3] This can be achieved successfully laparoscopically.[5] Intra-operative recognition of VCP will prevent unnecessary organ resection and prolonged antibiotics which are unlikely beneficial, unless rare organ injury is present.

This case reinforces the need to improve awareness and early recognition of VCP to ensure appropriate management in a timely fashion. It remains to be determined whether there is a true association between VCP and bowel perforation.

Figure 1: Axial CT slice showing numerous walled off fluid collections anterior to the uterus.

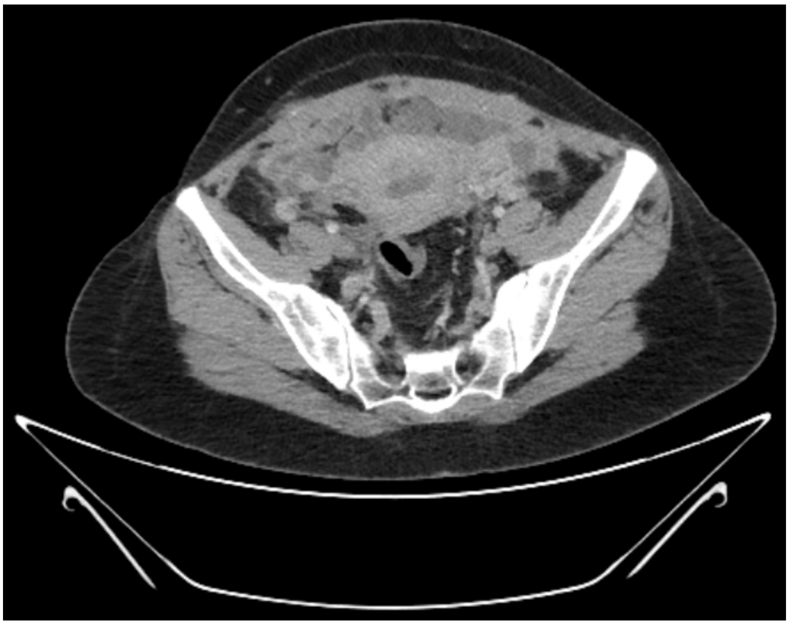


Figure 2: Laparoscopic view of creamy-white nodules (arrows) situated on the anterior abdominal wall and associated inflammatory adhesion.

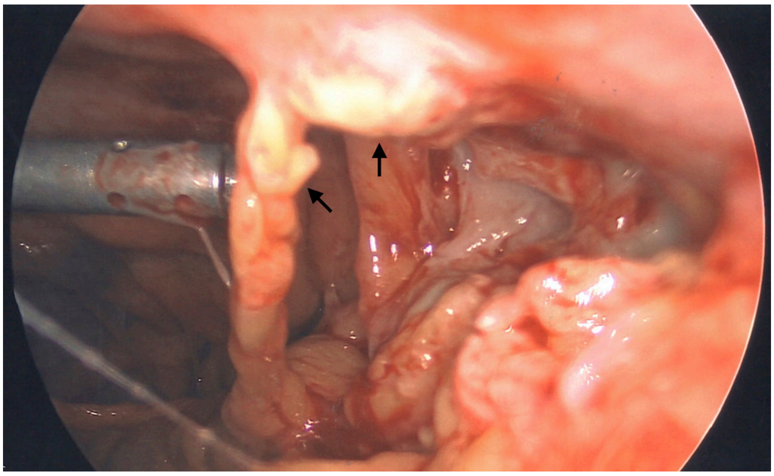
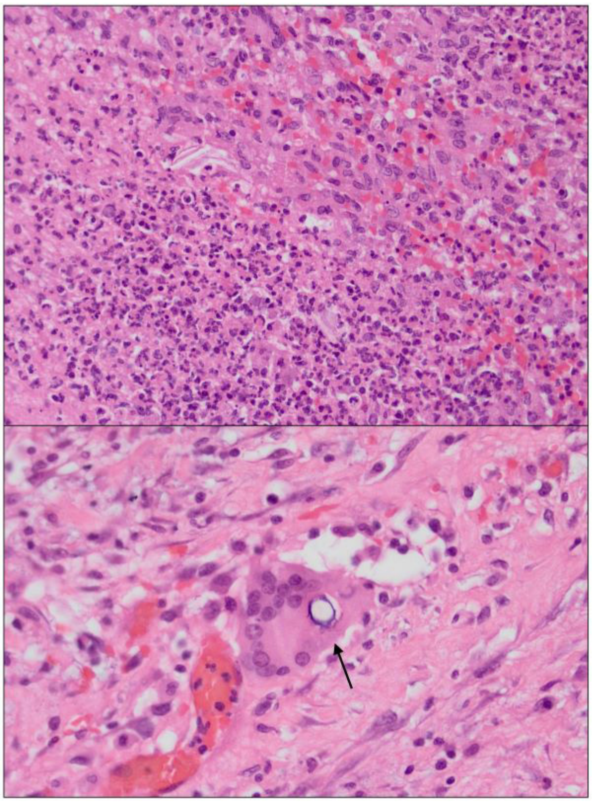


