End-of-life medical decision making in general practice in New Zealand—13 years on

Impact of the New Zealand 2011 Rugby World Cup on an urban emergency department

Core public health functions for New Zealand

| New Zealand university students’ knowledge and attitudes to organ and tissue donation | Trauma training in New Zealand: A survey of general surgical trainees | Multidisciplinary operating room simulation-based team training to reduce treatment errors: a feasibility study in New Zealand hospitals |
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Core Public Health Functions for New Zealand
Daniel Williams, Barbara Garbutt, Julia Peters
Public health services add value to the health sector by helping manage demand for health care services and by helping the sector understand how we can improve population health, and play a key role in managing emerging health risks. This special article defines the principles and key components of the public health services essential for a highly-functioning New Zealand health system.

Multidisciplinary Operating Room simulation-based team training to reduce treatment errors: a feasibility study in New Zealand hospitals
Failures in communication between members of operating room teams can impair teamwork and contribute to avoidable harm to patients. This is often attributed to steep hierarchies and professional role boundaries inhibiting speaking up or shared decision-making. To address this, we developed a team training intervention using simulation technology to recreate a surgical operation on a computerised, simulated patient, which allowed surgeons, anaesthetists and nurses to train together to develop skills and strategies to improve communication and sharing of information about the case. We found this was feasible and acceptable and showed evidence of improved teamwork and communication. We recommend this type of training for all operating room teams to change communication behaviours in operating theatres and better outcomes for patients.

New Zealand university students’ knowledge and attitudes to organ and tissue donation
Jon Cornwall, Cyril Schafer, Navneet Lal, Rohit D’Costa, Shyamala Nada-Raja
This article looks at New Zealand young adult’s attitudes and knowledge on organ and tissue donation. It examines this subject relating to both their own, and loved ones, donation. New Zealand has a poor rate of organ donation compared to similar countries. It is an important health issue given the necessity for organ donation is increasing. There has been a lot of media interest in NZ around organ donation recently, and this study explores concepts central to these pieces—and provides facts relevant to organ donation practise, as opposed to arguments and/or speculation, which are sometimes key to many media pieces.

Service planning implications of estimating Primary Health Organisation enrolment rate based on a Health Service Utilisation population rather than a census-derived population
Wing Cheuk Chan, Dean Papaconstantinou, Doone Winnard
Primary Health Organisation (PHO) enrolment is considered an important indicator of access to primary health care services. The standard method of estimating the PHO enrolment rate, using the estimated resident population from Statistics New Zealand as denominator, may not provide a reliable indicator to determine the true enrolment rate by ethnicity because of numerator and denominator mismatch. Using the Health Service Utilisation population (a proxy of health services need) as a denominator, PHO enrolment rates were similar across the selected ethnicities in the CMDHB population. The Health Service Utilisation population can potentially define a clear intervention pathway to better target people who are not yet enrolled in a PHO.
SUMMARIES

End-of-life medical decision making in general practice in New Zealand—13 years on
Phillipa Malpas, Kay Mitchell, Heidi Koschwanez
The aim of this study was to explore medical decision-making practices at the end of life made by GPs (MDEL) in NZ and to identify changes in practice with a previous study published in 2004. Our study shows that medical decisions at the end of life that hasten death through the prescribing, supplying or administration of a drug with that explicit purpose, continue to be a reality in New Zealand, that nurses are allegedly involved in such practices, and there appears to be more discussion with patients about MDEL. The study contributes significantly to our understanding of GPs' medical decision-making at the end of life and indicates further areas for research, particularly nurses’ involvement at the end of life.

Impact of the New Zealand 2011 Rugby World Cup on an Urban Emergency Department
Mark Gardener, Tim Parke, Peter Jones
The 2011 Rugby World Cup generated some very busy evenings for the Adult Emergency Department at Auckland Hospital, with up to 25 ambulances arriving per hour around the time of the Opening Ceremony and the Final. Alcohol intoxication contributed significantly to the workload with up to 50% presentations on Final night being alcohol related. The Hospital's plans, which included $50,000 of additional medical staffing, coped well with the event and the Emergency Department waiting time target was met during this period. We hope that our experience in supporting what was a very successful tournament can help with the planning of future events, including the 2015 Rugby World Cup in England.

Trauma Training in New Zealand: A Survey of General Surgical Trainees
Hannah Hurst, Ian Civil, Li Hsee
on behalf of the RACS New Zealand Trauma Committee
Trauma training is important to provide good patient care of the injured. This paper surveyed the perception of trauma training among the surgical doctors in training. Most felt the exposure to trauma training was not adequate. This paper addressed some of these issues and provides solutions such as medical simulation and specialised courses to allow the trainees to gain more exposure.

Informed consent to breech birth in New Zealand
Rhonda Powell, Shawn Walker, Alison Barrett
When managing a breech pregnancy (with baby's head at the top of the uterus), New Zealand maternity care providers have legal duties to provide full and unbiased information about risks and benefits of all options, including a planned vaginal breech birth. Information should be presented in a balanced and accessible way and not limited to the maternity care provider’s personal preferences. Women have legal rights to make an informed choice, to give or refuse consent, to a second opinion and to co-operation among providers. Clinical policies should include appropriate and non-coercive care for women who choose to birth their breech-presenting baby vaginally and consideration should be given to any institutional reforms or educational priorities needed to achieve this.
Commentary on ‘Core public health functions for New Zealand’

Nick Wilson

The special article on ‘Core public health functions for New Zealand’ by Williams and colleagues in this issue of the *Journal* is a very valuable contribution to public health thinking in this country. The inter-relationships between goals, outcomes sought, core functions and key principles are all well outlined. The valuable illustrative examples in their Table 2 indicate the depth of experience and thinking by the authors.

It seems likely that there would be widespread acceptance by health workers for the content of this article, and indeed by the public as well. Even so, in an ideal democratic society attitudes of the public to the principles could be subjected to further evaluation of acceptability eg, with surveys or citizen juries.¹

### Some areas for possible further work

The authors had space restrictions to elaborate on particular issues, but future work could be done on areas where there might be differing perspectives within the New Zealand health sector and society. For example:

- **The stated goal includes New Zealander’s living “longer” lives—but is this really what most people want?** Perhaps a majority might prefer the health sector to focus more attention on the quality component of life with greater effort directed at major causes of disability. Indeed, there are various potential complex advantages and disadvantages of having an increasingly older population (as discussed elsewhere by New Zealand authors²,³). The ranked list of causes of disability for New Zealand was documented in a recent *Lancet* article: back pain (largest burden); major depressive disorder; neck pain; anxiety; “other musculo-skeletal disorders”; asthma; chronic obstructive pulmonary disease (COPD); hearing loss; diabetes and migraine (tenth in burden).⁴ Of course, preventing some of these conditions (eg, COPD and diabetes) will both reduce disability and result in longer lives, as will progress with tobacco and alcohol control. But the scope for extending life expectancy might soon start to face diminishing marginal returns.

- **Does public health action around “reducing health disparities” include addressing lower male life expectancy?** Indeed, some causes of the gap are readily achievable—such as preventing cardiovascular disease in men.⁵

- **Should “evidence” for public health practice include both evidence of intervention “effectiveness”, but also “cost-effectiveness” to ensure the best value for money?** The authors thoughtfully discuss cost-effectiveness in the Background section, but this does not end up in any of the principles.

- **Should there be a principle of the health system striving to be more environmentally sustainable with ongoing reductions in its carbon footprint?** Such approaches have been adopted by the National Health Service in the UK and in various other jurisdictions.⁶,⁷ Indeed, the *Lancet* has recently described tackling climate change as the greatest opportunity for advancing global health.⁸

- **Should there also be a principle of the health system striving to maximise...**
EDITORIAL

co-benefits for all sectors of society? This might mean, for example, that alcohol control gets special attention given that there are major health benefits but also very wide societal benefits (relating to reduced crime, violence and lost productivity).

The critical importance of prevention in public health

The authors appropriately detail “preventive interventions” as one of the five core public health functions. But this category may deserve even more emphasis since it generally stands out in terms of value-for-money and the size of the health gain achievable. For example, preventive interventions to reduce alcohol-related harm are likely to be cost-saving to society. Modelling work for the New Zealand setting also indicates that a range of interventions to prevent high dietary salt intake will also be net cost-saving to the health system. Likewise for raising tobacco taxes to prevent tobacco-related disease, again with net cost-savings even though people will incur extra health costs by living longer.

Some preventive interventions will even raise extra tax revenue for the New Zealand Government—which can then be used to improve health in other areas, or to fund other public sectors, such as improving education. Examples are traditional taxes on alcohol and tobacco, but potentially new taxes such as those on junk food and sugar-sweetened beverages (as per New Zealand modelling work), and also a salt tax. Indeed, the World Health Organization has recently stated that increasing tobacco tax is the most cost-effective way to reduce tobacco use and prevent youth uptake of smoking. Nevertheless, some preventive interventions might not be worthwhile as per our work on the cost-effectiveness of HPV vaccination for boys in New Zealand at current vaccine prices (in contrast to improving HPV vaccination for girls).

Another notable feature of some of these preventive measures that change the environment is that they can also reduce disparities. For example, greater health gain for Māori is suggested by modelling work on raising tobacco taxes, for multiple interventions to reduce dietary salt intake, and in the domain of food taxes/subsidies.

The particular importance of law as a public health intervention

Williams et al appropriately mention public health laws and regulations in their article, yet this is another area that may deserve a special emphasis. This is because there is now a strong scientific basis for the use of the law as a public health instrument, as shown by one review which identified 65 systematic reviews of studies on the effectiveness of 52 public health laws. Most of these laws were found to be effective in achieving their health objectives, and they encompassed: injury prevention; housing; tobacco; vaccination; violence; and food safety. In addition, a review of the “ten great public health achievements” in the US last century (up to the year 1999) found that all ten were supported by laws at each level of government. Laws that benefit public health are relatively low-cost to pass (estimated at $3.7 million for New Zealand) and can have high levels of effectiveness for multiple decades. For example, the smokefree law banning smoking in pubs and restaurants in New Zealand has been very effective and only a few court cases were required in its wake. New laws are probably needed in New Zealand to raise taxes on hazardous products (as detailed above), but also to improve food labelling, to control marketing of alcohol and junk food, and to accelerate the tobacco endgame (eg, via retail outlet reduction). But some existing laws might also cause net public health harm and may need to be reviewed. For example, are the country's cycle helmet laws fully fit for purpose if these are potentially making it harder to establish cycle sharing schemes in cities? Such schemes are good for public health and are increasingly common internationally (at over 700 cities globally).
Summary

This special article by Williams et al is clearly a valuable contribution to public health thinking in this country. Yet future work could expand on some of the details and give more emphasis to those core functions which have more potential importance than others.

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EDITORIAL

Winners and losers during the 2011 Rugby World Cup
Michael Ardagh

History records that in December 1642, a Dutch seaman called Abel Tasman led his two ships, the Heemskerck and the Zeehaen, into Golden Bay, New Zealand, thinking he had found the western edge of Terra Australis Incognita. Back in Europe, people were over the fear they would drop off the edge of the earth if they sailed too far, but still believed there must be a great southern continent to balance the northern Eurasian continent, thereby stopping the otherwise unbalanced world from toppling over and rolling into space. The Dutch were just the people to find it, being the great explorers of the time, but finding it was not without risk—their boats were small, the seas were big, their rations were scorbutic and there were sea monsters depicted on their maps. However, after a skirmish with the locals, Tasman decided the risk was too great and he sailed away without stepping on land. Exactly what happened is a little unclear, as there is only a cursory account, and only from Tasman’s perspective. The local folk, Ngāti Tūmatakōkiri, might have written a different account were they able (rather than Abel). Suffice it to say, there was an altercation and some of Tasman’s crew were lost. He labelled the place “Murderers’ Bay” as a concluding expression of his version of events. More recently, the bay was re-named Golden Bay by local real estate agents.

More than a century later, an Englishman called James Cook came to New Zealand, fed his sailors oranges, used maps without sea monsters on them, and made landfall. The Dutch had missed their chance. Eager French sailors made an impression, but generally were too late. The English had set the scene for a persisting period of British colonisation and all the things that came with it—not the least of which was rugby.

History records that in October 2011, New Zealand won the Rugby World Cup. The English invented it, the French tried to ruin it and a Dutch brewery was sponsoring it, but it was the local emergency department left to resuscitate some of the consequences.

In this edition of the Journal, Gardener and colleagues describe the experience of Auckland City Hospital Adult Emergency Department (ED) during the tournament. Eden Park, in Auckland, hosted the opening ceremony, the first game, both semi-finals and the final. The ED was the receiving hospital for medical events from Eden Park and from the central city ‘Fan Zone’. The ED planned for more than a year: planned again when games were redistributed from an earthquake-damaged Christchurch; spent approximately $50,000 on extra medical staffing; doubled the number of beds available in its Short Stay Unit; ran a publicity campaign; and established agreements with the three other emergency departments in greater Auckland to assist, if required. They saw 8% more patients overall, but with a number of surges of demand which overwhelmed capacity. Alcohol was a significant contributor to the increased demand.

The paper is succinct, well written and is a useful example for other centres which might host similar events—most significantly, of course, London for the 2015 Rugby World Cup. However, their paper raises an important question:

While many—probably including the major sponsor—profited from this event, why did the health system incur a cost?

In addition to the quantified money for extra medical staff, there are unquantified...
dollar costs associated with planning and with treating more patients. Furthermore, there are unknown opportunity costs—missed or delayed opportunities for care. Auckland Hospital ED was overwhelmed on at least two occasions due to World Cup activities, such that ambulances had to queue to offload new patients and patients had to be diverted to other EDs in Auckland. During these occasions, the ED would have been significantly overcrowded with patients in corridors and the waiting areas, suffering delays for all phases of care, and with nurses, doctors and others able to spend less time with each patient.

There is overwhelming evidence that this state of affairs is associated with worse patient experiences and outcomes, including higher mortality rates for the population of patients treated in overcrowded emergency departments.2

Are we happy with this? Are we happy that an elderly lady with pneumonia might have received antibiotics later than she should have; that a child with asthma might have remained in a corridor sitting on his mother’s lap inhaling the stale fumes of the sponsor’s product; that a girl with abdominal pain might have gone home unseen, disillusioned by the delay and frightened by the raucous clientele in the waiting room? Are we happy that, while the health system pays and its customers suffer, others are profiting from the Rugby World Cup?

Statistics New Zealand notes financial gains, including an increase in New Zealand’s Gross Domestic Product, from increased international visitor arrivals, transport demands, international visitor spending, and increased activity in the retail, accommodation, and restaurant industries.3 Of course, the purveyors of alcohol are likely to have made a killing.

What might have been done? It would seem that reduction and mitigation of the health harms of events such as the Rugby World Cup should have been part of the preparation. In this regard, harms might have been reduced by interventions primarily associated with alcohol use. During the London Olympics, alcohol-related harm was reduced and the likely effective interventions were the “restricted advertising, appropriate service planning, and pricing strategies that were in place for the Games”.4 The Rugby World Cup was sponsored by a brewery, the sponsors product was promoted heavily, and the ‘party’ nature of the tournament (‘party central’) was emphasised. It would seem the New Zealand Rugby World Cup approach was something opposite to the discouragement associated with the London Olympics.

In addition to reducing the harms, there was further capacity to intervene prior to the harms overwhelming the local hospital. Swain and colleagues described their efforts to reduce the impact on Wellington Hospital due to the Wellington Rugby Sevens tournaments and the Wellington Rugby World Cup games. They worked successfully with their local council and ambulance service to provide more cost effective medical care for intoxicated people closer to the scene.5

Our public hospitals sail close to the supply and demand wind. They cannot be expected to soak up the predictable health side-effects of events such as the Rugby World Cup. Efforts should be made to prevent harm and to mitigate the effects of the remaining harm on the hospital. Beyond this, the demand which cannot be prevented nor mitigated should be paid for.

History records that the 2011 Rugby World Cup had many winners, but the public health system was a loser. History should not repeat.

Competing interests: Nil

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EDITORIAL

The review of trauma training of general surgical trainees in New Zealand by Hurst et al has highlighted two important issues:

1. General surgical trainees are aware they are required to have a functional knowledge of optimal trauma care.
2. General surgical trainees feel they do not get adequate exposure to operative trauma surgery.

The authors’ recommendation was that surgical training should be reorganised to meet their needs. The challenge for general surgery is how to gain this specialised skill base in an operative patient group that appears to be shrinking, yet develop a much broader skill set required of a general surgeon that deals with major trauma patients. As well as the need for an appropriate range of trauma operative skills, the requirement for concise and timely decision-making for severely injured patients is becoming more relevant than ever.

Improvements in pre-hospital and emergency department care, combined with the increasing use of non-operative modalities such as interventional radiology, have made the trauma laparotomy a relatively rare operation, however it is a procedure that demands an increasingly high level of skill. The same can be said for other lifesaving procedures that may fall within the domain of the on-call general surgeon in situations where subspecialists are not available, or the patient cannot be safely transferred. It is apparent that some general surgeons may need specialised operative skills outside the trauma laparotomy; these are well known and can be taught in courses such as Definitive Surgical Trauma Care (DSTC) course, as listed by the authors.

Knowledge of best practice in emergency surgical care of the multi-trauma patients is firmly ingrained in the Royal Australasian College of Surgeons curriculum for general surgical training, and general surgical trainees need to be cognisant of the roles and responsibilities of other specialist groups into the patient journey, such as emergency physicians, intensivists, nursing and allied health professionals.

New Zealand trauma care has recently taken a bold step forward with the formation of the Major Trauma National Clinical Network (MTNCN), a group comprised of clinical leaders in trauma care and members from appropriate jurisdictions. An early piece of work was the National Trauma Capability and Capacity Survey that showed a disparity in the understanding of trauma elements and requirements between hospitals with or without trauma services. To help remedy this situation and provide data on major trauma patients, the Ministry of Health directed that all hospitals in New Zealand submit a minimum trauma dataset on all major trauma patients admitted in New Zealand hospitals. New and existing regional trauma systems are gaining momentum with data collection, clinical guideline development and quality improvement activities.

As regional trauma systems develop, trauma specialists will be needed to drive change and provide clinical leadership, thus opening up new opportunities for trainees with a sub-specialty interest in trauma care.

The general surgical trainees of today will be expected to provide significant clinical input and leadership in this process of trauma quality improvement. Their role may involve lower volumes of operative patients with operable intra-abdominal

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**Trauma training of general surgical trainees in New Zealand**

Grant Christey
injuries, but a broader skill set of emergency operative procedures and an ability to provide an overview of the timely role of all of the attendant clinical groups, especially in relatively small or geographically remote hospitals when faced with critical or multiply-injured patients. They should be able to save lives in situations when transfer is impossible or dangerous, and plan optimal strategies based on the clinical status and types of injuries. With an understanding of the longer term consequences of major injury, they should be able to collaborate with other surgical and allied groups to enable early return to domicile; close to appropriate local services and their families/whanau for the long journey to recovery.

