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Bailey Yee, Eleanor Barrett, Mona Jefferys, Anne Haase, Caz Hales

Hospitalised patients with extreme obesity frequently require additional care support to accommodate their larger physical size (also known as bariatric care). The aim of this clinical audit was to benchmark the quality of bariatric service delivery against moving and handling, patient care best practice standards, and to determine the prevalence of hospitalised patients admitted to Wellington Regional Hospital requiring bariatric-level care. The prevalence of hospitalised patients requiring bariatric services was 6.4%; one third of these patients did not have their bariatric care needs identified, which contributes to missed care opportunities and adverse effects for patients and clinical teams. Whilst the majority of patient focused moving and handling hazards were well documented, environmental hazards or equipment limitations were poorly reported. Developing and improving policy adherence will assist in addressing shortcomings in the standard of providing a safe environment for patients with bariatric care needs to support high-quality care.

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Nicole Cant, Mary Buchanan, Anitra C Carr, Joseph M Boden

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Rachael L Parke, Alana Cavadino, Shay P McGuinness

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Seeking of help and support after experiencing sexual harm: considerations for cisgender women, cisgender men and gender-diverse people

Tess Patterson, Linda Hobbs, Gareth J Treharne, Melanie Beres

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Asha Shashikumar, Karaponi Okesene-Gafa, Te Hao Apaapa-Timu, Jessica Wilson, Charlotte Oyston

Rates of diabetes in pregnancy are increasing, and new ways of providing healthcare that are efficient and accessible are needed. During COVID-19, we carried out most clinic appointments for diabetes in pregnancy over the phone. A survey of patients who used telephone clinics found that patients found the clinics useful and convenient. However phone appointments were not ideal for every situation, and optimising the clinic design and maintaining flexibility in scheduling is important if ongoing use is planned.

Trauma Team Activation: improved care of major trauma patients

Maria Nonis, Andrew McCombie, Christopher Wakeman, Dominic Fleischer, Laura Joyce

Trauma team activation status at Christchurch Hospital was associated with decreased time to diagnostic imaging. Trauma team activation was also associated with a shorter ED length of stay; however, these patients had increased rates of surgery and admission to ICU.

Responding to the tāngata whai ora voice: an Aotearoa New Zealand quality improvement solution

Amanda Luckman, Paul Clements, Thomas White, Angela Jury, Jennifer Lai, Mark Smith

This viewpoint paper advocates that when tāngata whai ora (people seeking wellness) feedback is an integral part of quality improvement activities in mental health and addiction services, there is potential for powerful change that leads to improved support and outcomes for people. Mārama Real Time Feedback is a feedback collection tool designed for Aotearoa New Zealand's mental health and addiction services. The paper describes the development, implementation, and use of this tool.

Regional vs Metropolitan. Bigger is not always better

Chris Wakeman, Rachael Lauchlan, Ros Pochin

Trauma team activation is used throughout the world to gather the multi-disciplinary teams to meet trauma patients in emergency department (ED) trauma bays, with the aim of providing the best possible treatment for the unwell trauma patient. Trauma teams have been shown to reduce the time to resuscitation, time to computed tomography (CT), time to discharge from the ED and, most importantly, time to transfer to the operating theatre.[1–3] Demetriades et al. showed how the introduction of a trauma team resulted in a reduction in mortality of 42.7% for severely injured penetrating trauma patients with an injury severity score (ISS) over 30.[4] Teams make fewer mistakes than individuals, but bringing individual experts together does not always promise an effective team. Team performance can be improved through simulation, audit and an attitude for improvement.[5]

In this issue of the *New Zealand Medical Journal*, Nonis et al. review whether trauma team activations are associated with a decrease in mortality, and if they improve in-hospital care for major trauma patients. This was a retrospective observational study of all major trauma patients admitted to Christchurch Hospital over two years (2018–2019).[6] Of interest, Christchurch Hospital uses a two-tiered trauma activation system, and comparisons are made between the levels of activation and results. This two-tiered system aims to reduce unnecessary involvement of specialist teams and protect this limited resource for more serious cases. Nonis et al. showed that the Christchurch Hospital Trauma Team Activation system is associated with reduced time to diagnostic imaging and definitive management in surgery of major trauma patients presenting to Christchurch Hospital. Also of interest is the under-triage and under-diagnosis of older adults with major trauma who have significantly higher mortality and morbidity.[6]

A recent paper by Lynham et al. published in this journal reviewed what is happening in New Zealand by comparing rural and metropolitan hospitals and, in particular, they looked at trauma call activation criteria and the role of the anaesthetists in trauma calls.[7] This paper surveyed all New Zealand hospitals, and found that 75% have a trauma team and a trauma call criterion; however, there is a wide variation in the number of team members and in team composition. For instance, anaesthetists were only involved in 50% of trauma teams throughout the country and in some hospitals, there was a change in the team composition after hours, with a more junior team dealing with complex trauma patients.

Logistics within the rural and regional centres of New Zealand mean that a pragmatic approach to trauma team make-up needs to be undertaken. Regional centres do not always have onsite anaesthetists after hours, which is when most trauma team activation occurs.[8] They are also often lacking an on-call intensivist.

However, the smaller workforce means that the team attending the trauma call are more likely to be known to each other, and their familiarity with each other's skill sets can lead to better team synergy and communication.[9] As Lynham et al. states that smaller trauma teams with between 5–8 members may be more effective, and that regional centres are advantaged in this respect, typically with smaller numbers of staff available to attend.[7]

Most trauma teams have general surgeons as the surgical representative. In regional hospitals, the general surgeons are more acclimatised to being generalists and this can be advantageous. These generalists are used to managing thoracic injuries and traumatic brain injuries through necessity, as they have no onsite capability from sub-speciality colleagues.

Trauma nurse coordinators/nurse specialists are key team members in 71% of the trauma teams in hospitals around New Zealand.[7] The roles and titles vary between institutions, with most hours per week spent on data collection, case management and clinical activities, which includes attending trauma calls in ED within hours and often taking an active role as part of the trauma team. This allows the trauma nurse specialist to have an overview for the entire patient journey; this helps with coordination of care of the trauma patient from "door to discharge". The current

goal for the Major Trauma Network is to grow the trauma nursing workforce to be comparable and more standardised across national centres.[10]

The papers by Nonis et al. and Lynham et al. raise the questions of who should make up trauma teams, what is the optimum number team members, and what activates a trauma call in the different institutions.[6,7] This leads nicely into further standardisation of what leads to mandatory and discretionary trauma calls. Junior staff move between institutions and regions as part of their training. National standardisation would lead to increased clarity of when to activate the team across all institutions and reduce confusion.

Major metropolitan trauma centres have taken this trauma activation one step further with the Code Crimson—this is relatively new to New Zealand (and is not touched on by Nonis et al.). There is scope for a review on how this is functioning within units in the major metropolitan centres of New Zealand, as this is offered in some of our bigger trauma centres, but not all major trauma centres. The aim of Code Crimson is to gather a consultant-led team in the ED to tend to trauma patients with life-threatening haemorrhage.[11]

By having senior medical officers (SMOs) in the trauma bay, the hope is to ensure a faster, more streamlined passage of getting the patient through to the operating theatre or interventional radiology for definite treatment. Since its introduction in Christchurch Hospital, we have seen an improvement in consultant engagement in trauma needing urgent treatment. This will hopefully lead to a general improvement in outcomes for our trauma patients. Criteria need to be standardised within all major trauma hospitals, requiring a timeline for establishing a Code Crimson protocol.

Nonis et al. shows that trauma team activation is essential in improving outcomes. We need national consistency with good rural systems and metropolitan centres adopting comprehensive trauma systems, with trauma calls and admission services.

COMPETING INTERESTS
Nil.

AUTHOR INFORMATION
Chris Wakeman: Trauma, Colorectal and General Surgeon, Christchurch Hospital, New Zealand.
Rachael Lauchlan: Trauma Nurse Specialist, Christchurch Hospital, New Zealand.
Ros Pochin: General Surgeon, Nelson Hospital, New Zealand.

CORRESPONDING AUTHOR
Chris Wakeman: Trauma, Colorectal and General Surgeon, Christchurch Hospital, New Zealand.
E: Christopher.Wakeman@cdhb.health.nz

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Improving health services for patients with extreme obesity requiring bariatric level care at Wellington Regional Hospital: a clinical audit

Bailey Yee, Eleanor Barrett, Mona Jeffreys, Anne Haase, Caz Hales

ABSTRACT

AIM: To benchmark the quality of bariatric service delivery against moving and handling and patient care best practice standards, and determine the prevalence of hospitalised patients admitted to Wellington Regional Hospital requiring bariatric level care.

METHODS: A clinical audit consisting of retrospective case-note review and cross-sectional survey was conducted and benchmarked against Accident Compensation Corporation (ACC) national standards. Information recorded included patient demographics, admission planning, patient anthropometric and risk assessments, provider communication, room preparation, mobilisation plan, equipment needs, space and facility design considerations, discharge planning and reportable events.

RESULTS: A total of 574 patients were included. The prevalence of hospitalised patients requiring bariatric services was 6.4%. One third of patients (34.3%) were not identified by clinical teams as requiring bariatric support. Most bed (80%) and bathroom (83%) spaces failed to achieve the facility design standard. The majority of patient focused moving and handling hazards were documented whereas environmental hazards or equipment limitations were poorly reported. Only 26.1% of patients had a documented discharge plan.

CONCLUSION: Inadequate identification of patients requiring bariatric support and insufficient documentation of bariatric service delivery were identified. Improving policy adherence will address shortcomings in the provision of a safe environment and high quality care for bariatric patients.

Extreme obesity is typically defined as a body mass index (BMI) equal to or greater than 40kg/m^2. In 2021, approximately 5.9% of adults in Aotearoa New Zealand were identified as extremely obese, with this statistic disproportionately represented amongst structurally marginalised groups, including Māori (13.0%), Pasifika peoples (24.5%) and those living in areas of high deprivation (11.9%).[1] Bariatric service delivery refers to the care received by those with additional needs due to extreme obesity; this includes appropriate spatial facility design, equipment uses, and collection of information needed to inform high quality services. It does not explicitly relate to specialist care for weight loss management (i.e., bariatric surgery).

The prevalence of patients admitted to hospitals with extreme obesity is unknown, although the prevalence is likely to be higher than the general population with estimates as high as 16% in North American studies of general medical patients.[2,3] Hospitalised patients with extreme obesity have poorer healthcare outcomes than normal-weight patients,[4–7] including longer lengths of stay, higher likelihoods of intensive care admission, increased risk of pressure injuries, falls, and readmission within 28 days of discharge.[4–7] Despite the plethora of literature highlighting the importance of appropriate bariatric service delivery,[5,8,9] health services in Aotearoa New Zealand do not meet the care needs of this patient population, as care is often fragmented and specialised equipment is frequently unavailable, missing or too small.[10–12] Currently there is a lack of robust evidence regarding variation of service provision for patients with extreme obesity by Te Whatu Ora districts.

In 2016, Capital & Coast District Health Board (CCDHB) introduced bariatric care bundles (defined as a package of wider beds, mobilisation and hygiene equipment) into the bariatric care pathway to address equipment concerns. Subsequently, this approach to bariatric service provision has been introduced into four other DHBs (Auckland, Waitematā, Canterbury, and Hutt Valley) based on a research and industry-led initiative.[13,14] The utilisation of these bundles as a part of the bariatric care service remains unaudited at CCDHB, and the adherence to and application of current bariatric

policies remain unexplored. Additionally, the prevalence of patients admitted to CCDHB requiring bariatric care is currently unknown, limiting the ability of service providers to plan service delivery needs for this population.

Whilst moving and handling training is mandatory for all staff at CCDHB, 28 reportable events between April and September 2021 identified patients' weight as a contributing factor leading to staff injuries, and equipment issues. The Accident Compensation Corporation (ACC) Moving and Handling Guidelines report healthcare workers have one of the highest rates of musculoskeletal disorders among all occupational groups.[15] In 2019, healthcare work-related entitlement claims were around 6%. Of those, soft tissue injury accounted for 64%.[16] To approach this concern, regular examining of safe patient handling practices may serve as a strategy in controlling unnecessary costs and improving staff and patient outcomes.[5]

Aim and objectives

This clinical audit aims to benchmark the quality of bariatric service delivery against moving and handling and patient care best-practice standards and determine the prevalence of hospitalised patients admitted to Wellington Regional Hospital (WRH) requiring bariatric level care. Researchers will identify areas of improvement in service delivery and provide recommendations relevant to CCDHB policies.

Criteria and standards

The audit framework was developed using ACC Moving and Handling Guidelines for bariatric patients[15] and relevant CCDHB policies (Appendices, Tables S1–10). The ACC guidelines were originally developed in 2003 and updated in 2012 following review of international research, consultation with healthcare stakeholders and international peer review. The purpose of ACC guidelines is to reduce manual and patient handling injuries.[15] The recommendations listed in the guidelines reflect evidence-informed practices consistent with international standards for safe patient handling and processes that should be considered in care planning for hospitalised patients requiring bariatric services.[15] These processes include admission planning, client assessment, communication, room preparation, mobilisation plan, equipment needs, space and facility design considerations and planning for discharge.[15] Additionally, relevant CCDHB policies and procedures were used to structure the audit framework and include: "Patient Admission to Discharge Plan";[17] "Bariatric Equipment";[18] "Moving and Handling";[19] "Moving and Handling Patients and Objects";[20] "Malnutrition in Adult Inpatients;"[21] "Prevention and Management of Patient Falls";[22] "Health and Safety";[23] "Admission to Transit Lounge";[24] "Pressure Injury Prevention and Management";[25] and "Adverse Event and Incident Management".[26]

Method

This baseline clinical audit consisted of retrospective and cross-sectional components to identify patients requiring bariatric services admitted to WRH. Patients were identified as bariatric if they had a BMI equal to or greater than 40kg/m^2; weighed ≥150kg, or had large physical dimensions requiring bariatric equipment.

Cross-sectional survey

All adult inpatients aged 18 years and over on one of nine adult inpatient wards were included in the point prevalence survey. Paediatric and delivery/postnatal wards were excluded due to different requirements and service decision-making processes. Three researchers conducted the survey (BY, EB, CH) on two occasions: 15 December 2021 and 19 January 2022. The clinical team did not calculate a sample size *a priori*, as the audit was limited in time and resources and only conducted on two single days. A *post hoc* sample size analysis with 95% confidence interval (CI) was conducted.

Patients requiring bariatric level care were identified from the clinical notes. Where no data was available, patients were asked their height and weight. The audit team calculated BMI to affirm the patient's bariatric status. If a patient was eligible for clinical audit, researchers assessed the spatial design considerations and equipment suitability as per the criteria and standards framework (Appendices, Tables S1–10). Patients were asked to complete a hospital patient satisfaction survey about their care experiences.

Retrospective case-note review

All adult patients aged 18 years and over identified as requiring bariatric level care admitted to WRH between 1 August and 30 September 2021 were included in the case-note review. Pregnant women were excluded due to the difficulty of using BMI to determine bariatric status. The case-note review was completed to benchmark the quality of documented care against the bariatric

service delivery standards framework. Researchers identified eligible patients through a bariatric equipment hire database and electronic medical records coding system. Data collection was conducted by two researchers (BY, EB).

Collected data was stored and managed using RedCap. The information collected included seven areas of moving and handling and patient satisfaction (Table 1). Data analysis was conducted using Microsoft Excel. Descriptive statistics of absolute differences and percentages of documented care that did or did not meet practice standards were analysed and presented.

Ethical approval was not required. However, the audit was conducted within an ethical framework, which included maintaining patient confidentiality, not collecting unnecessary data, anonymising all data at the time of data collection, and using the hospital secure data management software system. The clinical audit was approved by the CCDHB Clinical Audit Committee in December 2021 (Audit Approval Number: 2021/73).

Results

Cross-sectional point prevalence survey

A total of 548 patients were included in the point prevalence survey (Table 2). Of those, 6.4% of patients (n=35) were identified as bariatric. A post hoc sample size analysis shows that given a sample of 548 people, the precision of our estimate of extreme obesity is reasonable (95% CI=4.6–8.8).

Most patients requiring bariatric services were admitted as an emergency admission (80.0%) and had some level of mobility (71.4%). Of those patients identified as bariatric, 22.9% were Māori (n=8), 25.7% were Pasifika peoples (n=9), 45.7% were New Zealand (NZ) European (n=16) and 5.7% identified as other ethnicity (n=2); indicating that Māori and Pasifika peoples are overrepresented in this patient population. The clinical team identified two thirds of patients requiring bariatric services (65.7%), with the remaining (34.3%) detected by the audit team (n=12).

Five bariatric patients included in the point prevalence survey did not complete the clinical audit of facility design, space and equipment. Reasons included: that health conditions excluded the ability to be assessed, refusal to participate, or that they were absent from the ward area at the time of data collection.

Only bedspaces (33.3%) where patients were independently mobile met the standard for accommodating all equipment required to manage bariatric care and mobilise comfortably from bed to chair or commode (Table 3). Only 29.5% of all equipment used during patient care had sufficient, safe working loads to prevent actual and potential injury to patients and staff. Whilst some items had a sufficient working load, the dimensions of the equipment were not suitable to fit the patient's size and shape. Most ward areas did not meet the standard of a safe environment; 80.0% of bed spaces and 83.3% of bathroom spaces failed to achieve the standard. Despite this, 53.3% of facilities for bariatric patients were designed to support safe moving and handling assistance. The patient satisfaction survey demonstrated an overall positive report of patients' experience of the service received at WRH.

Retrospective case-note review

A total of 26 patients requiring bariatric services were included in the retrospective case-note review during the two-month period (see Table 4). Of those patients identified, 34.6% were Māori (n=9), 19.2% were Pasifika peoples (n=5) and 46.2% were NZ European (n=12); indicating that Māori and Pasifika peoples are overrepresented in this patient population. Most patients requiring bariatric service delivery were admitted as an emergency admission (84.6%). Five patients were excluded from the retrospective case-note review as they did not meet the bariatric inclusion criteria (incomplete data, pregnancy during admission and age (adult <18 years)).

Over two thirds of patients (69.2%) had a weight documented on or within 24 hours of admission (see Table 5). Of those patients requiring any equipment or other resources needed for moving and handling, 25% was documented as ordered. Only one bariatric bundle had been requested and was reported to have arrived within one hour, meeting the standard. The standard that all issues, patient experiences and discussions relative to bariatric care with patient and family/whānau should be documented was not achieved at all for any patient.

Most bariatric patients (92.3%) had documentation of the number of staff needed for moving and handling as per their care plan (Table 5). Additionally, 88.5% of patients had identification and assessment of moving and handling hazards documented as they appeared throughout care. Despite the evaluation of patient handling risks being documented, the LITE (Load, Individual, Task, Environment) assessment was not documented at all. Nursing staff had completed the documentation of

Table 1: Data extracted from retrospective and cross-sectional clinical audits.

Patient demographics	Ethnicity (as recorded in patient notes)
	Admission type (elective or emergency)
	Identification of bariatric status
	Mobility status (mobile, immobile)
Admission planning	Provision of transport
	Pre-existing health conditions of a patient
	Weighed within 24hrs of admission
	Patient, family/whānau briefed on moving and handling policies
	Bariatric bundle activation
	Mobility plan
	Preliminary discharge plan
Client assessment	Required level of assistance
	Limitation in patient's weight-bearing capability
	Height (cm)
	Weight (kg)
	Body circumference (cm)
	Health conditions that may affect moving and handling
	LITE (Load, Individual, Task, Environment) assessment
	Risk assessments within 8–16hrs of admission
	Care plans within 8–16hrs of admission
	Updating of risk assessments and care plans
Communication	Patient, family/whānau concerns
	Communication between care teams
	Provision of education from health professionals
Room preparation	Type of bed space (Single, double, multi-occupancy rooms)
	Accommodation of all equipment in bed space
	Bed area to move a patient from bed to chair or commode to chair
	Single room appropriation for bariatric care
Mobilisation plan	Mobility plan documented and updated regularly
	Patient, family/whānau involvement
Equipment needs	Equipment identified/documented
	Safe working loads of equipment
Space and facility design considerations	Sufficient bed space for care needs
	Sufficient bathroom space for care needs
	Moving and handling concerns with the layout of the space
	Nurse in Charge and/or Duty Nurse Manager assessment of bed space

Table 1 (continued): Data extracted from retrospective and cross-sectional clinical audits.

Planning for discharge	Discharge plan Mobility/nutrition inclusion if applicable Equipment needed for discharge Onward referrals Time of discharge listed in MAP
Reportable events	The reportable event caused to patient/staff Patient reassessment of risk after the reportable event Indication of required treatment Third-party claim administered
Mārama Real Time Feedback Survey	Service welcoming and friendly Patient respect and involvement in decision-making Communication and family/whānau involvement Support for future and plan reviewed periodically

Table 2: Patient demographics of cross-sectional hospital prevalence.

Point prevalence clinical audit: demographics				
Data collection dates		**15 Dec 2021**	**19 Jan 2022**	**Total**
Total patient population		**n/272 (%)**	**n/276 (%)**	**N/548 (%)**
Identification of bariatric status	Bariatric	14/272 (5.1)	21/276 (7.6)	35/548 (6.4)
	Not bariatric	258/272 (94.9)	255/276 (92.4)	513/548 (93.4)
Total bariatric patient population (n)		**14**	**21**	**35**
Ethnicity[i]	Māori	5/14 (35.7)	3/21 (14.3)	8/35 (22.9)
	Pasifika peoples	4/14 (28.6)	5/21 (23.8)	9/35 (25.7)
	NZ European/Pākeha	5/14 (35.7)	11/21 (52.4)	16/35 (45.7)
	Other	0	2/21 (9.5)	2/35 (5.7)
Type of admission	Elective	3/14 (21.4)	4/21 (19.0)	7/35 (20.0)
	Emergency	11/14 (78.6)	17/21 (81.0)	28/35 (80.0)
Mobility status	Mobile	11/14 (78.6)	14/21 (66.7)	25/35 (71.4)
	Immobile	3/14 (21.4)	7/21 (33.3)	10/35 (28.6)
Identification used for bariatric status[ii]	A weight of 150kg or more	4/14 (28.6)	6/21 (28.6)	10/35 (28.6)
	A BMI of 40 or more	12/14 (85.7)	9/21 (42.9)	21/35 (60.0)
	The patient has large physical dimensions	2/14 (14.3)	6/21 (23.8)	8/35 (22.9)
	A lack of mobility or other conditions that make moving and handling difficult	0	1/21 (4.8)	1/35 (2.9)
	Other (e.g., equipment hire, "obesity" descriptor)	3/14 (21.4)	5/21 (23.8)	8/35 (22.9)
Who identified the patient's bariatric status	Auditors	6/14 (46.2)	6/21 (28.5)	12/35 (34.3)
	Clinical team	8/14 (53.8)	15/21 (71.4)	23/35 (65.7)

[i]CCDHB has a lower proportion of Māori (11.8 vs 16.6%) and a similar proportion of Pasifika peoples (7.1 vs 6.7%) compared to the national population average.[27] However, it is important to note that Wellington Regional Hospital is a tertiary referral centre for the lower North Island and upper South Island, and therefore local ethnicity population and hospitalised ethnicity data needs to be interpreted with caution.[ii]Does not equal to 100%, as a patient could have more than one identifier.

Table 3: Results table of cross-sectional hospital prevalence.

Point prevalence clinical audit: results table		
Item N=30[i]	**Standard achieved (%)**	**Standard NOT achieved (%)**
Room preparation		
Is the bed area large enough to accommodate all equipment needed to manage the patient.	10/30 (33.3)[ii]	20/30 (66.7)
Is there enough space around the bed area to move the patient comfortably from bed to chair or commode to chair?	10/30 (33.3)	20/30 (66.7)
Equipment needs		
All equipment will have sufficient safe working loads to prevent actual and potential injury to patients and staff.	15/38 (29.5)[iii]	23/38 (60.5)
Space and facility design considerations		
All facilities must provide a safe environment:[iv] Bedroom Bathroom	 6/30 (20.0) 5/30 (16.7)	 24/30 (80.0) 25/30 (83.3)
Facilities are designed or modified for safe moving and handling practices.	16/30 (53.3)	14/30 (46.7)
Consumer feedback survey (%)		
The service is welcoming and friendly.	95.8	
I feel respected.	95.8	
I am involved in decision-making.	86.7	
The people I see communicate with each other when I need them to.	92.7	
My/our family/whānau are given information and encouraged to be involved.	85.7	
I have the support I need for the future.	88.2	
My/our plan is reviewed regularly.	93.3	
I/we would recommend this service to friends and family/whānau if they needed similar care of treatment.	94.3	

[i] Only 30 out of 35 bariatric patients identified in the point prevalence were assessed. [ii]Standard was only met for bedspaces where patients were mobile and required no staff support. [iii]Out of 38, as some patients had more than one piece of equipment for care. [iv]Based on ACC guidelines: Bedspace of 1,200mm clear space on each side of the bed and at the foot of the bed (to privacy curtain); Bathroom of door opening is a minimum of 1,200mm clear width. Depth of room is a minimum of 2,200mm from door to opening. A total of 1,500mm of clear space in front of the toilet. For two carers, there needs to be at least 950mm or for one career a minimum of 1000mm on each side from the toilet bowl centre. In facilities with mostly mobile residents, it may be adequate to provide for one carer with at least 950mm on one side and 450mm on the other side from the toilet bowl centre.

Table 4: Patient demographics from case-note review.

Case-note review: demographics		
Total bariatric population		**N=26 (%)**
Type of admission	Elective	4 (15.4)
	Emergency	22 (84.6)
Identification for this audit	Equipment hire/bariatric bundle	24 (92.3)
	MAP (clinical coding)	1 (3.8)
	Reportable events	1 (3.8)
Ethnicity[i]	Māori	9 (34.6)
	Pasifika peoples	5 (19.2)
	NZ European/Pākeha	12 (46.2)
Identification used for bariatric status[ii]	A weight of 150kg or more	9 (34.6)
	A BMI of 40 or more	5 (19.2)
	The patient has large physical dimensions	6/26 (23.1)
	A lack of mobility or other conditions that make moving and handling difficult	1/26 (3.8)
	Referrals	9/26 (34.6)
	Other (e.g., equipment hire, "obesity" descriptor)	10/26 (38.5)

[i]CCDHB has a lower proportion of Māori (11.8 vs 16.6%) and a similar proportion of Pasifika people (7.1 vs 6.7%) compared to the national population average.[27] [ii]Does not equal to 100%, as a patient could have more than one identifier.

Table 5: Retrospective case-note results.

Case-note review: results table		
Item N=26	**Standard achieved N/(%)**	**Standard NOT achieved N/(%)**
Admission planning		
All patients must be weighed on admission.	18/26 (69.2)	8/26 (30.8)
All issues, patient experiences and discussions with patient and family should be recorded.	0/26 (0)	26/26 (100)
Any equipment and other resources needed for moving and handling are ordered.[i]	6/24 (25.0)	18/24 (75.0)
Bariatric bundle arrived within one hour of request.[ii]	0/1 (0.0)	1/1 (100.0)
Patient assessment		
Using safe assistance appropriate to the specific patient needs as per their care plan. (Documented staff assistance needed for moving and handling in patient's care plan.)	24/26 (92.3)	2/26 (7.7)
Identification, assessment, and control of individual moving and handling hazards as they are identified.	23/26 (88.5)	3/26 (11.5)
A LITE assessment is undertaken to guide how the activity is executed.	0/26 (0.0)	26/26 (100.0)
Risk assessments are completed by nursing staff:[iii] Falls/Mobility Braden Scale Nutrition Delirium[iv]	 18/25 (72.0) 21/25 (84.0) 7/25 (28.0) 4/11 (36.4)	 7/25 (28.0) 4/25 (16.0) 18/25 (72.0) 7/11 (63.6)
Risk assessments are completed by nursing staff within 8–16 hours of admission: Falls/Mobility Braden Scale Nutrition Delirium	 15/18 (83.3) 16/21 (76.2) 5/7 (71.4) 3/4 (75.0)	 3/18 (16.7) 5/21 (23.8) 2/7 (28.6) 1/4 (25.0)
Care plans are completed by nursing staff within 8–16 hours of admission:[v] Functional independence Skin integrity Mobility Elimination/output Hydration/nutrition	 14/25 (56.0)	 11/25 (44.0)

Table 5 (continued): Retrospective case-note results.

Case-note review: results table		
Item N=26	**Standard achieved N/(%)**	**Standard NOT achieved N/(%)**
Communication		
Documentation of moving and handling risks and ensuring that these are communicated to other works at handover.[vi]	6/21 (28.6)	15/21 (71.4)
Documentation of health professionals providing education that is related to bariatric needs.	0/26 (0.0)	26/26 (100.0)
Mobility plan		
All patients should have a documented mobility/falls assessment.	19/26 (73.1)	7/26 (26.9)
The individualised plan should be updated each day or more frequently is the plan of care changes.	7/19 (36.8)	12/19 (63.2)
The patient should be re-assessed if medical status changes.	4/11 (36.4)	7/11 (63.6)
The patient and their family/whānau/carer must be, when practical included in the mobility risk assessment process.	0/19 (0.0)	19/19 (100.0)
Equipment needs		
Appropriate equipment will be available to ensure bariatric patients are able to be managed and maintained safely.[vii]	18/24 (75)	9/24 (37.5)
Space and facility design considerations		
The appropriateness of the rooms will be assessed by the Nurse in Charge and the Duty Nurse Manager.[viii]	2/25 (20.0)	20/25 (80.0)
Planning for discharge		
The Patient Admission to Discharge Plan (PADP) must show evidence of a documented discharge plan to ensure a safe coordinated discharge.[ix]	6/23 (26.1)	17/23 (73.9)
Ensure appropriate equipment have been made before the patient is discharged.[x]	5/15 (33.3)	10/15 (66.7)
Document discharge time on Medical Application Portal.	26/26 (100.0)	0/26 (0.0)
Reportable events (case study)[xi]	**Staff**	**Patient**
Complete an incident report for any injury, illness or near miss.	√	√
Report all incidents within SQUARE database system within 24 hours of incident.	√	√
For a clinical event, the reportable event should be also documented in the patient's record.	√	√

Table 5 (continued): Retrospective case-note results.

Case-note review: results table		
Item N=26	**Standard achieved N/(%)**	**Standard NOT achieved N/(%)**
Reportable events (case study)[xi]	**Staff**	**Patient**
Patient should be reassessed for a falls risk after a fall or near miss.	√	√
Incident injuries that require treatment H&SS must report to the third-party claim administer.	√	N/A

[i]Out of 24, as non-applicable to patients not needing equipment for moving and handling. [ii]Only one patient had ordered a bariatric bundle. [iii,v]Out of 25, as one patient had an ICU patient care plan. [iv]Smaller sample size as delirium assessment eligibility criteria is 75 years and older. [vi]Out of 21, as some patients did not change wards or need any moving and handling assistance, therefore hand-over communication is not applicable. [vii]Percentages do not equal 100% because of several patients having hired more than one piece of equipment. However, not all pieces of equipment were noted in patient's notes. Auditors identified the equipment not documented via the bariatric equipment hire database used as a selection method. [viii]Patient assessed in a chair, therefore not applicable for Duty Nurse Manager/Nurse in Charge to assess bedspace. [ix]Out of 23, as three patients was deceased at the time of discharge. [x]Out of 15, as only 15 patients needed equipment on discharge. [xi]Reported as a case study as only two patients with reportable events. The reportable event documented was either staff or patient.