Figure 3: The sections demonstrate an admixture of inflammatory cells including multinucleated giant cells that comprise the abscess material. Focally, there is laminated squamous debris (CK5/6 positive, calretinin negative) and a hair fragment engulfed by a giant cell (arrow), consistent with vernix caseosa peritonitis.



COMPETING INTERESTS

Nil.

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Anaesthetic Mortality in New Zealand

Read at the Annual Meeting of the British Medical Association at Christchurch, 1923, by D. S. Wylie, C.M.G., C.B.E., F.R.C.S., (Eng.).

My reasons for bringing to your notice a subject which possibly some of us might consider somewhat stereotyped are the consclusions which have been forced upon one during the last two and a-half years as the outcome of having considered the details of each anaesthetic death during that period which ahs been the subject of a coroner's enquiry.

In April, 1920, shortly after I undertook the duties of Inspect of Hospitals under the Health Department, I investigated the question of deaths under anaesthetics in New Zealand. On scrutinising, however, the figures supplied by the Registrar-General for the years 1913 to 1919, I found that in practically no case was the nature of the anaesthetic administered recorded, and, consequently, the figures for the period in question were of little or no practical value.

The matter was taken up with the various authorities concerned, and from June, 1920, until the present time, fairly full information has been obtained concerning each death under anaesthesia which has been the subject of a coroner's enquiry. The figures are interesting. From 1913 to 1919 the number of anaesthetic deaths reported in New Zealand each year varied from 5 (the number recorded in the years 1914 and 1918) to 11 (the number recorded in 1919). In 1920 there were 11 deaths; in 1921,21; in 1922, 22. That is, we have a total of 54 deaths in three years, compared with 57 deaths in the preceding seven years.

The sudden increase in 1921 was striking, but in considering the matter it had to be remembered that greater attention was being paid to the matter of securing accurate returns, and that for the years 1915 to 1919 the influence of the war upon the population of New Zealand, and possibly upon the amount of surgical work which was done in the country at that time, had both to be taken into account.

It was considered that no definite good would have resulted from taking action at the end of 1921, having regard to the harmful effects resulting from the publicity which was given to the question of maternal mortality before proper enquiries had been made into that matter. It was resolved that, so far as the question of deaths from anaesthetics was concerned, proper enquiry should precede publicity. That this intention partly failed was not due to any action of the Health Department, but arose as the consequence of the use made of certain facts and figures, which were supplied by the Health Department to a medical practitioner for use in connection with a paper which he was reading, and details of which, I am informed, leaked out in an unfortunate way to the Press.