As trauma systems develop in New Zealand, there are growing career opportunities for trainees with special interests in trauma expertise and leadership. Trauma fellowship positions in hospital trauma services enable more formal training opportunities and can be augmented overseas or combined with dual fellowships in other subspecialties to fulfil departmental and professional requirements of new surgeons.

The issues raised by the authors reinforce the view that a new approach to trauma training for general surgical trainees is required. Trainees need ready access to the shrinking pool of operative trauma cases, and given that the role of the general surgeon is broader than simply providing operative intervention, their training should involve increased exposure to non-operative trauma management, involvement in local and regional trauma audit and education programs and specialised training in courses, such as DSTC. By doing so trainees will meet their own professional needs and contribute positively toward a new era of trauma quality improvement in New Zealand.

Competing interests: Nil

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Core public health functions for New Zealand
Daniel Williams, Barbara Garbutt, Julia Peters

ABSTRACT
This special article defines the public health principles and core public health functions that are combined to produce the public health services essential for a highly-functioning New Zealand health system. The five core functions are: health assessment and surveillance; public health capacity development; health promotion; health protection; and preventive interventions. The core functions are interconnected and are rarely delivered individually. Public health services are not static, but evolve in response to changing needs, priorities, evidence and organisational structures. The core functions describe the different ways public health contributes to health outcomes in New Zealand and provide a framework for ensuring services are comprehensive and robust.

The Ministry of Health and District Health Boards (DHBs) are mandated by the Health Act 1956 and the New Zealand Public Health and Disability Act 2000 to improve, promote and protect the health of their populations and to reduce health disparities. Our health system faces growing pressure due to an ageing population, an increasing burden of chronic diseases, increasing treatment costs, and fiscal constraints. In this context, effective delivery of public health services that help improve health status and manage health care demand is increasingly important.

Public health has been defined as the science and art of preventing disease, prolonging life and promoting health through the organised efforts of society.1 This special article describes the public health principles and the core public health functions that are combined in various ways by a range of providers to produce the public health services essential for a highly functioning New Zealand health system. It then outlines the implications of the core functions framework for public health service delivery.

The purpose of this special article is to:
• improve understanding of the ways public health services contribute to improved health outcomes; and
• help ensure that the health sector invests in an appropriate mix and configuration of public health services.

The core functions framework has been developed by the Public Health Clinical Network, formed by the clinical directors and managers of the 12 DHB Public Health Units and the Ministry of Health’s Director of Public Health to provide leadership for and strengthen the performance and sustainability of public health units. Many public health services are delivered by providers outside District Health Boards and the Ministry of Health. Valuable advice was received from a range of individuals and organisations during development of this article. The content of the article remains the responsibility of the Public Health Clinical Network.

Background
The outcomes sought by public health services are:
• a healthier population
• reduction of health disparities
• improvement in Māori health
• increased safeguards for the public’s health
• a reduced burden of acute and chronic disease

As health systems around the world respond to pressures such as ageing populations, increasingly expensive medical technology, a growing burden of chronic lifestyle-related disease and emerging and re-emerging infectious diseases, a number of countries have recognised that they cannot
continue to deliver effective and efficient health care unless they also take prevention seriously.2-4

Public health services add value to the health sector by helping manage demand for health care services and by helping the sector understand how we can improve population health. The public health sector helps connect the health sector to a wide range of other organisations which influence health outcomes. The public health sector also plays a key role in managing emerging health risks.

A significant and growing body of evidence demonstrates the cost-effectiveness of public health interventions. The UK Wanless Report modelled three scenarios for a publicly funded, comprehensive, high quality health service and found that the scenario which invested most heavily in public health was also was the least expensive and delivered the best health outcomes.5 An Australian report outlined the economic benefits of reducing the prevalence of six behavioural chronic disease risk factors (obesity, alcohol, smoking, exercise, diet and domestic violence). Over the lifetime of the 2008 Australian adult population, cost savings were estimated at between $2 billion and $3 billion.6 The Australian ACE (Assessing Cost Effectiveness) Prevention study, the largest and most rigorous evaluation of preventive strategies undertaken anywhere in the world, examined 150 preventive interventions, ranking them from most to least cost-effective by cost per disability adjusted life year. Some interventions, including taxation and regulation interventions on salt, alcohol and tobacco and the “polypill” for cardiovascular disease prevention, were found to be cost-saving, averting one million DALYs (disability adjusted life years) over the lifetime of the 2003 Australian population, costing the health sector $4.6 billion, but averting $11 billion in healthcare costs.7 Results of New Zealand’s own Assessing Cost-effectiveness: Prevention study are anticipated in 2015.

Since the mid-1990s there have been a series of projects to define core or essential public health functions in different jurisdictions.8-12 Although the nature of public health is universal, the way public health services are delivered varies widely around the world, as do the reasons for developing core services frameworks, so core functions frameworks developed for one country are not necessarily transferrable to other countries. A core functions framework for New Zealand must take into account those aspects of public health which are unique to our country, in order to meet New Zealand-specific needs and responsibilities (particularly the Treaty of Waitangi and existing Māori health disparities). Although there has been some discussion of core public health functions in New Zealand,13-15 there has been no agreed core functions framework.

This special article defines five core public health functions for New Zealand, based on the strategies described in the British Columbia Core Services Framework11 and the outcomes outlined in the WHO Western Pacific Region model,8 but adapted for New Zealand by the Public Health Clinical Network’s Core Functions Working Group. This core functions framework now forms the basis of the Ministry of Health’s Service Specifications for public health.

Public health providers

Public health services are diverse, and are provided by a wide range of organisations, including the Ministry of Health, District Health Boards (especially their public health units and planning and funding divisions), Crown Research Institutes, other government ministries, primary care, non-government organisations, local councils and universities, Pacific providers, and iwi, hapu and Māori organisations. Many, but not all, providers are funded from Vote Health. Only some providers currently see public health as their core business. Health-funded public health providers play an important role in supporting a public health approach in other organisations both within and outside the health sector and in supporting intersectoral strategies, such as Healthy Families NZ (a new government initiative providing leadership, information and resources to promote health in 10 high needs communities across New Zealand).
Public health principles

Public health principles can be defined in many ways. The key principles agreed by the Public Health Clinical Network are:

a. focusing on the health of communities rather than individuals
b. influencing health determinants
c. prioritising improvements in Māori health
d. reducing health disparities
e. basing practice on the best available evidence
f. building effective partnerships across the health sector and other sectors
g. remaining responsive to new and emerging health threats.

Core public health functions

Core public health functions are the fundamental components of a public health system that effectively improves population health. The five core public health functions agreed by the Public Health Clinical Network are:

1. Health assessment and surveillance
2. Public health capacity development
3. Health promotion
4. Health protection
5. Preventive interventions.

The core public health functions are interconnected; core functions are rarely delivered individually. Public health services can be described as public health initiatives that combine components of several core functions to achieve health outcomes. Figure 1 illustrates the link between functions, services and outcomes. Public health services are not static, but evolve in response to changing needs, priorities, evidence and organisational structures.

Table 1 (see page 19) includes brief descriptions and a list of key strategies for each of the core public health functions. Table 2 (see page 21) uses tobacco control and earthquake response and recovery as
### Table 1: Core functions, descriptions and strategies

<table>
<thead>
<tr>
<th>Core function</th>
<th>Strategies</th>
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| **1. Health assessment and surveillance: understanding health status, health determinants and disease distribution** | • **Monitoring, analysing and reporting** on population health status, health determinants, disease distribution, and threats to health, with a particular focus on health disparities and the health of Māori.  
• Detecting and investigating **disease clusters and outbreaks** (both communicable and non-communicable). |
| **2. Public health capacity development: enhancing our system’s capacity to improve population health** | • Developing and maintaining public health **information systems**.  
• Developing **partnerships** with iwi, hapū, whānau and Māori to improve Māori health.  
• Developing partnerships with Pacific leaders and communities to improve Pacific health.  
• Developing **human resources** to ensure public health staff, with the necessary competencies, are available to carry out core public health functions.  
• Conducting **research, evaluation and economic analysis** to support public health innovation and to evaluate the effectiveness of public health policies and programmes.  
• **Planning, managing, and providing expert advice** on public health programmes across the full range of providers, including primary care, planning and funding, councils and NGOs.  
• **Quality management** for public health, including monitoring and performance assessment. |
| **3. Health promotion: enabling people to increase control over and improve their health** | • Developing public and private sector **policies** beyond the health sector that will improve health, improve Māori health and reduce disparities.  
• Creating physical, social and cultural **environments** supportive of health.  
• Strengthening **communities’ capacities** to address health issues of importance to them, and to mutually support their members in improving their health.  
• Supporting **people to develop skills** that enable them to make healthy life choices and manage minor and chronic conditions for themselves and their families.  
• Working in **partnership with other parts of the health sector** to support health promotion, prevention of disease, disability, injury, and rational use of health resources. |
| **4. Health protection: protecting communities against public health hazards** | • Developing and reviewing **public health laws and regulations**.*  
• Supporting, monitoring and enforcing **compliance** with legislation.  
• Identifying, assessing, and reducing **communicable disease risks**, including management of people with communicable diseases and their contacts.  
• Identifying, assessing and reducing **environmental health risks**, including biosecurity, air, food and water quality, sewage and waste disposal, and hazardous substances.  
• Preparing for and responding to **public health emergencies**, including natural disasters, hazardous substances emergencies, bioterrorism, disease outbreaks and pandemics. |
| **5. Preventive interventions: population programmes delivered to individuals** | • Developing, implementing and managing **primary prevention programmes** (targeting whole populations or groups of well people at risk of disease: eg immunisation programmes).  
• Developing, implementing and managing population-based **secondary prevention programmes** (screening and early detection of disease: eg cancer screening). |

*Public health legislation covers a wide variety of issues, including communicable disease control, border health protection, food quality and safety, occupational health, air and drinking water quality, sewage, drainage, waste disposal, hazardous substances control, control of alcohol, tobacco and other drugs, injury prevention, health information, screening programmes, and control of medicines, vaccines and health practitioners.
examples of the way effective public health services combine strategies from several core functions.

**Implications for public health service delivery**

It is important to the whole health sector that public health services are delivered effectively and efficiently, so that they achieve the greatest impact on health outcomes. The five core functions provide a framework for ensuring that public health services are comprehensive and robust. District Health Boards need to understand how each of the functions is provided or accessed within their district and how public health services contribute to District Health Board objectives.

Most public health services include strategies from several core functions, so to be effective, providers need either the capacity to deliver comprehensively across several functions themselves or ready access to support from other public health organisations. The public health workforce is small and specialised, so organisational and workforce capacity are key assets.

As with many specialised health services, effective and efficient delivery requires appropriate and co-ordinated services at national, regional and local levels (see Table 3, page 25). Some public health services should be delivered once for the country. There is potential to improve co-ordination and alignment of some specialised public health services across regions within New Zealand. However, most public health services are provided by partnerships of public health and other health and non-health providers, and effective delivery depends on well-supported local public health staff, local relationships and an understanding of local communities and their needs. Because local public health services evolve over time in response to changing needs, priorities and relationships, funding arrangements should allow for flexibility and responsiveness in local service development.

**Conclusion**

Public health services are an integral part of a high-functioning New Zealand health system. It is important to the whole health sector that public health services are delivered effectively and efficiently, so that they achieve the greatest impact on health outcomes.

Public health services are not static, but evolve in response to changing needs, priorities, evidence and organisational structures. The five core public health functions describe the different ways public health contributes to health outcomes in New Zealand, and provide a framework for ensuring services are comprehensive and robust.
Table 2: Examples of public health services.

<table>
<thead>
<tr>
<th>Core function</th>
<th>Strategies</th>
<th>Examples (tobacco control)</th>
<th>Examples (Earthquake response &amp; recovery)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Health assessment and surveillance: understanding health status, health</td>
<td>Monitoring, analysing and reporting on population health status, health determinants, disease</td>
<td>• National smoking surveys, including Census and Year 10 school survey.</td>
<td>• Enhanced post-earthquake surveillance for gastroenteritis and influenza.</td>
</tr>
<tr>
<td>determinants and disease distribution</td>
<td>distribution, and threats to health, with a particular focus on health disparities and the health</td>
<td>• National and local monitoring, analysis and mapping of tobacco sales volumes, outlet</td>
<td>• Collecting, analysing and mapping water quality data.</td>
</tr>
<tr>
<td></td>
<td>of Māori. Detecting and investigating disease clusters and outbreaks (communicable and non-</td>
<td>distribution etc.</td>
<td>• Development and reporting of health success indicators for recovery, with a</td>
</tr>
<tr>
<td></td>
<td>communicable).</td>
<td>• National and local analysis of the impact of tobacco-related disease, including impact</td>
<td>particular focus on the hardest-hit communities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>on specific population sub-groups and on health disparities.</td>
<td></td>
</tr>
<tr>
<td>2. Public health capacity development: enhancing our system’s capacity to</td>
<td>Developing and maintaining public health information systems.</td>
<td>• Enhanced post-earthquake surveillance for gastroenteritis and influenza.</td>
<td></td>
</tr>
<tr>
<td>improve population health</td>
<td></td>
<td>• Reviewing international literature to ensure recovery initiatives are evidence-based.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Providing regular public health situation reports.</td>
<td></td>
</tr>
<tr>
<td>Developing partnerships with iwi, hapū, whānau and Māori to improve Māori</td>
<td>• Working in partnership with iwi, hapū, whānau and Māori to ensure services meet Māori needs.</td>
<td>• Supporting development of marae-based community recovery hub.</td>
<td></td>
</tr>
<tr>
<td>health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing partnerships with Pacific leaders and communities to improve Pacific</td>
<td>• Working with Pacific leaders and communities to ensure cessation services are accessible</td>
<td>• Working with Pacific church leaders to provide information and support to Pacific</td>
<td></td>
</tr>
<tr>
<td>health</td>
<td>and appropriate for Pacific people.</td>
<td>communities.</td>
<td></td>
</tr>
<tr>
<td>Developing human resources to ensure public health staff with the necessary</td>
<td>• Workforce planning, recruitment, training and ongoing professional development of staff involved</td>
<td>• Training all public health staff in emergency response procedures.</td>
<td></td>
</tr>
<tr>
<td>competencies are available to carry out core public health functions.</td>
<td>in primary and secondary care, cessation support, enforcement, policy analysis and informatics.</td>
<td>• Ensuring surge capacity plans are in place to allow regional and national staffing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>support.</td>
<td></td>
</tr>
<tr>
<td>Conducting research, evaluation and economic analysis to support public health</td>
<td>• Research studies to develop and assess innovative ways to decrease smoking initiation and</td>
<td>• Telephone survey to assess compliance with boil water notices.</td>
<td></td>
</tr>
<tr>
<td>innovation and to evaluate the effectiveness of public health policies and</td>
<td>effectively support cessation.</td>
<td>• Evaluating resource use (eg, Integrated Recovery Guide).</td>
<td></td>
</tr>
<tr>
<td>programmes.</td>
<td>• Providing national and local economic analysis to highlight the impact of tobacco on health</td>
<td>• Research on the nature of public health hazards post-earthquake (eg, microbial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>services, wider society and specific population groups, and the potential to decrease costs</td>
<td>contamination of liquefaction silt).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with decisive action.</td>
<td>• Research on protective and risk factors for individual and community coping post-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>earthquake.</td>
<td></td>
</tr>
<tr>
<td>Core function</td>
<td>Strategies</td>
<td>Examples (tobacco control)</td>
<td>Examples (Earthquake response &amp; recovery)</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>----------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>2. Public health capacity development: enhancing our system’s capacity to improve population health (cont)</td>
<td>Planning and managing public health programmes across the full range of providers, including PHOs, Planning and Funding, Councils and NGOs.</td>
<td>• Developing national and regional tobacco control strategies. • Developing and supporting development of tobacco control plans for DHBs, PHOs and PHUs, ensuring integration of local plans.</td>
<td>• Developing national public health emergency response plans and systems. • Working with councils to develop testing and public information programmes to support boil water notices and chlorination. • Supporting CERA community engagement programme. • Incorporating a health determinants approach into DHB recovery planning.</td>
</tr>
<tr>
<td>Quality management for public health, including monitoring and performance assessment.</td>
<td></td>
<td>• Standard-setting, reporting and audit of all tobacco control activities to ensure targets are achieved.</td>
<td>• Conducting debriefs for all staff. • Providing reviews and reports of public health response.</td>
</tr>
<tr>
<td>3. Health promotion: enabling people to increase control over and improve their health</td>
<td>Developing public and private sector policies beyond the health sector that will improve health, improve Māori health and reduce disparities.</td>
<td>• Developing fiscal policies to support tobacco sales reductions. • Developing local council smokefree policies (eg smokefree playgrounds and sports venues, smokefree public events). • Developing tobacco policies for businesses and organisations (eg, smokefree marae, employer support for smoking cessation, tobacco-free retailers).</td>
<td>• Supporting a “health in all policies” approach in recovery agencies with advice, committee membership, submissions and staff secondments. • Developing tools to promote consideration of longer-term impacts of recovery on health (eg, Integrated Recovery Guide).</td>
</tr>
<tr>
<td>Creating physical, social and cultural environments supportive of health.</td>
<td>• Increasing the number of smokefree places (eg, playgrounds, other public places and events, marae, clubs, homes). • National, regional and local education and marketing campaigns to highlight the dangers of tobacco, encourage cessation and promote smokefree as a positive choice, including sponsorship and promotion of the “Smokefree” brand.</td>
<td></td>
<td>• Working with insurers to prioritise winter heating support for people at high risk of hospital admission. • Identifying and supporting opportunities to increase active transport in urban rebuild. • Identifying potential for health gain from general improvements to home heating and insulation during rebuild.</td>
</tr>
<tr>
<td>Strengthening communities’ capacities to address health issues of importance to them, and to mutually support their members in improving their health.</td>
<td>• Supporting local communities to develop local smokefree policies (eg, marae, playgrounds) • Supporting community initiatives and events to raise tobacco awareness (eg, World Smokefree Day).</td>
<td></td>
<td>• Providing public information on the need to connect with and support others. • Working with schools in hardest-hit areas to develop community hubs and help coordinate community support. • Supporting citizens and community groups, particularly those within disadvantaged communities, to engage in participatory democratic processes for recovery and rebuilding.</td>
</tr>
</tbody>
</table>
### Core function

#### 3. Health promotion: enabling people to increase control over and improve their health (cont)

- Supporting **people to develop skills** that enable them to make healthy life choices and manage minor and chronic conditions for themselves and their families.

  - Brief intervention programmes in primary and secondary care.
  - Community cessation services, with a particular focus on those least able to access mainstream services.
  - Quitline.

Working in **partnership with other parts of the health sector** to support health promotion, prevention of disease, disability, and injury, and rational use of health resources.