61.3% of patients' risk assessments (mobility, Braden Scale, and nutrition) and 36.4% of patients who were eligible for delirium screens. Of those, the majority of risk assessments were completed within 8–16 hours of admission. Of the 25 patients, 56% of cases had written care plans by nursing staff within 8–16 hours of admission. The standard of health professionals providing education relative to bariatric needs was not achieved at all.

Most patients (73.1%) had mobility plans documented (Table 5), with daily updates completed approximately one third (36.8%) of the time. Despite mobility plans being documented, the standard that patients and families/whānau were involved in the mobility assessment process was not achieved at all.

Three quarters of patients were documented as having the appropriate equipment to be managed and maintained safely. However, 37.5% of patients did not meet this standard. This result does not equate to 100%, as a single patient could have more than one piece of equipment for their care. Additionally, 20% of patients had the appropriateness of rooms assessed by Nurse in Charge and/or Duty Nurse Manager documented.

A documented discharge plan listed within the Patient Admission to Discharge Plan (PADP) achieved standard 26.1% of the time. One third of patients had appropriate equipment documented at discharge. Additionally, all patients had a recorded discharge time noted within the Medical Application Portal (MAP). However, this is an automatic management tool and therefore does not reflect the sufficiency of documentation in the workplace.

Two patients (7.7%) had reportable events documented. In both cases "weight" was identified as a contributing factor. Both reportable events attributed to staff and patient did achieve all applicable standards for report processing (Table 4).

Discussion

This audit aimed to benchmark the quality of bariatric service delivery against moving and handling and patient care best practice standards. One critical finding of this audit was the lack of identification by the clinical teams that a patient met the criteria for bariatric service support. This significant issue can contribute to missed care opportunities to provide high quality care, and increases the risk of injury to staff and patients if inappropriate equipment is used. Missed care refers to delayed or omitted care (in part or whole) of any aspect required in a patient's care plan.[28] Failure to appropriately provide care has been recognised as contributing to adverse events and lowering the overall quality of care.[29] This problem globally affects patient outcomes, including extended lengths of stay, increased risk of pres-

sure ulcers, and hospital-acquired infections.[30] Failure to identify patients requiring bariatric services consequently impacts the communication of appropriate care between clinical teams. Of those requiring moving and handling assistance, only 28.6% of patient handling risks were communicated to other wards at handover.

Findings from the audit showed little consideration was given to the spatial and facility design for those patients with extreme obesity. Our results demonstrated 80% of bed spaces did not meet ACC's standards for a safe environment.[15] Predominantly, bed spaces failed on the premise that the foot of the bed did not have 1,200mm of clear space to allow the safe transferring of a patient. Additionally, most bathroom spaces did not meet the standards. This was due to the bathroom space not having a minimum of 450mm from the toilet bowl centre to the wall or door openings failing to have a minimum of 1,200mm clear width. These findings are consistent with previous healthcare literature;[11,31] a study conducted by Hales et al. found the physical environment of the hospital created mobilisation difficulties for all participants in several care situations.[11] Hales et al. indicated space was a significant factor that impacted largely on the participant's ability to mobilise independently or with equipment assistance.[11] Failure to create a safe environment for moving and handling will compel clinical teams to exhibit unsafe patient handling to complete a task. This will contribute to a higher likelihood of adverse events caused to staff and patients.

There were frequent issues with availability and suitability of bariatric equipment. Whilst CCDHB has "within-the-hour" access to all bariatric equipment necessary for patient care needs, its use in patient care was dependent on staff request. Safe working loads and inappropriate equipment dimensions to fit the size and shape of the patient were of most concern and related most often to shower stools and chairs. Researchers identified that most shower supplies could maintain a person's weight with extreme obesity. However, it was not deemed appropriate due to the equipment frame not being able to fit the size and shape of the individual or the uncomfortableness while doing so. Additionally, researchers discovered that at the time of the point prevalence, the clinical team ordered a bariatric bed for one patient, but it was not delivered. The clinical team failed to follow up on this issue due to time pressures. This reinforces the issue of missed care opportunities for patients with bariatric needs, often resulting in inequities and inconsistencies in delivering high quality healthcare. Failure to provide timely and appropriate equipment suitable for patients with bariatric level support can result in continued discomfort, slower recovery and preventable reportable events caused to staff and patients.

The majority of patients in this audit had documented assessment of moving and handling hazards as they appeared throughout care. However, documentation of the LITE assessment did not achieve standard. This is a significant concern as the moving and handling of bariatric patients can carry a serious risk. The LITE principles are a method to remember key risk factors that should be considered when preparing safe patient handling tasks.[32] Clinical teams must consider all four principles before starting a handling technique and organising any equipment. Failure to provide documentation of LITE assessments leaves staff and patients at risk of injuries.

There was poor adherence with documenting discharge plans within the PADP. Discharge planning is crucial to improving the efficiency and quality of healthcare delivery.[33] A Cochrane Review identified that individualised discharge planning reduces the length of hospital stay and readmission rates for adults.[34] The effectiveness of individualised discharge planning does not differ for elective and emergency admissions.[33] Failure to provide discharge planning will cause further missed care opportunities and a higher risk of re-admission for a patient requiring bariatric services.

There was a noticeable discrepancy between patient satisfaction and standards of service delivery. This suggests service users are not aware of what they might expect during their care. From this audit it is not possible to determine if this discrepancy is specific to patients requiring bariatric level support or the population in general, due to the stigma of obesity.

Our audit has several limitations. Researchers relied on a clinical team report for the cross-sectional point prevalence if a patient was not present (i.e., not in ward at the time of data collection). Additionally, researchers entrusted patients' estimation of weight and height if not independently measured by the clinical team. The cross-sectional audit result could potentially be affected by the difference in seasonal effects on admissions of people with extreme obesity, as it was only conducted in the summer, and the absence of COVID-19 hospitalisations during the period of

data collection. Undertaking this type of audit at different time points across the year will assist in determining a more accurate hospital prevalence. The exclusion of pregnant women with extreme obesity means the assessment of standards of care within the maternity service was not established leading to an under-estimation of overall hospital bariatric need. Researchers could not assess the duration of time from ordering equipment to delivery due to confidentiality reasons. However, researchers acknowledge 80–90% of equipment deliveries via Essential (a partnership agency providing bariatric, fall prevention and pressure relief equipment to CCDHB), are delivered within an hour of request based on company reporting. In the case-note review, there were no means to assess if actual equipment ordered met the needs and physical size requirements of the patient. Therefore, equipment reported as ordered was deemed appropriate. Although most standards were achieved for patients receiving bariatric services, the audit is unable to determine if care was culturally safe as there were no benchmarks for cultural safety within the ACC recommendations or CCDHB policies. A final limitation to the audit is the currency of the ACC moving and handling standards used to inform the clinical audit. A review and update of the evidence is required.

This clinical audit highlights the need for further consideration of how clinical teams correctly identify patients who require bariatric level support. Better processes need to be developed to improve communication and documents in the decision-making of care practices and equipment needs; supported by moving and handling education. The inclusion of bariatric experts on the redesign of hospitals and retrofitting of clinical areas is vital to ensure future care facilities appropriately meet safe environmental standards.

Conclusion

Current identification measures for patients with extreme obesity are not always practiced at CCDHB, contributing to missed care opportunities and adverse effects for patients and clinical teams. Developing and improving policy adherence will assist in addressing shortcomings in the standard of providing a safe environment for bariatric patients to support a high quality care.

COMPETING INTERESTS
Nil.

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AUTHOR INFORMATION
Bailey Yee: Summer Scholarship Student, Faculty of Health, Te Herenga Waka – Victoria University of Wellington, Wellington, New Zealand.
Eleanor Barrett: Moving and Handling Specialist, Centre of Clinical Excellence, Capital & Coast, and Hutt Valley Districts, New Zealand.
Dr Mona Jeffreys: Senior Research Fellow, Health Services Research Centre, Te Herenga Waka – Victoria University of Wellington, Wellington, New Zealand.
Dr Anne Haase: Associate Professor, School of Health, Te Herenga Waka – Victoria University of Wellington, Wellington, New Zealand.
Dr Caz Hales: Senior Lecturer, Registered Nurse, School of Nursing, Midwifery and Health Practice, Te Herenga Waka – Victoria University of Wellington. Wellington, New Zealand.

CORRESPONDING AUTHOR
Caz Hales: School of Nursing, Midwifery and Health Practice, Te Herenga Waka – Victoria University of Wellington, PO Box 600. Wellington, New Zealand. Ph: 04 463 6135. E: Caz.hales@vuw.ac.nz

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Cannabis use and patterns of psychotic symptomatology in a longitudinal birth cohort

Nicole Cant, Mary Buchanan, Anitra C Carr, Joseph M Boden

ABSTRACT

AIM: Research has established associations between regular cannabis use and psychotic symptomatology in young people. However, there has been little previous research on whether the experience of psychotic symptomatology differs between non-users and regular users of cannabis.

METHOD: Data were from the *Christchurch Health and Development Study* (CHDS), a longitudinal cohort born in 1977. Data on frequency of cannabis use and (past month) psychotic symptomatology were obtained at the age 18, 21 and 25 waves of assessment. Symptoms were rank ordered by the number of affirmative responses over the three assessments, and the symptom profile of non-users and regular users were compared using a non-parametric Mann–Whitney U test.

RESULTS: Among non-users and regular users, the commonly reported symptoms of psychosis were those that would be considered "mild". More severe symptoms were not commonly reported. A comparison of the symptom profile across the two groups showed no significant differences.

CONCLUSION: There was no evidence of qualitative differences in the pattern of psychotic symptomatology reported by non-cannabis users and regular cannabis users. Although regular cannabis users tend to report a greater number of symptoms, these symptoms did not tend to be severe, and were unlikely to be indicative of psychotic illness.

Cannabis is a drug used widely for "recreational" purposes, with over 75% of New Zealanders have reported using cannabis at least once by age 25, and with 12.5% showing use consistent with the *Diagnostic and Statistical Manual of Mental Disorders* (DSM)[1] criteria for dependence.[2] The active components of cannabis are cannabinoids, with two cannabinoids having the highest concentration: delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD).[3] THC is responsible for most of the desirable and less desirable effects of cannabis on anxiety, euphoria, perception and memory.[4] The average THC potency in cannabis has increased over the last two decades from 4% THC in 1994 to 12% THC in 2014, whereas the potency of CBD has decreased from 0.5% in 2004 to <0.2% in 2014.[5]

Cannabis intoxication can cause a drug-induced psychosis-like state which is short lived and resolves after a period of abstinence.[6] However, there is evidence that regular cannabis use may be associated with an increased risk of psychotic symptoms when the individual is no longer intoxicated.[7] Psychotic symptomatology is a defining characteristic of schizophrenia spectrum disorders and can result in significant periods of disability.[8] The defining positive symptoms of psychosis are hallucinations; perception-like experiences that occur without external stimuli; and delusions, fixed beliefs that are not amendable despite conflicting evidence.[9] In a sample of patients treated for cannabis-induced psychosis, Arendt and colleagues[10] reported that 45% of patients were later diagnosed with schizophrenia spectrum disorder, and that this occurred at an earlier average age than patients who did not use cannabis. The landmark study by Andreasson and colleagues,[11] who examined over 45,000 male participants in Sweden, found that even after adjustment there was dose-response relationship between cannabis exposure and the development of schizophrenia spectrum disorder.

Further evidence suggests that adolescence appears to be a particularly vulnerable period for the relationship between cannabis use and increased risk of developing psychosis.[12] Evidence suggests that regular cannabis use in adolescence may disrupt the normal development of the pre-frontal cortex and dopaminergic system to increase the risk of developing schizophrenia or psychosis.[12] THC exposure in susceptible users may lead to permanent alterations in neurotrans-

mitter functions, leading to psychotic illness in the long-term.[13]

While the associations between cannabis and psychosis are relatively well-established, the question of a causal conclusion is widely debated.[14] There are several alternative models, implicating social, demographic and genetic factors. One alternative model is that those with a genetic, or other predisposition to psychosis, may either self-medicate their prodromal symptoms with cannabis or may hasten the onset of a psychotic illness to which they are predisposed. Caspi and colleagues[15] found that the association between early cannabis use and psychosis was limited to those with a particular genotype (the Val/Val variant of the COMT gene, involved in dopamine regulation). Furthermore, Henquet et al[16] found that baseline cannabis use predicted an increase in the risk for later psychotic symptoms, and that this association was stronger for those predisposed to psychosis. Finally, a recent study by Wainberg and colleagues,[17] using a polygenic risk score (PRS) for schizophrenia, found a much stronger link between the use of cannabis and later psychotic symptomatology in those with high schizophrenia PRS than in those with low schizophrenia PRS (67% with psychosis vs 7%).

The present study used data from the *Christchurch Health and Development Study* (CHDS). The CHDS has studied a cohort of over 1,000 participants since their birth in 1977 to age 40. The cohort were questioned about their cannabis use and experiences of psychotic symptoms from age 16 onwards. The data from this cohort has been used to produce extensive research on cannabis use and its potential harms.[2,7,18]

Fergusson et al.[7] investigated the causal link between cannabis use and psychotic symptoms in the CHDS. After control for confounding, daily cannabis use resulted in a significant increase in rates of psychotic symptoms (1.6–1.8 times higher) compared to non-cannabis users. Furthermore, the analysis showed evidence for the causal role of cannabis in psychosis through the specificity of association, robustness to control for confounding and dose-response.[19] However, no research has examined whether there is a qualitative difference in the kinds of symptoms reported by regular cannabis users and non-users. It could be argued that if psychosis is caused by cannabis use (reflected in a higher rate of symptoms), then we might also expect to observe more serious symptoms of psychosis (such as thought insertion, delusions and hallucinations) among regular cannabis users.

The present research aimed to reanalyse the data reported by Fergusson et al.[7] to examine the patterns of psychotic symptoms reported from the CHDS cohort at ages 18, 21 and 25, in order to answer the following question: was there a significant qualitative difference between the patterns of psychotic symptoms reported by regular cannabis users, as compared to those who did not use cannabis?

Methods

Participants

The data were gathered from the CHDS, a longitudinal study of a cohort of participants who were born in Christchurch, New Zealand in mid 1977. The original cohort had a total of 1,265 participants (635 males, 630 females) which represented 97% of births in Christchurch during the period of recruitment. The cohort was composed of approximately 87% NZ European and 13% Māori/Pasifika ethnicity at birth. The cohort has been studied at birth, age four months, one year and then at annual intervals until age 16, and again at ages 18, 21, and at five yearly intervals from age 25 to 40. The present study used data obtained from the age 18, 21, and 25 assessments. Sample sizes ranged between 1,025 (age 18); 1,011 (age 21); and 1,003 (age 25) representing between 79–81% of the original birth cohort.

Measures

Psychotic symptomatology

At each assessment at age 18, 21 and 25 years the participants took part in a comprehensive mental health interview which was designed to assess multiple aspects of the individual's psychosocial adjustment and mental health, including any current (within the past month) psychotic symptoms.[7] The assessment tool was the symptom checklist 90 (SCL-90),[20] from which ten items were used to represent symptoms of psychosis.[21] Participants were asked to respond "yes", "no", or "maybe" to whether they had experienced each symptom in the month prior to the assessment. The answer options "yes" and "maybe" were counted as a positive response, and these were summed for the 10 items at each assessment to generate a total symptoms of psychosis score for ages 18, 21 and 25 years. These items are shown in Table 1, along with the percentage of respondents endorsing each item.

Frequency of cannabis use

At each assessment at age 18, 21 and 25 years the participants were questioned on their cannabis use. This information classified participants

on a five-point scale based on their average frequency of cannabis use over the 12-month period. The scale consisted of: Group 1=non-cannabis user; Group 2=used cannabis a few times; Group 3=used cannabis on less than monthly basis; Group 4=used cannabis on at least a monthly basis; and Group 5=used cannabis on at least weekly (or more often) basis. To assess the accuracy of the participants self-reporting, a nominated informant also reported the individual's cannabis use at ages 18, 21 and 25 years. There was appropriate agreement between the participant and the informant ($r=0.68$; $p<0.001$). For the purposes of the present analysis, those who indicated using cannabis "at least weekly" or more often during an assessment period were classified as "regular cannabis users" during that assessment period.

Data analysis

In the first step of the analysis, in order to show differences in reporting across assessment ages, the percentage of positive responses for each psychotic symptom was calculated at age 18, 21 and 25. Chi-squared tests were performed to investigate differences between the frequencies of psychotic symptoms reported at the three assessment periods. A Šidák correction for multiple significance testing using correlated data was employed, setting the p-value for statistical significance at $p=0.01$.

In the second step of the analysis, the psychotic symptoms at each assessment point were ranked in order from most frequently reported to least frequently reported, within each level of cannabis use (classified as noted above, ranging from "no cannabis use" to "regular (at least weekly) cannabis use"). These were then aggregated over the period 18–25 years by calculating the average percentage of positive responses across the three assessments, for each level of cannabis use. In order to compare the "no cannabis use" with the "regular cannabis use" group across the three assessments of psychotic symptoms, the aggregated ranks were tested for rank-order differences using a non-parametric Mann–Whitney U test, at $p<0.05$ significance level (two-tailed).

Results

Frequency of psychotic symptoms

The incidence of each psychotic symptom in the CHDS cohort, represented by the percentage of positive respondents from each age group, is shown in Table 1.

The three most frequently reported symptoms were the same across all three assessment points. These were: "other people being aware of your private thoughts"; "having ideas or beliefs that others do not share"; and "never feeling close to another person". Similarly, the three least frequently reported symptoms were also the same across all three assessment points. These were: "the idea that someone else can control your thoughts"; "hearing voices that other people do not hear"; and "the idea that something serious is wrong with your body".

Some symptoms were significantly reported more or less frequently at different time points. Some symptoms decreased in frequency as age increased: "the idea that someone else can control your thoughts"; and "never feeling close to another person". Finally, reports of the symptom "having ideas or beliefs that others do not share" were significantly more frequently reported at age 21, than at ages 18 or 25.

Rank order of psychotic symptoms relative to cannabis use at each time point

The rank orders of psychotic symptoms reported from non-cannabis users and regular (at least weekly) cannabis users at each time point is shown in Table 2. At all ages, the same three symptoms were reported most frequently for both groups. These were: "having ideas or beliefs that others do not share"; "feeling that you are being watched or talked about by others"; and "feeling that other people cannot be trusted".

The least frequently reported symptoms were also similar between groups. At 18 years, the symptom "having thought that are not your own", was one of the three least frequently reported for both groups. At both 21 years and 25 years, both groups shared the same three least frequently reported symptoms, these were: "the idea that someone else can control your thoughts;" "hearing voices that other people do not hear"; and "having thoughts that are not your own".

Aggregated rank order of psychotic symptoms across ages 18, 21 and 25

The rank order of psychotic symptoms reported from non-cannabis users and regular cannabis users across ages 18, 21 and 25 is shown in Table 3. The rank order is formed from aggregated percentages of the positive responses across the three ages (see Methods).

For both non-cannabis users and regular

Table 1: The percentage of positive responses for each psychotic symptom at age 18, 21 and 25.

Psychotic symptom	Age 18	Age 21	Age 25
The idea that someone else can control your thoughts	3.6	4.8[a]	2.6[b]
Hearing voices that other people do not hear	2.1	1.7	2.1
Other people being aware of your private thoughts	15.0	15.7	14.2
Having thoughts that are not your own	8.7[a]	6.5[b]	4.4[c]
Having ideas or beliefs that others do not share	15.0[a]	19.5[b]	16.5[a]
The idea that something serious is wrong with your body	2.8	2.9	2.6
Never feeling close to another person	18.2	18.8[a]	15.9[b]
The idea that something is wrong with your mind	7.7	8.8	7.7
Feeling that other people cannot be trusted	7.3	7.7	7.7
Feeling that you are watched or talked about by others	6.3	7.0	7.4

Total sample at age: 18 N=1,025; 21 N=1,011; 25 N=1,003.
Differing superscript indicates statistically significant comparison between assessments, p<0.01.

Table 2: Rankings of psychotic symptoms reported by the CHDS cohort at ages 18, 21 and 25, and comparison between non-cannabis users and regular cannabis users.

	Age 18		Age 21		Age 25	
	Order ranking		Order ranking		Order ranking	
Psychotic symptom	Non-users	Regular users	Non-users	Regular users	Non-users	Regular users
The idea that someone else can control your thoughts	9 equal	5	8	8	9	8
Hearing voices that other people do not hear	9 equal	4 equal	10	9	10	7 equal
Other people being aware of your private thoughts	6	6 equal	6	7	6	9
Having thoughts that are not your own	8	7	9	10	8	7 equal
Having ideas or beliefs that others do not share	1	1	2	2	2	3
The idea that something serious is wrong with your body	4	6 equal	4	4	4	6
Never feeling close to another person	5	4 equal	5	6	5	4
The idea that something is wrong with your mind	7	3 equal	7	5	7	5
Feeling that other people cannot be trusted	2	3 equal	3	1	3	2
Feeling that you are watched or talked about by others	3	2	1	3	1	1

Ranking scored as: 1=most frequently reported; 9=least commonly reported.
Symptoms at the same rank (same percentage of positive responses) are considered "equal" and hold the same ranking.

Table 3: Aggregated rankings of psychotic symptoms reported by the CHDS cohort between non-cannabis users and regular cannabis users.

	Order ranking	
Psychotic symptom	**Non-users**	**Regular users**
The idea that someone else can control your thoughts	8	8
Hearing voices that other people do not hear	10	7
Other people being aware of your private thoughts	3	1
Having thoughts that are not your own	6	9
Having ideas or beliefs that others do not share	2	3
The idea that something serious is wrong with your body	9	10
Never feeling close to another person	1	2
The idea that something is wrong with your mind	4	6
Feeling that other people cannot be trusted	5	5
Feeling that you are watched or talked about by others	7	4

Total sample N=1,025 (non-cannabis users N =538; Regular cannabis users N=64); Rank = "one" being most commonly reported; and Rank = "ten" being least commonly reported symptom.

cannabis users the same three symptoms were most commonly reported. These were: "having ideas or beliefs that others do not share"; "never feeling close to another person"; and "other people being aware of your private thoughts". Furthermore, non-cannabis users and regular cannabis users reported overlapping symptoms that were the least commonly reported: "hearing voices other people do not hear"; "the idea that someone else can control your thoughts"; and "the idea that something is seriously wrong with your body".

As noted in the Methods section, the symptom rankings for the non-user and regular user groups were compared using a non-parametric Mann–Whitney U test. The results of this analysis indicated that the distribution of symptom rankings for regular cannabis users did not differ significantly from that of the non-cannabis users (p=0.85). These results suggest that participants who used cannabis regularly at some point during the period of 18 to 25 years reported a pattern of psychotic symptomology that did not differ from non-cannabis users.

Discussion

This project utilised data from a longitudinal study of a birth cohort (the *Christchurch Health and Development Study*), gathered from ages 18, 21 and 25 to examine whether there was a significant difference between the patterns of psychotic symptoms reported from regular cannabis users compared to non-cannabis users. Previous research using this cohort has shown that those who use cannabis regularly ("at least weekly") reported a significantly greater number of symptoms of psychosis during the period 18–25 years than those who did not use cannabis.[7,21] The present analyses sought to determine whether there was a qualitative difference in the kind of symptoms being reported by the two groups.

The primary findings of this analysis were that, while Fergusson et al.[7] had previously informed that regular cannabis users reported symptoms of psychosis at a rate that was 1.6 to 1.8 times higher than non-users over the period 18 to 25 years, there was no discernible difference in the pattern

of symptom reporting over the same observation period. Both groups tended to report common, low-level symptoms (such as "having ideas or beliefs that others do not share"), and neither group was likely to report what would be considered as more severe[22] positive symptoms of psychosis, such as "hearing voices that other people do not hear". It is clear from the pattern of results that regular cannabis users were not more likely than non-users to report symptoms that would be considered severe, irrespective of the fact that they reported a greater number of symptoms overall.

One of the main features of the literature on the potential causal role of cannabis use in the development of psychosis has been the use of a variety of methods for measuring psychotic illness/symptomatology.[13] For example, the Dunedin Multi disciplinary Health and Development Study has used schizophreniform disorder as an outcome measure,[15] while other studies have employed psychotic symptomatology as measured by the CIDI.[16] The present study used the psychoticism subscale of the SCL-90,[20] which differs markedly from the CIDI measure of psychotic symptoms, in terms of the nature of the items, and the lack of overlap between SCL-90 Psychoticism items and DSM symptom criteria for disorders with psychotic features. Indeed, several studies have shown that the SCL-90 is not particularly reliable in terms of distinguishing those with differing levels of symptoms (as measured by clinicians, or via alternative measures).[23] Perhaps more importantly, however, the SCL-90 has been shown to have poor positive predictive value for diagnosing psychotic illness.[24] Collectively, the results suggest that while those who were regular cannabis users reported a significantly greater number of symptoms than non-users, the symptom profile between the two groups did not differ, showing that there was no evidence of greater "severity" among regular cannabis users. Furthermore, it could also be argued that the measure was not, in fact, measuring psychotic symptomatology (as described in both DSM and ICD systems) in any reliable manner.

The present study also found that the incidence of symptom reporting indicated that there was a difference in the psychotic symptoms reported at different ages. While the incidences for six of the psychotic symptoms were stable over age, four symptoms had significant age differences. Incidence of reporting the symptom "having thoughts that are not your own" increased with age, whereas incidences of the symptoms "the idea that someone else can control your thoughts" and "never feeling close to another person" decreased with age. Finally, reporting of the symptom "having beliefs that others do not share" was highest at age 21.

This trend may be explained by the brain maturing over adolescence and early adulthood, resulting in a reduced frequency of particular symptoms. Adolescence is a period marked by significant brain development, with the pre frontal cortex (PFC) being one of the last brain areas to mature. The PFC is responsible for higher level cognitive functioning such as behaviours of goal-orientated planning and decision-making.[25] This is of significance because the age of onset for schizophrenia and other related disorders is most commonly in early adulthood, with peak age of onset being 20–29 years.[26] An understanding of the incidence of psychotic symptoms at different ages is helpful for health professionals to improve their care as well as enhance their vigilance of psychotic symptoms in young people. Of course, as noted above, some measure of caution should be used in the interpretation of SCL-90 symptoms as representing psychotic illness.

Patients who use cannabis have been shown to have increased likelihood of psychiatric hospital admission, compulsory treatment, and increased duration of admission.[27] The present study suggests that while cannabis users may have an increased incidence of psychosis, there is little reason to expect that the extent of cannabis use is related to the severity of psychotic disorder. These findings could aid health practitioners to further understand the nuanced nature of the relationship between cannabis use and psychotic symptoms, providing an opportunity for more tailored or personalized care for particular patients.[28].

Though there is considerable evidence for a dose-dependent relationship of cannabis on psychotic symptoms,[13] far less research has been done on the patterns of psychotic symptoms associated with cannabis exposure. The present study is the first (to our knowledge) to examine whether there was a qualitative difference between regular cannabis users and non-users in terms of their experiences of symptoms of psychosis. It would be particularly useful for other prospective studies that hold data on cannabis and psychotic symptomatology to undertake similar analyses, as it could be argued that the results of these investigations may differ according to the measure of psychotic symptomatology used.

A key strength of the present study was that it analysed data collected using a prospective, longi-

tudinal design, allowing for an investigation of the impact of cannabis exposure on psychotic symptomology over multiple time points.[29] Additionally, the CHDS cohort has been followed since birth, reducing potential selection bias and recall bias.

The present study also has a number of limitations. The first, as mentioned previously, is that the use of the SCL-90 psychoticism subscale is problematic in that the scale cannot be reliably used to identify individuals with a psychotic illness. Also, the present study only held data on cannabis use and psychotic symptoms to age 25, so longer-term associations were not able to be investigated. However, given that both cannabis use and psychotic symptomology are most prevalent in young adulthood, using a younger age group is appropriate.[2,26] In addition, it should be noted that the "regular user" group was relatively small (n=64), which may have affected the reliability of observations within this group, as compared with the non-user group. Finally, the present study used data collected in 1995, 1998 and 2003. ElSohly et al.[5] found that the potency of cannabis as represented by the THC content of the plant increased significantly between 1994 and 2014. As THC is implicated in the link between cannabis and psychosis, the increased potency has potential implications on the relationships investigated in the present study,[30] with the possibility that the consumption of cannabis containing higher average THC levels may be more strongly associated with symptom reporting. Therefore, more recent research is warranted to investigate the effects of higher potency exposure to cannabis on patterns of psychotic symptomatology.

COMPETING INTERESTS
Nil.

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AUTHOR INFORMATION
Nicole Cant: MSc student, Centre for Postgraduate Nursing Studies, University of Otago, Christchurch, New Zealand.
Mary Buchanan: PhD student, Department of Psychological Medicine, University of Otago, Wellington, New Zealand.
Anitra Carr: Research Associate Professor, Department of Pathology and Biomedical Science, University of Otago, Christchurch, New Zealand.
Joseph M Boden: Professor, Department of Psychological Medicine, University of Otago, Christchurch, New Zealand.

CORRESPONDING AUTHOR
Prof. Joseph M Boden: Director, Christchurch Health and Development Study, Department of Psychological Medicine, University of Otago Christchurch, Christchurch 8011. E: joseph.boden@otago.ac.nz

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Transfusion practice in patients undergoing cardiac surgery in New Zealand—impact of the TRICS III study (the TRICS TRIPS study)

Rachael L Parke, Alana Cavadino, Shay P McGuinness

ABSTRACT

AIM: Cardiac surgery is the largest perioperative user of donated blood products. There is significant uncertainty as to the optimal threshold for RBC transfusion in patients undergoing cardiac surgery with little evidence to guide practice. We wished to determine whether the results of a large randomised controlled trial had changed practice.

METHODS: A prospective observational study of red blood cell (RBC) transfusions of patients undergoing cardiac surgery utilising cardiopulmonary bypass was undertaken as well as a cross-sectional self-administered online practice survey of clinicians ordering red blood cell transfusions in all publicly funded cardiac centres in New Zealand.

RESULTS: Significantly more transfusions were administered to a pre-transfusion haemoglobin <75g/L and thus considered in agreement with the restrictive arm of the TRICS III study after completion of TRICS III study enrolment and before results were known (T1)=44% when compared to after results were known (T2=56.7%, p=0.01). Most respondents in the clinician survey had participated in the TRICS III study.

CONCLUSIONS: After the publication of the findings of a large multi-national clinical trial, clinicians involved in the care of cardiac surgery patients were more restrictive in their administration of red blood cell transfusions than before the trial findings were published.

Cardiac surgery is the largest perioperative user of donated blood products accounting for 14–20% of total blood product consumption and consuming 50% of all red blood cell (RBC) transfusions given to surgical patients.[1–3] Perioperative anaemia and administration of RBC transfusions have been shown to be independent predictors of poor outcomes.[4–10] While restrictive strategies have reduced transfusion in other populations,[11–13] it may be inappropriate and unsafe to extrapolate these findings to cardiac surgery. Previously, inter-physician and inter-hospital variability in transfusion practice has been shown, often unrelated to patient risk factors.[14,15]

The Transfusion Requirements in Cardiac Surgery III (TRICS III) study was an international, open label, randomised-controlled, noninferiority study in moderate- to high-risk patients undergoing cardiac surgery conducted 2014–2017.[16] The study enrolled 5,243 participants (633 in New Zealand) and showed that a restrictive transfusion strategy (transfuse if haemoglobin level was <75g/L starting from induction of anaesthesia) reduced transfusion of allogeneic red blood cells and was non-inferior to a liberal strategy (transfuse if haemoglobin level was <95g/L in the operating room or Intensive Care Unit (ICU) or was <85g/L in the non-ICU ward) for a composite outcome of mortality and major morbidity.[16,17] Participants were enrolled between 14 November 2014 and 17 March 2017 in New Zealand and the study published 12 November 2017.