On considering in further detail the anaesthetic deaths for 1920,1921 and 1922, certain facts of interest and importance manifest themselves. In putting these before you I am fully aware of the danger of drawing conclusions from insufficient data, and especially so when dealing with small numbers. So far as statistics are concerned, we must all bear in mind the epigram of *Sir Berkeley Moynihan*, when he said: "Statistics may be made to prove anything—even the truth".

I will now deal briefly with the various aspects of the case which scrutiny of the 54 deaths, which occurred in 1920, 1921 and 1922, compels one to consider.

GEOGRAPHICAL DISTRIBUTION

1. The deaths, as the attached table shows, have occurred pretty evenly in the North and in the South Islands, there being for the period we are considering 28 deaths in the North Island and 26 deaths in the South Island.

Included in the number of deaths occurring in private are four fatalities, which took place in dental surgeries.

Of the deaths in the North Island three occurred in the Public Hospital, Auckland, three occurred in private hospitals and one in private. The Wellington figures show one death in the Public Hospital and one death in a private hospital, making a total of 2. Three deaths occurred in the Public Hospital at Napier. 10 deaths occurred in public hospitals elsewhere in North Island and five occurred in private, including dental surgeries, making a total of sixteen anaesthetic deaths in the North Island outside Wellington, Auckland and Napier.

In taking the 26 deaths, which occurred in the South Island, it is found that their incidence is as follows:—5 deaths in the Public Hospital at Christchurch, one in a private hospital in

North Island (28 deaths)				
	Pub Hosp.	**Priv. Hosp**	**In private**	**Total**
Auckland	3	3	1	7
Wellington	1	1	0	2
Napier	3	0	0	3
Elsewhere in N.I.	10	1	5	16
	17	5	6	28
South Island (26 deaths)				
	Pub Hosp.	**Priv. Hosp**	**In private**	**Total**
Christchurch	5	1	1	7
Dunedin (Plus Dunedin Dental Sch.)	6	2	0	9
	1			
Timaru	2	0	0	2
Invercargill	2	0	1	3
Elsewhere in S.I.	3	2	0	5
Total	19	5	2	26
Grand Totals	36	10	8	54

Christchurch and one in private, making a total of 7. Seven deaths occurred in the Public Hospital at Dunedin, including in which figure is one death which took place at the Dental School. Two deaths took place in private hospitals in Dunedin and none in private, making a total of 9. Two deaths took place in thePublic Hospital in Timaru, two in the various private South Island hospitals other than Christchurch and Dunedin.

2. The next question to consider is the number of fatalities induced by chloroform, by chloroform and ether mixtures, and by ether respectively—no deaths having been recorded from the use of nitrous oxide, ethyl chloride, the use of spinal anaesthetics or of local anaesthesia. The figures are as follows (table below):—

Chloroform was responsible for 8 deaths in 1920-21 and for 10 deaths in 1922. Chloroform and ether mixtures were responsible for 16 deaths in 1920-21 and for 10 deaths in 1922. Ether was responsible for 33 1-3 per cent. of the mortality, chloroform and ether mixtures for slightly over 48 per cent., and ether for 18 ½ per cent.

Incidentally it is interesting to note that of the 22 fatalities in 1922 no fewer than 12 occurred either during the induction of the anaesthetic or just at the commencement of the operation. For the sake of comparison it is of interest to consider for a moment the figures supplied concerning 700 deaths occurring during anaesthesia in England, and which are quoted in the *Oxford Loose-Leaf surgery*. These are as follows:—Chloroform, 378; chloroform and ether, 100; ether, 28; nitrous oxide, 12; ethyl chloride, 6; spinal, 8; scopolamine, 2; local,6; not specified, 160. Of these

	1920-21	1922	Total
Chloroform	8	10	18
Chloroform and ether mixture	16	10	26
Ether	8	2	10
Total	32	22	54

233 died before the operation commenced. The comments made upon these figures are as follows:—"In analysing these figures one is at once impressed with the dominance of fatalities under chloroform, and it is difficult not to attribute them to the improper selection of the anaesthetic agent, although the inexperience of the administrators may have been a contributing factor. *Fleming* (who is responsible for the figures) is undoubtedly correct in his belief that the appalling death-rate would not have occurred if ether had been administered instead of chloroform. From a purely scientific point of view these statistics serve to show the great need of reform in the selection and administration of anaesthetics."