- Supporting DHB and primary care in addressing local tobacco issues (eg developing smokefree campuses, co-ordinating tobacco control initiatives, recording of patient smoking status, ensuring accessible cessation support).

**Examples (tobacco control)**

- Providing safety advice for aftershocks (“drop, cover, hold on”; securing furniture)
- Providing public information about management and reporting of minor illness post-earthquake.

**Examples (Earthquake response & recovery)**

- Incorporating a health determinants approach into DHB recovery plans.
- Providing information on normal responses and self-care for post-earthquake stress, along with appropriate referral via primary care for specialist support.

#### 4. Health protection: protecting communities against public health hazards

- Developing and reviewing **public health laws and regulations**.
- Developing and updating of Smokefree Environments Act (SFEA) and other regulatory controls on tobacco use, sales, sponsorship.

**Examples (tobacco control)**

- Ministry of Health advice on earthquake recovery legislation.

**Examples (Earthquake response & recovery)**

- Using powers under Health Act and other legislation to provide protection against hazards (eg, closure of contaminated rivers to fishermen and whitebaiters).

- Identifying, assessing, and reducing **communicable disease risks**, including management of people with communicable diseases and their contacts.
- Publicly highlighting tobacco use as an important risk factor for certain communicable diseases (eg, meningococcal disease, legionnaire’s disease).

**Examples (tobacco control)**

- Monitoring and advising welfare centres for displaced people, including management of unwell residents.
- Promptly identifying and controlling communicable disease outbreaks.
- Communicating practical public advice about safe sewage disposal and hand hygiene.

**Examples (Earthquake response & recovery)**

- Monitoring, assessing and advising on contamination of air, water and soil.
- Supporting return of recreational and drinking water to pre-quake quality.

- **Examples (Earthquake response & recovery)**

- Highlighting tobacco smoke as key indoor air pollutant. Increasing the number of smokefree places (eg playgrounds, other public places and events, marae, clubs, homes).

**Examples (tobacco control)**

- Increasing the number of smokefree places (eg playgrounds, other public places and events, marae, clubs, homes).
<table>
<thead>
<tr>
<th>Core function</th>
<th>Strategies</th>
<th>Examples (tobacco control)</th>
<th>Examples (Earthquake response &amp; recovery)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4. Health protection:</strong> protecting communities against public health hazards (cont)</td>
<td>Preparing for and responding to <strong>public health emergencies</strong>, including natural disasters, hazardous substances emergencies, bioterrorism, disease outbreaks and pandemics.</td>
<td>• Address post-disaster smoking relapses as part of disaster recovery plans, through information, education and cessation support.</td>
<td>• Ensuring adequate emergency planning and training for all public health and associated staff.</td>
</tr>
<tr>
<td><strong>5. Preventive interventions:</strong> population programmes delivered to individuals</td>
<td>Developing, implementing and managing <strong>primary prevention programmes</strong> (targeting whole populations or groups of well people at risk of disease: eg immunisation programmes).</td>
<td>• Providing targeted information to youth discouraging smoking initiation (eg, individual letters from GP at age 12).</td>
<td>• Increasing eligibility and coverage for influenza vaccination in vulnerable groups.</td>
</tr>
<tr>
<td>Developing, implementing and managing <strong>secondary prevention programmes</strong> (screening and early detection of disease: eg, cancer screening).</td>
<td>• Routine collection of smoking status in primary and secondary care, with systematic brief intervention follow-up and referral to more intensive cessation support as indicated.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Table 3: National regional and local service provision

<table>
<thead>
<tr>
<th>National services</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For reasons of effectiveness or efficiency there are some public health services</td>
<td></td>
</tr>
<tr>
<td>which should be delivered once for the country. These include:</td>
<td></td>
</tr>
<tr>
<td>Legislative oversight and a range of technical support, including specialised</td>
<td></td>
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<tr>
<td>advice, reference laboratory services and nationally used manuals for communicable</td>
<td></td>
</tr>
<tr>
<td>disease control and environmental health.</td>
<td></td>
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<tr>
<td>Surveillance and analysis of national/international communicable and non-</td>
<td></td>
</tr>
<tr>
<td>communicable disease trends.</td>
<td></td>
</tr>
<tr>
<td>Co-ordination of inter-district emergency responses.</td>
<td></td>
</tr>
<tr>
<td>National programmes, registers or information systems–NIR and immunisation policy</td>
<td></td>
</tr>
<tr>
<td>screening programmes, drinking water programme.</td>
<td></td>
</tr>
<tr>
<td>Public health workforce planning and development.</td>
<td></td>
</tr>
<tr>
<td>National public health and intersectoral policy analysis and development.</td>
<td></td>
</tr>
<tr>
<td>Developing and maintaining for the full spectrum of public health services a</td>
<td></td>
</tr>
<tr>
<td>clear strategic direction, consistent service specifications and a transparent</td>
<td></td>
</tr>
<tr>
<td>funding model which takes into account the particular public health needs of New</td>
<td></td>
</tr>
<tr>
<td>Zealand's varied local communities.</td>
<td></td>
</tr>
</tbody>
</table>

| Regional services                                                                 |           |
| Some services should be accessible to all districts and public health providers,  |           |
| but can be provided or supported by regional public health services or networks. |           |
| There is potential to improve the co-ordination of these services across the    |           |
| country to improve efficiency and effectiveness. They include:                  |           |
| Advanced surveillance and analysis, including GIS.                              |           |
| Public health policy analysis.                                                  |           |
| Programme design and evaluation.                                                |           |
| Environmental health technical expertise.                                        |           |
| Support for outbreak investigation and control, including surge capacity support.|           |
| Health impact assessment.                                                       |           |
| Development of consistent operational protocols to suit local needs.            |           |
| Public health workforce training.                                               |           |

| Local services                                                                   |           |
| Most public health programmes are provided in partnership with a range of other   |           |
| health and non-health providers. Effective delivery depends on well-supported     |           |
| local health staff, local relationships and an understanding of local communities|           |
| and their needs. Delivery of regulatory services also requires national          |           |
| consistency and strong national links. Local programmes include:                 |           |
| Identification of locally emerging public health issues.                         |           |
| Communicable disease and outbreak control.                                      |           |
| Public health emergency response.                                                |           |
| Regulatory controls on alcohol, tobacco and the physical environment, and         |           |
| associated health promotion.                                                     |           |
| Immunisation co-ordination.                                                     |           |
| Liaison with and support for local authorities, DHBs and primary care            |           |
| organisations.                                                                  |           |
| Support and co-ordination for health promotion in settings (eg, workplaces,      |           |
| education, primary care).                                                        |           |
| Planning and funding of health care and public health programmes to meet local   |           |
| needs.                                                                          |           |
| At a local level, public health providers must have (or have access to) an       |           |
| appropriate range of public health skills, be comprehensively linked with other  |           |
| services, and the planning framework must be flexible enough to allow providers  |           |
| to respond to local need.                                                       |           |

• Identification of locally emerging public health issues.
• Communicable disease and outbreak control.
• Public health emergency response.
• Regulatory controls on alcohol, tobacco and the physical environment, and associated health promotion.
• Immunisation co-ordination.
• Liaison with and support for local authorities, DHBs and primary care organisations.
• Support and co-ordination for health promotion in settings (eg, workplaces, education, primary care).
• Planning and funding of health care and public health programmes to meet local needs.
SPECIAL ARTICLE

Competing interests: Nil

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URL:

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15. Medical Officers of Health, Planning and Purchasing of Public Health Services - Medical Officer of Health Advice to the Director of Public Health and Director-General of Health, 2009. [internal document].
End-of-life medical decision making in general practice in New Zealand—13 years on
Phillipa Malpas, Kay Mitchell, Heidi Koschwanez

ABSTRACT
AIMS: The aim of this study was to explore medical decision-making practices at the end-of-life made by GPs (MDEL) in New Zealand and to identify changes in practice with a previous study published in 2004.
METHODS: A postal questionnaire was sent to 3,420 GPs in New Zealand in May 2013. Anonymous phone interviews were also undertaken. Analysis of the questionnaire was done on IBM SPSS Statistics 21.
RESULTS: There was a 21% response rate from two mail outs. Of the 650 GPs who responded, 547 had contact with a patient prior to death and had the potential to make a MDEL. Of these, 359 (65.6%) reported making a MDEL. Of the 359 GPs who reported making a MDEL, 16 (4.5%) attributed death to a drug that had been prescribed, supplied or administered explicitly for the purpose of hastening the patient’s death. The alleged involvement of nurses in practices that intentionally hasten death is high.
CONCLUSION: Our study shows that some GPs have explicitly assisted their patients to die, that nurses are allegedly involved, and there is a tendency towards more discussion with patients about MDEL.

Personal and professional decision-making regarding medical treatment and care at the end-of-life has become a significant issue of public discussion in many industrialised countries experiencing a growing older population and increasing rates of chronic disease. For instance, advance care planning and the implementation of instructional directives are being promoted in many countries reflecting the importance of patient preferences, as well as greater awareness of palliative care options at the end-of-life. In some jurisdictions, societal and political discussion has resulted in laws permitting euthanasia and physician-assisted suicide. A small number of countries in Europe and several states in the US permit such practices, with many more countries indicating high public acceptance of euthanasia and physician-assisted suicide, including New Zealand. In 2014, Belgium became the first country in the world to enact legislation that allows children of any age to seek euthanasia under certain qualified circumstances. The Canadian province of Quebec also recently voted to legalise medical aid in dying, mirroring assisted dying laws in the Netherlands, and in February 2015, the Supreme Court of Canada ruled that prohibiting assisted suicide is unconstitutional. Federal or provincial governments were given one year to enable legislation that will respect the Supreme Court ruling. In November 2014, Lord Falconer’s Assisted Dying Bill progressed to the Committee Stage debate in the House of Lords (UK). The bill would allow competent adults with less than 6 months to live, medical assistance to end their life.

Research suggests the majority of New Zealanders support euthanasia and physician-assisted suicide under clearly-defined conditions. A recent survey of general practitioners (GPs) in the Waikato region found that 45–50% of GPs “support or would probably support” euthanasia and physician-assisted suicide in New Zealand. Our Prime Minister, John Key, has indicated his broad support of euthanasia, however the practices of euthanasia and physician-assisted suicide remain illegal, and are not supported by a number of professional medical bodies.

This research, using a questionnaire and anonymous phone interviews, explores the
ARTICLE

actions of New Zealand GPs caring for dying patients within the context of available palliative care and pain management services. The aim of this study was to explore medical decision-making at the end-of-life (MDEL) by GPs in New Zealand. Additionally, results of this survey were compared with those of a previous study (data collected in 2000) to identify and examine changes in practice over the past 13 years in New Zealand.

Methods

The study comprised two components. The first component, presented herein, consisted of a postal survey based on the Remmelink questionnaire used in the Netherlands and elsewhere, sent to 3,420 GPs in New Zealand in May 2013. The English version of the questionnaire was obtained from the authors of the Australian study and used in the 2004 study. The same questionnaire was used in this study. Medical decisions at the end of life (MDEL) comprised any act or omission at the end of life, including that which may hasten death. Such acts include withholding or withdrawing treatment, as well as intensifying the alleviation of pain and/or symptoms using morphine or a comparable drug. GPs were identified from a commercial mailing list and a follow-up postcard was sent 6 weeks later. The questionnaire asked for details on the last death in the previous 12 months for which the GP was the attendant doctor. Confining responses to the last death minimised bias and retained consistency for comparison with the previous 2004 study. The questionnaire also asked GPs to comment on the accessibility of an interdisciplinary pain management or palliative care team in their particular setting. Analysis of the questionnaire was done on IBM SPSS Statistics 21.

In the second component of the study, additional information was sought by inviting respondents to ring a free-phone number to be interviewed anonymously about their experiences caring for dying patients. Results from this study are not reported here. Ethics approval was given by the University of Auckland Human Participants Ethics Committee on 10 April 2013 (reference 9124), for a period of 3 years.

Table 1: Demographic breakdown of participants (N=650) with bracketed comparative figures from 2004 (N=1255). Percentages rounded.

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
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</tr>
<tr>
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<td>71</td>
</tr>
<tr>
<td>NZ Maori desc.</td>
<td>16</td>
<td>2.5</td>
</tr>
<tr>
<td>NZ PI desc.</td>
<td>2</td>
<td>.3</td>
</tr>
<tr>
<td>NZ other desc.</td>
<td>5</td>
<td>.8</td>
</tr>
<tr>
<td>Pacific Island</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>69</td>
<td>10.6</td>
</tr>
<tr>
<td>Other European</td>
<td>80</td>
<td>12.3</td>
</tr>
<tr>
<td>MdE/LtAm/Af</td>
<td>7</td>
<td>1.1</td>
</tr>
<tr>
<td>Other</td>
<td>30</td>
<td>4.6</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>.15</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City (&gt;100,000)</td>
<td>49</td>
<td>45</td>
</tr>
<tr>
<td>Small city (30-100,000)</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Town (&lt;30,000)</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Rural</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* No comparison as different categories from 2004 study. Could indicate >one category.
Table 2: Medical decisions at the end of life (MDELs) by general practitioners for last death attended in previous 12 months (n=547)

<table>
<thead>
<tr>
<th>Action reported as per questionnaire</th>
<th>Deaths attended in last year n=547 No. (%)</th>
<th>Actions* before death n=359 GPs† No. (%)</th>
<th>Last action before death n=359 No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No MDEL actioned</td>
<td>188 (34.4%)</td>
<td>8 (2.2%)</td>
<td></td>
</tr>
<tr>
<td>Not possible to perform MDEL due to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First contact with patient after death</td>
<td>8 (1.5%)</td>
<td>19 (5.3 %)</td>
<td></td>
</tr>
<tr>
<td>Patient death sudden and totally unexpected</td>
<td>39 (7.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible to perform MDEL, but was not actioned</td>
<td>141 (25.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDEL actioned</td>
<td>359 (65.6%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Taking into account the probability that end of life hastened by:

<table>
<thead>
<tr>
<th>Question</th>
<th>No. (%)</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q3a Withholding a treatment</td>
<td>151 (42.1%)</td>
<td>8 (2.2%)</td>
</tr>
<tr>
<td>Q3b Withdrawing a treatment</td>
<td>180 (50.1%)</td>
<td>19 (5.3 %)</td>
</tr>
<tr>
<td>Q3c Intensifying alleviation of pain and/or symptoms</td>
<td>316 (88.0%)</td>
<td>219 (61.0 %)</td>
</tr>
</tbody>
</table>

In part with intention of hastening the end of life by:

<table>
<thead>
<tr>
<th>Question</th>
<th>No. (%)</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 Intensifying the alleviation of pain and/or symptoms</td>
<td>63 (17.5%)</td>
<td>31 (8.6%)</td>
</tr>
</tbody>
</table>

With the explicit purpose of not prolonging life, or hastening the end of life and death caused by:

<table>
<thead>
<tr>
<th>Question</th>
<th>No. (%)</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5a Withholding a treatment</td>
<td>58 (16.2%)</td>
<td>23 (6.4%)</td>
</tr>
<tr>
<td>Q5b Withdrawing a treatment</td>
<td>48 (13.4%)</td>
<td>43 (12.0%)</td>
</tr>
</tbody>
</table>

Q6 Death caused by drug prescribed, supplied or administered with the explicit purpose of hastening the end of life.

<table>
<thead>
<tr>
<th>Drug given by ‡</th>
<th>n=16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Doctor</td>
<td>2 (12.5%)</td>
</tr>
<tr>
<td>Nurse</td>
<td>15 (81.3%)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (6.3%)</td>
</tr>
</tbody>
</table>

*More than one action could be answered by the GP
†Percentage may not total 100 due to rounding
‡More than one person could be identified

Results

There was a 21% response rate from the two mail outs. Forty-seven questionnaires could not be delivered (unknown at address). Returned questionnaires numbered 675, of which 25 were returned blank, some with comments for non-response, which left 650 usable questionnaires. A demographic breakdown of responders is in Table 1.

Of the 650 GPs who responded, 547 had contact with the patient prior to death and had the potential to make a medical decision at the end-of-life. Of these, 359 (65.6%) reported making a MDEL (see Table 2). The last action before death ranged from decisions to withdraw or withhold
### Table 3: Discussion with patient about possible hastening of death by proposed action

<table>
<thead>
<tr>
<th>Last-mentioned medical decision at the end-of-life (MDEL)</th>
<th>Withheld treatment with probability of hastening death (Question 3a)</th>
<th>Withdrew treatment with probability of hastening death (Question 3b)</th>
<th>Used drug to alleviate pain/symptoms with probability of hastening death (Question 3c)</th>
<th>Medical action partially intended to hasten death (Question 4)</th>
<th>Withheld treatment explicitly to hasten death (Question 5a)</th>
<th>Withdrew treatment explicitly to hasten death (Question 5b)</th>
<th>Death caused by drug (Question 6)</th>
<th>Total †</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=8</td>
<td>n=19</td>
<td>n=219</td>
<td>n=31</td>
<td>n=23</td>
<td>n=43</td>
<td>n=16</td>
<td>n=359</td>
<td></td>
</tr>
<tr>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Discussed shortly before or at time of performing last-mentioned act or omission</td>
<td>-</td>
<td>4 (21.1%)</td>
<td>43 (19.6%)</td>
<td>8 (25.8%)</td>
<td>5 (21.7%)</td>
<td>13 (30.2%)</td>
<td>1 (6.3%)</td>
<td>74 (20.7%)</td>
</tr>
<tr>
<td>Discussed some time beforehand</td>
<td>1 (12.5%)</td>
<td>6 (31.6%)</td>
<td>30 (13.7%)</td>
<td>11 (47.8%)</td>
<td>16 (37.2 %)</td>
<td>8 (50.0%)</td>
<td>82 (22.9%)</td>
<td></td>
</tr>
<tr>
<td>No discussion took place</td>
<td>7 (87.5%)</td>
<td>8 (42.1%)</td>
<td>107 (48.9%)</td>
<td>7 (30.4%)</td>
<td>14 (32.6%)</td>
<td>7 (43.8%)</td>
<td>163 (45.4%)</td>
<td></td>
</tr>
<tr>
<td>Missing (no response)</td>
<td>-</td>
<td>1 (5.3%)</td>
<td>39 (17.8%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>40 (11.2%)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4: Competency of patient when ‘No Discussion’ about possible hastening of death occurred

<table>
<thead>
<tr>
<th>Last-mentioned medical decision at the end-of-life (MDEL)</th>
<th>Withheld treatment with probability of hastening death (Question 3a)</th>
<th>Withdrew treatment with probability of hastening death (Question 3b)</th>
<th>Used drug to alleviate pain/symptoms with probability of hastening death (Question 3c)</th>
<th>Medical action partially intended to hasten death (Question 4)</th>
<th>Withheld treatment explicitly to hasten death (Question 5a)</th>
<th>Withdrew treatment explicitly to hasten death (Question 5b)</th>
<th>Death caused by drug (Question 6)</th>
<th>Total †</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=7</td>
<td>n=8</td>
<td>n=107</td>
<td>n=13</td>
<td>n=7</td>
<td>n=14</td>
<td>n=7</td>
<td>n=163</td>
<td></td>
</tr>
<tr>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Patient competent to discuss</td>
<td>1 (14.3%)</td>
<td>2 (25%)</td>
<td>31 (29.0%)</td>
<td>1 (7.7%)</td>
<td>0</td>
<td>2 (14.3%)</td>
<td>1 (14.3%)</td>
<td>38 (23.3%)</td>
</tr>
<tr>
<td>Patient not capable/not fully capable of discussion</td>
<td>6 (85.7%)</td>
<td>6 (75%)</td>
<td>71 (66.4 %)</td>
<td>12 (92.3%)</td>
<td>7 (100%)</td>
<td>11 (78.6%)</td>
<td>5 (71.4%)</td>
<td>118 (72.4%)</td>
</tr>
<tr>
<td>Missing</td>
<td>-</td>
<td>-</td>
<td>5 (4.6%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1 (7.1%)</td>
<td>7 (4.3%)</td>
</tr>
</tbody>
</table>
Table 5: Estimate of life shortened by last action taken.