Of equal importance to the generation of evidence is the translation of findings into clinical practice. We wished to understand how the dissemination of the results of the TRICS III study impacted real-world clinical practice.

Methods

This study of the impact of knowledge translation involved two components:

1. Multi-time period, prospective observational study.
2. Cross-sectional, self-administered online questionnaire of clinicians ordering blood transfusions.

Prospective observational study of RBC administration

Setting

A prospective, observational study at all five publicly funded cardiac surgical centres in New Zealand.

Aim

To benchmark current RBC transfusion practice and determine the proportion of transfusions compliant with findings of the TRICS III study.

Conducted for four weeks at the following time points:

- October 2017 after completion of TRICS III study enrolment and before results were known (T1).
- May 2019 after the publication of TRICS III study results (T2).

Participants

Consecutive patients admitted to the ICU following cardiac surgery using cardiopulmonary bypass during the study periods. Each site collected data on eligible patients over a four-week period capped at 50 patients at each time point.

Ethical approval

Ethics (13/CEN/189/AM07) and local site governance approval were obtained before study commencement. The requirement for written informed consent was waived.

Data collection

Data was collected by trained research coordinators at each site and managed using REDCap (Research Electronic Data Capture) hosted at the Medical Research Institute of New Zealand.

Data included:

- Demographic data (ethnicity, age, gender), type of surgery.
- At the time of each transfusion episode, the following data was recorded by the clinical staff administering the transfusion: pre- and post-transfusion haemoglobin and haematocrit values (routinely collected values measured before transfusion and first value measured after transfusion), place of transfusion (theatre, ICU or ward) and the primary reason for transfusion from a prespecified list.

Clinician survey

Aim

To describe self-reported practice regarding the administration of RBCs.

The survey was conducted:

1. September 2018 after completion of study enrolment and before results were known.
2. May 2018 two months after the results of the TRICS III study were published.
3. May 2019 12 months after the results of the TRICS III study were published.

Participants

All cardiac surgeons, anaesthetists, perfusionists and ICU consultants in New Zealand that cared for patients undergoing cardiac surgery were invited to participate. An invitation to participate containing a link to the questionnaire was distributed by email to all participants. Completion of the survey implied consent to participate. Participants received a reminder, weekly for four weeks, to complete the survey. As clinicians could choose to participate in all surveys the sample at each time point was not identical, however, there was likely significant overlap, but information to link them together was not collected.

Data collection

An online questionnaire was administered using REDCAP. The survey consisted of demographic questions regarding participants including specialty, length of practice, number of cases performed per year and location. The respondent was asked to provide an answer regarding the administration of RBCs to hypothetical patients. Finally, respondents were asked if they had participated in the TRICS III study or not; if they knew the results of the study, and whether this knowledge had impacted their practice.

Data analysis

Data were summarised separately by time point and transfusion status for the prospective observational study of RBC administration, and by survey (time point) for the clinician surveys. All data were described using means (± standard deviation [SD]) for continuous variables or number (n) and percentage (%) for categorical variables. For categorical variables, comparisons between time points/groups/surveys were performed using Chi-squared tests or Fisher's exact test. To compare time points/groups/surveys by continuous variables, a t-Test or Kruskal–Wallis test (for measures with non-normal distribution) was applied. For consistency with the rules used for suspension of the transfusion protocol in the TRICS III study, we also compared study time points after removing transfusion episodes that were documented as occurring for a major bleeding episode. Major bleeding was defined as clinical evidence of ongoing blood loss and a decrease in the haemo-

globin concentration of 3g/L in the preceding 12 hours or a requirement for at least three units of RBCs during the same period. For the question that asked clinicians to rank additional considerations when ordering RBCs, responses were analysed as follows: each factor ranked first was given three points; second-ranked received two points; third-ranked considerations received one point. Points were then summed for each factor.

All tests were independent and two-sided, with P-values <0.05 considered statistically significant. All statistical analyses were performed using Stata 16 (StataCorp LP, College Station, Texas).

Results

Prospective observational study of RBC administration

At baseline, (T1) 209 patients were admitted following cardiac surgery over a four-week period in October 2017. At T2, 181 patients were admitted following cardiac surgery over a four-week period in May 2019.

Participant characteristics

Characteristics of participants were comparable between timepoints and typical of the patient population that undergoes cardiac surgery in New Zealand (Table 1).

Transfusion characteristics

There was no significant difference in the number of units transfused at each transfusion episode between time points (Table 2). A similar proportion of patients received a RBC transfusion in T1 (45.9%) and T2 (43.6%; Table 1). Participants who were transfused received a median (IQR, range) of 3 units (1–4; 1–17) in T1 and 4 units (2–4; 1–25) in T2.

This study showed a significant increase from T1 to T2 in the proportion of RBC transfusions that were compliant with the restrictive arm of the TRICS III study (T1=44% T2=56.7%, p=0.01). The increase in compliance in ICU was more marked (41.5% of transfusions compliant at T1 increasing to 60% at T2, p=0.004).

RBC transfusions were mostly ordered and administered in the ICU with most patients requiring only one unit (Table 2).

The mean pre-transfusion haemoglobin and haematocrit did not differ significantly between T1 and T2, respectively. However, the proportion of transfusions given when the pre-transfusion haemoglobin was <75g/L was significantly higher at T2 (Table 2, Figure 1).

Clinical indication for transfusion differed between T1 and T2 (p<0.001). The most common reason recorded for RBC transfusion was low haemoglobin followed by major bleeding. There was a higher proportion of major bleeding and shock/altered tissue perfusion in T1 vs T2 and higher reporting of minor bleeding and disseminated intravascular coagulation in T2 (Table 2).

For consistency with the rules used for suspension of the transfusion protocol in the TRICS III study, we also compared study time points after removing transfusion episodes that were clinician-reported as a major bleeding episode (n=65). Findings remained unchanged.

Clinician survey

Survey 1 (S1) received 97 responses of which 90 were complete and included in the analysis (response rate=97/15; 62%). Survey 2 (S2) received 67 responses of which 63 were complete and included in the analysis (response rate=67/161; 41.6%). Survey 3 (S3) received 72 responses of which 64 were complete and included in the analysis (response rate=72/15; 45.9%).

Respondent characteristics and existing guidelines

Most responses were received from anaesthetists followed by ICU Consultants (Table 3). Close to half of the respondents reported having no formal written guidelines for the administration of RBCs but where they did exist, a significant increase in perceived adherence was seen at later time points (p=0.001).

Responses to scenarios and transfusion decision making

When asked what modifying factors would allow acceptance of a higher transfusion threshold there was broad agreement between intra-operative and post-operative clinicians. Both groups rated emergency surgery, valve surgery and age over 70 years as the most important factors (Figure 2).

Participation in and knowledge of TRICS III study

Most respondents had participated in the TRICS III study, with the majority reporting that participation had not resulted in them changing their practice. After the publication of TRICS III, 75.4% of respondents felt that there should be New Zealand-specific guidelines developed for the administration of RBCs, and an additional 9.8% thought we should wait for international guidelines to be developed (Table 4).

Table 1: Participant characteristics.

Variable	Category	All (n=390)			Did not receive transfusion (n=215)			Received transfusion (n=175)		
		Time 1	Time 2	P-value	Time 1	Time 2	P-value	Time 1	Time 2	P-value
Gender	Male	144 (68.9)	130 (71.8)	0.579	87 (77)	77 (75.5)	0.873	57 (59.4)	53 (67.1)	0.346
	Female	65 (31.1)	51 (28.2)		26 (23)	25 (24.5)		39 (40.6)	26 (32.9)	
Age, years	<50	32 (15.3)	15 (8.3)	0.099	22 (19.5)	8 (7.8)	0.016	10 (10.4)	7 (8.9)	0.653
	50–60	28 (13.4)	35 (19.3)		14 (12.4)	26 (25.5)		14 (14.6)	9 (11.4)	
	60–70	65 (31.1)	54 (29.8)		37 (32.7)	35 (34.3)		28 (29.2)	19 (24.1)	
	>70+	84 (40.2)	77 (42.5)		40 (35.4)	33 (32.4)		44 (45.8)	44 (55.7)	
	Mean (SD)	63.9 (13.9)	65.9 (11.1)	0.12	61.6 (14.9)	64.3 (10.1)	0.122	66.6 (12.2)	67.9 (12)	0.465
Ethnicity	NZ European	139 (66.5)	129 (71.3)	0.324	74 (65.5)	75 (73.5)	0.145	65 (67.7)	54 (68.4)	0.51
	NZ Māori	31 (14.8)	18 (9.9)		15 (13.3)	10 (9.8)		16 (16.7)	8 (10.1)	
	Pasifika	19 (9.1)	12 (6.6)		13 (11.5)	4 (3.9)		6 (6.3)	8 (10.1)	
	Asian/other	20 (9.6)	22 (12.2)		11 (9.7)	13 (12.7)		9 (9.4)	9 (11.4)	
Operation performed	Isolated CABG	95 (45.5)	93 (51.4)	0.157	50 (44.2)	52 (51)	0.141	45 (46.9)	41 (51.9)	0.308
	Single valve	39 (18.7)	44 (24.3)		28 (24.8)	29 (28.4)		11 (11.5)	15 (19)	
	Multi-valve surgery	20 (9.6)	11 (6.1)		12 (10.6)	7 (6.9)		8 (8.3)	4 (5.1)	
	CABG + Valve	27 (12.9)	18 (9.9)		7 (6.2)	9 (8.8)		20 (20.8)	9 (11.4)	
	Other cardiac surgery	28 (13.4)	15 (8.3)		16 (14.2)	5 (4.9)		12 (12.5)	10 (12.7)	
Received a transfusion	No	113 (54.1)	102 (56.4)	0.684	113 (100)	102 (100)	-			
	Yes	96 (45.9)	79 (43.6)					96 (100)	79 (100)	-

Table 1 (continued): Participant characteristics.

Variable	Category	All (n=390)			Did not receive transfusion (n=215)			Received transfusion (n=175)		
		Time 1	Time 2	P-value	Time 1	Time 2	P-value	Time 1	Time 2	P-value
Number of transfusion episodes	0	113 (54.1)	102 (56.4)	0.449	113 (100)	102 (100)	-	-	-	
	1	36 (17.2)	26 (14.4)					36 (37.5)	26 (32.9)	0.338
	2	20 (9.6)	27 (14.9)					20 (20.8)	27 (34.2)	
	3	16 (7.7)	13 (7.2)					16 (16.7)	13 (16.5)	
	4	8 (3.8)	4 (2.2)					8 (8.3)	4 (5.1)	
	5 or more	16 (7.7)	9 (5)					16 (16.7)	9 (11.4)	
Total		209	181		113	102		96	79	

Results shown are n(%) unless otherwise indicated.
CABG = Coronary artery bypass graft SD = standard deviation.

Table 2: Transfusion characteristics.

Variable	Category	Time 1 (n=269)	Time 2 (n=194)	p
Place of transfusion, n(%)	Theatre	85 (31.6)	58 (29.9)	0.432
	ICU	135 (50.2)	108 (55.7)	
	Ward	49 (18.2)	28 (14.4)	
Pre transfusion haemoglobin (g/L), n(%)	<75g/L	118 (44.0)	106 (56.7)	0.01
	<75g/L – Theatre	35 (41.7)	27 (48.2)	0.445
	<75g/L – ICU	56 (41.5)	63 (60)	0.004
	<75g/L – Ward	27 (55.1)	16 (61.5)	0.583
	Mean (SD)	76.9 (10.3)	75.6 (10.5)	0.209
Post transfusion haemoglobin (g/L)	Mean (SD)	85.7 (11.9)	83.7 (9.5)	0.061
Pre transfusion haematocrit (%)	Mean (SD)	0.24 (0.03)	0.23 (0.04)	0.119
Post transfusion haematocrit (%)	Mean (SD)	0.26 (0.04)	0.26 (0.03)	0.192
Number of units transfused, n(%)	1	209 (77.7)	146 (75.3)	0.394
	2	54 (20.1)	38 (19.6)	
	3	3 (1.1)	3 (1.5)	
	4	3 (1.1)	6 (3.1)	
	10	0 (0.0)	1 (0.5)	
Clinical indication for transfusion, n(%)	Low haemoglobin	174 (64.7)	128 (66)	<0.001
	Major bleeding	46 (17.1)	19 (9.8)	
	Minor bleeding	9 (3.3)	12 (6.2)	
	Shock/altered tissue perfusion	11 (4.1)	3 (1.5)	
	Invasive procedure	0 (0.0)	3 (1.5)	
	Improve oxygen delivery	2 (0.7)	1 (0.5)	
	Disseminated intravascular coagulation	0 (0)	9 (4.6)	
	Unknown (not recorded)	27 (10)	14 (7.2)	
	Other reason	0 (0)	5 (2.6)	

ICU = Intensive Care Unit

Figure 1: Pre-transfusion haemoglobin for each timepoint.

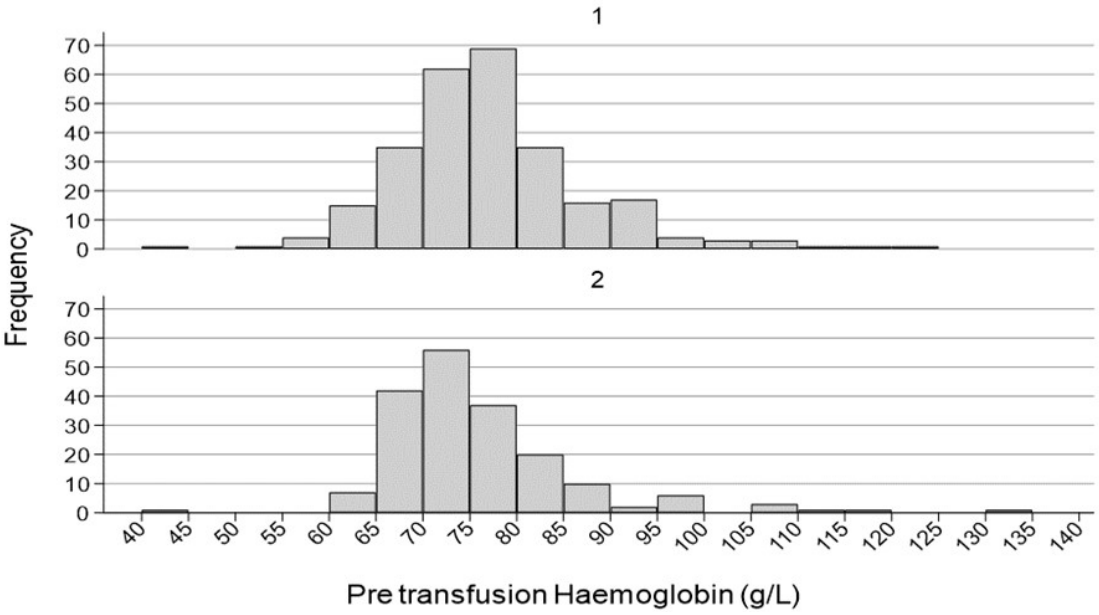
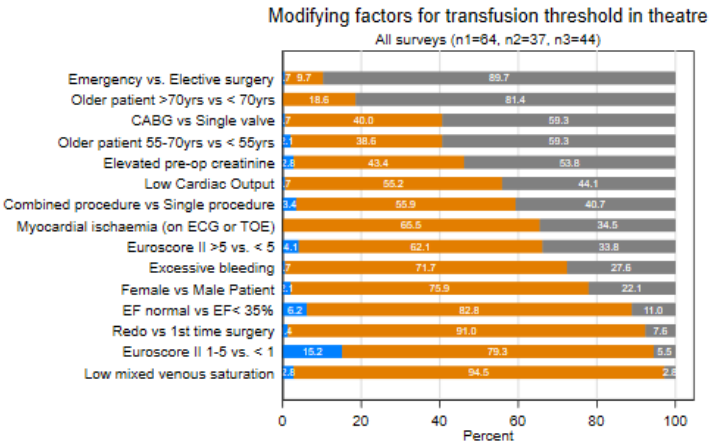


Figure 2: Modifying factors for transfusion threshold in theatre and ICU.



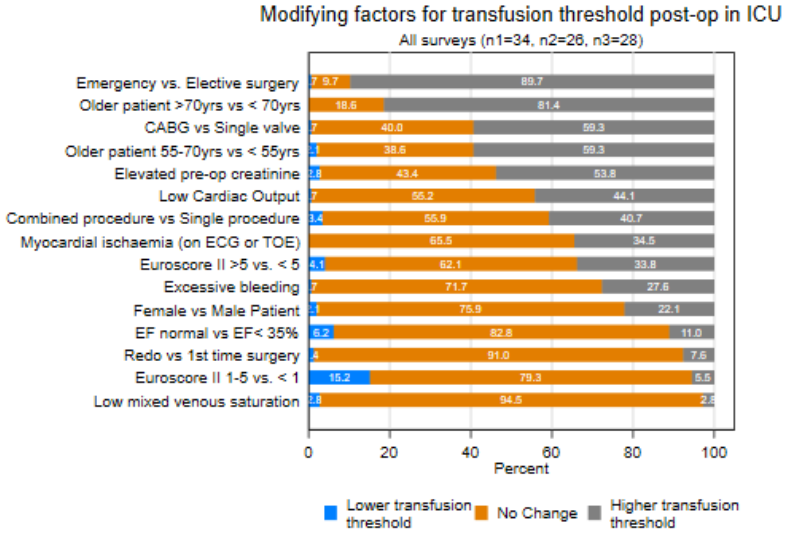


Table 3: Respondent characteristics.

Variable	Category	Survey 1	Survey 2	Survey 3	P-value
Total n (%)		**90 (100)**	**63 (100)**	**64 (100)**	**-**
Speciality	Anaesthesia	37 (41.1)	28 (44.4)	28 (43.8)	0.838
	Cardiac surgery	6 (6.7)	7 (11.1)	5 (7.8)	
	Intensive care	26 (28.9)	18 (28.6)	21 (32.8)	
	Perfusion	21 (23.3)	10 (15.9)	10 (15.6)	
Level of training	Trainee	2 (2.2)	0 (0)	0 (0)	0.340
	Specialist	88 (97.8)	63 (100)	64 (100)	
Years of clinical practice since end of training	0–4 years	12 (13.6)	13 (20.6)	14 (21.9)	0.920
	5–9 years	22 (25)	15 (23.8)	14 (21.9)	
	10–14 years	15 (17)	8 (12.7)	7 (10.9)	
	15–19 years	14 (15.9)	10 (15.9)	9 (14.1)	
	20 years or more	25 (28.4)	17 (27.0)	20 (31.3)	
Cardiac surgical cases personally involved in within last year	<50	4 (4.4)	4 (6.3)	3 (4.7)	0.547
	50–100	36 (40.0)	25 (39.7)	33 (51.6)	
	100–200	37 (41.1)	26 (41.3)	16 (25)	
	200–300	7 (7.8)	3 (4.8)	7 (10.9)	
	300 or more	6 (6.7)	5 (7.9)	5 (7.8)	
City of practice	Auckland	32 (35.6)	26 (41.3)	22 (34.4)	0.941
	Christchurch	13 (14.4)	6 (9.5)	6 (9.4)	
	Dunedin	10 (11.1)	5 (7.9)	5 (7.8)	
	Hamilton	14 (15.6)	10 (15.9)	13 (20.3)	
	Wellington	21 (23.3)	16 (25.4)	18 (28.1)	

Table 3 (continued): Respondent characteristics.

Variable	Category	Survey 1	Survey 2	Survey 3	P-value
Total n (%)		**90 (100)**	**63 (100)**	**64 (100)**	**-**
Existing guidelines for transfusion of patients undergoing cardiac surgery	Yes – formal, written guidelines that are adhered to strictly	14 (15.6)	11 (17.5)	6 (9.4)	0.741
	Yes – formal, written guidelines that are followed on occasion	31 (34.4)	21 (33.3)	23 (35.9)	
	No formal guidelines	39 (43.3)	28 (44.4)	28 (43.8)	
	Don't know	3 (3.3)	3 (4.8)	5 (7.8)	
	Other	3 (3.3)	0 (0)	2 (3.1)	
Which areas have specific transfusion guidelines for cardiac surgery	Anaesthesia	27 (30)	22 (34.9)	21 (32.8)	0.795
	Cardiac surgical ward	12 (13.3)	4 (6.3)	7 (10.9)	0.395
	Intensive care	50 (55.6)	38 (60.3)	26 (40.6)	0.066
	Perfusion	9 (10)	6 (9.5)	11 (17.2)	0.333
	No areas	27 (30)	16 (25.4)	25 (39.1)	0.238
In your opinion, how often are the guidelines adhered to?	<40% of the time	4 (4.4)	1 (2.1)	3 (7.7)	0.001
	41–60% of the time	21 (23.3)	3 (6.4)	11 (28.2)	
	61–80% of the time	16 (17.8)	14 (29.8)	12 (30.8)	
	>80% of the time	10 (11.1)	15 (31.9)	7 (17.9)	
	No idea	39 (43.3)	14 (29.8)	6 (15.4)	

Results shown are n(%) unless otherwise indicated.

Table 4: General questions in clinician survey.

Question	Responses	Survey 1	Survey 2	Survey 3
Did you participate in the TRICS III Study?	No	11 (12.5)	5 (7.9)	6 (9.8)
	Yes	77 (87.5)	58 (92.1)	55 (90.2)
If yes, since the study finished, have you transfused red blood cells?	More than before	4 (5.2)	3 (4.8)	2 (3.3)
	No change	69 (89.2)	51 (81)	47 (77.1)
	Less than before	4 (5.1)	9 (14.3)	12 (19.7)
What do you think the results of the TRICS III study will show?	No difference	28 (31.8)	-	-
	Restrictive is better	23 (26.1)	-	-
	Liberal is better	11 (12.5)	-	-
	I don't know	26 (29.6)	-	-
Are you aware of the findings of TRICS III?	No	-	10 (15.9)	5 (8.2)
	Yes	-	53 (84.1)	56 (91.8)
Since the TRICS III study results were published has your department changed its guidelines?	No	-	39 (61.9)	36 (59)
	Yes	-	3 (4.8)	4 (6.6)
	N/A (we didn't have guidelines)	-	21(33.3)	21 (34.4)
Do you think we should develop guidelines for RBC transfusion in cardiac surgical patients?	Yes – we should develop New Zealand guidelines	-	43 (68.2)	46 (75.4)
	Yes – but we should wait for international guidelines to be developed and follow those	-	10 (15.9)	6 (9.8)
	No – we don't require guidelines	-	10 (15.9)	9 (14.8)

Discussion

We conducted a national, multi-timepoint prospective observational study and clinician survey of transfusion practice after cardiac surgery to assess the impact of the dissemination of the findings of the TRICS III study.[16]

Our key findings were of a significant change in transfusion practice, with clinicians being more restrictive in their use of RBCs and strong support for the development of guidelines for transfusion practice.

There was a 29% relative increase in the proportion of RBC transfusions compliant with the findings of the TRICS III study. This occurred in theatres, ICUs and the postoperative wards, driven by a significant change in practice in the ICUs, which recorded an increase in compliance of 45%. One reason for this may be that the TRICS III study was run out of the ICUs in four of the five centres: therefore, ICU clinicians may have been more aware and engaged in disseminating and translating the results of the study. Another reason might be that ICUs had the highest reported rates of guidelines for RBC transfusion.

The findings of the TRICS III study appear to have been translated into practice more rapidly than may have been expected. Translating evidence and knowledge into practice is a challenging process due to the complexity of healthcare systems.[18] It has been demonstrated previously that change in healthcare can be slow with reports of it taking up to 17 years.[19] Our study was undertaken 12 months following the dissemination of the TRICS III study results. It would be interesting to undertake the observational study again, perhaps through regular clinical audit, to see if there was a sustained change.

While there was a significant improvement in compliance with the restrictive arm of the TRICS III study, this only reached 56.7% at best. There may be several factors for this, perhaps the most important one being that in the TRICS III study protocol a higher transfusion trigger was allowed in patients who were bleeding. In our study approximately 50% of noncompliant transfusion episodes were attributed to bleeding and, in a further 25%, the reason was unknown. This is consistent with findings of the clinician survey where ongoing active bleeding ranked highest across all three clinical areas as additional consideration for RBC transfusion.

There was some variability in transfusion practice between centres however this is less than previously reported and did not reach significance at T2, which perhaps adds weight to any plan for national transfusion guidelines.

We also found that reasons considered before prescribing an RBC transfusion did not differ across the surveys and relate to previously published work. When asked what additional factors were considered important, clinicians cited age and low body mass index. TRICS IV—a trial of restrictive versus liberal transfusion in younger patients undergoing cardiac surgery—is a large new study attempting to clarify the relationship between patient age and transfusion thresholds (ClinicalTrials.gov Identifier: NCT04754022).[20]

We found that the proportion of clinicians who reported that they would aim for a higher Hb reduced significantly from S1 to S3 which may reflect a change in self-reported practice based on the results of the TRICS III study.

These results also concur with the recommended haemoglobin threshold of 75g/L for cardiac surgery patients reported in the 2018 Patient Blood Management International Consensus.[21]

We undertook both the observational study and the clinician-reported survey to demonstrate both what had actually occurred in practice and what clinicians thought had changed. This adds strength to the study findings and impetus for the development of future practice guidelines.

As with all observational work this study does have several limitations. We did not link individuals across time points for the clinician surveys, so could not assess individual changes in practice but only those at an overall level. We also cannot say whether the findings of this study relate specifically to the trial results or whether other factors may have also influenced over the study periods including background temporal changes in practice. It should also be recognised that this study was undertaken in one country only and therefore may not be generalisable to other healthcare systems and practices. In addition, because all five cardiac surgical hospitals participated in this study, we did not have available control sites that did not participate to compare.

Our study suggests a rapid translation of the results of the TRICS III study into clinical practice in New Zealand. Participation of all five cardiac surgical centres in the study, rapid and targeted presentation of the findings in multi-disciplinary fora, and the use of local guidelines at each hospi-

tal may have contributed to this. It is anticipated that there may be savings to the public hospital system through a more consistent approach to blood transfusion.

In conclusion, following the publication of the findings of the TRICS III trial, clinicians involved in the care of cardiac surgery patients in New Zealand were more restrictive in their administration of red blood cell transfusions than before the trial findings were published. There was strong support for the development of clinical guidelines for transfusion of RBCs.

COMPETING INTERESTS
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AUTHOR INFORMATION
Rachael L Parke, RN PhD: Nurse Senior Research Fellow, Associate Professor, Cardiothoracic and Vascular Intensive Care Unit, Auckland City Hospital, Auckland, New Zealand; Medical Research Institute of New Zealand, Wellington, New Zealand; School of Nursing, University of Auckland, Auckland, New Zealand.
Alana Cavadino, BSc MSc PhD: Biostatistician, School of Population Health, University of Auckland, Auckland, New Zealand.
Shay P McGuinness: Intensive Care Consultant; Cardiothoracic and Vascular Intensive Care Unit, Auckland City Hospital, Auckland, New Zealand; Medical Research Institute of New Zealand, Wellington, New Zealand.

On behalf of the New Zealand TRICS TRIPS Investigators and the Improving Outcomes after Cardiac Surgery Network.

CORRESPONDING AUTHOR
Associate Professor Rachael Parke, Cardiothoracic and Vascular ICU, Auckland City Hospital, Park Road, Grafton, Auckland 1148, New Zealand.
Ph: 006421893176. E: rparke@adhb.govt.nz

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Helicobacter pylori in New Zealand: current diagnostic trends and related costs

Jan Kubovy, Murray L Barclay

ABSTRACT

AIM: To ascertain Helicobacter pylori (Hp) diagnosis trends and cost in a New Zealand cohort.

METHODS: All Hp tests within Canterbury between 2013–2018 were retrospectively reviewed, exclusive of histology. Overall numbers for each test modality, expenditure and test positivity rates were calculated and matched to ethnicity.

RESULTS: Over the six-year period, Hp testing increased 37% and associated cost by 42.6%, compared with population growth of 11.1%. Primary care requested 82% of the non-invasive tests. Despite guidelines recommending against Hp serology, this was the most frequent test and duplicate testing in the same patient was common. Mean annual test positivity rates were: Hp serology 12.3%; Campylobacter-like organism 7.2%; Hp stool antigen test 10.2%; urea breath test 17.5%. The mean across all test modalities was 10.4%. Test proportion per ethnicity was lower in Māori (48.2%) and Pasifika (67.8%), compared with Europeans (82.7%). This was in contrast with significantly higher test positivity rates (Māori 21.2%, Pasifika 37.8%) compared with Europeans 8.4%.

CONCLUSION: Hp testing and related costs increase is disproportionate to population growth. At risk ethnicities are under-represented in the tested cohort despite higher test positivity rates. Primary care-focussed intervention could lead to reduced cost and improved equity in Hp diagnosis.

Helicobacter pylori (Hp) related chronic gastritis is a common infection with varied prevalence rates throughout the world.[1] Ethnicity, country of birth and socio-economic status are the most important risk factors. Although often asymptomatic, Hp has a number of well-known clinical associations including dyspepsia, peptic ulcer disease and gastric cancer; all leading to disability, hospitalisation and loss of life with resultant significant healthcare burden.[2] Most of these outcomes are preventable by timely diagnosis and successful eradication.[3] Although there are a number of different diagnostic tests available, any such test is limited by its performance within clinical context, its accessibility and cost. The New Zealand population is ethnically and geographically diverse and constantly evolving due to rising immigration.[4] Consequently, up-to-date Hp-related data is sparse. Healthcare in New Zealand is provided by district health boards (DHB) on a regional level, with most DHBs offering their own Hp diagnostic pathways.[5,6] Little is known about the diagnostic trends and expenses in the DHBs. With this in mind, we looked at New Zealand regional data covering a population of roughly 550,000.

Methods

We have retrospectively reviewed all Hp test results within the Canterbury District Health Board (CDHB) catchment area over six consecutive years between 2013–2018. The tests included Hp serology, rapid urease test known as Campylobacter-like organism test (CLO), Hp stool antigen test (SAT), urea breath test (UBT) and Hp culture and antibiotic sensitivity (Hp C&S). Histology-based results were excluded. The only demographic data collected was ethnicity as stated on the patient's electronic record. The data was obtained with the help of the Canterbury Initiative Division of CDHB and covered all test requests from a location within CDHB boundaries. This included both the public and private sectors. Duplicate tests per single patient (defined as any additional test by the same modality linked to the same unique National Health Index identifier) were identified and only the historically first test per patient was included in test positivity rate calculations. Similarly, all equivocal test results were discounted in these test positivity rate calculations. This study received local ethical approval (CDHB Locality Authorisation) and was deemed out of scope for ethical approval by the Health and Disability Ethics Committee.

Results

A steady annual increase in overall numbers of tests carried out was recorded (Figure 1).

This was mirrored by increasing expenditure approaching $250,000 NZD per year in 2018 (Figure 2). The cost per test at the time, as advised by Canterbury Health Laboratories (in NZD and excluding goods and service tax (GST)), was: Hp serology $32.29; CLO $16.82; SAT $77.29; UBT $84.60; Hp C&S $59.25. These prices remained unchanged throughout this period. The CLO price is obviously exclusive of any gastroscopy related costs. As with other DHBs within New Zealand, in CDHB there is direct access to gastroscopy for symptomatic patients aged 55 years, or 45 years in at-risk ethnicities (i.e., without the need for prior-specialist review). We found these two subgroups to be proportionately representative of the total CLO test cohorts at 53.5% and 12.1% respectively.