I wish, however, to return to a consideration of our own figures, and desire now to direct your attention to the following 15 cases which occurred amongst the 18 deaths due to chloroform:—

No.	Nature of operation.	Age of patient.
1.	Extraction of teeth	Uncertain
2.	ditto	4
3.	ditto	15
4.	ditto	38
5.	Removal of tonsils	15
6.	ditto and adenoids	14
7.	ditto	7
8.	Quinsy	27
9.	Abcess of left groin	33
10.	Wound of arm	30
11.	Removal of septic finger nail	Uncertain
12.	Exophthalmic goitre	59
13.	Thyroidectomy	36
14.	Miscarriage	31
15.	Dilation of oesophagus	44

Here are a series of 15 cases, the vast majority of which are of a comparatively minor character, in which I am of opinion, after reading the evidence given at the various coroners' enquiries, that an appropriate, or wrongly-chosen, anaesthetic was administered. Who can defend the administration of chloroform for teeth extraction, or for the removal of tonsils and adenoids? *Professor A.R. Cushny* of the University of Edinburgh, in the latest edition of his well-known book on *Pharmacology* and *Therapeutics*, gives as a fair average the occurrence of one death in each three thousand cases where chloroform is administered, and one in ten to twelve thousand cases where ether is give. The *Extra Pharmacopoeia* gives the death-rate of chloroform as about seven times that of ether, which is said to have a death-rate of one in thirteen thousand.

Given two anaesthetics, one of which has a mortality at least three times as great as the other, some very specific justification for the use of the more dangerous must surely be brough forward and sustained before its use can be sanctioned. Here in a small group of eighteen fatalities we have chloroform given in no fewer than fifteen instances where the employment of other anaesthetics such as nitrous oxide, nitrous oxide and oxygen, ether, or local anaesthetics, would have been, to say the least of it, far safer, more in keeping with the deliberate opinion of recognised authorities, and more in consonance with the welfare of the patients to whom the anaesthetics were administered.

The group of fatalities occurring with the administration of chloroform and other mixtures can now be considered. These anaesthetic mixtures have been responsible for nearly fifty per cent. of the 54 fatalities we are now considering. I am sorry I cannot say how many cases are due to C(1) E(1), C(1)E(2), C(2)E(3), etc., as in many instances the exact proportions of the two drugs employed were not given in the evidence of the various medical men concerned. Among the 36 deaths occurring with the use of chloroform-ether mixtures are the following:—

No.	Nature of operation	Age of patient.
1	Tenotomy of Tendo Achilles	64
2	Adenoids and tonsils	13
3	ditto	6
4	Nasal obstruction and adenoids	13
5	Nasal obstruction	28
6	Extraction of teeth	23
7	Circumcision	7
8	Skin grafting	29
9	Fracture of fore-arm	38
10	Operation for fraction of femur	4

Here again, is a group of ten cases, in which the use of an anaesthetic with admittedly a higher death-rate than ether was employed, where the use of another anaesthetic agency would have been infinitely safer. I feel sure again that in this group of cases insufficient care was given to the selection of the anaesthetic having due regard to the welfare and safety of the anaesthetist, or under his supervision. It is often used for induction purposes (admittedly the most dangerous stage of general anaesthesia), and its ease of administration in comparison with he additional trouble of giving ether, together with an exaggerated idea of its safety, makes its use, I feel certain, more frequent than should be the case.