<table>
<thead>
<tr>
<th>Last-mentioned medical decision at the end-of-life (MDEL)</th>
<th>Withheld treatment with probability of hastening death (Question 3a) †</th>
<th>Withdrew treatment with probability of hastening death (Question 3b) †</th>
<th>Used drug to alleviate pain/symptoms with probability of hastening death (Question 3c) †</th>
<th>Medical action partially intended to hasten death (Question 4) †</th>
<th>Withheld treatment explicitly to hasten death (Question 5a) †</th>
<th>Withdrew treatment explicitly to hasten death (Question 5b) †</th>
<th>Death caused by drug (Question 6) †</th>
<th>Total †</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=8</td>
<td>n=19</td>
<td>n=219</td>
<td>n=31</td>
<td>n=23</td>
<td>n=43</td>
<td>n=16</td>
<td>n=359</td>
<td></td>
</tr>
<tr>
<td>&gt; six months</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1 (2.3%)</td>
<td>-</td>
<td>1 (0.3%)</td>
<td></td>
</tr>
<tr>
<td>One to six months</td>
<td>-</td>
<td>1 (5.3%)</td>
<td>2 (0.9%)</td>
<td>-</td>
<td>4 (17.4%)</td>
<td>5 (11.6%)</td>
<td>-</td>
<td>12 (3.3%)</td>
</tr>
<tr>
<td>One week to four weeks</td>
<td>-</td>
<td>-</td>
<td>3 (1.4%)</td>
<td>4 (12.9%)</td>
<td>4 (17.4%)</td>
<td>4 (9.3%)</td>
<td>1 (6.3%)</td>
<td>16 (4.5%)</td>
</tr>
<tr>
<td>One to seven days</td>
<td>2 (25.0%)</td>
<td>2 (10.5%)</td>
<td>25 (11.4%)</td>
<td>13 (41.9%)</td>
<td>9 (39.1%)</td>
<td>21 (48.8%)</td>
<td>11 (68.8%)</td>
<td>83 (23.1%)</td>
</tr>
<tr>
<td>&lt; 24 hours</td>
<td>-</td>
<td>4 (21.1%)</td>
<td>34 (15.5%)</td>
<td>10 (32.3%)</td>
<td>1 (4.3%)</td>
<td>2 (4.7%)</td>
<td>4 (25.0%)</td>
<td>55 (15.3%)</td>
</tr>
<tr>
<td>Probably not shortened</td>
<td>5 (62.5%)</td>
<td>11 (57.9%)</td>
<td>115 (52.5%)</td>
<td>4 (12.9%)</td>
<td>5 (21.7%)</td>
<td>10 (23.3%)</td>
<td>-</td>
<td>150 (41.8%)</td>
</tr>
<tr>
<td>Missing (not answered)</td>
<td>1 (12.5%)</td>
<td>1 (5.3%)</td>
<td>40 (18.3%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>42 (11.7%)</td>
</tr>
</tbody>
</table>

† may not total 100% due to rounding
treatment (or intensify the alleviation of pain and/or symptoms) with the probability that death would be hastened, through to actions partly or explicitly intended not to prolong life, or to hasten death (see Table 2). The most common MDEL actioned, taking into account the probability that this may hasten end-of-life, was increasing the alleviation of pain and/or symptoms, (88% n=359), followed by withdrawal of treatment (50.1% n=359) (see Table 2). Of the 359 GPs who reported making a MDEL, 16 (4.5%) attributed death to a drug that had been prescribed, supplied, or administered explicitly for the purpose of hastening the patient’s death. Of these cases, nurses were identified as the agent most likely to administer the drug, either alone or with another (see Table 2).

There were 156 cases where doctors discussed with the patient the ‘possible’ hastening of the end-of-life as a result of the act or omission (Table 3). This discussion occurred shortly before, or at, the time of performing the last-mentioned act or omission in 20.7% of cases (n=359), or occurred sometime beforehand in 22.9% of cases (n=359) (see Table 3). In most cases, the discussion was initiated by the GP, (62.2% n=156), followed by the patient (18.6% n=156), the patient’s partner or relative (15.4% n=156), and the nurse (3.8% n=156). In 37.2% of cases (n=156) where the MDEL was discussed with the patient, the patient explicitly requested the action. At the time this request was made, 52 patients (89.7% n=58) were deemed capable of assessing their situation adequately to make this decision.

In 45.4% (n=359) of cases GPs did not discuss with patients the possible hastening of death by the proposed action (see Table 3). In the majority of cases (72.4% n=163) this was because the patient was not considered capable of having the discussion, but in 38 cases (23.3% n=163) (see Table 4) despite the GP judging the patient capable, there was no discussion. Reasons given for not discussing the MDEL with the patient when the patient was judged competent were that the action was clearly the best one for the patient, or discussion would have done more harm than good, or another reason. When there had been no discussion with the patient, respondents reported discussing the decision with the partner/relative (61.9% n=163), the nurse (44% n=163), colleague (25% n=163), other professional carer (16% n=163), and someone else (2% n=163). More than one confidant could be identified.

In 38% (n=163) of cases where there was ‘No Discussion’ with the patient, the GP acted without any discussion with another person. Respondents were asked for the aim of the discussion and more than one answer could be given. The main aim of discussion was to make a joint decision (59.5% n=163), and exchange information (44% n=163) with support (34.3% n=163) and consultation/receive advice (30.6% n=163) scoring next. The option to ‘fulfil institutional requirements’ received the lowest support at 12.2% (n=163).

In 57.1% of cases, life was judged to have been shortened by less than 24 hours, or not at all (n=359). When you add in those cases where life was judged to have been shortened by one to seven days (23.1%), in over 80% of cases (n=359) life was judged to have been shortened by less than a week (see Table 5). There was a high non-response rate to the question ‘by how much was the life of the patient shortened by this last mentioned act or omission. (See Table 5).

In the cases where death was judged hastened by one to four weeks (16 cases), one to six months (12 cases) and more than six months (1 case) (see Table 5), all GPs indicated they had access to palliative care services. In one case where the decision was not discussed with patient, family or colleagues, the patient had previously expressed a wish for hastened death and an Advance Directive was influential in decision-making. In this case, morphine was increased partly with the intention of hastening death. None of these 29 patients were prescribed, supplied, or administered a drug explicitly to hasten their death.

GPs who prescribed, supplied or administered a drug to a patient explicitly to hasten death, as compared to GPs who did not, but who made another MDEL, were more likely to be male (p<.01), however no other differences in terms of age, religion, place of practice or access to palliative care services were observed between the two groups.

Of the 16 GPs who prescribed, supplied or administered a drug to a patient explicitly...
to hasten death and death ensued, these GPs tended to be older, and less likely to be religious. They all had access to palliative services and were more likely to live in a city (3 were rural). Gender did not factor (9 male, 7 female).

Of the 650 GPs who responded, 614 (94.5%) indicated they had access to an interdisciplinary pain management or palliative care team, and 595 (96.9% n=614) of them indicated that they consulted with such a team, (45.0%) frequently or (23.2%) always (see Figure 1). The main reasons given for not consulting were that the doctor had sufficient palliative care knowledge or services were inaccessible.

Discussion

Our study explored medical decision-making practices at the end-of-life reported by New Zealand GPs within the context of access to palliative care. Comparisons are drawn in this section with a previous study. Although findings were published in 2004, data was collected in 2000 and throughout this section these respondents are referred to as the “2000 group”.

The terms ‘euthanasia’ and ‘physician-assisted suicide’ were not used within the questionnaire; however, in question 6, GPs were asked whether the death was caused by the use of a drug prescribed, supplied or administered by the GP (or a colleague) with the explicit purpose (emphasis in questionnaire) of hastening the end-of-life or of enabling the patient to end his or her own life. Such intentional actions to hasten the end-of-life are understood as euthanasia (“the administering of lethal drugs by a physician to end the patient's life on the patient's explicit request”), or physician-assisted suicide (“the patient self-administers medication to end his or her life that was prescribed for this purpose by a physician”).

The most common MDEL reported was “intensifying the alleviation of pain and/or symptoms taking into account the probability” that the end-of-life would be hastened (88% n=359) (see Table 2), a similar finding reported in the 2004 study (84.8% n=693). However, physicians in the 2013 group were more likely than the 2000 group to withdraw a treatment, taking into account the probability that death would be hastened. Respondents indicated the treatment withdrawn ranged from drugs (ie, statins) to dialysis or chemotherapy. This may reflect a growing willingness to consider the futility of continuing some treatments, and the increased willingness to discuss this with patients seems to support this assertion. The 2000 group reported a discussion in 32.9% cases (n=693) and in 2013, 43.4% reported a discussion (n=359). Reported occurrences for all other MDEL were similar for both groups.

Of the 359 GPs who made a MDEL, 16 (4.5%) reported a drug was prescribed, supplied or administered with the explicit purpose of hastening the patient's death. Nurses were identified by GPs as the agent who administered the drug when this was explicitly intended to hasten the death of the patient (see Table 2). This mirrors results reported in 2004. The 2013 group appeared less likely than the 2000 group to identify a further agent (more than one could be identified). One identified “Another person” and two identified “You or a colleague”, as well as the nurse (in one case a Hospice nurse). This latter respondent identified himself as having had 10 years' experience working in Hospice and that he involved the Hospice home-care team in the case. The actions this respondent described (increasing sedation and reducing fluid intake to hasten the end-of-life), have been questioned in the literature as “slow euthanasia”, but defended as normal medical practice by others. The debate on whether continuous deep sedation constitutes euthanasia by another name is beyond the scope of this paper, but has been addressed at length elsewhere.

Nurses’ alleged involvement gives rise to two points of discussion. First, given the safety checks in place around drug administration in our health care system, it seems evident that any drugs administered to a patient would have been charted by a doctor. In view of professional training, institutional requirements regarding the distribution of narcotics, and ethical constraints, it seems unlikely that 15 nurses gave a fatal injection to the patient, or supplied them with drugs that caused the patient to die. Pain relief and sedation at the end-of-life are generally administered
via a pain pump or syringe driver and the person responsible for setting up the giving agent would be the nurse. Technically speaking, the person who administered the drug would therefore be the nurse, following doctor’s orders. This gives rise to the second point. This result indicates that in at least 15 of the cases where an assisted death was said to have been provided, the patient may have had a pump in situ, such as is normally used in good palliative care to provide appropriate symptom control.

It is plausible that nurses involved in such cases may have understood the medical action as conforming to standard palliative care measures in the particular context or equally, may have understood that the drug was explicitly intended to end the life of the patient. Nevertheless, the GPs who reported the deaths appear to have unequivocally viewed the actions as ‘explicitly’ intending the death of patient, and thus reported them as such.

A number of studies have shown that nurses are involved in MDEL, both in terms of decision-making and in the administration of a lethal drug. A recent Dutch study by Albers et al., found that the majority of nursing staff felt they should be involved in the process of decision-making at the end-of-life and that patients would rather talk to them than physicians about end-of-life decision-making. Results here confirm that GPs frequently discuss MDEL with nurses (44% n=163), when discussions are not held with the patient.

O’Connor and Aranda noted in their study that some nurses felt the relationship they developed with patients and significant others meant those nurses caring for dying patients may be in the best position to carry out euthanasia. Further research in the area of nurses’ involvement in decision-making at the end-of-life is needed.

Access to a multidisciplinary pain management or palliative care team was high at 94.5% (n=650) as was consultation with such teams at 96.9% (n=614) (see Figure 1), a comparable finding to 2004. These results are welcome given the review of palliative care in a recent report that highlights the challenges within palliative care in New Zealand—including a lack of awareness and utilisation of palliative care services amongst the general public and health care professionals, and a lack/absence of data on population need, service provision and service utilisation. Whilst a study of palliative care provision by rural GPs in New Zealand found that most reported they had good access to specialist advice, a recent study concluded the need for wider availability of specialist palliative care advice, 24-hour nursing cover and some support services for rural GPs.

**Discussion Status**

Over all MDEL, there was increased likelihood of discussion with the patient that the proposed action could hasten death in the 2013 group over the 2000 group, most notably for intensifying the alleviation of pain and/or symptoms using morphine or a comparable drug. When discussions had taken place with the patient, it appeared more likely to have occurred at some time prior—rather than at the time of the action—possibly indicating prior planning, except for discussions concerning intensifying the alleviation of pain and/or symptoms using morphine or a comparable drug. Increasing medication to alleviate symptoms was also the most common MDEL made by both groups and both groups had a high rate for “No Discussion” before this MDEL, even when the patient was deemed competent. The high rate of missing data for the question on discussion status for both groups may reflect a belief that actions regarded as routine medical management do not require discussion, but the GP wishes to avoid the implied criticism that “No Discussion” involves.

Any possible shortening of the patient’s life as a consequence of intensifying the alleviation of pain and/or symptoms may be defended under the principle of double effect, whereby the intention is to alleviate suffering and not to hasten death.

The increased tendency towards more discussion with the patient about possible hastening of death may be accounted for in several ways. First, there has been significant emphasis placed on advance care planning conversations in the past 3 years with the Ministry of Health outlining a comprehensive guide to such discussions for the health care workforce.

This is also seen in other countries. Second, given our finding of high access...
and use of interdisciplinary palliative care services, this suggests a greater awareness of end-of-life issues as they may influence personal decision-making. When viewed in light of the respect shown towards patient preferences (self-determination), this may be reflected in more discussion between patients and GPs at the end-of-life. Third, recognising that the average age of GPs is increasing (see also Table 1), it is plausible that older GPs may be more comfortable discussing MDEL actions with their older patients. Finally, given the number of highly-publicised family-assisted deaths within the media—both nationally and internationally—as well as media coverage of countries discussing medical practices that hasten death within the legislature, and a climate that is perhaps more open and supportive of discussing such practices there may be less reluctance by health professionals and patients generally to discuss MDEL.

Studies have shown that patients prefer end-of-life discussions with physicians early in their medical course; that strong relationships between patients and health care professionals were wanted by patients and health professionals; and that patients would like GPs to take the lead in initiating such discussions about MDEL. Given the New Zealand public’s interest in end-of-life decision-making—specifically practices that hasten death—greater public knowledge about the medical options legally available to patients at the end-of-life is required.

Several GPs noted on their questionnaires that they were confused about what actually constituted legal MDEL, wanting clarification particularly as the law related to increasing symptomatic treatment using medication that could hasten death. Given that it is GPs who will increasingly be responsible for coordinating end-of-life care in the community, that patients want their GPs to take the lead in discussions on end-of-life care and that there are palliative options to meet almost all need at the end-of-life, a clearer commitment by the relevant professional bodies and colleges to further educate and inform GPs on appropriate end-of-life care is overdue. It is interesting to note the high rate of missing data for a number of questions, particularly how much life was shortened by and discussion with patients about the possible hastening of death. Reluctance to give answers may indicate an unwillingness to state one’s actions when these actions involve illegal or morally grey areas. Tourangeau and Yan found that asking sensitive questions lowers response rates and boosts item non-response and reporting errors. Of course, prognostication is extremely difficult, and some GPs may have preferred not to guess. There was a tendency towards more GPs in the 2013 group over the 2000 group judging that the action taken probably did not shorten life particularly when the MDEL was withdrawing treatment explicitly to hasten death.

Limitations

The low response rate from GPs requires comment (21% response rate in 2013, compared to a 48% rate reported in 2004), although where the research subject is controversial, a low response rate is accepted. Caution needs to be exercised due to selection bias.

A number of GPs who completed the questionnaire in 2000 (published 2004) may have decided they had nothing further to add in 2013 and so declined to participate again. Anecdotal comments from several GPs indicated that they are increasingly invited to participate in research projects. Given that the general practice workforce in New Zealand is “stressed and diminishing,” and GPs are spending more time on patient-related paperwork, there may be less time and inclination to devote to completing cold-call questionnaires.

Due to the anonymised interview component of the research (not reported here), requiring additional information about how the phone interview would be undertaken (to reassure GPs about anonymity), the Participant Information Sheet was longer than was ideal, possibly discouraging some participants from completing the questionnaire. Additionally, some non-responders stated the questionnaire was “confusing” and “too complex” as a reason for declining participation. Finally, given the sensitivity of the subject material, a number of GPs may have declined to participate due to personal convictions about the context, motivations, and potential uses of such research.
Forcing a yes/no response to questions about complex end-of-life decision making suggests that some answers may not fully reflect actual practice. This was acknowledged in the questionnaire and respondents were requested to give answers that most closely approximated the circumstances of the death.

Conclusion

Our study shows that medical decisions at the end-of-life that hasten death through the prescribing, supplying or administration of a drug with that explicit purpose, continue to be a reality in New Zealand, that nurses are allegedly involved in such practices, and there appears to be more discussion with patients about MDEL. The study contributes significantly to our understanding of GPs medical decision-making at the end-of-life and indicates further areas for research, particularly nurses’ involvement at the end-of-life.

Competing interests:
Phillipa Malpas is a member of the End-of-Life Choice Voluntary Euthanasia Society of New Zealand. Kay Mitchell is a registered nurse with hospice experience (no longer practising) and reports grants from Health Research Council of New Zealand (HRC), grants from Maurice and Phyllis Paykel Trust, during the conduct of the study; Heidi Koschwanez reports grants from Health Research Council of New Zealand (HRC), grants from Maurice and Phyllis Paykel Trust, during the conduct of the study.

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Multidisciplinary operating room simulation-based team training to reduce treatment errors: a feasibility study in New Zealand hospitals


ARTICLE

ABSTRACT

AIMS: Communication failures in healthcare are frequent and linked to adverse events and treatment errors. Simulation-based team training has been proposed to address this. We aimed to explore the feasibility of a simulation-based course for all members of the operating room (OR) team, and to evaluate its effectiveness.

METHODS: Members of experienced OR teams were invited to participate in three simulated clinical events using an integrated surgical and anesthesia model. We collected information on costs, Behavioural Marker of Risk Index (BMRI) (a measure of team information sharing) and participants’ educational gains.