The following overall test volumes were recorded during the entire study period: Hp serology 17,291; CLO 10,070; SAT 8,331; UBT 322. Hp C&S was performed in only four cases during this time, rendering this test cohort inappropriate for further analysis. A total of 2,724 duplicate tests (50% of which was Hp serology) were identified and discounted from test positivity rate calculations. In addition, a total of 440 equivocal results (mostly Hp serology) were also excluded.

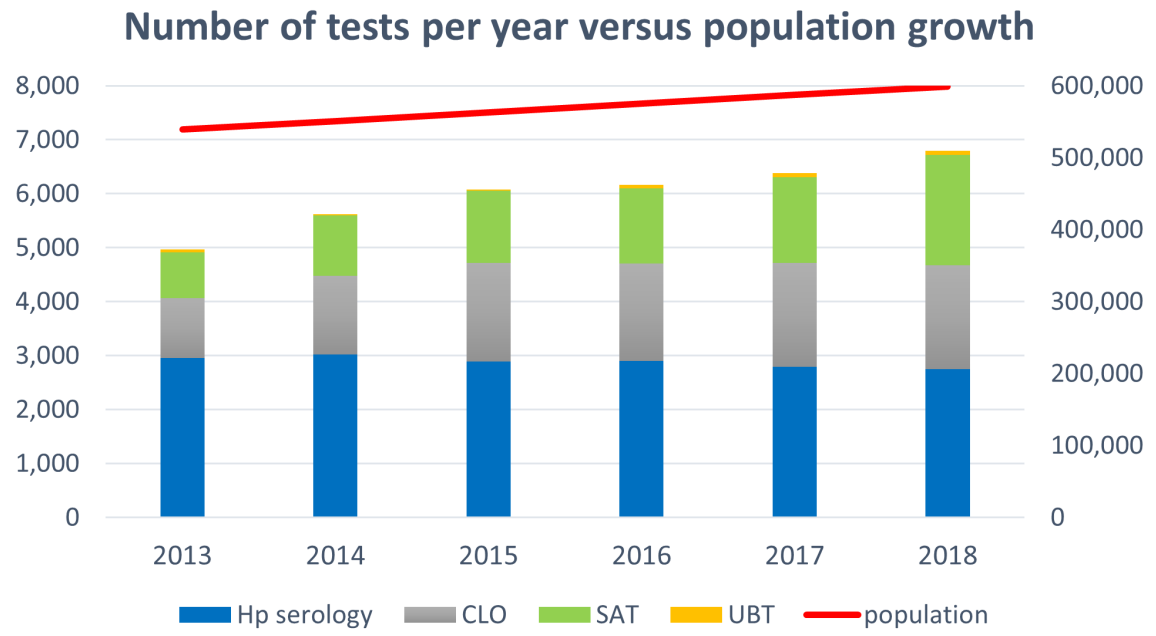
One hundred percent of SAT and roughly 75% of Hp serology tests were requested in primary care. The test utilisation by ethnicity is displayed in Table 1.

Relevant demographic data from official Canterbury censuses in 2013 and 2018 are provided for comparison in Table 2.[4]

Annual Hp test results are displayed in Figure 3. The test positivity rates appeared static overall during this period, however, the UBT cohort is too small to provide a reliable trend. Mean annual positive test rates over 2013–2018 period were: Hp serology 12.3%; CLO 7.2%; SAT 10.2%; UBT 17.5%. The compound mean annual test positivity across all test modalities was 10.4%, bearing in mind that an unknown number of patients could have been cross-tested with different test modalities that we couldn't account for. A detailed breakdown by ethnicity is provided in Table 1.

Although we have no information regarding the actual indication to test, a vast majority was likely undertaken in symptomatic patients. We stress that this is not a cross-sectional population sample and that Hp infection is commonly asymptomatic.[3] As such, the data only show Hp positivity in the tested cohort, but do not show population prevalence.

Figure 1: Annual number of tests undertaken in CDHB.



(Left Y-axis indicates number of tests; right Y-axis indicates population count)

Figure 2: Annual expenditure per test in NZD (excl. GST).

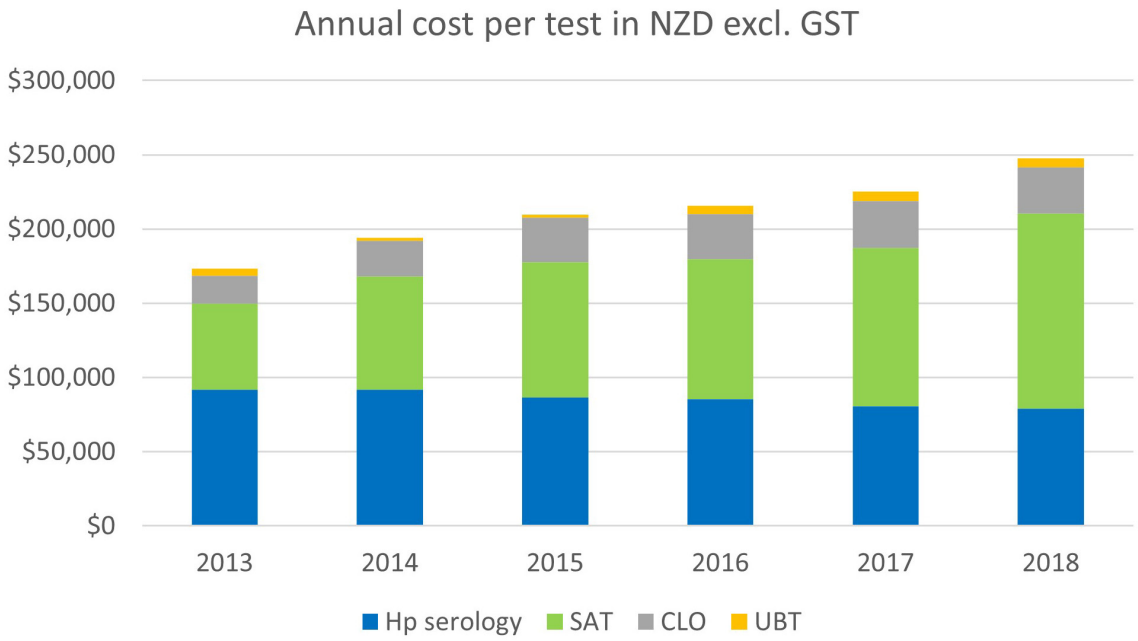


Table 1: Hp positivity rates and test utilisation in different ethnic groups. See Table 2 with the changing Canterbury ethnicity profile for comparison.

	Number of tests (n)	Test proportion (%)	Population proportion (%)	Mean test positivity (%)
Hp serology				
NZ European	12,022	75.4	84.6	8.4
Māori	713	4.4	8.7	21.2
Pasifika peoples	304	1.9	2.8	37.8
Asian	1,422	8.9	9.0	28.4
MELAA*	289	1.8	1.0	48.2
Other ethnicity	1,184	7.3	1.7	13.3
CLO				
NZ European	8,003	80.9	84.6	5.2
Māori	454	5.5	8.7	17.1
Pasifika peoples	161	1.6	2.8	35.4
Asian	634	6.4	9.0	17.9
MELAA*	128	1.2	1.0	21.0
Other ethnicity	420	4.3	1.7	3.5

Table 1 (continued): Hp positivity rates and test utilisation in different ethnic groups. See Table 2 with the changing Canterbury ethnicity profile for comparison.

	Number of tests (n)	Test proportion (%)	Population proportion (%)	Mean test positivity (%)
SAT				
NZ European	4,669	65.2	84.6	5.1
Māori	244	3.4	8.7	13.1
Pasifika peoples	122	1.7	2.8	28.6
Asian	1,366	19.0	9.0	22.9
MELAA*	235	3.2	1.0	24.6
Other ethnicity	525	7.2	1.7	10.8
UBT				
NZ European	182	59.0	84.6	8.2
Māori	11	3.5	8.7	27.2
Pasifika peoples	8	2.5	2.8	62.5
Asian	61	19.8	9.0	22.9
MELAA*	17	5.5	1.0	58.8
Other ethnicity	29	9.3	1.7	24.1

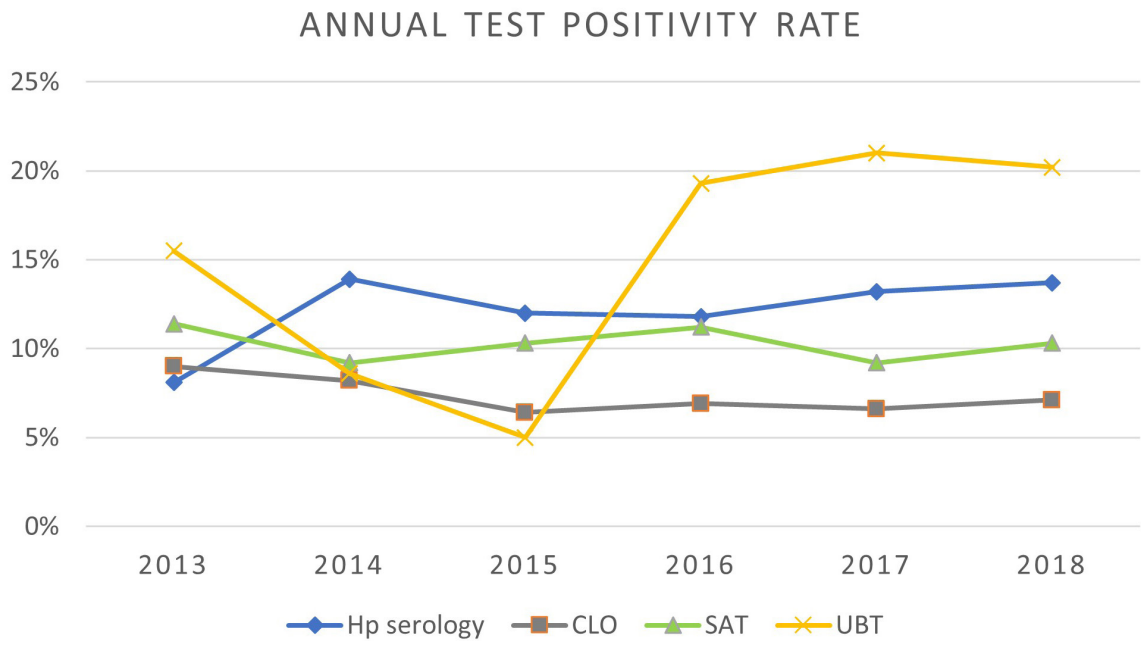
*Middle Eastern/Latin American/African

Table 2: Ethnic groups data as per official Canterbury region census along with calculated mean (from 2013 and 2018).

	2013 (%)	2018 (%)	Mean (%)
NZ European	86.9	82.4	84.6
Māori	8.1	9.4	8.7
Pasifika peoples	2.5	3.2	2.8
Asian	6.9	11.1	9.0
MELAA*	0.8	1.2	1.0
Other ethnicity	2.0	1.4	1.7

*Middle Eastern/Latin American/African

Figure 3: Annual incidence per test in tested population.



Discussion

This is the largest Hp test cohort published in New Zealand to date and the first study that directly addresses diagnostic costs. As this is only a regional study, we cannot assume similar trends and expenditure elsewhere in New Zealand. However, it is quite plausible that other DHBs would have comparable data, except perhaps for differing test positivity rates according to regional ethnicity profiles.

The progressive increase in testing and related expense isn't surprising and mirrors current trends in healthcare in New Zealand. Nevertheless, the costs incurred are significant (Figure 2). Should the diagnostic practices be similar in the rest of New Zealand with a population of 5 million, the projected annual nationwide cost (as of 2018) would sit at around 2.5 million NZD. If we were to include histology from gastric biopsy (local price is $94.14 NZD), the annual cost might see further significant increase. Once again, this excludes the major cost of gastroscopy. Also notable is the discrepancy between population growth and number of tests performed. The Canterbury population has increased by 11.1% during this period. In contrast, overall Hp test numbers rose by 37% and Hp test expenditure by 42.6%. This small difference between test numbers and cost is explained by increasing use of SATs, which are more expensive.

In terms of general trends, both SAT and CLO utilisation is increasing. The rise in SAT likely relates to improved diagnostic pathway awareness, while the increasing CLO use could be in part due to a relative ease of access to gastroscopy. UBT, considered a gold standard, seems a more marginalised test now, likely owing to its relative complexity and difficult access. The essentially absent data on Hp antibiotic sensitivity/resistance is certainly troubling with potential negative implications for eradication treatment outcomes. There also continues to be a high usage of Hp serology despite the existing guidelines advising against this.[5–7] These guidelines suggest that such testing in a country with a low overall Hp prevalence (such as New Zealand) is best left for population-based research rather than for a diagnosis with intent to treat given its poor sensitivity and specificity in such setting.[1,3] In addition, the repetition of Hp serology testing in the same patient serves little purpose beyond increasing the overall costs and this was certainly a common occurrence in our cohort.

All of the non-serology based tests, including SAT, CLO and UBT (and histology) rely on the presence of thriving Hp bacteria. The frequent use of proton pump inhibitors (PPIs) and antibiotics contributes to temporary suppression of Hp growth

and thus significantly increases the rate of false negative test results.[8–14] In our experience, this well established phenomenon is often not accounted for in clinical practice, although we acknowledge this study offers no data to support this observation. Nevertheless, better awareness of these principles, especially in the realm of primary care, should lead to improved diagnosis (especially of the at-risk cohorts) and possibly to reduced costs related to better test utilisation.

In contrast to this potentially inappropriate overuse of tests, we found disproportionately low numbers of tests in at-risk ethnic minorities. For instance, Māori were significantly underrepresented in all test modalities (Tables 1 and 2). This may well be yet another indicator of healthcare inequity in New Zealand. For illustration, the following compares the proportion of Hp tests in certain ethnicities in relation to the Canterbury Census; only 48.2% Māori and 67.8% Pasifika were tested for Hp compared with 82.7% of NZ Europeans. This is contrasted by significantly higher test positivity rates in these groups (Māori 21.2%, Pasifika 37.8%) compared with 8.4% in NZ Europeans. However, a particular test modality preference as opposed to test access could be a co-factor in certain cultures. A case in point might be the SAT cohort. We found this test to be significantly over-represented in our Asian subgroup (Table 1).

Data on Hp prevalence in New Zealand is patchy and varied.[15–21] Nonetheless, the overall Hp prevalence in this country is considered low by global standards (below 30%).[1] From the little information available, the South Island population seems to have a lower Hp prevalence than the North Island, likely owing to its differing ethnic make-up with a higher proportion of NZ Europeans.[4] A 1996 study from Canterbury found a Hp seroprevalence of 24% in this randomly selected population sample.[21] Approximately 20 years later, Hp seroprevalence in our tested cohort was 12.3%. As our cohort mostly consists of symptomatic patients, the true population seroprevalence in Canterbury may possibly be even lower. This trend is supported by other studies noting an overall decrease in seroprevalence in younger New Zealand birth cohorts.[19,22]

We found a surprisingly low test positivity in our CLO test cohort (7.2%). The explanation could lie in a combination of: poor test sensitivity in the presence of concurrent PPI use; relatively high numbers of NZ Europeans who underwent gastroscopy (>80%); opportunistic CLO testing at gastroscopy in the absence of relevant symptoms or findings; and, perhaps, a liberal access to gastroscopy with current referral guidelines anecdotally leading to a high number of gastroscopies with normal findings. Conversely, our UBT cohort had a relatively high positive test rate. However, this subgroup is more likely to represent either treatment failures or highly selected cases with resultant higher pre-test probability.

Our study drawbacks include lack of data on treatment and its outcomes as the local ethics approval specifically denied us access to this primary care-based information. In addition, no data exists on timing-dependent tests (UBT, SAT and CLO) in relation to PPI and/or antibiotic treatment. In other words, the rate of false negative test results is unknown, yet possibly significant. We haven't examined histology from gastric biopsies that could provide additional data, however, even this test can be falsely negative in the presence of PPIs and/or antibiotics. Lastly, and perhaps most importantly, this study does not report a true population prevalence given the nature of our cohort.

In conclusion, Hp testing and related expenditure is increasing and is disproportionate to the population growth. At-risk ethnicities are underrepresented in the tested cohorts despite the significantly higher test positivity rates in these groups. A primary care-oriented focus on improved adherence to diagnostic guidelines along with emphasis on testing at-risk minorities could address both issues. This could bring both a cost reduction in Hp testing and possibly lead to improved health outcomes of those most at risk of Hp infection.

COMPETING INTERESTS
Nil.

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Nikki Elliot, Canterbury Initiative Clinical Analyst.

AUTHOR INFORMATION
Jan Kubovy: Consultant Gastroenterologist, Department of Gastroenterology, Christchurch Hospital, Christchurch, New Zealand.
Murray L Barclay: Consultant Gastroenterologist and Clinical Pharmacologist, Departments of Gastroenterology and Clinical Pharmacology, Christchurch Hospital, and Clinical Professor, University of Otago, Christchurch, New Zealand.

CORRESPONDING AUTHOR
Jan Kubovy: Department of Gastroenterology, Level 2, Riverside, Christchurch Hospital, Riccarton Avenue, Christchurch, 8011, New Zealand.
E: jan.kubovy@cdhb.health.nz

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Seeking of help and support after experiencing sexual harm: considerations for cisgender women, cisgender men and gender-diverse people

Tess Patterson, Linda Hobbs, Gareth J Treharne, Melanie Beres

ABSTRACT

AIMS: This study examines the help-seeking behaviours of cisgender women, cisgender men and gender-diverse university students who have experienced sexual harm.

METHODS: We examine an existing data set from a cross-sectional survey of experiences of sexual harm among university students. Bivariate analyses were used to analyse the type of sexual harm experienced and subsequent help-seeking behaviours.

RESULTS: Although more cisgender women reported experiencing sexual harm, data from this survey demonstrates cisgender men and gender-diverse persons also report experiencing sexual harm. Of those who reported having experienced sexual harm, only a small proportion (27%) reported having told someone about their experience. People who told, most often told family or friends. Additionally, a small proportion of cisgender women told specialised sexual violence services or other services. Cisgender men were less likely to tell someone about their experience compared to cisgender women.

CONCLUSIONS: Sexual harm affects students of all genders on campus but there may be differential help-seeking behaviours depending on gender. Cisgender men and gender-diverse persons may be less likely to reach out to formal service providers. Support services need to consider how to accommodate the support needs of all survivors, including cisgender men and gender-diverse persons.

There is a recognised gap, both within the research literature and clinical settings, regarding provision of specialised support and treatment for male and gender-diverse (including all gender identities outside the gender binary male/female) survivors of sexual harm (including any type of forced or coerced sexual contact, assault, harassment or behaviour that happens without consent).[1,2] Specialised treatment and support interventions to date have been developed and tested in relation to meeting the needs of females.[3] More recently, agencies and clinicians consider, and provide, survivor-centred, trauma-informed, specialised care for male or gender-diverse survivors. In provision of such care, there are unique gender-related factors that indicate that support and treatment for survivors of sexual harm need to be gender specific.[4,5] For example, cultural constructions of masculinity and males' internalised masculine norms alter the adverse effects of sexual harm for male survivors and produce a barrier to male survivors seeking support.[6,7] Furthermore, the predominant traditional dichotomy of gender as either male or female has meant that the support and treatment needs of gender-diverse survivors has gone largely unexamined and need to be considered in the provision of specialist services.[8] Given that gender-diverse persons are over-represented in sexual harm statistics[9,10] it is important to examine the specific support and treatment needs that they present with.

Provision of gender-sensitive services for those who experience sexual harm is one key element for reducing harm in the aftermath of sexual assault, however, also important to consider is whether persons experiencing sexual harm seek help from such services. Of interest, are there gender-based differences in help-seeking behaviours? Although the help-seeking behaviours of survivors of sexual harm have been investigated by several researchers, these studies have generally not considered help-seeking through a gendered lens. Studies that included only female survivors or that did not distinguish findings by gender show survivors of sexual crime and interpersonal violence (including sexual assault and intimate partner violence) often choose not to seek help.[1,11–13] Evidence also suggests that university-aged students may be less likely to seek help than young people not at university or the general population;[12–14] and survivors

may be more likely to disclose to informal supports such as family and friends than more formal supports such as the police or mental health services.[12]

More recently, a small number of studies have examined help-seeking behaviours of gender-diverse persons related to having experienced physical or sexual harm. Research conducted examining intimate partner violence (domestic violence and abuse) indicates that gender-diverse persons tend to seek support from more informal sources rather than formal supports.[15,16] Research conducted examining experience of sexual harm indicates that male survivors are less likely than female survivors to seek help.[17–20] Overall, there is a paucity of research examining the similarities or difference in help-seeking behaviours of gender-diverse survivors compared to female and male survivors. It has been documented that male and gender-diverse persons who have experienced sexual harm may encounter distinct and unique access barriers to support services.[1,19,21] Furthermore, in New Zealand, Hare[21] reports LGBTQI survivors of sexual harm rarely seek help or justice.

A lack of professional help sought is concerning given the potential for long-term negative consequences, mental, physical and emotional, of sexual harm.[22-24] It is known that long-term negative consequences can be mitigated by seeking help.[25,26] Marginalised and potentially underserved groups have diverse support needs that, if not met, may compound the consequences of sexual harm.[1] Additionally, there is also risk of negative reactions to support seeking if services are not equipped to serve survivors with a diverse range of gender identities; negative reactions may impede well-being or result in secondary victimisation.[27,28] In order to provide equitable, effective and accessible help for survivors of sexual harm, a better understanding of help-seeking behaviours, taken through a gendered lens, is required.

This study reports from a cross-sectional survey of experiences of sexual harm among students at a large campus of a university in New Zealand and takes a gendered focus. We examine an existing data set drawn from the 2019 Campus Climate Survey[11] to better understand how cisgender (a person whose gender identity is the same as their sex assigned at birth) women, cisgender men and gender-diverse persons who report experience of sexual harm differ (or not) in terms of their experience of sexual harm and their help-seeking behaviours. Findings from this project will inform New Zealand specialist sexual violence support agencies and all health professionals, as well as providing strategic direction for future research. Based on past research reviewed above, it was hypothesised that there would be gender difference in experiences of sexual harm and help-seeking among university students, with cisgender women and gender-diverse persons more likely to experience sexual harm than cisgender men, and cisgender women more likely to seek help after experiencing sexual harm than cisgender men and gender-diverse persons.

Method

Measures

The Campus Climate Survey[11] was developed from the Administrator-Researcher Campus Climate Consortium (ARC3) survey tool and was piloted to confirm the ARC3 was culturally appropriate for use in New Zealand. Participants were asked a range of questions about their perceptions of campus climate regarding misconduct; and experience of harms such as stalking victimisation; cyberbullying; dating and flatting violence. Results and analysis presented here are from the ARC3 Sexual Assault Victimisation module of the survey. In this module of the survey students were asked specifically about sexual harm experiences, including sexual harassment by faculty staff or student, attempted sexual contact without consent, "attempted sexual assault" and sexual contact without consent (with or without oral, anal or vaginal penetration) and "sexual assault" by any person (i.e., not limited to staff or student perpetrator). Participants were asked to report sexual harm experienced since enrolment at the university, that took place on or off campus, and either during semester or a university holiday break. Participants who reported experiencing some sort of sexual harm were then also asked "Did you tell anyone about the incident before this questionnaire?" and "Who did you tell?" Telling someone about the incident was considered help-seeking behaviour. The survey was distributed via email to all (approximately 20,000) university students studying, in person, at the main campus of one of the universities in New Zealand during 2019 (see Beres and colleagues for full methodology[11]).

Participants

A total sample of 1,540 (7.7%) valid survey respondents was recorded. For the purpose of this analysis participants who reported sexual harm (n=425, 28%) are included here for analysis. Sexual harm included sexual harassment by faculty staff

or student, threatened or attempted sexual assault and sexual assault without consent by any person. The final sample of 425 participants who reported experience of sexual harm identified themselves as cisgender women (*n*=324; 76.2% of those experiencing sexual harm), cisgender men (*n*=97; 22.8%) or gender-diverse persons (*n*=4; 1.0%). Participants ranged in age from 18 to 72 years (*M*=22.03 years; *SD*=6.40; 83% of the sample were between 18 and 23 years). Participants identified as New Zealand European/Pākehā descent (*n*=306; 72.0%); Māori descent (*n*=45; 10.6%); Pacific Island descent (*n*=11; 2.6%); Asian descent (*n*=43; 10.1%); and other ethnicities (*n*=19; 4.5%). Participants were able to select multiple ethnic identities therefore totals for each ethnic group may exceed 100%.

Results

Type of sexual harm experience

A series of 3 (gender: cisgender women, cisgender men, gender-diverse people) x 2 (experience: yes, no) for each type of sexual harm experience (i) sexual harassment by staff, (ii) sexual harassment by student, (iii) attempted sexual assault, (iv) sexual assault without penetration, (v) sexual assault including penetration (oral, vaginal or anal penetration), Chi-squared analysis showed significant gender differences in experience of attempted sexual assault ($\chi^2(2, N=425)=7.82$; $p=0.02$; $C_v=0.02$), and experience of sexual assault without penetration ($\chi^2(2, N=425)=12.38$; $p<0.00$; $C_v<0.00$). For experience of attempted sexual assault post hoc analysis (calculation of *z*-scores and *p*-values with Bonferroni correction for type-1 error), showed no significant difference in the proportion of cisgender women (14%) and gender-diverse people (25%; Bonferroni corrected $p=0.008$) who experienced sexual assault and no significant difference in the proportion of cisgender men (4%) and gender-diverse persons (25%; Bonferroni corrected $p=0.008$) who experienced attempted sexual assault. However, a significantly greater proportion of cisgender women (14%) experienced attempted sexual assault compared to cisgender men (4%; Bonferroni corrected $p=0.008$). Similarly, for experience of sexual assault without penetration *post hoc* analysis showed no significant difference in the proportion of cisgender women (26%) and gender-diverse persons (25%; Bonferroni corrected $p=0.008$) who experienced sexual assault without penetration and no significant difference in the proportion of cisgender men (9%) and gender-diverse persons (25%; Bonferroni corrected $p=0.008$) who experienced sexual assault without penetration. However, a significantly greater proportion of cisgender women (26%) experienced sexual assault without penetration compared to cisgender men (9%; Bonferroni corrected $p=0.008$). Note, results need to be considered in light of the small number of gender-diverse survivors in the sample and the limitations that this places on the conclusions that can ultimately be drawn (see also Discussion).

There was no significant relationship found between gender and sexual harm experience for experiences of sexual harassment by staff, sexual harassment by student or sexual assault, nor for sexual assault including penetration.

Did respondents tell someone about their experience of sexual harm?

A 3 (gender: cisgender women, cisgender men, gender-diverse persons) x 2 (told someone: told, not told) Chi-squared analysis showed a significant relationship between gender and whether the survivor told someone about the sexual harm or not ($\chi^2(2, N=425)=10.22$, $p<0.01$; $C_v=0.16$). Post hoc analysis (conducted as described above) showed no significant difference in the proportion of cisgender women (31%) and gender-diverse persons (25%; Bonferroni corrected $p=0.008$) who told someone about the sexual harm and no significant difference in the proportion of cisgender men (14.4%) and gender-diverse persons (25%; Bonferroni corrected $p=0.008$) who told someone about the sexual harm. However, significantly fewer cisgender men told someone about the sexual harm (14.4%) compared to cisgender women (31%; Bonferroni corrected $p=0.008$; Table 1). Furthermore, odds ratio calculations showed that cisgender men were 2.65 times more likely to not tell someone about the sexual harm compared to cisgender women (odds ratio=2.65; $CI_{0.95}=1.43; 4.88$). Again, we note the low number of gender-diverse survivors in this sample which limits conclusions drawn in relation to the gender-diverse group. Replication of this comparison with a larger gender-diverse group is necessary.

Who did respondents tell about their experienced sexual harm?

For those who reported telling someone about their sexual harm (*n*=115), a 3 (gender: cisgender women, cisgender men, gender-diverse persons) x 4 (who told: Family/friends, sexual victimisation specialist services, medical and mental health services, other services) Chi-squared analysis showed no significant relationship between gender and who the participant reported telling someone about

Table 1: Did respondents tell someone (or not) about their experience of sexual harm by cisgender women, cisgender men and gender-diverse persons.

	Cisgender women	Cisgender men	Gender-diverse persons[1]	Total
Told someone	100 (31%)[a]	14 (14.4%)[b]	1[a,b]	115 (27.1%)
Did not tell	224 (69%)	83 (85.6%)	3	310 (72.9%)
Total	324	97	4	425

[1] Percents are not reported here due to low number (*n*=4) of gender-diverse persons.
[X] Each subscript letter denotes a subset of gender whose column proportions do not differ significantly from each other.

Table 2: When respondents told someone about their experience of sexual harm – who did they tell?

	Cisgender women (*n*=100)	Cisgender men (*n*=14)	Gender-diverse persons (*n*=1)	Total (*n*=115)
Family/friend	100 (100%)	14 (100%)	1 (100%)	115 (100%)
Sexual victimisation specialist services	1 (1%)	0	0	1 (0.9%)
Medical and mental health services	11 (11%)	0	0	11 (9.5%)
Other services	8 (8%)	0	0	8 (7%)

Will added to >100% as some told more than one category.

their sexual harm. Irrespective of gender identity, all respondents who had told someone that they had experienced sexual harm had told friends or family. Some (20% of respondents), in addition to telling friends or family also reported having told persons at specialist services or other professional or help services about the sexual harm. Of those who did tell services about their experience of sexual harm, all were cisgender women, and no cisgender men or gender-diverse persons reported their experiences of sexual harm to services (see Table 2).

Discussion

Contrary to the traditional and often-persistent schema that sexual harm is limited to female victims at the hands of male perpetrators, our research demonstrates that cisgender men and gender-diverse students are also experiencing sexual harm of all types. This finding emphasises the need for sexual harm research, interventions and supports to be directed at and to consider the needs of a broader range of persons who present across a range diverse genders. Recognising that cisgender men and gender-diverse persons also experience sexual harm legitimises and makes transparent their experiences as sexual harm.[29] Understanding and raising awareness that sexual harm is not solely a cisgender women issue enables survivors of all genders to interpret and report their sexual experience as harmful, which in turn may increase the likelihood of reaching out for support and treatment. Legitimising sexual harm as experienced by cisgender men and gender-diverse persons may also help make services more responsive to specific gender needs and recognise the need to routinely ask about sexual harm across gender.

The present study was primarily directed at examining the help-seeking behaviour of cisgender women, cisgender men and gender-diverse university students. Telling someone about the experience was considered as a proxy of help-seeking behaviour in terms of seeking support from others. Similar to previous research, in our study

only a small number of respondents who experienced sexual harm told someone about that experience.[1,12,13,20] Also in keeping with previous research (see Sabina and Ho[12] for a review), in our study those who did tell someone told informal supports such as family or friends, with only a small number of the total cisgender women participants (6.2%) additionally disclosing to more formal supports such as specialist and medical services. In Sabina and Ho's[12] review of 45 empirical studies they report that disclosure to informal supports such as friends and family is much more frequent than disclosure to formal supports, with rates of between 41% and 100% disclosure to informal supports. Disclosure rates to formal supports (e.g., police and campus authorities) ranged from 0% to 16%. Sabina and Ho[12] considered that the lower rates of disclosure reported in some of the reviewed empirical studies may be explained by the inclusion of men who are less likely to disclose abuse. In our study, cisgender men (14%) were less likely to tell someone about their experience compared to cisgender women (31%). Similarly, Banyard and colleagues[18] also report that male university students in the US were less likely to disclose (67%) than female students (85%). The difference in rates of disclosure between this study and US research are likely to reflect different ways of asking about help-seeking and recruiting participants. In this study, few gender-diverse persons who had experienced sexual harm had told someone, however, caution should be taken in interpreting findings for the gender-diverse group given the small number of gender-diverse respondents. Further research with a bigger sample size of gender-diverse survivors is needed to understand the support needs of these students who have experienced sexual harm.