We come now to the group of fatalities where ether alone was employed. They total 10 and I

No.	Nature of operation	Age and sex of patient
1	Thyroidectomy for exophthalamic goitre	21 male (at small pub hospital)
2	ditto ditto	20 m.
3	Abscess of lung	53 m.
4	Tracheotomy	5 m.
5	Acute Otitis Media	5 m.
6	Carcinoma of breast	37 f.
7	Epithelioma of mouth and jaw	43 m.
8	Cancer of the bowel	70 m.
9	Peritonitis	65 m.
10	Abscess of mouth (Ludwig's angina)	56 m.

propose to give you particulars of each one.

Case No, 9 occurred in the induction stage, and Case No. 8 occurred just after the operation commenced. It is to be remarked, also, that four of the ten fatalities took place in Dunedin. It will be noted that seven out of the ten deaths occurred in association with the performance of operative procedure of a very definitely serious character in contradistinction to many of the fatalities which took place with the use of chloroform and of chloroform-ether mixtures in comparatively minor cases. In neither of the goitre fatalities was the use of local anaesthesia in combination with the ether mentioned.

I now come to the question of the purity or otherwise of the various brands of anaesthetics now in use in New Zealand. With reference to this the Dominion Analyst is engaged in the work of their analysis at the present time, but the results are not yet available for use. It has been stated in certain quarters, somewhat loosely, that the number of anaesthetic deaths in the years 1920,1921 and 1922, has some connection with an inferior quality of chloroform which was supplied by the Defence Medical Stores to various hospitals and medical men in this country. I have seen a return prepared by the Defence Medical Stores showing the quantities and the brands of chloroform and ether supplied to its various customers April, 1921, to September, 1922, and from the returns it appeared that the Wellington Hospital, which, of all the large hospitals in New Zealand, has the lowest number of deaths, has been supplied with the largest quantity of the chloroform in question, namely 84lbx., and that the other large hospitals, where the bulk of the deaths have taken place, have not been supplied at all by the Defence Department. This information should, I think, dispose of any misapprehension likely to arise on this point.

Deliberate consideration of the figures which I have adduced will show, I think, that (1) insufficient care has been taken of late years in the choice of an anaesthetic for operative purposes, (2) inadvertently, no doubt, the interests of the patient are not being considered enough, (3) in many instances very faulty judgment is being exercised regarding the choice and administration of anaesthetics. Of the 54 deaths which have occurred during the period we have under review I consider that between 40 and 50 per cent. might, and should, have been presented by a better choice of anaesthetic, and I am of opinion that this matter requires the very fullest consideration which this meeting can give to it, and not merely that alone, but the taking of definite action by the meeting to produce a happier state of affairs and one redounding more to our credit as a profession.

I have recently returned from a visit to America and Canada, where I visited many of the chief clinics and hospitals, notably those of the *Mayo's* at Rochester, Minnesota, of *Dr. Crile*, at Cleveland, Ohio, the *Peter Bent Brigham Hospital*, Boston, which is the hospital of the *Harvard Medical School,* the *General Hospital*, Toronto, the *General Hospitals* at Winnipeg, Vancouver, and many hospitals in New York. Among the many admirable things one saw I was much impressed with the general high level of anaesthesia used in the various hospitals I visited, with the care taken in the choice of anaesthetic—especially in the class of case known as "the bad risk"—with the use made of spinal anaesthesia, especially in bladder and pelvic cases, with the use of paravertebral anaesthesia, sacral anaesthesia and the increasing use of local anaesthesia. Local anaesthesia is very largely used in combination with nitrous oxide and oxygen analgesia, and very excellent results are being obtained with it. I was especially impressed with the very high standard of anaesthetic work at the *Lakeside Hospital*, Cleveland, where *Dr. Crile* does the majority of his operative work. At this hospital they have a record of 51,000 cases of nitrous oxide and oxygen analgesial anaesthesia, or nitrous oxide, oxygen and ether, in combination with local anaesthetics in practically all cases, with only a single death. At this hospital I saw many operations for the following conditions: Goitre, gastric ulcers, duodenal ulcers, infection of biliary tract, appendicitis, pelvic gynaecological cases, etc., done with nitrous oxide and oxygen analgesia and the use of a local anaesthetic. In some of the cases, especially in the upper abdomen, the use of ten to fifteen per cent. ether for perhaps 15 to 20 minutes was necessary to secur adequate relaxation. I saw the patients afterwards, not only on the day of operation, but on each subsequent day during my stay in Cleveland, and was impressed not only with their general comfort but with the comparative absence of the various so-called minor unpleasantnesses which occur when ordinary inhalation anaesthesia is alone employed. The use of nitrous oxide and oxygen as a routine general anaesthetic necessitates the employment of specially trained people for the work. At Cleveland there are trained nurse anaesthetists, and very competent they are at their work. At certain hospitals open ether or the nitrous oxide ether sequence is employed routinely but even in these hospitals, local, sacral, and paravertebral anaesthesia is being increasingly employed. This is especially noticeable at Rochester, where they have now a specially trained medical man who does all the sacral, spinal, and paravertebral anaesthetic work for the various hospitals in this town. Increasing attention is being given the question of ensuring not only the maximum safety for the patient, but of administering an anaesthetic with the minimum discomfort to be endured afterwards. I was tremendously impressed with this point and am sure that we can in New Zealand emulate to advantage in this respect our American colleagues. Nowhere in the States did I see chloroform used either alone or as a mixture.