RESULTS: We successfully recruited 20 full OR teams. Set up costs were NZ$50,000. Running costs per course were NZ$4,000, excluding staff. Most participants rated the course highly. BMRI improved significantly (P = 0.04) and thematic analysis identified educational gains for participants.

CONCLUSION: We demonstrated feasibility of multidisciplinary simulation-based training for surgeons, anesthetists, nurses and anaesthetic technicians. The course showed evidence of participant learning and we obtained useful information on cost. There is considerable potential to extend this type of team-based simulation to improve the performance of OR teams and increase safety for surgical patients.

Failures of teamwork are frequent in healthcare and may result in compromised patient care, inefficiency, and tensions among staff.1-4 Salas et al5 propose that three coordinating mechanisms are required for effective teamwork: mutual trust, closed-loop communication, and shared mental models (a shared understanding between members of the team of the situation, goals and plan). These shared mental models have been linked to improved team performance across many industries.6 Two fundamental requirements for developing a shared mental model are effective communication and sharing of information between team members.7 In healthcare, the use of checklists that promote the sharing of clinical information and construction of shared mental models has resulted in reduced surgical complications,8-11 increased timely antibiotic administration,12 and improved medical management.13 Structured handovers also provide benefits that include fewer unexpected deaths14 and adverse events.15

Simulation is increasingly used for teamwork training in healthcare. However, the primary target of these simulation-based initiatives is often a single professional discipline, which fails
to fully address issues of communication between team-members from different disciplines. There are some published reports of multidisciplinary simulation-based team-training interventions for whole OR teams,\textsuperscript{16-18} and such interventions have gained some traction in obstetrics\textsuperscript{19,20} and emergency medicine.\textsuperscript{21,22} However, whole OR simulation-based team training is not widely adopted. A recent review of multidisciplinary simulation-based team-training identified three common barriers: recruitment of participants; achievement of adequate fidelity; and cost.\textsuperscript{16}

For voluntary educational initiatives, recruitment depends (among other things) on gaining the interest of all participants. For simulation-based education of OR teams, this requires simulations in which individuals from each discipline are engaged in meaningful and realistic activities. Some commercially available simulators are designed to engage anaesthetists,\textsuperscript{23} while others are suitable for surgeons\textsuperscript{24} but none combines the elements required to engage both at the same time, while also engaging theatre nurses and anaesthesia support staff.

This study is part of a wider body of work. Our ultimate goal is reducing treatment errors and improving patient safety through increasing our understanding of communication and teamwork in the OR and translating this into effective educational initiatives. The aim of this pilot study was to determine the feasibility and cost of developing and delivering a simulation-based course for surgical teams, and to evaluate its effectiveness.

Methods

This course is part of a wider research programme (Australia and New Zealand Clinical Trials Registry ID 12612001088831) to explore and improve teamwork and communication in the OR. We obtained approval from the Central Regional Ethics Committee, CEN/12/03/002.

Aims

We aimed to answer the following questions:

- Can we develop and run a simulation-based course for 20 general surgical OR teams?
- How much would such a course cost?
- Would the course be perceived by participants as a valuable learning experience?
- Would there be any evidence of learning by participants?

To do this we used a mixed methods approach.

A secondary objective was to obtain constructive feedback to guide further development of educational resources of this sort.

Course development and description

Research group

To ensure that our scenarios would be relevant to all disciplines we included representatives from surgery, anaesthesia, and nursing in the research group. This group, which included academics and clinical leaders from each disciplines, met monthly and contributed to each stage of course development and evaluation.

The participants

We designed our intervention for a complete, general surgical OR team, comprising six participants: a specialist surgeon, a surgical trainee (at any stage in their surgical training), a specialist anaesthetist or a senior trainee in their last year of training, two OR nurses and an anaesthetic technician. We recruited members of established OR teams from each of two large tertiary hospitals in Auckland (20 teams in total). On each course day, we aimed to recruit participants who regularly worked together.

Needs assessment

To ensure relevance of the course to participants, we conducted nine focus groups involving 45 participants (surgeons, anaesthetists, nurses, anaesthetic technicians) from the participating hospitals. We asked participants about their experiences of teamwork and communication in the OR.

A large proportion of the participants’ comments were related to problems with communication (ie, explicitness and checking that communication is successful) and ‘shared mental models’\textsuperscript{25} (ie, getting everyone on the same page).\textsuperscript{25}
Course objectives
Based on the needs assessment, the overarching objectives of the course were to improve communication and information sharing among members of the OR team.

The setting
The course was based at the Simulation Centre for Patient Safety (SCPS), University of Auckland. We created a realistic OR environment using: real drug ampoules and fluids with sterile syringes, needles and fluid giving sets as found in the clinical environment; artificial blood presented in packaging and identifiers as provided by the blood bank; equipment such as rapid infusion devices, fluid warmers, anaesthetic machine and surgical instruments similar to those used in our participants’ hospitals; patient clinical notes and investigations available online. We designed the simulations so that the participants worked together on the case without prompts or input from faculty, as they would do in their normal working environment. A faculty nurse was available in the simulation room to assist only when requested to do so by the participants, for example by helping them to locate equipment, take blood, confirming (or not) the presence of a rash. We used audiovisual equipment and StudioCode® v4.5.1 software (Studiocode Business Group, Sydney, Australia) for recording and reviewing scenarios, and Laerdal 3G SimMan (Stavanger, Norway) and METI® HPS™ (Sarasota, FL, USA) manikins.

Development of the scenarios
Scenarios were developed from real cases encountered by members of the research group, and included problematic incidents described in the focus groups. We aimed to provide challenges to participants from all of the participating disciplines.

Two scenarios involved acute abdominal pathology: appendicitis complicated by sepsis and subsequent allergic reaction; and a stab wound with lacerated inferior vena cava (IVC) complicated by cardiovascular collapse. The third scenario involved a traumatic leg amputation following an explosion, complicated by lung barotrauma.

To explore sharing of information among OR teams, when participants were briefed on the clinical scenario, they each were given a unique additional item of information about the patient that was clinically relevant and important, plausible for that member to have sole knowledge of, and should ideally be shared with all team members. Examples of these items were: the patient was carrying an asthma inhaler; patient recently on long-haul flight and had calf pain 24 hours ago; metronidazole charted in ED but not yet administered.

Surgical models
We commissioned a special effects company (Main Reactor, Auckland New Zealand) to work with three consultant surgeons to manufacture life-like surgical models that integrated with both the METI and 3G SimMan manikins. We wanted surgeons to be able to operate on the models using surgical instruments and, when appropriate, we wanted the models to bleed realistically.

The abdominal model had a replaceable skin that could be cleansed with chlorhexidine, incised and retracted. Within the abdominal cavity there were a molded aorta, kidneys and psoas muscles and models of small and large bowel with mesentery and omentum, and IVC. The base of the appendix, the caecum, the IVC, and the skin could all be sutured as necessary. The models could be connected to a blood pump to produce bleeding consistent with an IVC laceration or bleeding from the femoral vessels. Blood could be suctioned and the abdomen washed out (Figure 1).

Recruitment of participants
Teams of six participants were recruited using a first-come first-enrolled approach. On any one study day, we aimed to recruit participants from the same hospital, who could have previously worked together.

Recruiting 20 teams implied recruiting the majority of specialist general surgeons in each institution, but not the majority of the anaesthetists, nurses, or anaesthetic technicians.

Structure of the Course Day
Familiarisation
We began each day with a 30-minute familiarisation exercise to the equipment and environment.
Presentation
We provided an overview of the evidence on communication failures in the OR; outlined the basic elements of effective teamwork and explained two communication tools: closed-loop communication and structured call-out.

Briefing
We provided participants with individualised case briefing notes before each of the three scenarios. All participants received the same description of the basic clinical details for the case, as well as a unique item of clinically relevant information.

Scenarios
Each team of six participants attended for one full day and took part in all three scenarios, each of approximately 40 minutes duration. The first and third scenarios (abdominal cases) were presented in random order to account for order effects.

Debriefing
After each scenario, participants took part in a structured 40-minute debrief, facilitated by trained debriefers from the research group comprising a surgeon, anaesthetist, and nurse or anesthetic technician. The debrief clarified the events, explored mechanisms of and barriers to sharing information, sought examples from their clinical experience and looked for application to subsequent clinical practice.

Data collection and analysis

Participation
We recorded participant demographics and difficulties in recruiting specific team members for each course day.

Cost
We estimated costs from invoices for consumables, facility costs, the model makers, and the cost of goods donated by sponsors of the project.

Participant perceptions of value of the course
Participants completed a questionnaire about the realism of the simulation and the models after each scenario. This included provision for comments.

At the conclusion of the course, participants completed a course evaluation asking if they found the course enjoyable, if they found it a useful learning experience, if they would recommend the course to their colleagues, and if they would change their practice as a result of the course. They answered each question on a 5-point Likert scale from “Disagree strongly” to “Agree strongly”. Written comments were invited.

Behavioural Marker of Risk Index (BMRI)
Team communication was measured using a simple tool to score observable team behaviours that have been shown to be predictive of adverse events. The BMRI tool measures six domains of behaviour in three phases of surgery. The domains are: briefing, information sharing, inquiry, contingency management, assertion, and vigilance (Table 1). The three phases are induction, intraoperative, and handoff.

In this work, only induction and intraoperative periods were scored as the simulations ended before handoff.

Observers and training
Two trained observers (LS and MC) rated all the first and third scenarios of each course day. The training included an introduction to behavioural studies and the BMRI-tool as well as orientation to the OR environment, as recommended by Carthey. To ensure standardisation of observations, a series of exercises were performed before the recordings, whereby video clips of surgical cases were rated by
the trainers and observers and any discrepancies were discussed until consensus was reached. This process was repeated and within-group inter-rater agreement (RWG) was calculated at each step until acceptable agreement (RWG >0.8) was reached.

Statistical analysis

BMRI scores were calculated following the method of Mazzocco et al.27 First, scores for each of the domains (excluding contingency management and assertion, as these do not occur often) in each of the phases were converted from a 0–4 (never observed–observed frequently) scale to a binary score (ie, 0–2 were converted to 1 and 3–4 were converted to 0). Averages of the binary scores were taken to calculate the BMRI score. Note that, as BMRI is an index of risk, lower scores are considered better as they reflect more frequently observed behaviours.

Qualitative analysis of debriefs

We recorded and transcribed the debriefs for qualitative analysis. One investigator (DM) undertook formal thematic analysis of the transcriptions according to the methodology of Braun and Clarke.29 DM read all the transcriptions and then generated preliminary codes. The coded segments were then collated into themes using a table that linked theme headings to representative quotes. DM then reviewed the themes and sub-themes until consensus was reached on a coding framework.

Results

A total of 20 teams (120 professionals comprising 20 surgeons and 20 surgical trainees, 20 anaesthetists, 20 anaesthetic technicians, and 40 nurses) participated in the study between 15 October 2012 and 1 July 2013. Two study days were rescheduled because of surgeon unavailability. We were unable to recruit the full complement of participants from the study hospital on three days, and filled the gaps with participants from other hospitals in the region. The majority of participants were female (62.5%), but this varied by role (Table 2). Participants’ self-reported experience in the OR ranged from less than 6 months to over 21 years and also varied by role (Table 2).

Cost

The set-up cost for the models, including the blood pump was approximately NZD$50,000. The costs per day are presented in Table 3. This does not include faculty salaries because of variable funding and staffing arrangements.

Participants’ perceptions of value of the course

In the questionnaires administered after each scenario, when asked if the simulations and models were realistic, over 80% of participants agreed or strongly agreed (Figure 2). Also, 87.7% agreed or strongly agreed that the simulation was as challenging as a real case of similar nature, and 93.6% agreed or strongly agreed that they behaved as they would in real

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>Briefing</td>
<td>Situation/relevant background shared; patient, procedure, site/side identified; plans are stated; questions asked; ongoing monitoring and communication encouraged</td>
</tr>
<tr>
<td>Information sharing</td>
<td>Information is shared; intentions are stated; mutual respect is evident; social conversations are appropriate</td>
</tr>
<tr>
<td>Inquiry</td>
<td>Asks for input and other relevant information</td>
</tr>
<tr>
<td>Contingency management</td>
<td>Relevant risks are identified; backup plans are made and executed</td>
</tr>
<tr>
<td>Assertion</td>
<td>The members of the team speak up with their observations and recommendations during critical times</td>
</tr>
<tr>
<td>Vigilance</td>
<td>Tasks are prioritised; attention is focused; patient/equipment Monitoring is maintained; tunnel vision is avoided; red flags are identified</td>
</tr>
</tbody>
</table>

Table 1: Items used in scoring BMRI. Note inter-sub-team information sharing was not in the original tool.
In free text comments many noted that the model and scenario realism were generally very good.

Representative quotes were:

“The patient was very real and it felt like real scenarios” (nurse)

“Both the surgical models and scenarios were realistic and generated the appropriate stress response” (surgeon)

Participants indicated low blood viscosity, insufficient bleeding from lacerated IVC, and breath sounds that were difficult to interpret as limitations to the realism of the models. Limitations to the realism of the environment included: lack of clinical help; limited equipment; and differences from usual practice (eg, diathermy could not be used, the endotracheal tube needed lubrication with silicon and updated laboratory results had to be requested by telephone).

In the end-of-course questionnaire almost all participants agreed or strongly agreed (98.3%) that the course was a useful learning experience (Figure 3). All but one participant would recommend the course to colleagues and 89.2% of participants indicated they would change their practice as a result of the course.

Eighty-four participants wrote responses in a free text field on the end of course questionnaire. No participants indicated the course was unsatisfactory, and many participants suggested expanding the scope to other specialties and providing more regular courses as illustrated by the following quotes:

“Please keep doing these as a means of promoting education and awareness” (anaesthetic technician)

“...could make this a course for theatre staff to attend on a yearly basis” (anaesthetist)

“this course should be compulsory as part of annual update” (nurse)

“every theatre staff should be encouraged to attend” (surgeon).

Evidence of participant learning

BMRI

There was no difference in BMRI between scenarios. There was a significant improvement in BMRI from the first to the
**Figure 2:** Participant perceptions of the model and course realism

![Bar chart showing participant perceptions of the model and course realism](image)

**Figure 3:** Participant responses to the end-of-day questionnaire.

![Bar chart showing participant responses to the end-of-day questionnaire](image)

**Figure 4:** Boxplot of BMRI scores from the first to the third scenario

![Boxplot of BMRI scores](image)
The last scenario (0.15 v 0.056; p=0.04; Figure 4). The domain that contributed the most to the improvement was briefing.

Qualitative analysis of debriefs
Analysis of the debrief transcripts identified the following three themes arising from the experiences of course participants: promoting a team orientation; establishing a coordinated team; and appreciation of the importance of information sharing.

Promoting a team orientation
Participants discussed the importance of setting aside professional boundaries to work towards a common goal. They suggested more stable team membership and debriefing after complex cases could promote team values of cooperation and mutual support (Table 4). Some comments were prompted by discovering that team members had different information about the simulated cases.

Establishing a coordinated team
Participants highlighted the importance of a team that functions well as a unit.

They suggested this could be encouraged by clearly defining roles and establishing a team coordinator (Table 5).

Appreciation of the importance of information sharing
Many participants discussed the use of pauses in surgery as opportunities to share information, and included pre-operation team briefings, formal time-outs immediately before surgical incision, and ‘call-outs’ during critical events when the case became confusing or difficult to manage.

Participants suggested that all OR team members should contribute thoughts and opinions to help with patient management, and their recommendations included: putting hierarchy or anxiety aside to articulate uncertainty rather than continuing in silence; being assertive and explicit regardless of your position in the team; and inviting contributions from others. Closed-loop communication, avoiding acronyms, and using a whiteboard could help share information. Participants also identified directing communication by using people’s names as important, which
prompted discussions about knowing names. Participants also noted too much communicating during critical periods could potentially be distracting (Table 6).

**Discussion**

We succeeded in recruiting 20 full OR teams to a full-day simulation course. Almost all our participants from each of the disciplines found the simulations realistic. Participants rated the course highly in terms educational value and we showed evidence of learning by participants through a significant improvement in BMRI scores for communication and information sharing over the course of the day. In addition, the qualitative analysis of the debriefs following simulations suggested participants learnt about team orientation, team co-ordination, the importance of a sharing information between team members and strategies to achieve this.

Despite having senior clinical leaders on the project team, recruitment was not always easy. This could partly be ascribed to our strict protocol for participant eligibility and numbers and more flexibility might facilitate recruitment. This course was free to participants, which may have

<table>
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<th>Table 6: Appreciation of the importance of information sharing: illustrative participant quotes</th>
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| **Sharing information through briefings and prompted pauses** | “If the opportunity is there then it is great to have a briefing as a team beforehand, which may be possible in a trauma situation, you know if … you’ve got ten minutes before they’re coming up to theatre.” (A)  
“On induction [she] just went into severe bronchospasm ...stating the obvious, like, we’re not doing the surgery ...the anaesthetists everyone rolled their eyes as if that was obvious, but the nurses were like, Oh, okay good. We’ll un-scrub and help then.” (SS) |
| **Timing of timeouts** | “But in trauma, having [timeout] before the patient goes to sleep is quite good... You unmask a whole lot of things when you start giving a patient drugs and there isn’t a lot of time to stop and think after that, you really have to have thought through your options before that.” (A)  
“You can [have] time out once you get stability though, can’t you - I think it’s important about antibiotics, DVT and those other things being done.” (SS) |
| **Articulating uncertainty** | “I got the impression during my anaesthetic training [that] to admit any uncertainty or indecision or let anyone else chip in, that was sort of a sign of weakness... and it’s really nice to perhaps be given a template whereby you can maintain a leadership role whilst admitting uncertainty, indecisiveness, inviting input without… abdicating leadership.” (A) |
| **Increasing assertiveness and explicitness** | “When you’re a junior, or when you’re a nurse, you should always remember that your opinion counts, because - you don’t want to talk up - you might offend someone.” (A) |
| **Inviting contributions** | “It’s important to make sure that everybody in the room not only does share what they know but is made to feel like what they know is important. It doesn’t matter if you’re the porter or the scrub nurse, whoever you are in the room, that you are confident to share what you know.” (ST) |
| **Avoiding acronyms and abbreviations** | “But then I realized... do people have different ideas of ‘triples’? Cause my ‘triples’ is Amoxicillin, Gentamicin and Metronidazole… maybe I should have asked exactly what triples are.” (ST) |
| **Directing communication to specific people** | “And it’s not like, “Oh, someone get me this and someone get me that” it’s “[Name] can you go and get this” and “[Name] can you go and get me that”, so your name is said first, so you know that people are talking to you.” (N) |
| **Establishing the right amount of communication** | “Too much noise is bad as too little information …we should have good default procedures so that you don’t have to talk a lot …it should just be routine procedures.” (SS) |

A=Anaesthetist, SS=Specialist Surgeon, ST = Surgical Trainee, N=Nurse
influenced attendance. The course was outside any organisational or continuing professional development requirements. Embedding such courses in organisational structures could be required for widespread implementation.