Generally, non or delayed disclosure of sexual harm is not uncommon and has been previously linked to feelings of shame; doubt around how the disclosure may be handled and concerns about secondary victimisation.[11,27,28] Cisgender men may also downplay the severity of the sexual harm resulting in lower rates of reporting.[12,18,30]

The findings of the present study need to be considered in light of its limitations. This survey study includes a self-selected sample of university students from one city but had a similar response rate to international research.[11] The sample also includes only a small number of gender-diverse persons. Additional research is therefore needed with a larger sample size of gender-diverse persons to draw firm conclusions about the rates and type of help-seeking behaviours for this group. The results reported here, though, do provide important preliminary statistics and information that are relevant to the provision of sexual harm support services within New Zealand. Specifically, that support services need to consider how to best support and accommodate clients from a range of gender identity groups. In particular, they need to consider marketing or advertising their services in a gender-inclusive way so that it represents the full range of persons who may seek help in relation to sexual harm. Given that disclosure rates are low, and typically lower for cisgender males, health professionals should routinely ask about experiences of sexual harm irrespective of gender identity. Additionally, as the vast majority of those who did tell someone about their experience reported telling family or friends, this identifies a unique opportunity for family and friends to provide a supportive response and assist the survivor to identify supports available and the benefits of such support. In this way, consideration not only needs to be given as to how to support survivors directly but how to support and inform the potential supporters of survivors in our community.

Although the present study shed some light on help-seeking behaviour for persons who have experienced sexual harm, further qualitative research is needed to consider the reasons why those who have experienced sexual harm did not tell someone about their experience or seek help from formal support services.[18] Qualitative research could also explore enablers and barriers to seeking help from specialist services. This would inform both specialised sexual harm and more general support services in the development of services tailored to meet the needs of a wide spectrum of gender identities including cisgender women, cisgender men and gender-diverse persons.

In conclusion, New Zealand health professionals and specialist sexual violence support agencies need to examine accessibility for cisgender men and gender-diverse persons as these populations are experiencing sexual harm alongside cisgender women. Policy makers and specialist sexual violence service providers need to adapt a more holistic approach to accommodate the support needs of people who experience sexual harm and consider accessibility for a diverse range of gender identities. Future research needs to examine the reasons why students and others who experience sexual harm are not reaching out to more formal service providers.

COMPETING INTERESTS
Nil.

AUTHOR INFORMATION
Tess Patterson: Department of Psychological Medicine, University of Otago, New Zealand; Optentia Research Focus Area, North-West University, Potchefstroom, South Africa.
Linda Hobbs: Department of Psychological Medicine, University of Otago, New Zealand.
Gareth J Treharne: Department of Psychology, University of Otago, New Zealand.
Melanie Beres: Department of Sociology, Gender Studies and Criminology, University of Otago, New Zealand; Te Whare Tāwharau, Sexual Violence Support and Prevention Centre, University of Otago, New Zealand.

CORRESPONDING AUTHOR
Dr Tess Patterson: Department of Psychological Medicine, University of Otago, PO Box 56, Dunedin, 9054, New Zealand. E: tess.patterson@otago.ac.nz

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Teleclinics for the management of diabetes in pregnancy during COVID-19—maternal satisfaction and pregnancy outcomes

Asha Shashikumar, Karaponi Okesene-Gafa, Te Hao Apaapa-Timu, Jessica Wilson, Charlotte Oyston

ABSTRACT

AIMS: Diabetes in pregnancy (DiP) rates are increasing worldwide. Pasifika, Indian and Māori peoples have high rates of DiP any improvements in clinical care may be beneficial for these populations. During COVID-19 lockdowns, the DiP service in Counties Manukau Health (CMH) South Auckland switched from face-to-face appointments to teleclinics. This study aims to: determine satisfaction of pregnant people with teleclinics for DiP; compare clinical outcomes and attendance for those receiving care through teleclinics versus standard care; and compare rates of clinic attendance between face-to-face and teleclinic appointments.

METHODS: A standardised questionnaire was completed by those who had attended a teleclinic. The primary outcome was a high score (4–5/5) for satisfaction and future use. A separate, retrospective study of clinical outcomes, and the number of appointments scheduled/attended were compared between all DiP patients who were scheduled an appointment during lockdown, and all of those who were scheduled appointments the year prior.

RESULTS: Of the thirty-five participants who completed the survey (response rate 37%), 89% scored the clinic highly for satisfaction and future use. There were 179 patients scheduled to clinic during the period where teleclinics were the default model of care, and 187 patients scheduled to clinic the year prior. No differences in clinical outcomes were observed. Those receiving care during lockdown were offered more appointments, although attendance rates did not differ.

CONCLUSION: Teleclinics for DiP are acceptable to the people we surveyed, but should be developed further so they better support the needs of those using them.

Diabetes in pregnancy (DiP) describes both gestational (GDM; glucose intolerance first recognised in pregnancy), or pre-existing (type I or II) diabetes. There is a dose-dependent relationship between blood glucose levels and adverse pregnancy outcomes.[1] Accessing timely treatment to normalise blood glucose levels reduces harm to both mothers and babies.[2–5]

There are increasing rates of DiP internationally.[6] Within our own service, between 2006 and 2019, rates of GDM have increased from 2.7% to 12.4% of deliveries. With limited resources, there is increasing need to provide efficient, cost-effective care. Telehealth (the use of mobile phones, Bluetooth, web-based systems, email or apps) may provide a way of increasing the capacity of the existing workforce. In CMH South Auckland, telephone clinics were instituted as the default model of DiP care during COVID-19 Level 4 lockdowns.

Evidence suggests telehealth may produce clinical outcomes that are as good as standard care for DiP, however many studies use platforms for contact and remote monitoring that are not available in Aotearoa. Furthermore, most studies have been performed in East Asia, where different physical and social barriers to accessing antenatal care exist.[7] DiP disproportionately affects Māori, Pasifika, and Indian ethnicities who also experience high rates of adverse pregnancy outcomes. While research suggests that telehealth may reduce access barriers to care for those with less access to the social determinants of health, there is also a concern that widespread telehealth implementation may increase health disparities due to the lack of in-person interaction, a valued interface for some patients.[8] There are also technical barriers such as lack of access to internet connection or device unavailability.[8]

We leveraged the situation created by the emergency implementation of teleclinics to provide DiP care during the COVID-19 pandemic to assess the perception of usefulness of teleclinics and the potential impact on pregnancy outcomes and attendance.

Aims

The specific aims of the study were to:

1. Assess consumer's perception of the usefulness, interaction quality and satisfaction with the DiP teleclinics between 25 March to 27 April 2020.
2. Compare the incidence of

    - pre-identified core clinical outcomes[9] relating to DiP, and
    - attendance rates amongst those who received care in the period where teleclinics were provided, compared to a year earlier.

Additionally, we planned to describe outcomes for people of all ethnicities, as well as by ethnicity for Māori, Pasifika, non-Māori and non-Pasifika.

Methods

Ethical approval was obtained from the Health and Disability Commission Ethics Committee (20/NTB/122/AM02). Locality approval was obtained, and the study registered with the CMH research office (1246).

Description of usual care vs teleclinics during COVID-19 lockdown

Screening and diagnosis for GDM is as per the Aotearoa Ministry of Health Guidelines.[10] Individuals with DiP are referred to a multidisciplinary team (MDT) clinic where care is provided by dieticians, endocrinologists, midwives and obstetricians. DiP clinic visits are scheduled at least every 4 weeks. Fetal growth scans are requested at 28 and 36 weeks' gestation, with additional scans for obstetric indications. Between visits, ongoing support is provided by specialised diabetes midwives who adjust glycemic medications in consultation with the endocrinologist. Most people under the care of the DiP clinic also continue their routine antenatal visits with their lead maternity carer.

Between 24 March 2020 to 27 April 2020, phone call consultations (teleclinics) became the default model of care, unless the person had type I diabetes, or additional comorbidities necessitating in-person assessment. Patients were asked to send testing records by email or text message prior to the appointment. Ultrasound scans and blood tests were available through the usual providers. Patients were scheduled for appointments and telephoned by clinicians at a prearranged time to discuss results and review management. Diabetes midwives provided ongoing support via email, text, and phone calls.

Figure 1: Modified Telehealth Usability Questionnaire (TUQ) used in this study.

Usefulness:

1. The telephone clinic improved my access to healthcare
2. The telephone clinic saved me time travelling to hospital or specialist clinic
3. The telephone clinic provided for my healthcare needs.

Interaction quality:

4. I could easily talk to the doctor
5. I could hear the doctor clearly.
6. I felt I was able to express myself effectively

Satisfaction and future use

7. I felt comfortable communicating with the doctor
8. The telephone clinic is an acceptable way to receive diabetes in pregnancy care
9. I would use the telephone clinic again if it were offered
10. Overall I was satisfied with the telephone clinic system

Birth experience

11. The telephone clinic helped me feel prepared for birth in hospital

Statements are listed in the order asked on the questionnaire. All questions are answered using a 5-point Likert scale: 1 – strongly disagree, through to 5 – strongly agree. The headings indicate different domains; answers to questions within the domain were averaged for each individual to obtain a domain score.

Part 1: Survey of usefulness, interaction quality and satisfaction with teleclinics

Questionnaire modification and development

The Telehealth Usability Questionnaire is a standardised questionnaire used in health research and determined to be a highly valid, reliable, and with good internal consistency as a tool.[11] The original questionnaire consisted of 21 questions each with a five-point Likert scale response. We made minor modifications to use in our setting (see supplementary material). The final questionnaire used in this study is summarised in Figure 1. A free-text box was available at the end of the survey for women to enter any feedback.

Inclusion and exclusion criteria, and recruitment

Patients 16 years or over, who had at least one teleclinic for DiP care during the COVID-19 lockdown were asked if they would participate. Those who required use of a translator were excluded. Interested eligible women were contacted by a person not involved in their care. Those who agreed to take part were sent a link to the participant information sheet and electronic consent form (Qualtrics). Following consent, the questionnaire could be completed electronically (Qualtrics), or verbally (by telephone with a research assistant). Ethnicity, type of diabetes and diabetes treatment were recorded for each respondent according to protocols for the health sector.16 Level 1 categories of prioritised ethnicity were altered to separate, and prioritise, "Indian" above "Other Asian".

Analysis

The scores of individual questions within each domain were averaged to provide a domain score. Scores for each question and domain were reported with summary statistics. The primary outcome of interest was an average score of 4–5 in the "satisfaction and future use domain", indicating that the participant was highly satisfied with the teleclinic experience. We calculated that to determine an average score of 4 or more, with 10% precision, we required a sample size of at least 30 participants. Free-text responses were collated and coded using an inductive, data-driven approach. Codes were then organised into potential themes, and candidate themes were reviewed and refined.

Part 2: Describe and compare clinical pregnancy outcomes and clinic attendance

This was a retrospective observational study quantifying and comparing outcomes in two cohorts of women with singleton pregnancies and DiP, who delivered after 20 weeks' gestation. The first cohort (teleclinic) included those scheduled to attend a DiP clinic when teleclinics were the default model of care 31 March 2020 to 12 May 2020). While the majority of patients in this cohort were scheduled teleclinic appointments (including those surveyed in aim 1), this group also included a much smaller number of women who attended face-to-face clinics. The second cohort (pre-teleclinic*)* included those scheduled to attend any DiP clinic over the same period the year prior (31 March 2019 to 12 May 2019) and were solely scheduled face-to-face.

The clinical outcomes of interest were: hypertension (chronic, gestational, preeclampsia), mode of birth (spontaneous vaginal, instrumental vaginal, caesarean), birth outcome (liveborn, stillborn, neonatal death), birthweight (grams), customised birthweight >90th centile, neonatal intensive care admission, neonatal hypoglycaemia. These were used as they are the core outcomes that should be reported for studies on the treatment of gestational diabetes.[9] We recognised that the study was underpowered to look at rare clinical outcomes; however, it is important to describe clinical outcomes to identify potential impact.

Demographic and outcome data were provided via HealthAlliance. Where data could not be obtained through clinical coding, electronic maternity records were reviewed. The electronic clinical record was reviewed for each woman and the total number of hospital-based appointments offered and attended were counted. Appointments with different team members (e.g., endocrinologists, dieticians, obstetricians) occur in the same session in standard care, and these were counted as a single appointment. Where these appointments with different providers occurred as separate telephone calls they were counted separately for teleclinics, unless they occurred at the same time/day as a single call.

Demographic data and rates of each observed outcome were presented as summary statistics for each study cohort. Categorical variables are expressed as n (%) and continuous variables mean ± standard deviation or median (IQ range). Student's t-test or Mann–Whitney test were used to compare continuous variables between the two groups,

Figure 2: Study involvement for people who underwent teleclinic consultation for DiP.

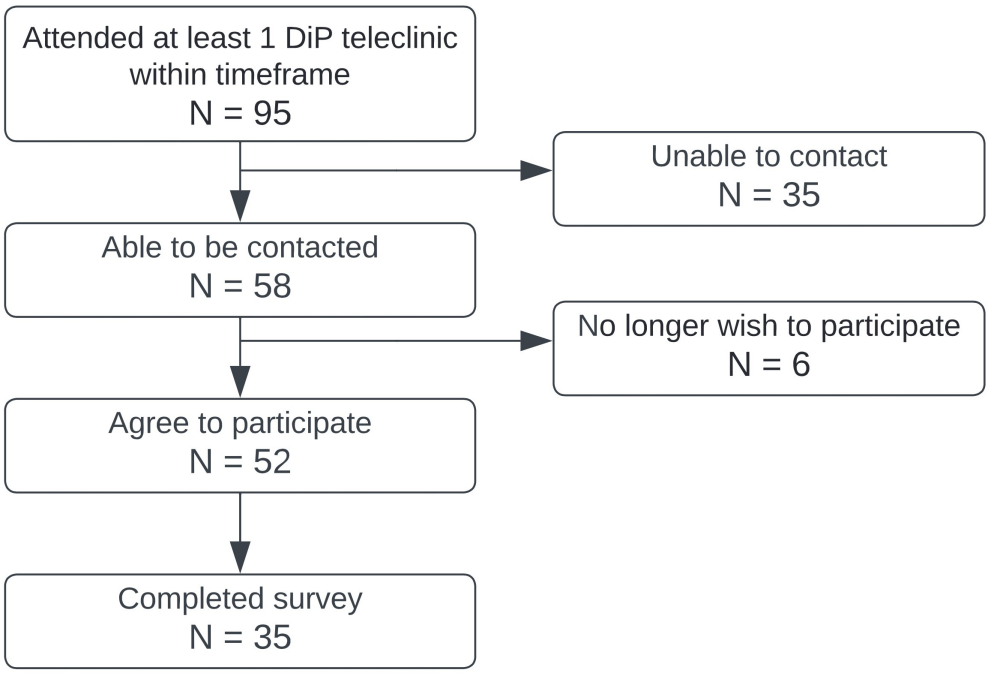

Table 1: Demographic characteristics of participants who completed modified teleclinic usability survey.

Maternal characteristic	**n (%)** **total n=35**
Ethnicity	
Māori	3 (9)
Pasifika peoples	9 (26)
Indian	16 (46)
Asian	5 (14)
NZ European/Other	2 (6)
Diabetes type	
Type 1	0 (0)
Type 2	4 (11)
Gestational	31 (89)
Diabetes treatment at birth	
Diet only	10 (29)
Metformin only	12 (34)
Insulin only	6 (17)
Metformin and Insulin	7 (20)

Table 2: Summary of free-text feedback.

Comfort and convenience of consultation method
Respondents referred to being able to remain in the comfort of their homes while speaking to their doctor, which put them at ease during DiP follow-up. "I didn't have to leave the comfort of my home to discuss my health". "On phone calls, the doctors were comfortable and understanding to talk to". Respondents expressed the monetary burden associated with travelling to and from face-to-face appointments was relieved through the utilisation of teleclinics. "[I] saved a lot of gas and money travelling to and from all [my] appointments".
Care not at the expected standard
Respondents expressed concern about reduced and slower follow up contact, and less support than initially expected. "Someone would contact [me] via phone on a certain date and it didn't happen". "Wasn't enough follow-up". "Wasn't much speed regarding help to get [my] blood sugar levels down".
A respondent described having to "make the initial contact" to understand how the blood glucose monitor and insulin pen were used. She used the descriptor of having "resorted to putting all my questions in an email" because she felt that direct contact was not being made appropriately. One respondent said that to some, it may feel like the "phone call is their only choice" to access advice even though it may not be what they anticipate their care to look like in pregnancy. Another said that being taught how to use insulin medication via a YouTube video was: "not my ideal way to be shown".

and the Chi-squared test to compare categorical variables between two groups; $p<0.05$ denoted statistical significance.

Results

Part 1: survey

Study involvement is summarised in Figure 2. The total number of participants approached (94) differs from the total number of participants attending clinics in Part 2 (below), as recruitment to the survey was started mid-way through the lockdown period. Of those who agreed to participate at the follow-up phone call our response rate was 67%. All respondents completed by Qualtrics. The characteristics of these respondents are described in Table 1.

The primary outcome (a score of 4 or more in the satisfaction domain) was observed in 89% of participants. Participants rated the teleclinic scores highly in every domain with median scores of 5, correlating to the response of "strongly agree". Due to the low numbers of women completing the survey, we were not able to analyse by ethnicity as planned. A breakdown of scores given by Māori vs non-Māori is provided in the supplementary material (Appendix 2). A summary of survey responses for Māori vs non-Māori is shown in the supplementary material (Appendix 2), for which there are no differences between the two groups of women. The distribution of score responses from participants for each question, stratified by ethnicity, is included as supplementary material (see Figure S1).We summarised the free text responses into two themes: the comfort and convenience of the consultation method, and that care via teleclinics did not reach the level expected. These are summarised in Table 2.

Part 2: Describe and compare clinical pregnancy outcomes and attendance rates

Between 31 March 20 to 12 May 2020, 179 people had a DiP appointment (telephone *or* face-to-face), and 187 had an appointment (face-to-face only) during the same period the year prior. Baseline characteristics (ethnicity, BMI, parity and treatment type) did not differ between the two time periods (supplementary Table S3). Pasifika peoples (37–45%),

Table 3: Pregnancy, birth, and neonatal outcomes for people who received DiP care in the period where teleclinics were offered, compared to those who received care in the same period the year earlier.

Delivery year		
Outcomes	**Pre-teleclinic (2019) n=187**	**Teleclinic (2020) n=179**
Hypertensiona (n, %)	**8 (4%)**	**4 (2%)**
Mode of birth (n, %)		
Vaginal	81 (43%)	83 (46%)
Emergency Caesarean	66 (35%)	60 (34%)
Elective Caesarean	24 (13%)	28 (16%)
Assisted vaginal	16 (9%)	8 (4%)
Stillbirth or neonatal death (n, %)	**4 (2%)**	**3 (2%)**
Preterm birth (<37 weeks)[b]	24 (13%)	23 (13%)
Gestation at birth (weeks mean ± sd)	37.3 ± (1.8)	37.4 ± (1.4)
Neonatal outcomes[b]		
Birthweight (g, mean ± sd)	3389 ± 677	3342 ± 646
Birthweight ≥90th centilec (n, %)	47 (26%)	39 (23%)
Neonatal unit admission (n, %)	35 (19%)	37 (21%)
Hypoglycaemia (n, %)	58 (31%)	51 (29%)

[a]hypertension includes chronic, gestational and pre-eclampsia. [b.] Livebirths only. [c] Birthweight centile customised for maternal height, weight, parity and ethnicity.

Indian (20–30%) and Māori (11–15%) were the most represented ethnic groups. More than two-thirds were from the highest deprivation quintiles, and over half had GDM. A comparison of outcomes for the two time periods is shown in Table 3. Birth outcomes were similar between the two groups. A summary of birth outcomes for Māori vs non-Māori is shown in the supplementary material (Table S4).

Those having care in the period where teleclinics were offered more appointments scheduled than those women the year prior (median (IQ range) of 5 (4–8) appointments compared to 4 (3–7) appointments) (p<0.0001). Non-attendance (either total, or as a proportion of scheduled clinics did not change between the two time periods.

Discussion

With the growing number of pregnancies affected by diabetes, improving access to care is critical for improving health outcomes and achieving health equity for populations underserved by the health system. It is important to determine whether new approaches are acceptable, accessible and provide health benefits for all consumers. We report that in our multi-ethnic population, teleclinics have been an acceptable means of providing care during COVID-19 lockdowns. Most (89%) of our participants were highly satisfied with the clinics, similar to the response seen in other countries.[12] As the first study of teleclinics for obstetric care in Aotearoa, this survey has enabled some insight into the perceived benefits

of teleclinics to our unique population. Participants reported financial and time-saving benefits of not having to travel, as well as physical convenience and comfort of having care provided by telephone. It is possible that these benefits may be more pronounced in a lockdown setting, where people are at home and have more flexibility around attending telephone appointments. Studies outside of the pandemic have also observed high maternal satisfaction and lower pregnancy-related stress with virtual consultations.[12,13]

Attendance rates at both telephone and face-to-face clinics are a surrogate marker for acceptability and access to care. Teleclinics could potentially increase non-attendance rates where there is limited access to phone, time or space for health consultations, or a preference for face-to-face contact. Although we did not observe a difference in attendance rates, we found more appointments were offered during the period where teleclinics were running. This could be due to appointments with different clinicians being spread over days, or it taking longer to communicate the same information in the absence of non-verbal communication. We did not collect information about duration of consultation, and it is not possible to know from our study about the relative inefficiencies and efficiencies of teleclinics vs standard care, or a preference for having appointments spread out over time. For teleclinics to become a viable option, care, scheduling should be streamlined to minimise any unnecessary appointments.

Some participants rated teleclinics poorly, describing poor quality and speed of information exchange. These concerns appeared to relate to the use of technology for communicating information outside of the consultation. Telemedicine encompassing data transmission, review, analysis and feedback may be time-consuming for providers. While timely communication has the potential to reduce anxiety, if individuals perceive delays or inadequate information they may feel unsupported. Further investigation is required as to how services should be resourced and/or how technology can be used in our population in a way that not only improves health outcomes, but also enables individuals to feel supported and that their concerns are being heard. It may be helpful to develop electronic (email or app-based) communication tools to specifically support the clinic so that there is one easy path for submitting blood sugar results, and non-urgent queries, while allowing patients to see when their results have been received, and receive updates. This would require extra resources to develop and maintain, but if minor queries are addressed between visits, then clinics can remain focussed on obstetric and diabetic concerns.

It is clear from this study that replacing standard care with teleclinics for DiP will not be appropriate or acceptable for every consultation. Having a choice on type of clinic is important, and there may be elements of care (learning about equipment use or conveying complex information) that are better provided in person. If other providers are considering phone-based clinics, we suggest maintaining flexibility and giving patients the options of what they would prefer for each appointment, and providing a point of contact between visits (such as email or phone). A hybrid model of care has been suggested in other studies where individuals have a preference to have a combination of in-person and telehealth visits.[12,14]

Clinical pregnancy outcomes relating to DiP

We did not expect to see significant changes in pregnancy birth events between the pre-teleclinic and teleclinic eras, given the small timeframe that teleclinics were the predominant means of care. However, given that the way in which care was provided changed dramatically we believe it is important to report rates of clinical outcomes in case this change had an unexpectedly significant impact on outcomes. Other small studies of DiP teleclinics have not seen significant changes to rates of birth outcomes when teleclinics are offered.[12] Existing meta-analyses have demonstrated improved maternal glycaemic control,[7,15] pregnancy, and neonatal outcomes.[7] Outcomes also between those receiving telehealth consultations versus the standard model of care were not significantly altered or worsened.[16]

Limitations

The main limitation of our study is the small sample size. For the survey, we attempted to contact every patient who indicated they would participate, however over one-third of patients were unable to be contacted at follow-up, and a further third did not complete the questionnaire. As follow-up contact was made by phone, this may bias the findings of the study towards the views of those who are more likely to favour or feel comfortable with telephone use in a health setting. It has been noted that Māori and Pasifika peoples value face-to-face contact to facilitate better conversation outcomes,[17] which may also affect the quality of responses obtained in the survey. Due to low numbers, the study was underpowered to report scores by ethnicity. Despite the small number surveyed, we believe that our find-

ings are useful and representative—the demographic representation is similar to those who attend our DiP clinics, and a range of positive and negative perceptions of care received was also evident within the individual responses. Our findings may not be generalisable to those who have type I diabetes, complex comorbidities and those who are not comfortable/able to have consultations in English, as these patients were seen face-to-face. This research also used the unique circumstance of lockdown in a global pandemic, and it is unknown whether this context may have influenced how teleclinics were perceived. Also, teleclinics may be perceived differently when work and family responsibilities change back to "normal" outside of lockdown. Further research is needed outside of the pandemic setting to determine if maternal satisfaction and birth outcomes remain unaffected. This study has led to the undertaking of further consumer-focussed research to find out specifically what parts of care should be face-to-face, and what could continue via telephone to better inform our own service.

Conclusion

The rapid switch to teleclinics for DIP antenatal care provoked by the COVID-19 lockdowns has provided an opportunity to assess an alternative means of providing DiP care. Most patients surveyed reported high levels of overall satisfaction, and pregnancy outcomes appeared to be unchanged. Providing care via teleclinic resulted in more scheduled appointments. However, some women experienced delays in response to their need for information. These areas should be addressed before a wider implementation of teleclinics for DiP especially for Māori, Pasifika and Indian women with high inequities in health outcomes.

COMPETING INTERESTS
Nil.

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AUTHOR INFORMATION
Asha Shashikumar: Year 6 Medical Student, Department of Obstetrics and Gynaecology, The University of Auckland, New Zealand.
Karaponi Okesene-Gafa: Obstetrician, Women's Health, Middlemore Hospital, Counties Manukau Health; Senior lecturer, Department of Obstetrics and Gynaecology, The University of Auckland, New Zealand.
Te Hao Apaapa-Timu: Māori Research advisor, Counties Manukau; Ko Awatea, Middlemore Hospital, Counties Manukau Health, New Zealand.
Jessica Wilson: Data analyst, Department of Paediatrics: Child and Youth Health, The University of Auckland, New Zealand.
Charlotte Oyston: Obstetrician, Women's Health, Middlemore Hospital, Counties Manukau Health; Senior lecturer, Department of Obstetrics and Gynaecology, The University of Auckland, New Zealand.

CORRESPONDING AUTHOR
Dr Charlotte Oyston: Senior Lecturer, Department of O&G, Faculty of Medicine and Health Sciences, University of Auckland, Private Bag 92019 Auckland Mail Centre Auckland 1142 New Zealand.
E: c.oyston@auckland.ac.nz

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Appendices

Appendix 1: Modification of the TUQ.

Questions specific to videoconferencing or computer technology use (which we did not use) were removed. We replaced the word "telehealth system" with "teleclinic", and the word "clinician" was replaced with "doctor". Following feedback from consumers, health professionals and Māori and Pasifika reviewers, we added two further questions: "I could understand the language used by the doctor" (this was included as part of the interaction quality domain), and "the teleclinic helped me feel prepared for birth in hospital" (new category—birth experience). This second question was added as it was recognised that discussion around labour and birth interventions that are more common in women with diabetes (such as induction of labour) may be more limited when not performed face-to-face.

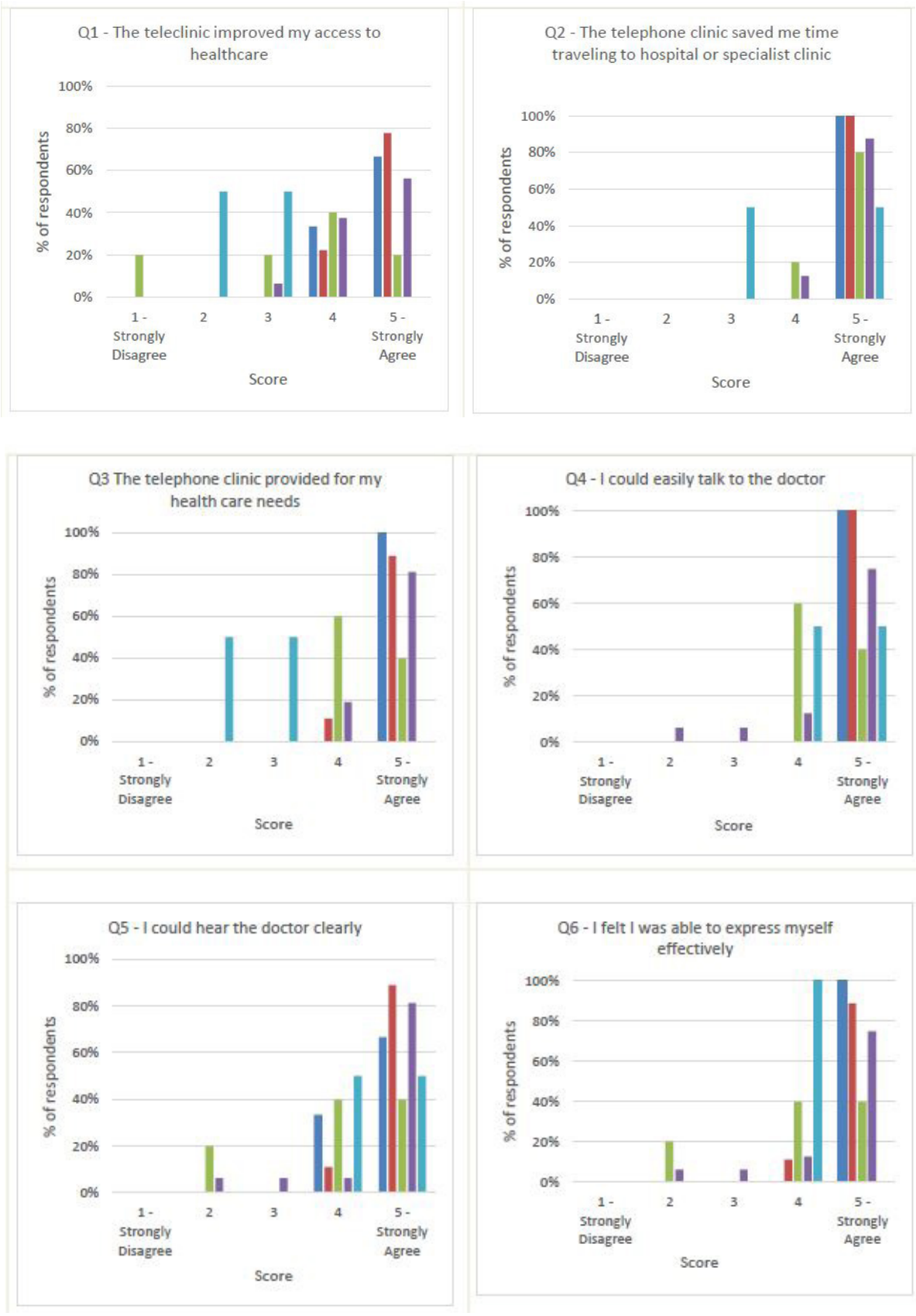
Appendix 2: Proportion of women with primary outcome–Māori and non-Māori.