The question arises now as to the nature of the steps which can be taken to improve matters. Personally I think that the following methods should be adopted:

1. KEEPING OF BETTER ANAESTHETIC RECORDS BY HOSPITALS.—Each hospital should, I consider, keep special records of the administration of anaesthetics, and should publish a summary annually of the administration of anaesthetics in their annual medical report, together with full details of any fatalities which occur. Only in this way will statistics worth having be produced and progress made possible.
2. THE APPOINTMENT BY EACH LARGE HOSPITAL IN NEW ZEALAND OF EITHER HONORARY ANAESTHETISTS, OR QF WHOLE-TIME PAID ANAESTHETISTIS.—During the last two or three years a special lecturer and instructor in anaesthetics has been appointed at the Dunedin Medical School. This was a most necessary proceeding, but in itself is not enough, and I am sure that the time is opportune for the appointment of special anaesthetists to our largest public hospitals, namely Dunedin, Christchurch and Auckland. Wellington has already an honorary anaesthetist in the person of Dr. Anson, and the sooner similar appointments are made at the other hospitals named the better for all concerned. If it is not possible to secure the services of medical men as honorary anaesthetists who are specialising in this work outside then I consider that the appointment of whole-time paid specialists should be undertake. Such appointments, with the co-operation of the surgical staffs of the institutions in question, should speedily procure results. The administration of

anaesthetics by house surgeons would be properly supervised, and they would necessarily acquire a better knowledge of the art of anaesthesia than they do at present. The question of the appointment of special anaesthetists should be considered by the honorary staffs of our large hospitals at the earliest possible moment, and recommendations made by them to their respective Boards, who are only waiting for a lead in this matter.

3. The honorary medical staffs of hospitals, and especially the surgical portions of the staff, should consider at the earliest possible moment at their monthly staff meeting the anaesthetic problem of their particular hospital, with a view to effecting improvements where such are necessary.
4. The establishment by this meeting of a small committee to further consider the matter and to enquire into the practicability or otherwise of the various suggestions which will no doubt be brought forward, and to communicate their recommendations within all possible speed to: (a) The Director-General of Health, Wellington; (b) the honorary staffs of the various public hospitals; in New Zealand; (c) the medical superintendents of all hospitals; and (d) each medical man practising in New Zealand, whether he is a member of the British Medical Association or not.

In conclusion I wish to thank the Director-General of health for the permission he gave me to use various departmental files for the purpose of this paper, and also Mr. Clayton, the Librarian of the Health department, for the very careful way in which he has kept and summarised the abstracts which have been prepared from time to time by the Health Department.