While participants generally considered the simulations to be of sufficient realism to engage, they did identify some limitations to the realism. These may be overcome by better familiarisation and framing of expectations, conducting more frequent simulations, or conducting the scenarios in-situ at the participants' usual place of work.

While development costs were considerable, ongoing costs of NZD$4,000 per day (plus staff time) are in line with other established simulation-based courses in our institution. At a minimum we estimate it would require two instructors and two simulation technicians to run this course but there is scope to increase the number of participants per course. This study was funded through grants and product donations from industry. Funding ongoing training may require innovative solutions working with quality and safety committees, colleges, district health boards and medical insurance organisations. For example an insurance-driven funding model has been piloted by the Harvard Surgical Safety Collaborative.\(^{18}\)

We have shown that all but two of the 120 participants agreed that the course was a valuable learning experience. The scale of the improvement in BMRI scores would, according to Mazzocco,\(^ {27}\) translate to a 16% reduction in adverse events (from an odds ratio of 1.24 to 1.04). The potential for cost-savings would more than justify the costs of the course. Furthermore, our analysis of the debriefs showed insightful reflections on information sharing amongst team members. Participants recognised instances where information was not shared, identified barriers to such information sharing, and discussed strategies to improve information sharing in clinical practice.

We think the strengths of the course were: establishing a multidisciplinary research team; undertaking a preliminary needs assessment; reasonably realistic surgical models which could engage surgeons in technical tasks; building in challenges for all members of the team; creating a highly realistic simulation environment; and finally, minimal faculty input during the scenarios ensured communication was almost exclusively within the team of participants. There are a number of limitations in this study. We report only experiences on the course day, and do not evaluate retention of learning or transfer of learning to clinical practice. In future work we plan to explore the impact of the course on participants' knowledge and attitudes over time, and on their subsequent clinical practice.

There is potential for bias in our participants, who were all volunteers, and results may not reflect other groups of participants. The course was run at a purpose-built simulation centre and potential to run similar courses in situ will be the focus of future work.

Conclusions

We demonstrated feasibility of multidisciplinary simulation-based training for surgeons, anesthetists, nurses and anaesthetic technicians. The course was rated highly by participants, we showed evidence of participant learning and improved BMRI scores. There is considerable potential to extend this type of team-based simulation to improve the performance of OR teams and increase safety for surgical patients.
Competing interests:
The authors report grants from Health Workforce New Zealand, Auckland Medical Research Foundation, Auckland School of Medicine Foundation, Joint Anaesthesia Foundation Auckland; non-financial support from Kimberly-Clark, NZ Blood, Smith & Nephew, Covidien, Baxter, Definitive Surgical Trauma Care (DSTC) Course (NZ), Zimmer and Obex, during the conduct of the study.

Funding:
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Service planning implications of estimating Primary Health Organisation enrolment rate based on a Health Service Utilisation population rather than a census-derived population

Wing Cheuk Chan, Dean Papaconstantinou, Doone Winnard

ABSTRACT

AIM: Estimating Primary Health Organisation (PHO) enrolment rates with a census-derived estimated resident population denominator may provide misleading results because of numerator and denominator mismatch. This study uses the Health Service Utilisation (HSU) population denominator as an alternative.

METHOD: A HSU population was generated by record linkage of routinely collected datasets from the Ministry of Health via encrypted National Health Index (NHI). We compare PHO enrolment rates by age and ethnicity in Counties Manukau District Health Board (CMDHB) in 2013.

RESULTS: In CMDHB, 98% of people who had utilised publicly-funded health services in 2013 were enrolled in a PHO in 2013. Using the HSU population as a denominator, PHO enrolment rates for Māori, Pacific, Asian, New Zealand European/Other population groups were 98.3%, 97.7%, 97.6%, and 98.3% respectively. Just under 4% of people discharged from CMDHB inpatient facilities were not enrolled in a PHO within a month from the day of discharge in 2013.

CONCLUSION: Using the HSU population as a proxy of health services need, PHO enrolment rates were similar across ethnicities in the CMDHB population. Support to improve PHO enrolment coverage would be more efficient if the HSU population were used to target people who are not yet enrolled in a PHO.

The vision of the New Zealand Primary Health Care Strategy (PHCS) is that people are “part of local primary health care services that improve their health, keep them well, are easy to get to and co-ordinate their ongoing care” and that primary health care services “focus on better health for a population, and actively work to reduce health inequalities between different groups”. A key element of the implementation of the PHCS was the formation of Primary Health Organisations (PHOs) and population enrolment in PHOs. Along with the benefit of a nominated primary healthcare team to co-ordinate a range of health services including opportunistic and/or proactive preventive care, the advantages of PHO enrolment include lower co-payment for primary care visits.

Ideally, all eligible New Zealand residents should be enrolled. However, 100% PHO enrolment is unlikely because PHO enrolment is voluntary, and some people who are not enrolled may be well, and not perceive themselves to have any immediate health needs. These people may not see any advantage in PHO enrolment.
PHO enrolment is considered an important indicator of access to primary health care services, and is a mandated indicator in DHB Maori* health plans. This paper explores the possible explanations that may account for the long-standing observation of low Maori and Asian PHO enrolment and over 100% Pacific enrolment in New Zealand as reported in many published documents. Furthermore, it considers how efforts to improve PHO enrolment, to facilitate access to primary health care services, might be better targeted by using available administrative health data sets.

Standard calculation of PHO enrolment uses the Statistics New Zealand estimated resident population as a denominator. This paper describes an alternative method to calculate PHO enrolment by ethnicity using a Health Service Utilisation (HSU) population as a population denominator. Recent health service utilisation can be seen as a proxy of recent health services need, albeit an imperfect proxy. People who have had recent health service utilisation are more likely to benefit from PHO enrolment than people who have not had recent health service utilisation. For example, if a primary care follow-up is required following a hospitalisation, being enrolled in a PHO may result in lower co-payment fees and gives the opportunity for that care to be integrated with ongoing care by the primary care team of the patient’s choice. Since the contact details of people who have recently used health services are routinely recorded, the use of the health service utilisation population can potentially enable the health sector to readily identify people who have utilised health services recently but are not yet enrolled in a PHO. Therefore, people who might be missing out on the benefits of PHO enrolment could be better targeted. Since only routine administrative data from the Ministry of Health have been used, the methods can be readily replicated by the Ministry of Health, District Health Boards, and Primary Health Organisations.

The estimated resident population used as a denominator in the standard calculation of PHO enrolment is one of two common population outputs from Statistics New Zealand, namely the census usually resident population, and the estimated resident population. These two populations are often misunderstood by the health sector; they should not be used interchangeably. The differences between the two concepts and how they should be used are discussed in the appendix.

Methods

In Aotearoa New Zealand, virtually all healthcare users are assigned a unique alphanumeric code, the National Health Index (NHI), at the time of their first contact with the health care system. The encrypted form of NHI was used in this study to ensure privacy and anonymity of individuals. As all datasets were entirely based on anonymous non-identifiable administrative data, and this work was carried out under the function of DHBs to assess and monitor the needs of their population for services, no formal ethical review from the Health and Disability Ethics Committee was required, as per New Zealand ethical guidelines.

The following datasets were sourced from the Ministry of Health.

1. National Minimum Dataset (inpatient hospital events; NMDS, New Zealand coverage)
2. National Non-admitted Patient Collection (outpatients, ED and community visits; NNPAC, New Zealand coverage)
3. Pharmaceutical Collection (PHARMHOUSE, Northern region coverage only)
4. Laboratory Claims Collection (Northern Region coverage only)
5. Primary Health Organisation (PHO) Enrolment Collection, (New Zealand coverage)
6. General Medical Subsidy Data Mart (New Zealand coverage)
7. National Mortality Collection (New Zealand coverage)
8. Master encrypted and secondary encrypted NHI look up list

All the unique encrypted NHIs recorded in 2013 from any of the above datasets

* Double vowels are used rather than macrons where appropriate in Te Reo words in this article in keeping with the Tainui convention, as Tainui are Mana Whenua for the Counties Manukau district.
were merged to form a ‘Health Service Utilisation’ (HSU) population. The latest domicile code for an individual as recorded in any of the datasets was used to determine the DHB of domicile. The master encrypted and secondary encrypted NHI look-up list was used to ensure any known duplicated encrypted NHIs were not double counted. Effectively, the HSU population includes virtually everyone living in the area covered by the datasets (in this case limited to the Northern region because not all datasets had national coverage) who had a publicly-funded health service contact or was enrolled in PHO in 2013.

The HSU population is the inclusion criteria of this study. Ethnicity for the HSU population is derived from the NHI used to link the datasets and in keeping with the New Zealand health sector standard, ethnicity was prioritised from multiple ethnic codes in the following order: Māori, Pacific peoples, Asian, New Zealand European/‘Other’.

Aggregated estimated resident population numbers and population projections (MOH version 2013 based on New Zealand Census 2006) were sourced from Statistics New Zealand. This estimated resident population denominator was provided by Statistics New Zealand for the Ministry of Health in November 2013 which was based on projections from the 2006 Census.

1. ‘Standard’ method of calculating the percentage of people enrolled in a Primary Health Organisation

Calculating PHO enrolment rate using the standard method typically involves using the number of people enrolled in an area of interest divided by the corresponding estimated resident population in the same time period of interest. The numerator and denominator are not individually linked.

Definitions:

- **Denominator**: Estimated resident population from Statistics New Zealand in 2013 by age, gender, ethnicity and DHB.
- **Numerator**: The corresponding number of people enrolled by age, gender, ethnicity and DHB as per PHO enrolment 2013 Quarter Three. Quarter Three coincides with the annual June population estimate from Statistics NZ for the relevant year.

2. Alternative indicator: Percentage of people enrolled in a PHO within the CMDHB Health Service Utilisation population in 2013

The denominator is the Health Service Utilisation (HSU) population in 2013 derived as described above from record linkage of Ministry of Health datasets via encrypted NHI. The HSU population for this study were defined as below:

- people who were domiciled in Counties Manukau in 2013, and
- enrolled in a PHO, or had a publicly-funded health service contact in 2013, namely inpatient and outpatient services, pharmaceutical dispensing, community laboratory test, GMS claims, and
- were still alive at 31 December 2013.

The numerator is the number of people who were enrolled in a PHO (anywhere in New Zealand) at some point during 2013, as determined by record linkage at encrypted NHI level within the HSU population. The HSU population is the inclusion criteria of the study population and the PHO enrolment status is determined for each individual within the HSU population via encrypted NHI linkage between the PHO enrolment data and HSU population. Since the numerator and denominator are individually linked, the ethnicity and demographic variables in the study were identical for an individual, based on the NHI used for linkage, so the numerator-denominator mismatch described in previous reports is eliminated. Note that ethnicity in the PHO register may differ from the ethnicity recorded in the NHI, and this study uses the NHI ethnicity for an individual to avoid numerator denominator mismatch.

Six quarters of PHO enrolment (2013 Q1–4, 2014 Q1–2) were used to determine the enrolment status in 2013, based on the starting date of enrolment, because some of the 2013 enrolment statuses were subsequently recorded late, in the 2014 PHO enrolment datasets.

3. Subgroup analysis:

   a. The percentage of people discharged from either of the two key inpatient facilities for CMDHB: Middlemore Hospital (MMH) and Manukau
Surgical Centre (MSC) in 2012 and 2013 who were not enrolled within one month of discharge.

Definitions:

- **Denominator:** Number of people who were discharged from CMDHB hospital facilities in 2012 and 2013 (casemix acute, arranged and elective discharges). People who died within one month of discharge were excluded. Note: One individual may be discharged more than once in a year.

- **Numerator:** The number of people discharged from MMH and/or MSC who were not enrolled (anywhere in New Zealand) based on the date of enrolment in 2012 and 2013 as recorded in the PHO enrolment data within a month of hospital discharge. Four quarters of PHO enrolment data in the relevant year and the first two quarters of PHO enrolment data in the subsequent year were examined. The start date of enrolment as recorded in the PHO enrolment record was used. The latest/end date of enrolment determines the latest quarter that an individual is present in the PHO data. The cut off dates for financial claims were used; eg, if an individual is last present in Q1 then it is assumed the person is enrolled on 20 November in the previous year, Q2: 20 February in the year of interest, Q3: 20 May, Q4: 20 August.

b. A simplified ‘annual’ method of estimating the percentage of enrolment can be carried out by determining whether people discharged (excluding deaths) in 2013 were enrolled in 2014 Q2 PHO enrolment, or not.

Definitions:

- **Denominator:** Number of people with CMDHB hospital casemix discharges in 2013 excluding death.

- **Numerator:** Out of people who were discharged from CMDHB hospital facilities in 2013, the number of people who enrolled in 2014 Q2 nationally (Cut-off date: 20 February).

**Results**

**Standard method of calculating PHO enrolment:**

Comparing the population estimates released from Statistics New Zealand with the PHO enrolment data at a high level suggests PHO enrolment for the CMDHB population had a coverage of 97% in a ‘snapshot’ view at Quarter Three that coincides with the annual June population estimate, 2013. The estimated percentage of PHO enrolment is the number of people enrolled, divided by estimated resident population from Statistics New Zealand in CMDHB in the corresponding age group in 2013.

Females of child-bearing age appear to have a relatively high level of enrolment (Table 1). Males between the ages of 15 to 29 appear to have a lower level of enrolment. In the older age groups, there are more people enrolled than the Statistics New Zealand population estimates.

When enrolment is compared across ethnic groups, Maaori PHO enrolment appears to be much lower than might be expected when compared to estimated resident population from Statistics New Zealand (‘89% enrolment’ in Quarter Three 2013) (Table 2). On the other hand, Pacific PHO enrolment is much higher than the number expected based on the corresponding estimated resident population (‘111% enrolment’ in CMDHB). This pattern of PHO enrolment for CMDHB is generally consistent with the overall New Zealand pattern for people of these ethnicities (Table 2) and, as discussed subsequently, needs to be considered in the light of likely dataset mismatch in relation to identified ethnicity.

**Alternative indicator: Percentage of people enrolled within the CMDHB Health Service Utilisation population in 2013**

In CMDHB, out of the people who had contact with publicly-funded health services in 2013, 98% were enrolled at some point in 2013 (Table 3). In other words, only 2% of the Counties Manukau population who had used publicly-funded health services were not enrolled. In contrast to the standard method, the percentage of enrolment was similar across all the selected ethnicities (Table 3). Overall, females had a marginally
higher PHO enrolment than males. Pacific people had a marginally lower enrolment rate than Maaori.

Using the HSU population as a denominator, children aged 0–4 years had one of the lowest rates of PHO enrolment (Table 4).

The PHO enrolment rate was similar across the four ethnicities using the HSU population as a denominator (Table 5).

The difference in enrolment rates by ethnic group between the standard method for calculating PHO enrolment and our alternative method relates to the difference in the ethnic population size in the numerators and denominators used. The health service utilisation population has considerably higher numbers of people identified as Pacific and lower numbers of people identified as Asian than the estimated resident population. In the PHO enrolment register the percentage of people identified as Maaori and Asian is considerably lower than the percentage in the NHI used to link datasets for the HSU population.

**Table 1**: Estimated PHO enrolment rate for the CMDHB population in 2013 by age by the standard method

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of people enrolled as per 2013 Q3 PHO enrolment register</th>
<th>Estimated Resident Population from Stats NZ in 2013</th>
<th>Estimated PHO enrolment rate (standard method)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>0-4</td>
<td>20,183</td>
<td>21,339</td>
<td>20,460</td>
</tr>
<tr>
<td>5-9</td>
<td>20,439</td>
<td>21,727</td>
<td>20,060</td>
</tr>
<tr>
<td>10-14</td>
<td>18,971</td>
<td>19,975</td>
<td>19,460</td>
</tr>
<tr>
<td>15-19</td>
<td>18,918</td>
<td>19,066</td>
<td>19,660</td>
</tr>
<tr>
<td>20-24</td>
<td>19,135</td>
<td>18,048</td>
<td>19,800</td>
</tr>
<tr>
<td>25-29</td>
<td>17,987</td>
<td>15,447</td>
<td>18,230</td>
</tr>
<tr>
<td>30-34</td>
<td>17,538</td>
<td>14,719</td>
<td>17,540</td>
</tr>
<tr>
<td>35-39</td>
<td>17,058</td>
<td>14,533</td>
<td>16,990</td>
</tr>
<tr>
<td>40-44</td>
<td>18,796</td>
<td>16,621</td>
<td>19,220</td>
</tr>
<tr>
<td>45-49</td>
<td>17,830</td>
<td>16,863</td>
<td>18,340</td>
</tr>
<tr>
<td>50-54</td>
<td>16,576</td>
<td>15,618</td>
<td>17,170</td>
</tr>
<tr>
<td>55-59</td>
<td>13,603</td>
<td>13,001</td>
<td>13,940</td>
</tr>
<tr>
<td>60-64</td>
<td>11,571</td>
<td>11,076</td>
<td>11,810</td>
</tr>
<tr>
<td>65-69</td>
<td>9,466</td>
<td>9,061</td>
<td>10,010</td>
</tr>
<tr>
<td>70-74</td>
<td>6,965</td>
<td>6,461</td>
<td>7,190</td>
</tr>
<tr>
<td>75-79</td>
<td>4,826</td>
<td>4,209</td>
<td>4,930</td>
</tr>
<tr>
<td>80-84</td>
<td>3,573</td>
<td>2,673</td>
<td>3,500</td>
</tr>
<tr>
<td>85-89</td>
<td>2,180</td>
<td>1,404</td>
<td>2,030</td>
</tr>
<tr>
<td>&gt;90</td>
<td>1,228</td>
<td>492</td>
<td>1,200</td>
</tr>
<tr>
<td>Overall</td>
<td>256,843</td>
<td>242,333</td>
<td>261,540</td>
</tr>
</tbody>
</table>
**Table 2: PHO enrolment rate by District Health Board in New Zealand and ethnicity in Quarter 3 2013, using the standard method**