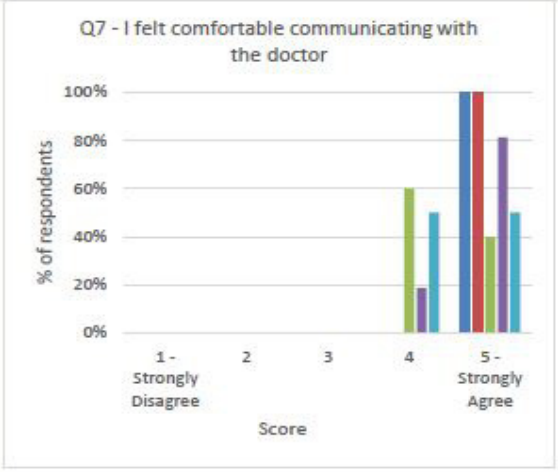
	% Women with average score ≥4	
Domain	**Māori N=3**	**non-Māori N=32**
Usefulness	100	88
Interaction quality	100	91
Satisfaction and future use	100	88
Birth experience	100	81

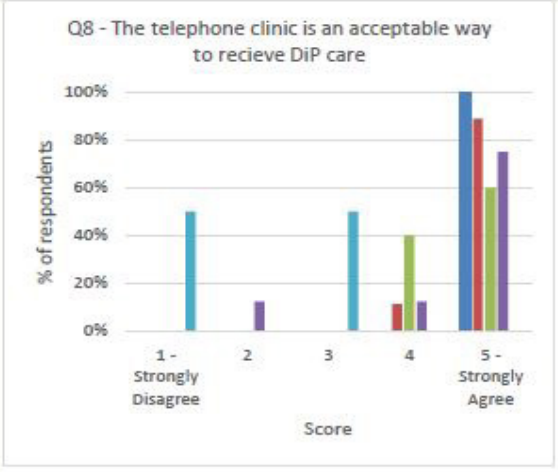
Appendix 3: Average survey response per domain–Māori and non-Māori.

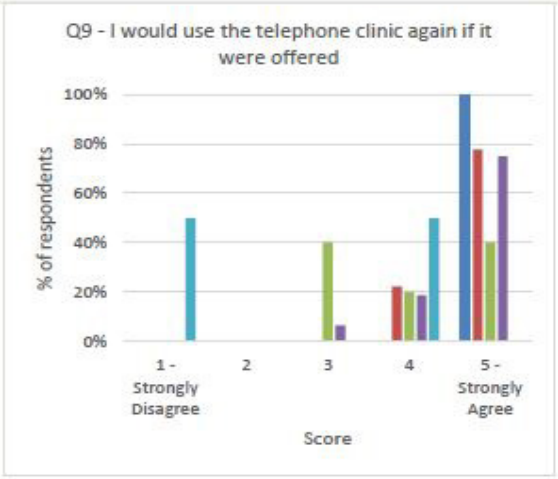
Domain/Question	**Median score**	
	Māori	**non-Māori**
Usefulness		
Q1	5	5
Q2	5	5
Q3	5	5
Average for domain	5	5
Interaction quality		
Q4	5	5
Q5	5	5
Q6	5	5
Average for domain	5	5
Satisfaction for domain		
Q7	5	5
Q8	5	5
Q9	5	5
Q10	5	5
Average for domain	5	5
Birth experience		
Q11	5	5
Average for domain	5	5

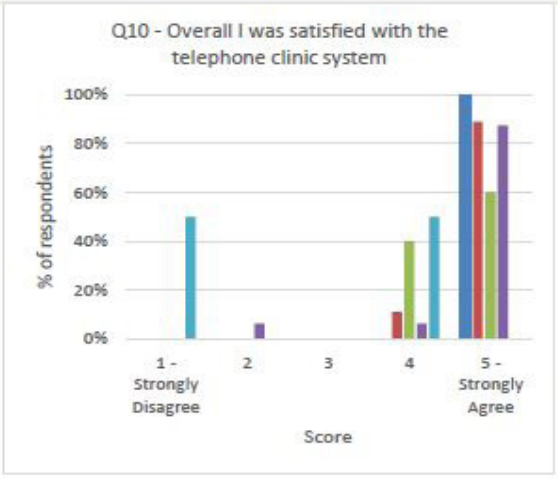
Appendix 4: Survey responses per question of women's perception of teleclinics for DiP care by ethnicity.

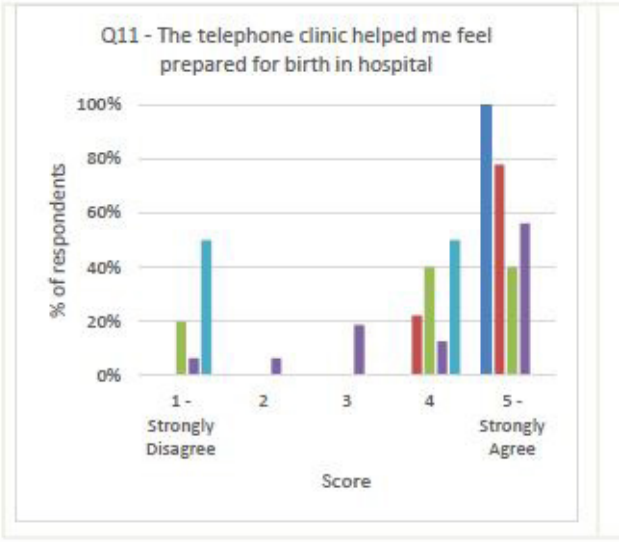












Key	Ethnicity	n=35
	Māori	3
	Pasifika peoples	9
	Asian	5
	Indian	16
	NZ European	2

Appendix 5: Maternal characteristics of women delivering in 2019 vs 2020.

Delivery year			
Maternal characteristics	**Pre-teleclinic era n=187**	**Teleclinic era n=179**	***P***
Maternal age (years, mean ± sd)	**32.3 ± 5.3**	**32.1 ± 5**	**0.61**
Ethnicity (n, %)			
Māori	21 (11%)	27 (15%)	0.19
Pasifika peoples	85 (45%)	66 (37%)	
Indian	38 (20%)	54 (30%)	
Asian	16 (9%)	12 (7%)	
NZ European	24 (13%)	18 (10%)	
Other	3 (2%)	2 (1%)	
Parity (n, %)			
0	69 (37%)	50 (28%)	0.08
1	49 (26%)	64 (36%)	
2+	69 (37%)	65 (36%)	
BMI (kgm^{-2} mean ± sd)	33.8 ± 9.1	33.3 ± 8	0.64
Deprivation quintile 9 or 10 (n, %)			
Yes	120 (64%)	130 (73%)	0.36
No	67 (36%)	49 (27%)	
Type of diabetes (n, %)			
GDM	111 (59%)	116 (65%)	0.55
Type 1	8 (4%)	6 (3%)	
Type 2	68 (36%)	57 (32%)	
Diabetes treatment (n, %)			
Diet	44 (24%)	35 (20%)	0.72
Metformin	47 (25%)	44 (25%)	
Insulin	29 (16%)	34 (19%)	
Metformin and insulin	67 (36%)	66 (37%)	
Pre-existing hypertension (n, %)	6 (3%)	4 (2%)	

Appendix 6: Core outcomes for Māori and non-Māori.

Pre-teleclinic (2019)			**Teleclinic (2020)**	
Outcomes	Māori n=21	non-Māori n=166	Māori n=27	non-Mā n=152
Hypertensiona (n, %)	1 (5%)	7 (4%)	0 (0%)	4 (3%)
Mode of birth (n, %)				
Vaginal	11 (52%)	70 (42%)	15 (56%)	68 (45%
Emergency Caesarean	6 (29%)	60 (36%)	8 (30%)	52 (34%
Elective Caesarean	3 (14%)	21 (13%)	3 (11%)	25 (16%
Assisted vaginal	1 (5%)	15 (9%)	1 (4%)	7 (5%)
Stillbirth or neonatal death (n, %)	0 (0%)	4 (2.4%)	1 (4%)	2 (1%)
Preterm birth (<37 weeks') b	3 (14%)	21 (13%)	3 (12%)	20 (13%
Gestation at birth (weeks mean±sd)	37.3±1.5	37.3±1.8	37.5±1.5	37.4±1.
Neonatal outcomesb				
Birthweight (g, mean±sd)	3536±521	3370±694	3439±448	3325±6
Birthweight ≥90th centile (n, %)	4 (19%)	43 (27%)	8 (31%)	31 (21%
Neonatal unit admission (n, %)	7 (33%)	28 (17%)	5 (19%)	32 (21%
Hypoglycaemia (n, %)	11 (52%)	47 (29%)	6 (23%)	45 (30%

Trauma Team Activation: improved care of major trauma patients

Maria Nonis, Andrew McCombie, Christopher Wakeman, Dominic Fleischer, Laura Joyce

ABSTRACT

AIM: To assess whether Trauma Team Activation (TTA) at Christchurch Hospital is associated with reduced mortality or improves in-hospital care for major trauma patients, and review differences in the two-tier activation system (Trauma Call versus Trauma Standby).
METHODS: A retrospective observational study of major trauma patients presenting to Christchurch Emergency Department (ED) 2018–2019. Univariate analyses were undertaken followed by multivariate analyses controlling for age and injury severity score (ISS).
RESULTS: Major trauma patients with a TTA had a higher mean ISS (p<0.001) compared to patients without TTA. After controlling for age and ISS, TTA was associated with decreased time to CT (p<0.001), and shorter ED length of stay (LOS) (p<0.001). Despite an increased rate of surgery (OR 1.9, 95%CI:1.2–3.0) and admission to ICU (OR 4.1, 95%CI:2.0–8.5), with longer total hospital LOS (p<0.001). When compared to those with a Trauma Standby, patients with a full Trauma Call had a higher mortality (OR 1.5, 95%CI:0.3–8.4), increased rates of surgery (OR 2.7, 95%CI:1.4–5.2) and ICU admission (OR 17.9, 95%CI:4.2–77.4), with a longer hospital LOS (p=0.006).
CONCLUSION: TTA was associated with decreased time to diagnostic imaging and definitive management in major trauma patients. Whilst causation cannot be inferred, these trends were apparent after controlling for age and ISS.

Injury is the leading cause of death for New Zealanders under the age of 35 and is the second leading cause of hospitalisation.[1] The World Health Organization (WHO) estimates that injury accounts for approximately 12% of all disability-adjusted life years (DALYs) lost.[2] Major trauma is defined in New Zealand by the New Zealand Major Trauma Registry (NZ-MTR) as Injury Severity Score (ISS) greater than or equal to 13, or death following trauma that is principally due to the injuries sustained.[3–5]

A key component of trauma systems globally is a multi-professional trauma team response.[5–7] The multi-professional team consists of specialised healthcare professionals from a variety of health backgrounds across a range of specialties including, but not limited to, emergency medicine, anaesthesia and surgical specialities.[5,8] There is strong evidence that trauma patients benefit from dedicated trauma team care.[9–12]

Christchurch Hospital uses a two-tier system for Trauma Team Activation (TTA). TTA is based on defined criteria which include both physiological and mechanism of injury parameters, and can be activated prior to, or on arrival to hospital.[6,8] For the most serious traumas a "Trauma Call" is placed via the operator, with an automated process that directs health professionals from emergency medicine, the intensive care unit (ICU), general surgery, and anaesthesia to attend in person. The radiology department and blood bank are notified.

For trauma that is predicted to be less serious based on mechanism and observations a "Trauma Standby" can be activated. This is considered the second tier of our Trauma Team Activation system. The details for this process are displayed in Appendix 1. A Trauma Standby requires that a general surgery registrar attends within 30 minutes, with radiology and blood bank also notified. This TTA system provides a pragmatic solution to limited resources, with the aim of reserving the full Trauma Call for those trauma patients predicted to be most seriously injured. The timeframe for our data collection was prior to the introduction of Code Crimson at Christchurch Hospital, which will be considered the first level of a three tier Trauma Team Activation system.

Multiple studies have shown that TTA reduces time to radiological investigation, such as computed tomography (CT), and to surgery, in addition to reducing the time taken for resuscitation.[5,10] However, there is conflicting evidence in the literature as to whether TTA reduces mortality for major trauma patients.[10,13,14] The aim of this study was to assess whether TTA in Christchurch is associated with reduced mortality for major trauma patients, and whether the two-tier system for TTA had any differences in patient outcomes for those patients who received a full Trauma Call when compared to a Trauma Standby.

Method

The STROBE guidelines for reporting observational studies were adhered to.[15]

Study design and setting

This was a retrospective observational study conducted using data collected from major trauma patients presenting to the Emergency Department (ED) at Christchurch Hospital from 1 June 2018 to 31 May 2019. Approval for the study was granted by the University of Otago Ethics Committee (HD21/002) and the Canterbury District Health Board (RO #20227).

Setting

Christchurch Hospital is a tertiary level hospital in Canterbury, New Zealand, which covers a population of approximately 550,000.[16] It is the sole major acute referral centre in the region, with over 100,000 presentations each year, of which 400–450 are major trauma. Major spinal trauma from the lower third of the North Island and all of the South Island, and major burns from the lower three quarters of the South Island are directly transported to Christchurch Hospital.

Participants

Patients with major trauma (ISS ≥13, or death due to trauma) recorded in the Canterbury District Health Board (CDHB) Major Trauma database between 1 June 2018 and 31 May 2019 were considered eligible to be included in the study. Exclusions were made in line with the National Trauma Network, including such conditions as presentations delayed more than seven days after injury or isolated neck of femur fractures.[17] Data were extracted from the CDHB Data Warehouse, with clinical records reviewed manually for missing variables. Inter-hospital transfers, patients from the 15 March 2020 terror attack, duplicates, and patients with missing data after manual searches were excluded.

Variables

The primary outcome was to observe for differences in the in-hospital all-cause mortality for those patients who had a TTA versus vs those who did not have a TTA. Other key performance indicators (KPIs) reviewed were time to CT, ED length of stay (LOS), ICU LOS, total hospital LOS, need for surgical intervention and time to surgical intervention (in the operating theatre or interventional radiology). Categories for time to surgery were defined according to the data dictionary definition from the Major Trauma Registry.

Study size

Original study size was determined by the number of patients identified in the CDHB Major Trauma database who attended Christchurch Hospital ED in the one-year period.

Statistical methods

Statistical Packages for Social Sciences versions 26–28 (SPSS) was used for calculations.[18] TTA patients were compared to no TTA patients in terms of baseline characteristics and KPIs (primary analysis). Trauma Calls vs Trauma Standby were also compared (subgroup analysis). Supplementary analysis was also conducted for TTA vs those who did not have a TTA but met TTA criteria (supplementary analysis). Univariate comparisons were performed using Chi-squared tests for independence, odds ratios (ORs), and t-tests for independent means. Multivariate models controlling for ISS and age were also adopted for predicting the associations between TTA and Trauma Call statuses, in analyses one and two respectively, and KPIs. For the multivariate models binary logistic and cox regression models were used where most appropriate.

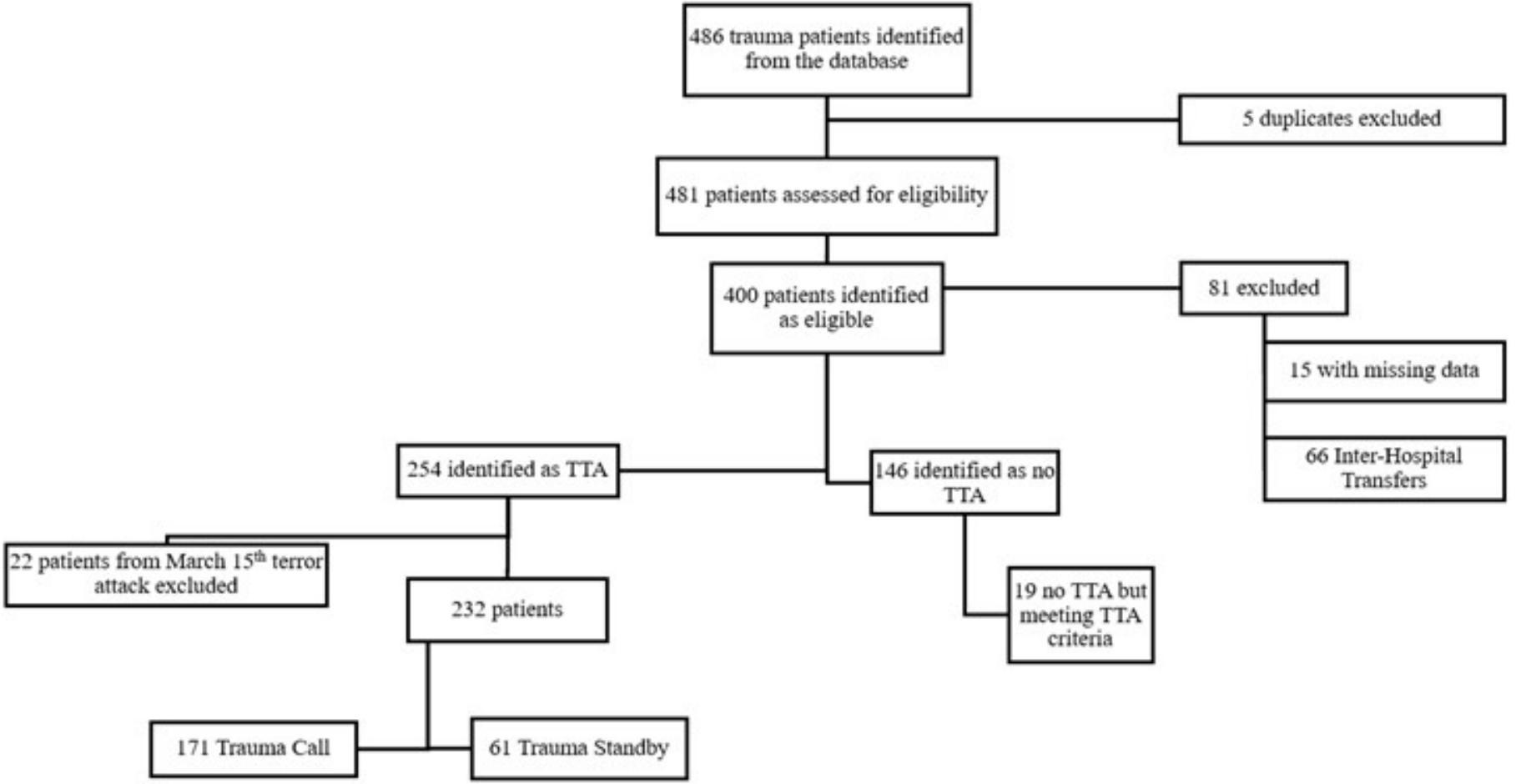
For the supplementary analyses carried out (Appendix 2) on trauma calls versus those who met criteria but were not called, the continuous variables had n<30 in the "met criteria" group and so were assessed for normality. These were found to not be normal and so non-parametric tests were used for the univariate analyses.

Results

Participants

Four hundred and eighty-one patients with major trauma attended Christchurch Hospital ED in the one-year period. After excluding inter-hospital transfers, duplicates and patients with missing data, 400 patients were eligible for inclusion in the study. There were 254 patients in this cohort who had a TTA, and 146 who did not have a TTA. Of those who had a TTA, 22 patients from the 15 March 2020 terror attack were excluded. Of the remaining 232 TTA patients, 171 received a full Trauma Call, while 61 had a Trauma Standby. Of the 146 patients who did not have a TTA, 19 of those met criteria for a TTA (see Figure 1).

Figure 1: Patient selection flow diagram.



Primary analysis: Trauma Team Activation vs those without Trauma Team Activation

Patients younger than 65 years were more likely to receive a TTA than not receive a TTA, with 0–17-year-olds being most likely to receive a TTA (OR 9.47; 95%CI:3.02–29.67). There were no gender differences in TTA rates (OR 0.76; 95%CI:0.49–1.18), nor any difference in TTA rates between different ethnicities.

Mean ISS was higher in TTA patients (21.1 [SD=8.7] vs 17.8 [SD=6.3]; p<0.001). Mechanism of injury differed (p<0.001), with patients involved in a road traffic crash (RTC) more likely to have a TTA and those with a fall less likely. Patients who had a TTA were triaged to be seen more rapidly (p<0.001). The rates of TTA varied between morning, evening, and night shifts (p=0.001) (see Table 1).

KPIs varied between patients with a TTA vs those with no TTA. Mortality rate was lower (OR 0.5; 95%CI:0.2–0.9), mean time to CT shorter (mins) (86.6 [SD=97.3] vs 228.2 [SD=218.1]; p<0.001), and ED LOS (hours) shorter for TTAs (3.8 [SD=2.8] vs 6.2 [SD=3.2]; p<0.001). Patients with a TTA had a longer mean hospital LOS (days) than no TTA (12.8 [SD=12.6] vs 5.8 [SD=4.4]; p<0.001).

Those with a TTA were more likely to be admitted to ICU compared to no TTA (OR 6.8; 95%CI:3.5–13.4). Those with a TTA were also more likely to have a longer ICU LOS (days) (11.1 [SD=12.7] vs 3.4 [SD=2.5]; p<0.001) and were more likely to require surgery (OR 2.8; 95%CI:1.8–4.3). Those patients with a TTA were more likely to require surgery in less than 24 hours. The admitting specialty varied for those with a TTA and no TTA (p<0.001), with more patients with no TTA being admitted to a non-surgical specialty.

Multivariate analysis was conducted controlling for age and ISS. The trend towards TTA being associated with lower mortality was maintained in multivariate analysis, albeit insignificantly; this change from significance to non-significance is more likely due to a change in statistical power brought about by multivariate analysis (OR 0.53; 95%CI:0.2–1.3). Multivariate analysis demonstrated that patients with a TTA had a shorter time to CT, shorter ED LOS but longer total hospital LOS (p<0.001). Patients with a TTA remained more likely to be admitted to ICU (OR 4.1; 95%CI:2.0–8.5) and have a longer ICU LOS (p=0.007), and more likely to require surgery (OR 1.9; 95%CI:1.2–3.0) (see Table 2).

Subgroup analysis: Full Trauma Call vs Trauma Standby

Mean ISS was higher in Trauma Call patients compared to Trauma Standby patients (22.7 [SD=9.3] vs 17.2 [SD=5.2]; p<0.001). Patients aged 0–17 (OR 7.14 (95%CI:1.45–35.29) and 18–29 (OR 4.13, 95%CI:1.57–10.88) were more likely than those over age 64 to have a full Trauma Call. There was no difference between males and females (OR 1.20; 95%CI:0.62–2.31), or between different ethnic groups. Mechanism of injury did not differ significantly (p=0.67) (see Table 3).

There was no significant difference in mortality between patients who received a Trauma Call vs those who received a Trauma Standby (OR 2.8; 95%CI:0.63–12.78). The mean time to CT (mins) was similar (83.3 [SD=108.7] vs 95.7 [SD=55.8]; p=0.40), although the medians differed such that Trauma Calls waited less time than Trauma Standbys (54.5 vs 84.0 mins; p<0.001), with a strong positive skew for those with a Trauma Call causing the means to be the same.

Those with a Trauma Call had a longer mean hospital LOS (days) compared to those with a Trauma Standby (14.4 [SD=13.4] vs 8.5 [SD=8.5]; p<0.001). Trauma Call patients had a shorter ED LOS (hours) (3.2 [SD=2.9] vs 5.3 [SD=1.8]; p<0.001). They were also more likely to be admitted to ICU (OR 26.6; 95%CI:6.3–112.2), more likely to require surgery (OR 3.5; 95%CI:1.9–6.5) and had a shorter time to surgery (p<0.001).

Multivariate analyses were conducted controlling for age and ISS for patients who received a Trauma Call vs Trauma Standby. Once controlled for age and ISS, mortality for Trauma Call patients became slightly higher than for Trauma Standby patients (OR 1.5; 95%CI:0.29–8.4). Mean time to CT was no different (p=0.54) between Trauma Calls and Trauma Standbys, with no difference in mean ED LOS (p=0.16). Mean hospital LOS remained significantly longer for Trauma Calls (p=0.006). The odds ratio for admission to ICU for patients with a Trauma Call fell to 17.9 (95%CI:4.2–77.4). Patients with a Trauma Call were more likely to require surgery (OR 2.7; 95%CI:1.4–5.2), albeit less so that in the univariate analysis (see Table 4).

Supplementary analysis: Trauma Team Activation vs those without a TTA but meeting TTA criteria

Clinical records were reviewed to determine whether those patients who did not have a TTA met the Christchurch Hospital Trauma Team Activation criteria. This group was compared to those patients who did have a TTA. Mean ISS was not significantly higher in TTA patients (21.1 [SD=8.7] vs 18.1 [SD=4.9]; p=0.169). There was no significant difference in mortality (OR 0.67; 95%CI:0.14–3.15) between these groups, even once ISS was controlled for (OR 0.43; 95%CI:0.07–2.73). Time to CT (mins) was shorter (86.6 [SD=97.3] vs 162.1 [SD=144.7]; p<0.001) but hospital LOS (days) was longer for patients with

Table 1: Characteristics of patients with Trauma Team Activation vs those without Trauma Team Activation

Variable	Trauma Team Activation Mean [SD] or n (%) (n=232)	No Trauma Team Activation (n=146)	Statistical test	Result†
Age				
0–17	22 (9.5%)	4 (2.7%)	Odds ratio (65+ Ref)	OR 9.47 (95% CI:3.02–29.67)
18–29	61 (26.3%)	19 (13.0%)		OR 5.53 (95% CI: 2.86–10.68)
30–49	63 (27.2%)	23 (15.8%)		OR 4.72 (95% CI: 2.51–8.86)
50–64	50 (21.6%)	38 (26.0%)		OR 2.27 (95% CI: 1.26–4.08)
65+	36 (15.5%)	62 (42.5%)		OR 1
Female	67 (28.9%)	51 (34.9%)	Odds ratio	OR 0.76 (95% CI: 0.49–1.18)
Ethnicity				
NZ European	178 (76.7%)	123 (84.2%)	Odds ratio (European Ref)	OR 1
NZ Māori	26 (11.2%)	13 (8.9%)		OR 1.38 (95% CI: 0.68–2.80)
Pasifika peoples	10 (4.3%)	2 (1.4%)		OR 3.46 (95% CI: 0.74–16.04)
Asian & Middle Eastern	15 (6.5%)	8 (5.5%)		OR 1.30 (95% CI: 0.53–3.15)
Other/ unknown	3 (1.3%)	0 (0%)		Uncalculatable
ISS‡	21.1 [10.4]	17.8 [6.3]	t-test for independent means	p<0.001
Mechanism of injury				
Road traffic crash	78 (33.6%)	11 (7.5%)	Chi-squared test for independence	p<0.001
Inflicted§	19 (8.2%)	10 (6.8%)		
Motorbike crash	24 (10.3%)	14 (9.6%)		
Fall	39 (16.8%)	71 (48.6%)		
Sport	38 (16.4%)	35 (24.0%)		
Pedestrian	19 (8.2%)	1 (0.7%)		
Other¶	15 (6.5%)	4 (2.7%)		

Table 1 (continued): Characteristics of patients with Trauma Team Activation vs those without Trauma Team Activation

Variable	Trauma Team Activation Mean [SD] or n (%) (n=232)	No Trauma Team Activation (n=146)	Statistical test	Result†
Triage on arrivalþ				
1	114 (52.1%)	6 (4.1%)	Chi-squared test for independence	p<0.001
2	100 (40.1%)	37 (25.3%)		
3	16 (7.1%)	91 (62.3%)		
4	1 (0.4%)	11 (7.5%)		
Unknown	1 (0.4%)	1 (0.7%)		
Shift of presentationµ				
AM	83 (35.8%)	54 (37.0%)	Chi-squared test for independence	p=0.001
PM	94 (40.5%)	78 (53.4%)		
NOCTE	54 (23.3%)	13 (8.9%)		
Unknown	1 (0.4%)	1 (0.7%)		

† p-values reported except in cases of odds ratios where 95% confidence intervals are reported;
‡ Injury Severity Scores available for 225 TTA and 146 no TTA;
§ Inflicted included assault, struck and gunshot;
¶ Other included crush, burns, electrocution, explosion, ingestion, jump, self-harm and unknown;
þ Triage as per Australasian Triage Scale;
µ AM=0800–1559, PM=1600–2359, NOCTE=0000–0759

Table 2: Key performance indicators for patients with Trauma Team Activation vs those without Trauma Team Activation.

Variable	Trauma Team Activation Mean [SD] or n (%) (n=232)	No Trauma Team Activation (n=146)	Univariate Statistical test	Univariate Result†	Multivariate Statistical test	Multivariate model controlling for age and ISS
Mortality	17 (7.3%)	22 (15.1%)	Odds Ratio	OR 0.5 (95% CI: 0.2–0.9)	Binary logistic	OR 0.53 (95% CI: 0.2–1.3)
Time to CT (mins)	86.6 [97.3]	228.2 [218.1]	t-test for independent means	p<0.001	Cox regression	p<0.001‡
	Median=60	Median=170	Mann–Whitney U test	p<0.001		
ED LOS§ (hours)	3.8 [2.8]	6.2 [3.2]	t-test for independent means	p<0.001	Cox regression	p<0.001‡
Admission to ICU	83 (35.8%)	11 (7.5%)	Odds Ratio	OR 6.8 (95% CI: 3.5–13.4)	Binary logistic	OR 4.1 (95% CI: 2.0–8.5)
ICU LOS§ (days)	11.1 [12.7]	3.4 [2.5]	t-test for independent means	p<0.001	Cox regression	p=0.007‡,¶
Hospital LOS§ (days)	12.8 [12.6]	5.8 [4.4]	t-test for independent means	p<0.001	Cox regression	p<0.001‡
Surgery	163 (61.0%)	57 (35.6%)	Odds Ratio	OR 2.83 (95% CI: 1.89–4.25)	Binary logistic	OR 1.9 (95% CI: 1.2–3.0)
Time to surgeryþ						
<24hrs	90 (55.2%)	17 (29.8%)	Chi-squared test for independence	p=0.02	NA	NA
24–48hrs	32 (19.6%)	14 (24.6%)				
48–72hrs	12 (7.4%)	9 (15.8%)				
>72hrs	29 (17.8%)	17 (29.8%)				
Admitting specialty						
Cardiothoracic Surgery	37 (15.7%)	28 (19.2%)	Chi-squared test for independence	p<0.001	NA	NA
General Medicine	1 (0.4%)	25 (17.1%)				
General Surgery	50 (22.1%)	27 (18.5%)				
Neurosurgery	38 (14.6%)	25 (17.1%)				

Table 2 (continued): Key performance indicators for patients with Trauma Team Activation vs those without Trauma Team Activation.

Variable	Trauma Team Activation Mean [SD] or n (%) (n=232)	No Trauma Team Activation (n=146)	Univariate Statistical test	Univariate Result†	Multivariate Statistical test	Multivariate model controlling for age and ISS
Admitting specialty						
Orthopaedic Surgery	71 (29.6%)	29 (19.9%)				
Orthopaedics –Spinal	22 (10.5%)	6 (4.1%)				
Paediatric Surgery	6 (3.7%)	0 (0%)				
Otherμ	7 (3.4%)	6 (4.1%)				

† p-values reported except in cases of odds ratios where 95% confidence intervals are reported;
‡ Cox regression for continuous variables;
§ LOS = Length of Stay;
¶ Hazard ratio increased from 0.34 to 0.39 suggests the difference between TTA and no TTA is smaller once controlled for age and ISS (both continuous);
þ % of those that had surgery,
μ Other admitting specialities = ENT, Vascular, Maxillofacial, Plastics, Urology and unknown

Table 3: Characteristics of patients with Trauma Call vs Trauma Standby.

Variable	Trauma Call Mean [SD] or n (%) (n=171)	Trauma Standby (n=61)	Statistical test	Result†
Age				
0–17	20 (11.7%)	2 (3.3%)	Odds ratio (65+ Ref)	OR 7.14 (95% CI: 1.45–35.29)
18–29	52 (30.4%)	9 (14.8%)		OR 4.13 (95% CI: 1.57–10.88)
30–49	42 (24.6%)	21 (34.4%)		OR 1.43 (95% CI: 0.61–3.32)
50–64	36 (21.1%)	14 (23.0%)		OR 1.84 (95% CI: 0.74–4.54)
65+	21 (12.3%)	15 (24.6%)		OR 1
Female	51 (29.8%)	16 (26.2%)	Odds ratio	OR 1.20 (95% CI: 0.62–2.31)
Ethnicity				
NZ European	128 (74.9%)	50 (82.0%)	Odds ratio (European Ref)	OR 1
NZ Māori	21 (12.3%)	5 (8%)		OR 1.64 (95% CI: 0.59–4.59)
Pasifika peoples	9 (5.3%)	1 (1.6%)		OR 3.52 (95% CI: 0.43–28.47)
Asian & Middle Eastern	12 (7.0%)	3 (4.9%)		OR 1.56 (95% CI: 0.42–5.77)
Other & unknown	1 (0.6%)	2 (3.3%)		OR 0.20 (95% CI: 0.02–2.20)
ISS‡	22.7 [9.3]	17.2 [5.2]	t-test for independent means	p<0.001
Mechanism of injury				
Road traffic crash	60 (35.1%)	18 (29.5%)	Chi-squared test for independence	p=0.67
Inflicted§	14 (8.2%)	5 (8.2%)		
Motorbike crash	18 (10.5%)	6 (9.8%)		
Fall	26 (15.2%)	13 (21.3%)		
Sport	25 (14.6%)	13 (21.3%)		
Pedestrian	16 (9.4%)	3 (4.9%)		
Other¶	12 (7.0%)	3 (4.9%)		

Table 3 (continued): Characteristics of patients with Trauma Call vs Trauma Standby.

Variable	Trauma Call Mean [SD] or n (%) (n=171)	Trauma Standby (n=61)	Statistical test	Result†
Triage on arrivalþ				
1	108 (63.2%)	6 (9.8%)	Chi-squared test for independence	p<0.001
2	56 (32.7%)	44 (72.1%)		
3	5 (2.9%)	11 (18.0%)		
4	1 (0.6%)	0 (0%)		
4	1 (0.6%)	0 (0%)		
Shift of presentationµ				
AM	61 (35.7%)	22 (36.1%)	Chi-squared test for independence	p=0.261
PM	65 (38.0%)	29 (47.5%)		
NOCTE	44 (25.7%)	10 (16.4%)		
Unknown	1 (0.6%)	0 (0%)		

† p-values reported except in cases of odds ratios where 95% confidence intervals are reported;
‡ Injury severity scores available for 164 Trauma Calls and 61 Trauma Standby;
§ Inflicted included assault, struck and gunshot;
¶ Other included crush, burns, electrocution, explosion, ingestion, jump, self-harm and unknown;
þ Triage as per Australasian Triage Scale;
µ AM=0800–1559, PM=1600–2359, NOCTE=0000–0759

Table 4: Key performance indicators for patients with Trauma Call vs Trauma Standby.

Variable	Trauma Call Mean [SD] or n (%) (n=171)	Trauma Standby (n=61)	Univariate statistical test	Univariate result†	Multivariate statistical test	Multivariate model controlling for age and ISS
Mortality	**15 (8.8%)**	**2 (3.3%)**	**Odds Ratio**	**OR 2.8 (95% CI: 0.63–12.78)**	**Logistic regression**	**OR 1.5 (95% CI: 0.29–8.4)**
Time to CT (mins)	83.3 [108.7]	95.7 [55.8]	t-test for independent means	p=0.40	Cox regression	p=0.54‡
	Median=54.5	Median=84	Mann–Whitney U test	p < 0.001		
ED LOS§ (hours)	3.2 [2.9]	5.3 [1.8]	t-test for independent means	p < 0.001	Cox regression	p=0.16‡
Admission to ICU	81 (47.4%)	2 (3.3%)	Odds Ratio	OR 26.6 (95% CI: 6.3–112.2)	Logistic regression	OR 17.9 (95% CI: 4.2–77.4)
ICU LOS§ (days)	11.1 [12.8]	12.5 [12.0]	t-test for independent means	p=0.89	Cox regression	p=0.96‡
Hospital LOS§ (days)	14.4 [13.4]	8.5 [8.5]	t-test for independent means	p<0.001	Cox regression	p=0.006‡
Surgery	114 (66.7%)	22 (36.1%)	Odds Ratio	OR 3.5 (95% CI: 1.9–6.5)	Logistic regression	OR 2.7 (95% CI: 1.4–5.2)
Time to surgery¶						
<24hrs	69 (60.5%)	4 (18.2%)	Chi-squared test for independence	p<0.001	NA	NA
24–48hrs	21 (18.4%)	3 (13.6%)				
48–72hrs	5 (4.4%)	6 (27.3%)				
>72hrs	19 (16.7%)	9 (40.9%)				
Admitting specialty						
Cardiothoracic Surgery	25 (14.6%)	12 (19.7%)	Chi-squared test for	p=0.07	NA	NA
General Medicine	0 (0%)	1 (1.6%)	independence			

Table 4 (continued): Key performance indicators for patients with Trauma Call vs Trauma Standby.

Variable	Trauma Call Mean [SD] or n (%) (n=171)	Trauma Standby (n=61)	Univariate statistical test	Univariate result†	Multivariate statistical test	Multivariate model controlling for age and ISS
Mortality	**15 (8.8%)**	**2 (3.3%)**	**Odds Ratio**	**OR 2.8 (95% CI: 0.63–12.78)**	**Logistic regression**	**OR 1.5 (95% CI: 0.29–8.4)**
Admitting specialty						
General Surgery	37 (21.6%)	13 (21.3%)				
Neurosurgery	33 (19.3%)	5 (8.2%)				
Orthopaedic Surgery	49 (28.7%)	26 (42.6%)				
Orthopaedics –Spinal	15 (8.8%)	3 (4.9%)				
Paediatric Surgery	6 (3.5%)	0 (0%)				
Other[þ]	6 (3.5%)	1 (1.6%)				

† p-values reported except in cases of odds ratios where 95% confidence intervals are reported;
‡ Cox regression for continuous variables;
§ LOS = Length of Stay;
¶ % of those that had surgery;
þ these were ENT, Vascular, Maxillofacial, Plastics, Urology and unknown.

a TTA compared to those who met the criteria but did not have a TTA (12.8 [SD=58.6] vs 6.4 [SD=3.7]; p=0.027). There was no significant difference in ED LOS (hours) (3.8 [SD=2.8] vs 4.9 [SD=3.4]; p=0.119). There was no significant difference in admission to ICU (OR 2.09; 95%CI:0.67–6.50); however, patients with a TTA trended insignificantly towards a longer ICU LOS (days) (11.1 [SD=12.7] vs 5.3 [SD=3.4]; p=410). There was no significant difference for requiring surgery (OR 1.28; 95%CI:0.50–3.26) and time to surgery did not differ significantly between groups (p=0.56).

Multivariate analyses were conducted controlling for age and ISS looking at mortality, time to CT, ED LOS, hospital LOS, admission to ICU, ICU LOS and whether surgery was required for patients who received a TTA vs patients who did not receive a TTA but met criteria. Once age and ISS were controlled for, there continued to be no significant difference in mortality (OR 0.43; 95%CI:0.07–2.73). There continued to be no significant difference in ED LOS (hours) (p=0.259). Hospital LOS (days) remained significantly longer for TTA patients (p=0.012). There continued to be no significant difference in admission to ICU (OR 1.42; 95%CI:0.44–4.50), ICU LOS (days) (p=0.34), or requirement of surgery (OR 1.38, 95%CI: 0.53-3.60) (see Appendix 2).

Discussion

Christchurch Hospital uses a two-tier trauma team activation system to ensure that a full multi-professional trauma team are available to rapidly attend to critically injured major trauma patients, while reducing the resources and staff for the less severely injured trauma patient. This two-tier system aims to reduce unnecessary involvement of specialist teams, and protect this limited resource for more serious cases.

During the one-year period reviewed those that had a trauma team activation had a higher mean ISS compared to those without a TTA. Patients with a full Trauma Call also had higher mean

ISS than those with a Trauma Standby. As ISS is officially calculated after the patient has been fully assessed, this suggests that patients with more severe injuries are being appropriately recognised early in their healthcare journey.

It is reassuring that the TTA process is not biased by either gender or ethnicity. However, patients over 64 years of age were markedly less likely to receive a TTA, suggesting a potential under-appreciation of injuries in this age group. Older adults were also less likely to have a full Trauma Call if they did receive a TTA. This is concerning as multiple previous studies have found that even after adjusting for injury severity and pre-existing medical conditions, older trauma patients have consistently worse outcomes, with twice the mortality and significantly longer ICU and hospital length of stay.[19–23] The Christchurch TTA system does not currently contain any age-specific criteria, which has been shown to improve the identification of injured older adults.[24,25] In addition studies have shown that the care of elderly trauma patients is an area of research that trauma clinicians have previously identified as a research priority to improve care of these patients.[26] This is currently being investigated by our study team.

Road traffic crashes accounted for the majority of TTAs, with 43.9% of TTAs being a combination of road traffic crashes and motorbike crashes. This finding is similar to the caseload proportions identified when the New Zealand Major Trauma Registry was first implemented. At the time 50% of all trauma caseload was accounted for by road traffic crashes.[27] Further research into the mechanism of injury of trauma presenting to Christchurch Hospital over a longer timeframe would be valuable to aid public health policy initiatives.

The primary multivariate analysis which controlled for both ISS and age showed that TTA was associated with decreased time to CT, time to surgery and ED LOS, despite these patients having an increased rate of requirement for surgery, admission to ICU and longer ICU LOS. This suggests that TTAs may be associated with improving rapid assessment and management on presentation to hospital. After controlling for age and ISS, there was no longer a significant difference in mortality for patients with a TTA vs those with no TTA. There may be a number of reasons for this; however, the under-recognition of major trauma in older adults, who have higher mortality rates that younger patients with similar injuries, will be confounding this issue.

Patients who received a full Trauma Call, as compared to Trauma Standby, had a higher mortality after controlling for ISS and age. It is not clear whether there are other factors not captured by ISS and age that are affecting this group. A further investigation is warranted to determine whether there are specific patient groups that would benefit from a full Trauma Call, as well as a cost-benefit analysis of activation of the full multi-professional trauma team.

Limitations

The retrospective and observational nature of this study incurs standard limitations in data collection and interpretation. Due to the retrospective and observational nature of our study causality cannot be inferred. The number of cases in some of the subgroup analyses is small which may limit statistical power. The CDHB Major Trauma Database does not record those patients who have a TTA but are not finally coded as having major trauma, and so the rate of false positive TTAs is not known. A limitation of our dataset is the absence of data regarding trauma patients who are not classified as major trauma (ISS<12). This data is not collected within the CDHB trauma database due to resource constraints. Another limitation of our data is the absence of data regarding patients who are directly transferred from ED to the operating theatre. This data would be valuable to evaluate in further studies.

Conclusions

The Christchurch Hospital Trauma Team Activation system is associated with reduced time to diagnostic imaging and definitive management in surgery of major trauma patients presenting to Christchurch Hospital. The current two-tier activation process requires review to determine if there are certain patient groups who do not require the full Trauma Call and could therefore have similar benefit from a Trauma Standby, without the associated resourcing costs.

An additional tier of TTA will shortly be introduced in Christchurch, for the most critically injured patients. “Code Crimson” will increase the number of senior clinicians attending TTAs for patients with immediately life-threatening haemorrhage due to trauma, and a review of the outcomes of all major trauma patients after this process change will be essential.[28] The addition of age-specific criteria to the current protocol should be considered due to the under-triage and under-diagnosis of older adults with major trauma who have significantly higher mortality and morbidity.

COMPETING INTERESTS
Nil.

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AUTHOR INFORMATION
Maria Nonis MBChB, BSc: Department of Surgery, University of Otago (Christchurch), New Zealand; Emergency Department, Te Whatu Ora, Christchurch, New Zealand.
Andrew McCombie PhD, BSc, BA(Hons): Department of Surgery, University of Otago (Christchurch), New Zealand; Department of General Surgery, Te Whatu Ora, Christchurch, New Zealand.
Christopher Wakeman MBChB, FRACS, MTSci, MMedSci: Department of Surgery, University of Otago (Christchurch), New Zealand; Department of General Surgery, Te Whatu Ora, Christchurch, New Zealand.
Dominic Fleischer MBChB, FACEM: Emergency Department, Te Whatu Ora, Christchurch, New Zealand.
Laura Joyce MBChB, FACEM, BMedSc(Hons), MMedEd, CCPU: Department of Surgery, University of Otago (Christchurch), New Zealand; Emergency Department, Te Whatu Ora, Christchurch, New Zealand.

CORRESPONDING AUTHOR
Maria Nonis MBChB, BSc: Department of Surgery, University of Otago (Christchurch), New Zealand; Emergency Department, Te Whatu Ora, New Zealand.
E: maria.nonis@outlook.co.nz

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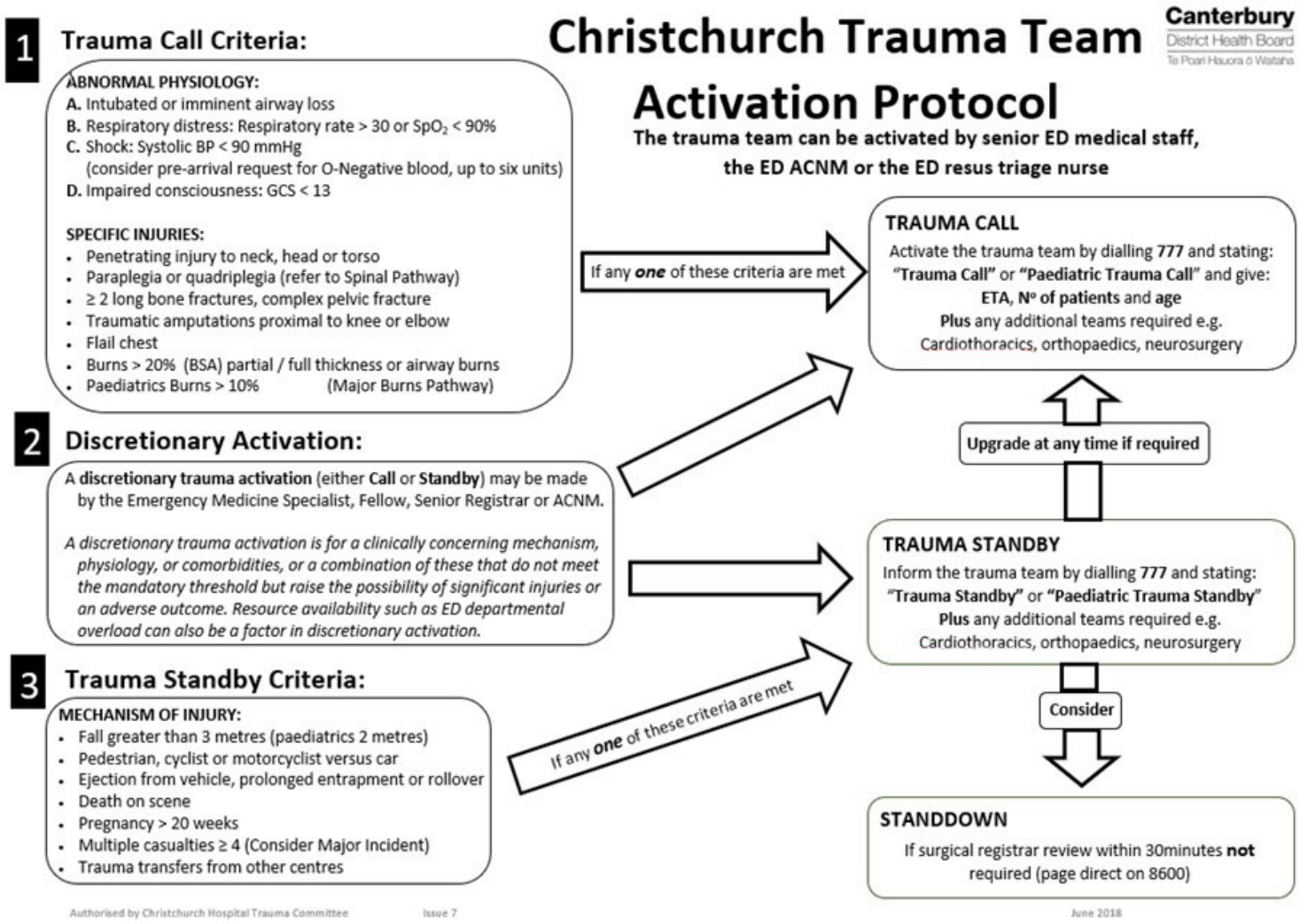
Appendices

Appendix 1: Christchurch Trauma Team Activation protocol.



Appendix 2: ISS and key performance indicators for major trauma patients who had a Trauma Team Activation vs those who didn't, but met Trauma Team Activation criteria.

Variable	Trauma Team Activation Mean [SD] or n (%) (n=232)	No Trauma Team Activation, but meeting criteria (n=19)	Univariate statistical test	Univariate result†	Multivariate statistical test	Multivariate model controlling for age and ISS
ISS‡	21.1 [8.7]	18.1 [4.9]	Mann–Whitney U test	p=0.169	NA	NA
Age						
<65	196 (84.5%)	15 (78.9%)	Odds Ratio	OR 0.69 (95% CI: 0.22–2.19)	NA	NA
65+	36 (15.5%)	4 (21.2%)				
Mortality	17 (7.3%)	2 (10.5%)	Odds Ratio	OR 0.67 (95% CI: 0.14–3.15)	Logistic regression	OR 0.43 (95% CI: 0.07–2.73)
Time to CT (mins)	86.6 [97.3]	162.1 [144.7]	Mann–Whitney U test	p<0.001	Cox regression	p=0.007§
	Median=60	Median=116	Mann–Whitney U test	p<0.001		
ED LOS¶ (hours)	3.8 [2.8]	4.9 [3.4]	Mann-Whitney U test	p=0.119	Cox regression	p=0.259§
Admission to ICU	83 (35.8%)	4 (21.1%)	Odds Ratio	OR 2.09 (95% CI: 0.67-6.50)	Logistic regression	OR 1.42 (95% CI: 0.44–4.50)
ICU LOS¶ (days)	11.1 [12.7]	5.3 [3.4]	Mann–Whitney U test	p=0.410	Cox regression	p=0.134§
Hospital LOS¶ (days)	12.8 [58.6]	6.4 [3.7]	Mann–Whitney U test	p=0.027	Cox regression	p=0.012§
Surgery	136 (58.6%)	10 (52.6%)	Odds Ratio	OR 1.28 (95% CI: 0.50–3.26)	Logistic regression	OR 1.38 (95% CI: 0.53–3.60)
Time to surgeryþ						
<24hrs	73 (53.7%)	6 (50.0%)	Mann–Whitney U test	p=0.56	NA	NA
24–48hrs	24 (17.6%)	2 (20.0%)				
48–72hrs	11 (8.1%)	2 (20.0%)				
>72hrs	28 (20.6%)	1 (10.0%)				

† p-values reported except in cases of odds ratios where 95% confidence intervals are reported; ‡ Injury Severity Score available for 225 TTA and 19 no TTA, but meeting criteria; § Cox regression for continuous variables; ¶ LOS= Length of stay; þ % of those that had surgery.

Responding to the tāngata whai ora voice: an Aotearoa New Zealand quality improvement solution

Amanda Luckman, Paul Clements, Thomas White, Angela Jury, Jennifer Lai, Mark Smith

ABSTRACT

Understanding and responding to the voice of people receiving mental health and addiction services is imperative. The policy environment in Aotearoa New Zealand is shifting to place greater value on gathering input and feedback from people accessing health services. This viewpoint article looks at the use of patient reported experience measures (PREMs), with a particular focus on mental health and addiction services and the development of Mārama Real Time Feedback (Mārama).

Measures examining people's experience of health services are used widely internationally. Mārama is one tool that has been specifically developed for the Aotearoa New Zealand context. The tool can be completed by people accessing mental health and addiction services (tāngata whai ora – people seeking wellness) along with their whānau. People with lived experience of accessing mental health and addiction services provide critical leadership supporting the use and implementation of Mārama within services. Feedback gathered through Mārama must be actioned to truly improve services. This action can return power to tāngata whai ora who may otherwise feel powerless in the health system.

He mana tō te kupu.
Words have great power.

This whakataukī (Māori proverb) speaks to the value of words that Patricia Leavy also references when she says: "People must be able to use their voice, tell their stories, have their experiences recognised and their voices heard".[1] As the lead author (AL), and in reflecting upon my own experience of the health system, I have felt seen and validated when services have listened to my feedback, both positive and constructive.

Within the health system, one method of hearing and honouring the voice of the people is to gather and utilise data about people's experiences of services.[2] However, it is not sufficient to just collect satisfaction or experience data.[3] To truly recognise and hear the voices of people who experience mental health challenges and substance use issues (tāngata whai ora – people seeking wellness) it is imperative to act on information about people's service experiences. This is the cycle of continuous quality improvement that evidences more effective services. Quality improvement aims to make a difference to tāngata whai ora by improving the "safety, effectiveness, and experience of care",[4] and the completion of this feedback cycle returns power to the people receiving services. This article advocates that when measures of tāngata whai ora reported experience are an integral component of quality improvement activities, there is potential for powerful change resulting in improved support and outcomes for people.

He Ara Oranga: Report of the Government Inquiry into Mental Health and Addiction concludes that the "consumer voice needs to be supported, strengthened and included in all aspects of the system, from governance to service delivery".[5] The *Health and Disability System Review* also highlights the importance of centring the health system around the needs of people.[6] More recently, *Kia Manawanui*, the Ministry of Health's long-term pathway to mental wellbeing, commits to "amplify the voices and strengthen the leadership of [...] people with lived experience". It further commits to "set expectations that funders, commissioners and providers of mental wellbeing services and supports will proactively seek out the voices of these groups and establish mechanisms to obtain their input".[7]

In line with the international literature,[2] these three documents signal an increasing focus on listening to, and acting upon, the voices of tāngata whai ora and their whānau within mental health and addiction services, and health services more broadly. The policy environment in Aotearoa New Zealand is shifting to place greater value on gathering and understanding information from people accessing health services. Gathering experience

data and feedback is one way of understanding what tāngata whai ora and their whānau want from services. Importantly, feedback from tāngata whai ora Māori and whānau voices are critical for informing strategies to address the health inequities experienced by Māori.[8]

This viewpoint article is written explicitly from a tāngata whai ora perspective, and intends to highlight topical issues for lived experience and other mental health and addiction sector leaders on the subject of quality improvement with specific reference to the use of a locally developed tool, Mārama Real Time Feedback (Mārama). The article describes international practice in the area of person-reported experience measures, with a particular focus on mental health and addiction, then goes on to describe a solution developed and implemented in Aotearoa New Zealand. Finally, we comment on the future direction and need for tāngata whai ora led experience measures.

It is noted that this article takes a strengths-based approach to the use of language, based upon the conventions of *Te Reo Hāpai: The Language of Enrichment*, a Māori language glossary for the mental health, addiction, and disability sectors.[9] As such, words (kupu) in te reo Māori are used in this article to include both Māori and non-Māori.

Experience measures are widely used internationally

Generally, health services can use two types of tools to capture peoples' voices and perspectives. Patient reported outcome measures (PROMs) gather information about peoples' perceived physical, mental and emotional health statuses to help services understand how they have impacted on peoples' outcomes. On the other hand, patient reported experience measures (PREMs) gather information about the perceived quality of care. PREMs help services to understand how people feel about the service or support provided, what is important to them, and what opportunities there are for improvement.[10,11,12]

This viewpoint article focuses on PREMS, which the World Health Organization considers as an indicator of the quality and responsiveness of health services and systems.[13] Similarly, a recent paper from the Organisation for Economic Co-operation and Development (OECD) highlights that "patient-reported measures are a critical tool for improving policy and practice in mental health care".[2] Many countries have widely implemented PREMS in health care settings, including New Zealand, Australia, the UK, US and Canada.[14] Over the last 20 years, there has been a deliberate international shift towards measuring peoples' experience of services (rather than satisfaction), as this provides greater detail to enhance services' abilities to make improvements to people's experiences.[15]

PREMs can form one part of a feedback loop to inform service quality improvement. PREMs help identify areas of effective practice, and where and why people report positive and negative experiences.[16] In addition to quality improvement, people's experience of services provides an indication of the quality of support that can be used for benchmarking. Having a standard set of questions and a consistent method of data collection enables people's experiences to be compared over time and between services.[16] Standardisation also enables benchmarking at a national and international level[16] and can support shared learning across services.

Several foundational frameworks have guided development of consumer experience measures, including the Picker Institute[17] and Institute of Medicine.[18] Looking at other countries, there are numerous examples of consumer experience measures used in quality improvement and benchmarking. Examples of surveys designed for large-scale collection in mental health and addiction services include: Your Experience of Service Survey (Australia); Community Mental Health Survey (UK); Consumer Assessment of Healthcare Providers and Systems (CAHPS) – Experience of Care & Health Outcomes (ECHO) Survey (US); National Patient Survey (Sweden); Flemish Mental Health Services Survey (Belgium); and the Psychiatric Inpatient Patient Experience Questionnaire (Norway).[2,14]

A tool has been developed for Aotearoa New Zealand

In Aotearoa New Zealand, mental health and addiction services are required to collect and respond to feedback data about tāngata whai ora experiences in accordance with several policies. The Ngā Paerewa Health and Disability Services Standard requires all providers of health and disability services to ensure that people with lived experience of mental health issues or addiction, and whānau, participate in the planning, implementation, monitoring and evaluation of service delivery.[19] Under the previous health system structure, district health boards (DHBs) were required as part of the Ministry of Health's Operational Policy Framework to undertake and report the results of a mental health consumer

survey. DHBs were further expected to work with tāngata whai ora to implement systems for capturing consumer experience.[20] They must then demonstrate internal and external accountability through reporting to the public and clinical community, including any improvements and achieved changes. However, a limitation of this previous process was that it does not ensure data is translated into quality improvements.[20] For tāngata whai ora, it is crucial that services collect this information, implement change, and report on the actions taken as a result of feedback.

In 2013, the Office of the Health and Disability Commissioner (HDC), in its capacity to monitor mental health and addiction services, contracted CBG Health Research (CBG) to develop an electronic tool to enable tāngata whai ora and whānau to provide feedback directly to service providers in "real-time". CBG led a collaborative process to develop an evidence-informed survey with the HDC and the Ministry of Health, which included involvement of people with lived experience. A literature review was undertaken to inform the survey design, from which CBG developed a set of potential questions.[15] These were used to initiate conversations with seven pilot sites, which included Māori and Pasifika services. Feedback gained through the pilot significantly influenced the final question design.[21] This led to the development of Mārama Real Time Feedback (Mārama).

Mārama is an online feedback collection tool that can be completed by tāngata whai ora and/or whānau at any point during a person's contact with services. Feedback is provided using tablets, URL links, and QR codes. Work is also underway to enable mobile phone access to the survey using a URL link. The use of technology means feedback data is captured and reported in real time. Timely access to feedback data through effective use of information management and technology is essential for quality improvement initiatives.[22]

Mārama consists of seven questions that tāngata whai ora and whānau rate on a 5-point agreement scale (see Figure 1). The questions were developed to collect feedback from people of varied population groups and are available in seven languages, including te reo Māori. Importantly, Mārama includes a question about whānau involvement and provides the option for whānau to complete the survey from their own perspective. This honours and acknowledges the important role of whānau within Māori health models, such as Te Whare Tapa Whā.[23] Services can also add questions customised to their setting or local needs. Some services have used this opportunity to include a broad cultural question, for example "my culture and beliefs are respected", and others have developed questions specific to Māori experiences of services to meet their local needs.[24] To ensure the tool is used to its full potential to meet the needs of Māori and Pasifika peoples, there is a need for further evaluation to be undertaken in this area.

Since its launch in 2014, Mārama has gathered data on the experiences of over 44,240 tāngata whai ora and whānau (as of 2 March 2022). Approximately 80% of the feeback is from tāngata whai ora and 20% from whānau. The aggregated data collected since 2014 indicates around one third (38%) of the feeback was collected from respondents identifying as Māori; 9% Pasifika; 4% Asian; and 49% New Zealand European/Other. These proportions have been fairly consistent over time. There is good represention of Māori perspectives among the feedback data (29% of people who accessed mental health and addiction services in 2019/20 were Māori).[25] Mārama is currently being used by a large proportion of DHBs (17) and an increasing number of NGOs (13), along with several primary health services. The trend towards increasing collection and use by NGOs looks likely to continue. Continuous review and improvement will remain essential to support the expansion of Mārama across the sector, including responsiveness to tāngata whai ora Māori and whānau.

Mārama provides a national quality measurement and reporting system for the sector. Mārama itself has been subject to continuous quality improvement, and technology developments have enabled greater uptake of the tool. Increased uptake of Mārama builds a larger data set that can be used by individual organisations, and nationally at an aggregated level. The collected data can be publicly viewed through tracking graphs and report cards available on the Te Pou website (tepou.co.nz) and participating organisations can access more detailed reports through the Mārama website (marama.co.nz). Figures 2 and 3 provide examples of how Mārama data are regularly reported at a national level.

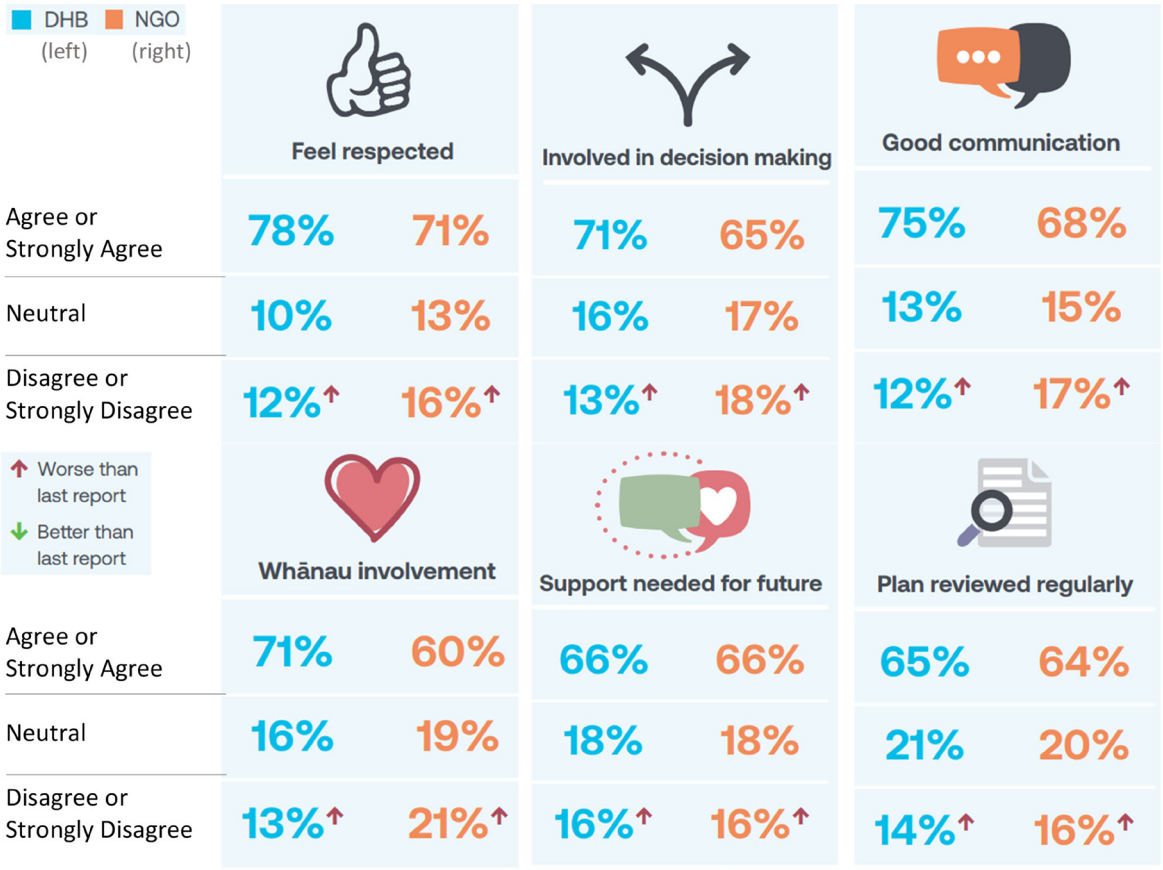
People with lived experience provide critical leadership

People with lived experience of mental health challenges and or addiction issues who work within mental health and addiction services have been key to the implementation of Mārama. Among services with the highest Mārama collection rates

Figure 1: Mārama Real Time Feedback core questions.