<table>
<thead>
<tr>
<th>DHB</th>
<th>Māori</th>
<th>Pacific</th>
<th>Asian</th>
<th>NZ European &amp; Others</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>79%</td>
<td>115%</td>
<td>71%</td>
<td>102%</td>
<td>93%</td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>93%</td>
<td>93%</td>
<td>93%</td>
<td>99%</td>
<td>97%</td>
</tr>
<tr>
<td>Canterbury</td>
<td>80%</td>
<td>96%</td>
<td>74%</td>
<td>99%</td>
<td>95%</td>
</tr>
<tr>
<td>Capital and Coast</td>
<td>86%</td>
<td>99%</td>
<td>79%</td>
<td>96%</td>
<td>93%</td>
</tr>
<tr>
<td>Counties Manukau</td>
<td>89%</td>
<td>111%</td>
<td>77%</td>
<td>105%</td>
<td>97%</td>
</tr>
<tr>
<td>Hawkes Bay</td>
<td>92%</td>
<td>96%</td>
<td>90%</td>
<td>99%</td>
<td>97%</td>
</tr>
<tr>
<td>Hutt</td>
<td>85%</td>
<td>94%</td>
<td>98%</td>
<td>100%</td>
<td>97%</td>
</tr>
<tr>
<td>Lakes</td>
<td>100%</td>
<td>90%</td>
<td>73%</td>
<td>102%</td>
<td>100%</td>
</tr>
<tr>
<td>MidCentral</td>
<td>85%</td>
<td>94%</td>
<td>76%</td>
<td>96%</td>
<td>93%</td>
</tr>
<tr>
<td>Nelson Marlborough</td>
<td>87%</td>
<td>93%</td>
<td>97%</td>
<td>99%</td>
<td>98%</td>
</tr>
<tr>
<td>Northland</td>
<td>104%</td>
<td>83%</td>
<td>93%</td>
<td>102%</td>
<td>102%</td>
</tr>
<tr>
<td>South Canterbury</td>
<td>77%</td>
<td>104%</td>
<td>115%</td>
<td>101%</td>
<td>99%</td>
</tr>
<tr>
<td>Southern</td>
<td>79%</td>
<td>99%</td>
<td>68%</td>
<td>95%</td>
<td>92%</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>100%</td>
<td>93%</td>
<td>81%</td>
<td>98%</td>
<td>98%</td>
</tr>
<tr>
<td>Taranaki</td>
<td>87%</td>
<td>84%</td>
<td>76%</td>
<td>100%</td>
<td>97%</td>
</tr>
<tr>
<td>Waikato</td>
<td>94%</td>
<td>100%</td>
<td>75%</td>
<td>100%</td>
<td>97%</td>
</tr>
<tr>
<td>Wairarapa</td>
<td>103%</td>
<td>105%</td>
<td>96%</td>
<td>103%</td>
<td>103%</td>
</tr>
<tr>
<td>Waitemata</td>
<td>79%</td>
<td>100%</td>
<td>76%</td>
<td>101%</td>
<td>94%</td>
</tr>
<tr>
<td>West Coast</td>
<td>91%</td>
<td>102%</td>
<td>115%</td>
<td>96%</td>
<td>96%</td>
</tr>
<tr>
<td>Whanganui</td>
<td>87%</td>
<td>108%</td>
<td>73%</td>
<td>100%</td>
<td>96%</td>
</tr>
<tr>
<td><strong>Overall New Zealand</strong></td>
<td>89%</td>
<td>106%</td>
<td>76%</td>
<td>100%</td>
<td>96%</td>
</tr>
</tbody>
</table>

**Table 3: Percentage of PHO enrolment within the CMDHB Health Service Utilisation population in 2013 by ethnicity**

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Enrolled</th>
<th>Not enrolled</th>
<th>Number of people in the CMDHB health service utilisation population</th>
<th>Percentage of enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Māori</td>
<td>85,436</td>
<td>1,457</td>
<td>86,893</td>
<td>98.3%</td>
</tr>
<tr>
<td>Pacific</td>
<td>130,985</td>
<td>3,150</td>
<td>134,135</td>
<td>97.7%</td>
</tr>
<tr>
<td>Asian</td>
<td>97,302</td>
<td>2,357</td>
<td>99,659</td>
<td>97.6%</td>
</tr>
<tr>
<td>NZ European &amp; Others</td>
<td>198,228</td>
<td>3,472</td>
<td>201,700</td>
<td>98.3%</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td>511,951</td>
<td>10,436</td>
<td>522,387</td>
<td>98.0%</td>
</tr>
</tbody>
</table>
Table 4: Percentage of PHO enrolment within the CMDHB Health Service Utilisation population by summarised age groups and gender

| Age (years) | Females | | | Males | | |
|-------------|---------|---------|--------|---------|---------|
| | Enrolled | Not enrolled | Number of people in the CM HSU population | % of enrolm’t | Enrolled | Not enrolled | Number of people in the CM HSU population | % of enrolm’t |
| 00-04 | 20,979 | 719 | 21,698 | 96.7% | 22,361 | 802 | 23,163 | 96.5% |
| 05-14 | 40,434 | 592 | 41,026 | 98.6% | 42,575 | 665 | 43,240 | 98.5% |
| 15-24 | 39,170 | 910 | 40,080 | 97.7% | 37,887 | 1,141 | 39,028 | 97.1% |
| 25-44 | 72,848 | 1,255 | 74,103 | 98.3% | 62,503 | 1,921 | 64,424 | 97.0% |
| 45-64 | 61,281 | 785 | 62,066 | 98.7% | 57,821 | 1,025 | 58,846 | 98.3% |
| 65 & over | 29,027 | 334 | 29,361 | 98.9% | 25,065 | 287 | 25,352 | 98.9% |
| Overall | 263,739 | 4,595 | 268,334 | 98.3% | 248,212 | 5,841 | 254,053 | 97.7% |

Table 5: Percentage of PHO enrolment within the CMDHB Health Service Utilisation population by age and ethnicity

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Maaori</th>
<th>Pacific</th>
<th>Asian</th>
<th>NZ European and others</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-04</td>
<td>97.2%</td>
<td>96.5%</td>
<td>95.6%</td>
<td>97.0%</td>
</tr>
<tr>
<td>05-09</td>
<td>99.0%</td>
<td>98.1%</td>
<td>98.1%</td>
<td>99.0%</td>
</tr>
<tr>
<td>10-14</td>
<td>98.7%</td>
<td>97.8%</td>
<td>98.6%</td>
<td>99.1%</td>
</tr>
<tr>
<td>15-19</td>
<td>98.1%</td>
<td>97.8%</td>
<td>97.5%</td>
<td>98.1%</td>
</tr>
<tr>
<td>20-24</td>
<td>97.7%</td>
<td>97.1%</td>
<td>94.7%</td>
<td>97.5%</td>
</tr>
<tr>
<td>25-29</td>
<td>98.1%</td>
<td>97.6%</td>
<td>96.1%</td>
<td>96.9%</td>
</tr>
<tr>
<td>30-34</td>
<td>98.3%</td>
<td>97.8%</td>
<td>97.7%</td>
<td>97.0%</td>
</tr>
<tr>
<td>35-39</td>
<td>98.2%</td>
<td>98.0%</td>
<td>98.4%</td>
<td>97.6%</td>
</tr>
<tr>
<td>40-44</td>
<td>98.2%</td>
<td>98.0%</td>
<td>98.7%</td>
<td>97.9%</td>
</tr>
<tr>
<td>45-49</td>
<td>98.5%</td>
<td>98.3%</td>
<td>98.5%</td>
<td>98.4%</td>
</tr>
<tr>
<td>50-54</td>
<td>98.7%</td>
<td>98.1%</td>
<td>98.6%</td>
<td>98.4%</td>
</tr>
<tr>
<td>55-59</td>
<td>99.0%</td>
<td>98.2%</td>
<td>98.6%</td>
<td>98.6%</td>
</tr>
<tr>
<td>60-64</td>
<td>99.3%</td>
<td>97.9%</td>
<td>98.5%</td>
<td>98.8%</td>
</tr>
<tr>
<td>65-69</td>
<td>99.4%</td>
<td>97.9%</td>
<td>98.9%</td>
<td>99.2%</td>
</tr>
<tr>
<td>70-74</td>
<td>99.4%</td>
<td>97.3%</td>
<td>98.6%</td>
<td>99.1%</td>
</tr>
<tr>
<td>75-79</td>
<td>99.7%</td>
<td>96.3%</td>
<td>97.6%</td>
<td>99.3%</td>
</tr>
<tr>
<td>80-84</td>
<td>99.3%</td>
<td>96.9%</td>
<td>97.7%</td>
<td>99.4%</td>
</tr>
<tr>
<td>85+</td>
<td>98.1%</td>
<td>96.9%</td>
<td>97.7%</td>
<td>99.3%</td>
</tr>
<tr>
<td>Overall</td>
<td>98.3%</td>
<td>97.7%</td>
<td>97.6%</td>
<td>98.3%</td>
</tr>
</tbody>
</table>

Table 6: Percentage of PHO non-enrolment one month post discharge from CMDHB inpatient facilities in 2012 and 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Middlemore Hospital</th>
<th>Manukau Surgical Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Number of case mix discharges</td>
<td>65,824</td>
<td>66,239</td>
</tr>
<tr>
<td>Number of people discharged not enrolled within a month of discharge</td>
<td>2,650</td>
<td>2,627</td>
</tr>
<tr>
<td>Percentage of non-enrolment one month post hospital discharge</td>
<td>4%</td>
<td>4%</td>
</tr>
</tbody>
</table>
Table 7: Number and percentage of PHO non-enrolment post discharge from MMH & MSC in 2013 by age (comparison between one month post discharge vs a simplified method using enrolment as at Q2 2014 PHO enrolment)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of non-enrolment within a month of discharge</th>
<th>Percentage of non-enrolment within a month of discharge</th>
<th>Percentage of non-enrolment as at Q2 2014 PHO enrolment data (simplified ‘annual’ method)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-04</td>
<td>477</td>
<td>6.5%</td>
<td>5.1%</td>
</tr>
<tr>
<td>05-09</td>
<td>76</td>
<td>3.7%</td>
<td>4.1%</td>
</tr>
<tr>
<td>10-14</td>
<td>68</td>
<td>3.7%</td>
<td>3.7%</td>
</tr>
<tr>
<td>15-19</td>
<td>187</td>
<td>5.4%</td>
<td>5.6%</td>
</tr>
<tr>
<td>20-24</td>
<td>303</td>
<td>7.2%</td>
<td>7.1%</td>
</tr>
<tr>
<td>25-29</td>
<td>288</td>
<td>8.0%</td>
<td>7.2%</td>
</tr>
<tr>
<td>30-34</td>
<td>189</td>
<td>5.4%</td>
<td>5.0%</td>
</tr>
<tr>
<td>35-39</td>
<td>154</td>
<td>4.7%</td>
<td>4.9%</td>
</tr>
<tr>
<td>40-44</td>
<td>148</td>
<td>3.8%</td>
<td>3.7%</td>
</tr>
<tr>
<td>45-49</td>
<td>132</td>
<td>3.2%</td>
<td>3.6%</td>
</tr>
<tr>
<td>50-54</td>
<td>135</td>
<td>3.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>55-59</td>
<td>110</td>
<td>2.7%</td>
<td>3.3%</td>
</tr>
<tr>
<td>60-64</td>
<td>95</td>
<td>2.3%</td>
<td>3.1%</td>
</tr>
<tr>
<td>65-69</td>
<td>56</td>
<td>1.4%</td>
<td>2.2%</td>
</tr>
<tr>
<td>70-74</td>
<td>63</td>
<td>1.7%</td>
<td>2.8%</td>
</tr>
<tr>
<td>75-79</td>
<td>62</td>
<td>1.9%</td>
<td>2.9%</td>
</tr>
<tr>
<td>80-84</td>
<td>45</td>
<td>1.6%</td>
<td>3.3%</td>
</tr>
<tr>
<td>85+</td>
<td>39</td>
<td>1.5%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Total</td>
<td>2,627</td>
<td>4.0%</td>
<td>4.2%</td>
</tr>
</tbody>
</table>

within a month from the day of discharge in both 2012 and 2013 (Table 6). The percentage not enrolled was lower for those discharged from the MSC than from MMH. This would seem logical given that discharges from MSC are from elective procedures and referral from primary care is usually part of the journey to get to the event of surgery.

Infants and young children aged 0 to 4 years, along with 20 to 29-year-olds had the highest rates of non-enrolment within a month of discharge in 2013 (Table 7).

Higher proportions of Maaori, Pacific, and Asian people were not enrolled one month post discharge compared to New Zealand European/Other groups in 2013 (Table 8).

At a high level, the non-enrolment rate post discharge from CMDHB inpatient facilities is similar to other publicly-funded hospitals in the Auckland metro region (Table 9).

Discussion

These health data linkage analyses suggest the standard method of estimating PHO enrolment may not be a reliable indicator to determine the true enrolment rate by ethnicity. The long-standing observation of low Maaori enrolment and over 100% Pacific enrolment in New Zealand suggests there is, at least in part, an artefact related to the inconsistent way ethnicity is recorded in the health datasets compared to the census-based population estimates.

There are a number of practical advantages of using the alternative Health Service Utilisation (HSU) population to inform health service planning and provision. The HSU population is an actual count of people who have accessed publicly-funded health services. Unlike some of the population outputs from Statistics New Zealand, which
Table 8: Number and percentage of PHO non-enrolment one month post discharge from MMH & MSC in 2013 by age and ethnicity

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Maaori</th>
<th>Pacific</th>
<th>Asian</th>
<th>NZ European &amp; others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-04</td>
<td>130</td>
<td>214</td>
<td>76</td>
<td>57</td>
<td>477</td>
</tr>
<tr>
<td>05-09</td>
<td>15</td>
<td>35</td>
<td>13</td>
<td>13</td>
<td>76</td>
</tr>
<tr>
<td>10-14</td>
<td>11</td>
<td>36</td>
<td>13</td>
<td>8</td>
<td>68</td>
</tr>
<tr>
<td>15-19</td>
<td>32</td>
<td>78</td>
<td>40</td>
<td>37</td>
<td>187</td>
</tr>
<tr>
<td>20-24</td>
<td>56</td>
<td>103</td>
<td>73</td>
<td>71</td>
<td>303</td>
</tr>
<tr>
<td>25-29</td>
<td>63</td>
<td>76</td>
<td>81</td>
<td>68</td>
<td>288</td>
</tr>
<tr>
<td>30-34</td>
<td>31</td>
<td>68</td>
<td>34</td>
<td>56</td>
<td>189</td>
</tr>
<tr>
<td>35-39</td>
<td>33</td>
<td>51</td>
<td>25</td>
<td>45</td>
<td>154</td>
</tr>
<tr>
<td>40-44</td>
<td>27</td>
<td>47</td>
<td>20</td>
<td>54</td>
<td>148</td>
</tr>
<tr>
<td>45-49</td>
<td>29</td>
<td>47</td>
<td>19</td>
<td>37</td>
<td>132</td>
</tr>
<tr>
<td>50-54</td>
<td>17</td>
<td>52</td>
<td>19</td>
<td>47</td>
<td>135</td>
</tr>
<tr>
<td>55-59</td>
<td>19</td>
<td>43</td>
<td>18</td>
<td>30</td>
<td>110</td>
</tr>
<tr>
<td>60-64</td>
<td>13</td>
<td>33</td>
<td>17</td>
<td>32</td>
<td>95</td>
</tr>
<tr>
<td>65-69</td>
<td>9</td>
<td>26</td>
<td>7</td>
<td>14</td>
<td>56</td>
</tr>
<tr>
<td>70-74</td>
<td>6</td>
<td>31</td>
<td>6</td>
<td>20</td>
<td>63</td>
</tr>
<tr>
<td>75-79</td>
<td>5</td>
<td>20</td>
<td>17</td>
<td>20</td>
<td>62</td>
</tr>
<tr>
<td>80-84</td>
<td>&lt;5</td>
<td>14</td>
<td>12</td>
<td>17</td>
<td>45</td>
</tr>
<tr>
<td>85+</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>501</td>
<td>977</td>
<td>491</td>
<td>658</td>
<td>2,627</td>
</tr>
</tbody>
</table>

Table 9: Percentage of hospital casemix discharges in 2013 where the person was not enrolled as per 2014 Q2 PHO enrolment dataset (simplified method), Auckland metro inpatient facilities

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Percentage of non-enrolment post discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middlemore Hospital + Manukau Surgical Centre</td>
<td>3.9%</td>
</tr>
<tr>
<td>North Shore Hospital</td>
<td>4.2%</td>
</tr>
<tr>
<td>Waitakere Hospital</td>
<td>3.7%</td>
</tr>
<tr>
<td>Auckland City Hospital</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

are derived from statistical and modelling methods,13 people who have utilised health services are potentially contactable based on the contact details of the last health care visit. There is a defined intervention path that may potentially improve PHO enrolment using the HSU population as a denominator. On the other hand, for the short-fall of PHO enrolment compared to the census-based population estimates, there is no clear defined path to improve PHO enrolment. In other words, there is no absolute certainty that these people in fact exist or are contactable and would benefit from PHO enrolment.

The way the health sector prioritises ethnicities within the health data and how health services are funded, such as PHO capitation funding, may create an inadvertent artefact of undercounting Maaori if multiple ethnicities of individuals are not fully captured, as in the case of PHO enrolment. Enrolling Maaori or Pacific people attracts a higher level of capitation payment than other ethnicities.14 However, there is no additional financial gain/loss in
accurately differentiating between Māori and Pacific ethnicities (or recording multiple ethnicities as long as either one of the Māori and Pacific ethnicities was recorded).

It is important to differentiate the issue of non-enrolment from the need for having more accurate ethnicity coding in the health sector. The current study proposes the use of an HSU population as a proxy of health services need, and as the denominator of PHO enrolment as well as inclusion criteria of the study. Ethnicity records were derived from the NHI and applied to both the numerator and denominator consistently at the individual basis to estimate PHO enrolment rate. The proposed method cannot correct for any underlying miscategorisation of ethnicity. Some people who are Māori may be counted for example as Pacific or New Zealand European. However, if the primary concern is that they are missing out on care because of non-enrolment, given enrolment across all ethnicities is around 98%, it seems unlikely that they are missing out on enrolment advantages, whatever group they are classified in. Improving the quality of ethnicity recording has a number of wider benefits, but the overall number of people who benefit from PHO enrolment may not actually increase as a consequence of better quality ethnicity recording.

While there is value in improving the quality and consistency of the ethnicity data in the health sector, it is important to acknowledge that even if the process of recording ethnicity within the health sector were perfectly aligned with the health sector standard, the proportions and the number of people by ethnicities would not necessarily be perfectly identical to the census-based estimates for a number of reasons. Firstly, the self-reported concept of ethnicity allows individuals to report different ethnicities in different locations or context. Indeed, previous literature has noted that self-reported ethnicity responses can vary depending on the context of the question and individuals' responses can change over time.

Secondly, there are a number of adjustments made to improve the reliability of the estimated resident population by Statistics New Zealand. All the adjustments made by Statistics New Zealand are sensible and appropriate and they are expected to provide more realistic population estimates compared to census usually resident population at defined point in time, but the adjustments themselves are potential reasons why the population outputs by ethnicity differ from that of the health sector.