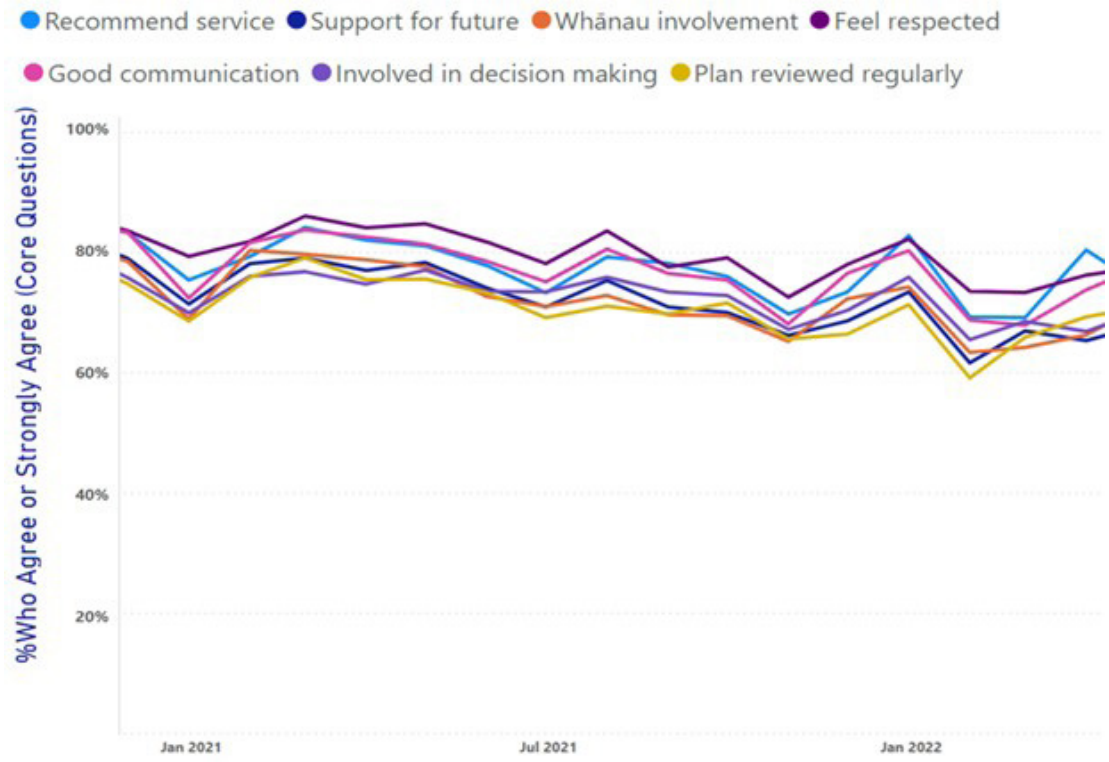
Q1: Relationship/partnerships
I feel respected.
Q2: Communication/information
I am involved in decision making.
Q3: Continuity of Care/coordination
The people I see communicate with each other when I need them to ("don't know" option).
Q4: Family involvement
My family/whānau are given information and encouraged to be involved ("N/A" option).
Q5: Recovery and support
I have the support I need for the future.
Q6: Recovery and support
Our plan is reviewed regularly
Q7: Friends and family
I would recommend this service to friends and family/whānau if they needed similar care or treatment.
Q8: Free text
Is there anything you want to say about your recent experience with the service or anything you think we can improve on?
Demographics:
Age group/Gender/Ethnicity

Figure 2: Mārama national report of tāngata whai ora feedback collected between September 2021 and March 2022 (2,288 total surveys: 1,058 DHB surveys and 1,230 NGO surveys).



Source: Te Pou (http://www.tepou.co.nz/initiatives/marama-real-time-feedback).

Figure 3: Example of the Mārama tracking graphs updated daily using real time data showing the percentage of tāngata whai ora and whānau who agree or strongly agree with the Mārama statements (January 2021 to January 2022).



Source: Te Pou (http://www.tepou.co.nz/initiatives/marama-real-time-feedback)

in 2020, people with lived experience of mental health challenges and addiction issues were key to implementation. Lived experience leadership has been demonstrated through various roles in the implementation of Mārama, including involvement in Mārama project lead or champion roles, steering groups, as well as the coordination and direct involvement of feedback collection. Similarly, a sector consultation survey undertaken in 2020 found people working in mental health and addiction services agreed that lived experience leadership is important to the collection and use of Mārama feedback.[24] Lived experience leadership also plays a critical role in closing the quality feedback loop.

While leadership for the collection of feedback to inform quality improvement is not restricted to people working in lived experience roles, it is clear that a key consideration for services is how to utilise and demonstrate lived experience leadership in their use of Mārama. However, it is crucial that lived experience leadership is valued and implemented respectfully, and that it is not simply co-opted in to improve completion rates of Mārama questionnaires.

One organisation that meaningfully embeds lived experience leadership for Mārama is Odyssey, an addiction service provider in Aotearoa New Zealand. The organisation's consumer advisor, Thomas White, has a lead role in taking responsibility for the implementation of Mārama, alongside other colleagues. Lived experience leadership is demonstrated in the collection of information, how it is shared and interpreted, and actions taken as a result. White describes the value of lived experience leadership in terms of "giving [tāngata] whai ora ownership of a direct source of communication [to the organisation]". The connection to governance and decision making is a key part of closing the feedback loop and demonstrating real change in response to feedback collected through Mārama. White describes the benefits of "being able to bring change that people with lived experience may have experienced themselves in services and being a link to governance and oversight of programmes".[26]

Feedback from tāngata whai ora requires action

While Mārama is a useful method of PREM data collection,[21,24] the value of the process is not simply in gathering more information, but in effectively analysing findings and using results to make service improvements. While there are excellent examples of the use of Mārama data, some services are still in the early stages of using the feedback to make improvements. Further work is needed to enhance organisational capacity and capability in using Mārama for quality improvement. Recent sector consultation suggests use of Mārama is maximised when organisations are focused on data use, not just collection rates, and have organisational capacity or tools to analyse the free text responses.[24]

The wider literature indicates improving service quality using PREMs requires commitment, an understanding of the data, dissemination of findings, use of quality improvement tools, and co-designed plans to action positive change.[3,4,27] At the organisational level, readiness for change and sustainable quality improvement requires senior management support and staff training, as well as infrastructure and processes that will enable change.[3,4,27] Implementing change is both a pragmatic and compassionate response to understanding how people experience services, and whether services have made a positive difference to people's wellbeing during some of their most difficult times. Investment in the Plan-Do-Study-Act (PDSA) cycle can help organisations demonstrate this change and communicate changes made in response to feedback.[4]

One such PDSA method used by some organisations in Aotearoa New Zealand is the "you said, we did" approach. This approach presents Mārama results and actions taken in response to findings to both tāngata whai ora and service employees.[24] Northland DHB is implementing learnings from Mārama according to this "you said, we did" approach. Staff are involved in presenting Mārama findings using easily understandable graphs, as well as any plans that services have to address the feedback from tāngata whai ora. Paul Clements, a lived experience leader from Northland DHB, describes this process as "very important for people to know that what they have said makes a difference and they can see it, otherwise when we ask them later to provide feedback they will be reluctant and think 'what's the point?'".[28] This level of accountability to tāngata whai ora and whānau validates the importance of the knowledge gained through PREMs, in this case Mārama, and demonstrates the utility of the information gathered.

Feedback from tāngata whai ora and whānau gathered through Mārama has been used in multiple ways by services. It is a key mechanism of sharing feedback with staff within some services, including executive leadership teams. Some organisations have developed dashboards which staff can access to support this process. While Mārama helps identify areas for service design and improvement, tāngata whai ora and whānau also use it as a mechanism to share positive feedback to staff. Services are using feedback to identify priority areas that need improvement in strategic plans. Thomas White from Odyssey says that "user commentary and key words have been used in data compilation to inform strategic and organisational pathways, creating objective evidence and robust discussions for change".[29] The introduction of new initiatives, training, and clearer communication in some services has been based on feedback about how tāngata whai ora and whānau are feeling. These improvements are often driven by both Mārama data and co-design with consumer groups. Other services have focused on areas where they have lower agreement scores and identified these as priority focus areas, leading some to explore what this means for their service and what is required to make meaningful improvements in practice. The identification that whānau engagement scores collected through Mārama are low across Aotearoa New Zealand has also led to engagement with family whānau advisors and progress in developing a plan focused on this area.

Conclusion

He aha te kai ō te Rangatira?
He kōrero, he kōrero, he kōrero.
What is the food of the leader?
It is knowledge. It is communication.

Feedback data, specifically PREMs, need to be collected in order to inform and support effective service delivery. As we look to the future there are opportunities to enhance the collection and use of feedback data. With health reforms currently underway towards a more centralised system (Te Whatu Ora – Health New Zealand and Te Aka Whai Ora – Māori Health Authority), there is potential to move to a nationally consistent approach to mental health and addiction

service feedback collection. Strategic leadership is required to ensure that feedback and quality improvement are embedded in the new health structure. There is a substantial amount of feedback that could be collected from tāngata whai ora and whānau through a national approach. In 2019/20, around 184,000 adults accessed specialist mental health and addiction services according to the Programme for the Integration of Mental Health Data.[25] This indicates the potential for the tāngata whai ora voice to make important contributions to service improvements.

Aotearoa New Zealand is now in a strong position to collect and respond to the service experiences of tāngata whai ora and whānau with Mārama. Mārama is a viable, useful and effective method for gathering feedback, and has seen good success in implementation across a range of service settings. Aotearoa New Zealand is placing increasing emphasis on hearing and responding to the voices of tāngata whai ora. This leads to opportunities for the growth and embedding of Mārama as a data collection and quality improvement tool. Lived experience leadership is a pivotal factor in the use of Mārama. The pairing of effective quality improvement through PREMs, with lived experience leadership, has the potential for tangible and positive improvements in service delivery for tāngata whai ora. *He Ara Oranga* directly encourages use of "a real time feedback tool like Mārama"[5] as a method to receive feedback from tāngata whai ora and their whānau. This article further articulates the relevance of this tool.

As lead author, thinking about my own lived experience, I have felt the most personal power when people providing mental health services have changed how they work in response to the feedback I have given them. In a system that inherently detracts from my decision-making and opinion, this feeling of power cannot be undervalued. We have opportunities now to make real changes to services in response to the experience data collected in Aotearoa New Zealand, and these changes will enhance the mana of our tāngata whai ora.

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AUTHOR INFORMATION
Amanda Luckman: Lived Experience Project Lead, Te Pou, Wellington, New Zealand.
Paul Clements: Consumer and Family Leader, Northland District Health Board, Whangārei, New Zealand.
Thomas White: Consumer Advisor, Service Improvement and Development, Odyssey, Auckland, New Zealand.
Angela Jury: Researcher, Te Pou, Auckland, New Zealand.
Jennifer Lai: Researcher, Te Pou, Auckland, New Zealand.
Mark Smith: Programme Lead – Outcomes and Information, Te Pou, Hamilton, New Zealand.

CORRESPONDING AUTHOR
Amanda Luckman: Te Pou, PO Box 7443, Wellington South 6011. E: Amanda.Luckman@tepou.co.nz

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Palatal keratosis associated with reverse (or "backwards") smoking (PKARS)

John Won, Hadleigh Clark

Palatal mucosal changes secondary to smoking habits have been recognised since the time of Sir James Paget in the 19th century.[1] Smoker's palate, or nicotinic stomatitis (NS) is most associated with habitual cigar or pipe smoking, yet may appear with conventional cigarette use, as well as regular consumption of thermally hot beverages.[2,3] Recently, NS has been identified with higher prevalence in those who vape.[4] NS is considered of negligible malignant transformation risk—typically resolving on habit cessation—even after many years.[3]

However, a variant—palatal keratosis associated with reverse smoking (PKARS)—is recognised as an established oral potentially malignant disorder (OPMD), distinct from leukoplakia and clinicopathologically separate from NS.[5,6] Reverse smoking involves smoking the lit end of the cigarette intraorally and PKARS may lead to palatal squamous cell carcinoma development (SCC).[5,7,8] We are highlighting a case to create awareness for screening unusual smoking habits, with reference to the palate as an overlooked site in oral cancer screening.

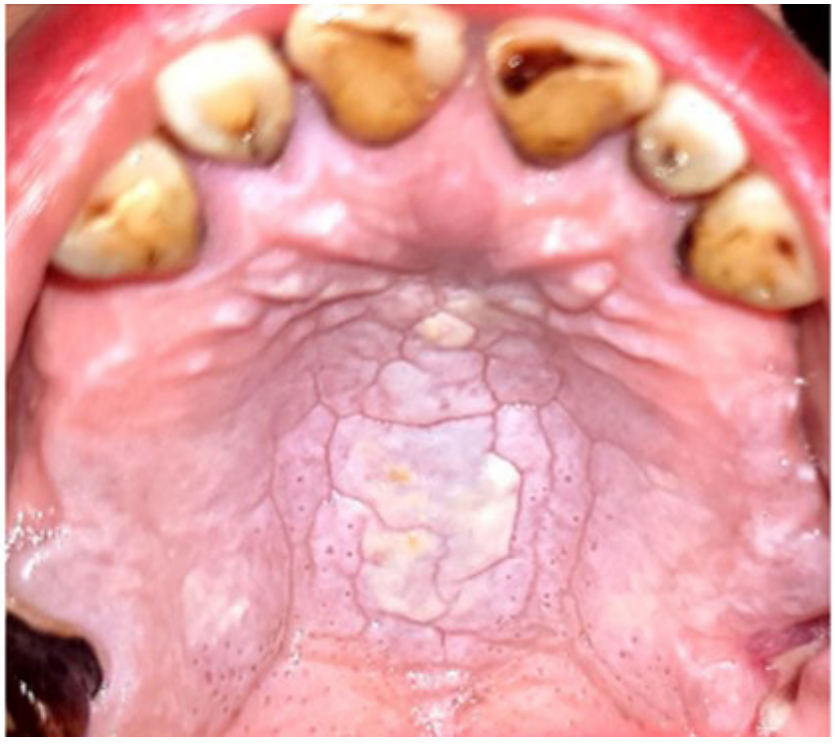
Case report

A 44-year-old Kapampangan-speaking Filipina was referred and seen for assessment in April 2021 for asymptomatic palatal changes incidentally noticed by her dentist. There was no contributory medical/medication history, however she reported a 30-year history of reverse smoking or "*pagsigarilyo ng pabaliktad*" ("backwards smoking") via an interpreter.

Clinically, there was no head and neck lymphadenopathy. Intraorally, findings were of diffuse palatal mucosal thickening, with discrete areas of increased plaque thickness and yellow pigmentation extending to the palatal rugae. The maxillary teeth also demonstrated extrinsic staining (Figure 1).

Three mapping biopsies were performed under local anaesthetic. Histology demonstrated hyperker-

Figure 1: Clinical photograph demonstrating palatal changes with thickening, yellow discolouration, umbilication and fissuring secondary to reverse smoking.



atosis and acanthosis of the squamous epithelium, with mild, patchy sub-epithelial chronic inflammation. There was no dysplasia or malignancy.

A diagnosis of PKARS was established. The patient was counselled of the potential risk of SCC development and cessation advice was provided; family members were also screened for the habit (negative). Referral was made to smoking cessation support services, but unfortunately the patient did not attend these, nor scheduled oral mucosal surveillance recalls, and has been lost to follow-up.

Discussion

Reverse smoking is seldom reported in Western countries. It has been identified as a regional practice amidst ethnocultural groups in Asia (India, Phillipines), Central and South America (Columbia, Panama, Venezuela, Caribbean Islands) and Europe (Sardinia), or expatriate communities thereof.[7,8] The majority of published English language studies arise from more than two decades ago and predominate from the Andhra Pradesh region of India, where the habit is endemic and socially accepted amidst coastal communities, even today.[6,8–10] Occasional case reports and observational studies also appear in contemporary Hispanic medical literature. Examples of the regional terminology for the habit are provided (Table 1).

In contrast to conventional cigarette smoking, reverse smoking predominates in females, occurring mostly after the third decade, typically using hand-rolled cheroot cigarettes.[6–8] A commonality to all practicing cultural groups is that populations reside in tropical/subtropical locations, fishing communities, rainy mountainous areas or those with abundant morning dew: the habit is thought to prevent the cigarette from going out and allows it to be consumed slowly. It is often performed with discretion from males in the community and may be passed down generationally.[10] Table 2 highlights regional language terms for the habit.

Where it is practiced, as many as 50% of all oral malignancies are found on the palate, a site usually spared other OPMDs.[5] The anatomical location of the palate means it is often overlooked during routine oral screening procedures.[7]

Clinical changes seen in PKARS are those of NS with additional features of dyspigmentation, fissuring, white plaque change with yellow-brown staining, papillary excrescences (1–3mm) or umbilication of the palatal duct openings, and frank ulceration [6,8,9] It is usually asymptomatic, except where ulcers are present.[8] Clinical and histological features of PKARS are contrasted against NS in Table 2.

Table 1: Regional examples of reverse smoking terminology.

Terminology (English transliteration)	Language	Country or region	Example reference
Aḍḍa pōgā / *adda chutta* (“reverse smoking”)	Telugu	India (Andhra Pradesh)	Bharath, et al. J Oral Maxillofac Pathol. 2015;19(2):182-187.
Candela pa den (“the fire within”)	Papiamentu (Portuguese Creole)	Dutch Caribbean (Aruba, Bonaire, Curaçao)	Schoenfeld & Holzberger. Arch Dermatol. 1963;90(1):89-90.
Hábito de fumar (*cigarro-/ cigarillo*) *invertido/invertida* (“habit of smoking (cigars/ cigarettes) inverted”)	Spanish	Columbia Ecuador	Ardila Medina et al. Revista Archivo Médico de Camagüey 2013. 17(3): 405-415. Quiñonez & López-Ulloa. Acta Odontológica Colombiana 2019. 9(2):102–110.
Fogu a intru (“the fire within”)	Sardinian	Italy	Racugno. Radiobiol. Radioter. Fis. Med 1958;13:221.
Fumar con la candela pa’ dentro (“smoking with the candle inside”)	Spanish	Venezuela	Ludmagally & Sijas Brunicardi. Acta odontológica venezolana 1991; 29(2):60-4.
Pagsigarilyo ng pabaliktad (“smoking backwards”)	Kapampangan	Phillipines	This study

Conclusion

To the authors' knowledge, we are not aware of similar cases having been reported in New Zealand. While the total numbers of expatriate communities in whom this occurs are expected to be low in the New Zealand populace, it behoves clinicians to consider alternative smoking habits in migrant population groups, especially from the aforementioned regions. If PKARS is suspected alongside a confirmed reverse smoking habit, referral should be made to an appropriate head and neck/maxillofacial surgical service, or related discipline, for biopsy and follow-up.

Table 2: Clinical and histologic findings in nicotinic stomatitis versus palatal keratosis associated with reverse smoking (PKARS).

	Nicotinic stomatitis	**Palatal keratosis associated with reverse smoking**
Clinical features	Hyperpigmentation	Hyperpigmentation and/or hypopigmentation
	Mild erythema and whitening of palatal mucosa	Marked erythema and diffuse whitening of palatal mucosa Atrophy sometimes present
	Mucosal thickening with blanching	Prominent fissuring and nodularity Yellow-brown staining of mucosa
	Erythematous minor salivary duct openings ("red dots") surrounded by keratotic rings	Papillary excrescences (1–3mm) or umbilications of duct opening
	Extrinsic staining of teeth	Extrinsic staining of teeth
		White/red plaque changes
		Frank ulceration
Histologic features	Increased melanin in basal layer of epithelium	Increased melanin in basal layer of epithelium or depigmented basal layer of epithelium
	Mild chronic inflammation, lymphatic dilatation, thickening of blood vessels	Often rete ridges absent and varying degree of inflammation in connective tissue
	Hyperorthokeratosis, parakeratosis and acanthosis	Hyperorthokeratosis > parakeratosis
	Squamous metaplasia/hyperplasia of excretory ducts and keratin plugging	Increased hyperplasia and hypertrophy of ductal epithelium; cystic dilatation and acinar atrophy
	Epithelial hyperplasia	Epithelial dysplasia or carcinoma
	Spongiosis and thinning of epithelium	Presence of koilocytes
		Eosinophilic bodies in basal layer of epithelium or beneath epithelium, similar to Civatte bodies

COMPETING INTERESTS
Nil.

AUTHOR INFORMATION
John (Jong Yoon) Won, Oral Medicine Registrar, Hospital & Specialist Dentistry, Te Whatu Ora Te Toka Tumai Auckland, New Zealand.
Hadleigh Clark, Oral Medicine Specialist, Hospital & Specialist Dentistry, Te Whatu Ora Te Toka Tumai Auckland, New Zealand.

CORRESPONDING AUTHOR
Dr Hadleigh Clark, BSc, BDS, MBChB, DClinDent (OralMed), Oral Medicine Specialist, Hospital & Specialist Dentistry, Te Whatu Ora Te Toka Tumai Auckland, Level 1, Building 4, Greenlane Clinical Centre, 214 Green Lane West, Epsom, Auckland 1051 New Zealand. E: hadleighc@adhb.govt.nz

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Global food security, self-sufficiency and the cost of bread to Aotearoa

Elaine Rush, Heather Came, Gayle Souter-Brown, Geoff Kira

Across the course of life, malnutrition, which includes overweight, underweight, obese or experiencing hidden hunger is associated with non-communicable diseases, impaired immunity and food insecurity. Agriculture is the main driver of food and nutrition security, yet few governments and trade agreements have cohesive policies that link national food guidelines based on evidence for prevention of disease and promotion of health and immunity to agricultural and economic policies.[1] The global impacts of climate change, COVID-19 and now the Russian invasion of Ukraine on global food security and supply, and subsequently the cost-of-living, are reverberating around the world. The trade of wheat—the main ingredient of the food-energy staple bread—is one indicator of food security. For example, in 2020 the Russian Federation, United States, Canada, France, the Ukraine and Australia together exported by weight 70% of the world's total export wheat.[2] Egypt, Indonesia, Turkey, China and Italy imported 25% of the total wheat exported. Clearly, wheat self-sufficiency is not possible in every country; the minimisation of post-harvest losses and costs of transport must be considered.

Previously we have argued that geographically-isolated Aotearoa, a net food exporting country, should be self-sufficient in food staples and feed local people first and well.[3,4] Most (95%) citizens consume bread products daily,[5] and the main ingredient of this bread is wheat imported from Australia.[4]

Food guidelines, including the New Zealand Eating and Activity guidelines,[6] recommend people eat a variety of nutritious foods every day, including grain foods: mostly wholegrain and those high in fibre. Wholegrain bread is recommended.[6] There are, however, no health-related agricultural or economic policies in place to support the local production and availability of bread and other diverse wholesome foods so that all New Zealand people can meet their dietary guidelines sustainably.

According to the last national adult nutrition survey,[5] undertaken in 2008, bread contributed 11% of the energy, 11% of the protein, 17% of the carbohydrates and 17% of the fibre to the average New Zealander's dietary intake. Wholegrain bread (heavy and light) was reported as eaten by slightly more than 60% of the population. In addition, Māori and Pacific ethnic groups, males, younger people and those living in socio-economically deprived areas were more likely to report consuming a greater quantity of lower quality bread than NZ European and other, older people and the less deprived. It is forecast that bread consumption will continue to increase in Aotearoa[7] and globally[8] over the next five years.

The latest household food price index survey by Statistics NZ has shown that the cost of food items in a representative food basket in New Zealand is increasing; from July 2021 to April 2022 by 6%.[9] One of the key items of the basket examined is bread. The cost of white bread has increased between December 2019, pre-COVID, and January 2022 by 18%, from $1.30 to $1.52 per 600g loaf. Wholegrain ($3.60 per 700g) and wheatmeal bread ($2.94 per 700g), both forms of wholegrain bread and nutritionally superior, did not change in price.

In 2018, we imported 410,000 tonnes of wheat grain and flour.[4] The value of the imported wheat was 146 million NZ dollars. Each year we produce only 0.1 million tonnes of milling wheat (for human consumption) and 0.3 million tonnes of feed wheat (for animal consumption).[10] Wheat grown in Aotearoa is often prioritised to feed animals in the dairy, poultry and livestock industries. This low ratio of milling to feed wheat is because growers are paid more for growing feed wheat and corn than milling wheat. 30% of the arable land in Aotearoa is used to grow cereals and 9% of that 30% is used to grow wheat (8%) and oats (1%). The rest of the arable land (91%) used for cereals is farmed for animal feed and silage (mainly corn) and a small amount for malting (barley for spirits).[10]

The quantity of bread and refined flour imported and consumed is one marker of the current burden of food insecurity, malnutrition and the cost-of-living in New Zealand. At the same time, the nutritional quality of the diet of New Zealanders continues to decline as shown

by a continual fall in vegetable and fruit intake.[11] Now is the time to reorientate the food system of New Zealand and sustainably produce the diverse range of vegetables, fruits, pulses, wholegrains and animal products required for health of the planet and the people of Aotearoa. It is time to prioritise feeding all our people over animals and generating export dollars, and spending money on imported food energy. We urgently need healthy public policy in the food production area to address the wicked problem of food security[12] and the associated costs to the health system.

COMPETING INTERESTS
Nil.

AUTHOR INFORMATION
Elaine Rush: School of Sport and Recreation, Faculty of Health and Environmental Sciences, Auckland University of Technology, Auckland New Zealand; Riddet Institute, Centre of Research Excellence in Food Science, Palmerston North, New Zealand.
Heather Came: Department of Public Health, Faculty of Health and Environmental Sciences, Auckland University of Technology, Auckland New Zealand.
Gayle Souter-Brown: Department of Public Health, Faculty of Health and Environmental Sciences, Auckland University of Technology, Auckland, New Zealand.
Geoff Kira: School of Health Science, Massey University, Palmerston North, New Zealand.

CORRESPONDING AUTHOR
Elaine Rush: School of Sport and Recreation, Faculty of Health and Environmental Sciences, Auckland University of Technology, Auckland New Zealand; Riddet Institute, Centre of Research Excellence in Food Science, Palmerston North, New Zealand.
E: elaine.rush@aut.ac.nz

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Correspondence: Medical Education

NZMJ, 1922

(*To the Editor,* N.Z. Medical Journal.)

Sir,—*Re* Medical Education, I must apologise for again asking for space in your journal. But this subject is of such importance to future generations that I feel justified in once more taking up the cudgels against the present system. Your editorials and the letter of Professor Carmalt Jones give considerable food for thought. Many of your readers must be very disappointed to find that the medical faculty of the Otago school appear to have completely ignored the recommendations made last year at Napier by this branch of the B.M.A.

As President I protest against the precious time of an annual conference being taken up by what now appears to have been a futile discussion. We, as an association, were asked by the Senate of the New Zealand University to express an opinion upon the proposal to add a sixth year to the medical course. We had a right to expect that some weight would be given to our advice.

The Dean and some of his colleagues see very little of the finished product turned out by his medical school. Those of us who have for many years come in contact, almost daily, at the public hospitals with the young graduates, see that they suffer from too little clinical experience. The new curriculum, as Professor Carmalt Jones points out, does little to remedy this defect. If a clinical teacher has at his disposal only twelve beds, as I understand is the case in Dunedin, naturally he does not want another year added to the clinical course. Apart from too much time devoted to preliminary subjects, there is too much time devoted to systematic lectures. These lectures are a relic of the past, of a time when few good text-books were available. They are comparable to the old custom practiced in the Presbyterian Churches (probably still extant in some), adopted at a time when Bibles were scarce and dear, namely the reading of the psalms line by line by the precentor, the congregation singing after him one line at a time. I should like to call attention to the leading article of the British Medical Journal of May 5th, entitled "The Medical Curriculum," and more especially to the following paragraph:—"The lengthening of the curriculum is attained by removing the subjects of chemistry and physics into a pre-medical curriculum, in accordance with what we believe to be a greatly accepted proposition that a knowledge of these two subjects should be required from any senior pupil, at a public or secondary school, who is intending to adopt a scientific career…

"Attendance at courses of lectures on medicine, surgery and midwifery is, we notice, no longer required…

"It will further be noted that if the pre-medical curriculum is completed at school there should be little, if any, addition to the cost to the student of his training."

It is quite time that the medical curriculum of the Otago school was revised by the Medical Board, and it is to be hoped that legislation will soon be brought down in Parliament to effect this change. If the sixth year is to be, as it should be, mainly a clinical year, it is obvious that Dunedin Hospital is not big enough to give the necessary clinical teaching. No sound reason has yet been put forward against the proposal to give students in their sixth year clinical experience in the other three principal hospitals. Clinical teachers could be appointed in each hospital and, possibly, arrangements could be made with the various hospital boards to appoint the students as junior house surgeons. The following figures culled from the annual report of the Department of Health, for the year ending March 31st, 1921, show the total clinical material in each hospital:—Auckland, 6,453 patients under treatment; Wellington, 4,709 patients under treatment; Christchurch, 5,737 patients under treatment; Dunedin, 3,817 patients under treatment.

Compare also with the number of beds for children in each hospital: Auckland 81, Wellington 101, Christchurch 45, Dunedin 24. Had the sixth year student access to this extra clinical material, surely it would rather add to than detract from the glory of the Otago Medical School. The opportunity of gaining clinical experience given the local students would then compare favourably with that given to the students in most of the British schools of medicine.—Yours faithfully,

WM. Y.

[The General Medical Council in June, 1922, revised the medical curriculum, and the regulations take effect from January 1st, 1923. The General Medical Council has not seen fit to institute a six years' curriculum such as has been adopted in Dunedin, but has ordained that a preregulation examination shall be held in the subjects of elementary physics and chemistry. "The period of professional study, between the date of the final examination for any diploma which entitles its holder to be registered under the Medical Act, should be a period certified study during not less than five academic years, in the last three years of which clinical subjects shall be studied." It is evident that the General Medical Council of the United Kingdom has failed to follow the lead of the Dunedin Medical School. —*Editor*, "N.Z.M.J"]