Despite these sensible adjustments made for the estimated resident populations by Statistics New Zealand, the inherent limitations related to the census-based population estimates are well documented, but not widely appreciated. Over time the proportion of the population estimated to have not responded to the census has increased. In the 2013 Census, the non-response rate (net undercount and substitute forms) was estimated to be 7.1% compared to 5.2% in 2006 and 5.0% in 2001. Adjustments had to be made for 5.5% of the census-night population who did not provide a response (or a classifiable response) to the ethnicity question of the census. While the number of people sampled has increased over time in the post-enumeration survey that is used to estimate the census undercount, the post-enumeration survey may still miss people who did not fill out the census the first time round. However, these people remain eligible and may seek or have utilised publicly-funded health services (and indeed services provided in other social sectors). It is important to acknowledge that the populations who interact with census and the post-enumeration survey may be slightly different from the populations who have utilised publicly-funded health services, and the differences may be quite marked in some population subgroups as noted in this study.

The HSU population refers to the number of people who were domiciled in a defined geographical area over a period of a year. On the other hand, each quarter of the PHO enrolment released from the Ministry of Health and each version of the estimated resident population produced by Statistics New Zealand are cross sectional measures or estimates at one point in time. The PHO enrolment at some point over the course of a year will provide a slightly higher enrolment percentage than enrolment percentage at one point in time.
Since the PHO enrolment records and health service utilisation records are both NHI linked, an integrated electronic system could potentially alert the responsible clinicians of the people who were yet to be enrolled at the time of health service contact. A recently published paper has described the potential value of the health service utilisation population to form a population register which has the potential to facilitate the clinical actions where clinical benefits are undisputed but implementation at the population level less than ideal.19

Arguably the need for a hospital admission is one of the stronger proxies of health services need, but only a proportion of people would be admitted to hospital in a given year. Patients who were admitted to MMH and/or MSC (the local hospitals of CMDHB) are more amendable to system improvement led by CMDHB than those admitted to facilities in other DHBs. Having processes to identify people who are not yet enrolled in a PHO as part of the hospital admission, as well as processes to support those people to enrol, are two important components to improve the PHO enrolment rate of people who have identified health services need. Percentage of PHO non-enrolment one month post discharge from a New Zealand hospital is an indicator of timeliness of enrolment, as many people could benefit from primary health care team follow up soon after hospital discharge. The relatively low enrolment in the 0–4 years age group demonstrated in this paper is likely to improve over time with the policy to automatically nominate a primary care provider for all newborns.20

A simplified indicator, such as the percentage of people who have had a hospital discharge in 2013 that were not enrolled as per 2014 Q2 PHO enrolment dataset, is not as analytically intensive and could be more readily taken up by local hospitals/DHBs in New Zealand. Alternatively, since the Ministry of Health has access to both PHO enrolment and hospitalisation data, a more sophisticated version could be run centrally, if such indicators were deemed to be useful by the health sector for quality improvement purposes. The key is not putting too much effort into developing indicators or making adjustments to make the results of the indicator look better, but to define processes that would support improvement of PHO enrolment, eg an NHI look-up system to check whether the person attending hospital (ideally in outpatient settings and ED as well as inpatients) is enrolled or not.

Since the percentage of non-enrolment using a simplified ‘annual’ method for the 0–4 years age group is lower than that of the percentage of non-enrolment within a month of discharge, the level of enrolment appears to increase with time in that age group. The modest increase in non-enrolment in some of the age groups may be related to a small proportion of people going overseas, or people receiving rest home care who may become unenrolled (because they receive care from a contracted GP who provides care for the whole rest home population and they are not necessarily enrolled in a PHO).

**Limitations**

There are a number of late entries in the PHO enrolment register for each quarter. On the other hand, people who are deceased may remain in the PHO enrolment dataset for a number of quarters. While there are a number of ongoing audits in place, a number of duplicate or incorrect entries have been noted in the PHO enrolment data from recent audits.

The estimated residential population denominator used for this report (MOH assumptions, version 2013) was based on the 2006 Census. The 2014 estimates based on the 2013 Census have become available recently, but publicly available reports relating to the data used in this paper were based on the 2013 estimates, so the 2013 estimates have been used to maintain consistency with those reports. However, the main concepts discussed, such as numerator-denominator mismatch and the potential use of the health service utilisation population discussed in this report remain valid.

There are likely a small number of exceptions to the assumption that people who had not utilised health services are healthy, however there is no clearly defined intervention pathway to identify such individuals by the health sector.
Conclusion

The use of the health service utilisation population as a denominator using record linkage can eliminate the artefact created by numerator-denominator mismatch in calculating PHO enrolment rates. Overall, PHO enrolment in Counties Manukau District Health Board was almost 98% in 2013. Support to improve PHO enrolment coverage would be more efficient if the HSU population were used to target people who are not yet enrolled in a PHO.

Appendix 1: The difference between estimated resident population and census usually resident population counts

It is important to differentiate the two commonly used census-based population outputs released from Statistics New Zealand, namely census ‘usually resident’ population and ‘estimated resident’ population. The census ‘usually resident’ population counts should not be used as the population denominator for health sector data or used as a description of population demography within a defined geographical area. Despite the name, census ‘usually resident’ population counts provide an underestimate of the actual overall population as well as a less realistic description of ethnicity mix because there are significant differential undercounts by ethnicity. For example, proportionately more Māori and Pacific people were under-counted by the census in 2013 compared to other ethnic groups. There were also differential non-response rates to the ethnicity question in the census by ethnicity.21

Other adjustments made to the census ‘usually resident’ population counts to get the ‘estimated resident’ population counts include the addition of residents temporarily overseas at the time of census; and births, deaths and international migration since the census night.21 Indeed, Statistics New Zealand has clearly stated the adjusted ‘estimated resident population’ (rather than census ‘usually resident’ population counts) should be used for the purposes of planning, and decision-making purposes.22

Competing interests:
All authors were paid employees of CMDHB.

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This study was undertaken as a result of work undertaken in the population health team for Counties Manukau District Health Board (CMDHB).

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URL:
REFERENCES:

ARTICLE

Trauma Training in New Zealand: A Survey of General Surgical Trainees

Hannah Hurst, Ian Civil, Li Hsee
on behalf of the RACS New Zealand Trauma Committee

ABSTRACT

INTRODUCTION: The surgical management of trauma is an important aspect of training in general surgery. The aim of this study is to assess the current levels of experience in trauma management and attitudes towards adequacy of exposure amongst current trainees in New Zealand.

METHOD: An anonymous survey assessing experience in trauma management posted to all New Zealand general surgical trainees in Surgical Education and Training (SET) years two to five.

RESULTS: 21 of 62 trainees responded. There was little correlation between SET levels or months of registrar experience and number of operations performed, which ranged from 0 to 22. 81% of trainees felt their exposure to trauma operations was inadequate. The average supervision rate for operating was 73%. The majority of trainees showed an interest in trauma with 76% replying yes, with four answering maybe, and one no. 100% of trainees felt that training in trauma was at least somewhat important.

DISCUSSION: Experience and training in trauma care is very important but currently inadequate to allow the safe delivery of surgical treatment for injured patients by well-trained surgeons. Surgical training needs to be reorganised, using all available clinical and simulation resources to ensure this critical skills area is maintained for all trainees.

Background

The surgical management of trauma is an important aspect of training in general surgery; the Royal Australasian College of Surgeons (RACS) recognises that the provision of emergency surgery is a core competency in surgery in all surgical specialties.\(^1,2\) Competency in trauma management requires a certain level of exposure, experience and supervision during training. In 2000, RACS found that while 95% of advanced trainees believed they might be involved in trauma management in the future, only 32% felt their exposure to major trauma operations was adequate.\(^3\) Since then, there have been changes in the structure of the training programme.

The aim of this study is to assess the current levels of experience in trauma management and attitudes towards adequacy of exposure amongst current trainees in New Zealand.

Method

An anonymous survey assessing experience in trauma management was posted to trainees by the RACS Wellington Office in the first week of March 2014. It was sent to all New Zealand general surgical trainees in Surgical Education and Training (SET) years two to five; a total of 62 trainees. The survey was sponsored by the RACS New Zealand Trauma Committee and approved by the Education Committee of the New Zealand Association of General Surgeons.

The short survey consisted of questions regarding level of training, trauma courses attended, operative experience and supervision, trauma resuscitation experience and supervision, interest in trauma as a career or fellowship, expectations of future involvement in trauma and an assessment of the perceived importance of training and the adequacy of exposure and supervision to trauma resuscitation and operating.
Results

Twenty-one of the 62 surveys sent out were returned by mail, making a response rate of 34%; three surveys from SET Twos, and six surveys each from SET years three, four and five.

There was little correlation between SET level, or months of registrar experience and number of operations performed; two SET Fives had performed 20 and 22 laparotomies, one had performed none and one SET Two had performed eleven laparotomies. There was 100% attendance at the Early Management of Severe Trauma (EMST/ATLS) course, all of the SET Fives and one SET Four had attended the Definitive Surgical Trauma Care (DSTC) course. Additional courses attended included ultrasoundography, APLS (Advanced Paediatric Life Support), EMSB (Early Management of Severe Burns) and a Masters of Trauma Sciences Degree. One outstanding SET Three with a Masters of Trauma Sciences Degree had attended 50 trauma operations and been principal operator for 18 of 20 trauma laparotomies.

The rate of consultant supervision for trauma operations by consultants ranged from 0–100%, 11 trainees (52%) reporting that all (100%) of the operations they were involved in were supervised. Only one trainee, who performed a total of 10 procedures, was never supervised. The average supervision rate was 73%.

Trainees were asked whether they had a desire for their future career to involve management of major trauma (yes, no or maybe), and separately whether they expected it to, regardless of their desire. The majority of trainees showed an interest in trauma with 76% replying yes, with four answering maybe and only one no. Only one of the 21 trainees did not expect to be involved in trauma in the future. Nine trainees were interested in carrying out a trauma fellowship, with seven replying maybe.

Trainees were asked how important they believed training in trauma is in regards to future practice on a scale of 1–5 (1 = unimportant, 3 = somewhat important, 5 = very important). 100% of trainees felt that training in trauma was at least ‘somewhat important’ with 10 of 21 trainees selecting ‘very important’ for resuscitation and 12 selecting ‘very important’ for operating.

Adequacy of exposure was also measured on a scale of 1–5 (1 = inadequate, 3 = sufficient, 5 = exceptional). For operating: only one trainee, who commented that they had worked as a trauma registrar for 18 months, selected a ‘4’. Three trainees thought that exposure had been ‘sufficient’, the remaining trainees (81%) felt their exposure was inadequate. Scores were better for exposure to trauma resuscitation with 12 of 21 (57%) selecting at least ‘sufficient’.

Supervision in trauma was assessed from 1–5 (1 = unsatisfactory, 3 = just adequate, 5 =
very satisfactory). The majority of trainees felt that their supervision was at least adequate with only three trainees selecting ‘1’ or ‘2’ for resuscitation and operating.

**Discussion**

One of the goals in the development of an inclusive trauma system in New Zealand is to ensure critically injured patients are transported in a timely manner to the right hospital with the right expertise. Similar to other developed countries, there is progression toward specialised trauma management. It is critical that exposure to trauma is adequate for trainees to address the future needs of trauma patients.

Our results show that experience in trauma is variable throughout the SET training programme. While trainees believe training in trauma is very important and they are interested in it, exposure is largely perceived to be inadequate. Although we had fewer survey participants than there were in 2000, it would seem that exposure to trauma surgery has declined in the past 14 years; with perceived adequacy falling from 32% to only 19%.

Our low response rate of 34% was disappointing but similar to previous surveys; for the survey in 2000, 272 of 587 (46%) responded, across Australasia.

The current structure of trauma management into specialised trauma centres has multiple benefits to patients, but may reduce surgical trainees’ opportunities for exposure to trauma.

Trainees have commented that variability in exposure may depend on the specific placements that any individual trainee may complete. Some who completed the survey noted that trauma exposure is generally limited in New Zealand and some commented that exposure was low in smaller centres and in those hospitals which were bypassed due to the existence of a nearby established trauma centre. Even for those working in a major trauma centre it was noted that, unless allocated to work for the trauma service, trauma exposure was limited to after-hours only.

The majority of trauma in New Zealand is blunt trauma, such as in motor vehicle crashes, rather than penetrating. With advances in diagnostic techniques and management these cases are increasingly managed non-operatively. Some trainees felt that while they had attended a large number of trauma calls or resuscitations, the majority did not need operative intervention. Two SET Fives said they felt uncomfortable or concerned that they were coming to the end of their training with what they felt was limited or inadequate trauma experience, with one having never been involved in a trauma laparotomy.

It is important that trainees are not just introduced to or exposed to a trauma situation, but that they become familiar with it. Due to the scarcity and variability in exposure to trauma, training is heavily reliant on educational courses. The EMST course was introduced to Australasia in 1988 and, over subsequent decades, resulted in improvements in patient care, both through individual management advances and improvements in trauma care systems. EMST and the DSTC course, which is more focused on surgical technique, are now highly recommended for General Surgery SET training in Australasia. There are many other courses now available targeting both individuals and teams of various levels and roles; each course having various lengths and objectives. Training courses variously utilise simulation, task training, live animal and human cadaver work; examples are found in the table on the next page.

Simulation-based training has been widely utilised in other disciplines that involve high stress situations, where decision making and actions are time-critical—such as aviation, fire and military. It may be employed to teach technical skills, familiarise staff with uncommon, high-stress events, and improve communication and teamwork whilst in a safe and structured environment. Structured trauma resuscitation team training has been shown to improve team performance, resulting in improved efficiency of patient care with fewer errors. Where there is an insufficient caseload to provide adequate exposure for trainees, simulation training could help to fill the gaps.

Simulating the operative environment is somewhat more challenging. As trauma surgery is performed relatively uncommonly, training may be supplemented by
Table 1: Some examples of available trauma courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMST/ATLS</td>
<td>Early Management of Severe Trauma</td>
<td>Emphasises life-saving skills and systematical clinical approach to managing severe trauma</td>
</tr>
<tr>
<td>ATCN</td>
<td>Advanced Trauma Care for Nurses</td>
<td>Taught concurrently with ATLS in some countries</td>
</tr>
<tr>
<td>DSTC</td>
<td>Definitive Surgical Trauma Care</td>
<td>Practical cadaveric workshop course and simulated operating theatre using porcine models</td>
</tr>
<tr>
<td>DPN TC</td>
<td>Definitive Perioperative Nurses Trauma Care</td>
<td>Usually conducted in conjunction with the DSTC course</td>
</tr>
<tr>
<td>PHTLS</td>
<td>Pre-Hospital Trauma Life Support</td>
<td>Targeting ambulance technicians, paramedics, registered nurses and registered medical practitioners</td>
</tr>
<tr>
<td>H]-2</td>
<td>Pre-Hospital and Emergency Department Resuscitative Thoracotomy</td>
<td>Practical course to improve decision making about role of resuscitative thoracotomy and how to integrate this into the trauma resuscitation. Utilises Porcine models.</td>
</tr>
<tr>
<td>SSET</td>
<td>Specialty Skills in Emergency Surgery and Trauma</td>
<td>Key learning outcomes include, acute limb ischaemia vascular repair, design a trauma team, abscess and necrotising fascitis, damage control surgery.</td>
</tr>
<tr>
<td>ATOM</td>
<td>Advanced Trauma Operative Management</td>
<td>Increasing surgical competence and confidence in the operative management of penetrating injuries</td>
</tr>
<tr>
<td>ASSET</td>
<td>Advanced Surgical Skills for Exposure in Trauma</td>
<td>A progression course from ATOM, uses human cadavers to teach surgical exposure of anatomic structure that when injured may pose a threat to life or limb</td>
</tr>
<tr>
<td>DMEP</td>
<td>Disaster Management and Emergency Preparedness</td>
<td>Emphasizes an all-hazards approach, demonstrating that many principles apply to disasters of all kinds, regardless of specific mechanism. Surgical problems and the role of surgeons in the disasters are emphasized, even with non-surgical forms of injury.</td>
</tr>
<tr>
<td>BEST</td>
<td>Basic Emergency Sonography for Trauma</td>
<td>Basic principles and practice of USS in emergency settings of trauma and AAA</td>
</tr>
<tr>
<td>CREST</td>
<td>Core Resuscitative Skills Training</td>
<td>Procedural skills course in securing and managing airway, chest tube insertion and gaining vascular access</td>
</tr>
<tr>
<td>RTT DC</td>
<td>Rural Trauma Team Development Course</td>
<td>Based on the concept that in most situations, rural facilities can form a trauma team consisting of at least 3 core members.</td>
</tr>
<tr>
<td>Team STEPPS</td>
<td>Simulation-based training to improve institutional collaboration and communication relating to patient safety</td>
<td></td>
</tr>
<tr>
<td>Trauma Team Training (Sydney Clinical Skills and Simulation Centre)</td>
<td>Focuses on team-based management of high acuity clinical presentations and the competencies required of the team as a whole</td>
<td></td>
</tr>
</tbody>
</table>
the use of live animal and human cadaver models. Each have their downfalls; in the anatomical differences in the animal models, and ‘unnatural’ tissue textures and lack of pulsatile vessels in cadavers. Although potentially costly, novel techniques, for example using sophisticated mannequins, and cadaver’s with artificially re-established circulation may be of benefit here.¹¹

Conclusion

Many trainees have an interest in working in trauma in the future; the majority believes experience in trauma is very important but often inadequate. This study confirms the suggestion that training in trauma care is currently inadequate to allow the safe delivery of surgical treatment for injured patients by well-trained surgeons.

Trainees are recommended to complete EMST and DSTC courses. There are guidelines available for trauma training in the SET curriculum. However, there are many other courses and techniques, including simulation, that may be employed to help trainees become more familiar with working in a trauma environment. Additionally it could be compulsory for all trainees to rotate through a position on a trauma service. Surgical training needs to be reorganised, using all available clinical and simulation resources to ensure this critical skills area is maintained for all trainees.

Competing interests: Nil

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REFERENCES:
7. Editorial, Simulation in Trauma Education: Beyond ATLS, Injury 2014;45(3):817-818

Competing interests: Nil

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New Zealand university students’ knowledge and attitudes to organ and tissue donation

Jon Cornwall, Cyril Schafer, Navneet Lal, Rohit D’Costa, Shyamala Nada-Raja

ABSTRACT

AIM: Organ and tissue donation (OTD) rates in New Zealand are low compared to many countries. Young adults are ‘tomorrow’s donors’, yet the attitudes and knowledge of this group to OTD have not been examined locally. Such information is relevant to OTD education and clinical engagement.

METHOD: A random sample of University of Otago students (<25 years, permanent New Zealand resident) was surveyed to examine OTD knowledge and attitudes. This included general knowledge, OTD policy (opt-in, opt-out), donation by self, and donation by loved ones. Questions included yes-no, multiple choice, and Likert-type responses. Analyses by sex, demographic characteristics, supportive attitudes to OTD, and University of Otago student profile were performed.

RESULTS: 180 responses were gathered (mean age 20.1 years, 67% female, 68% New Zealand European); there were no age or response differences between sexes, participants were generally not representative of the University of Otago student profile. Outcomes indicated limited OTD knowledge, positive support for OTD, and willingness to engage in donation the decision-making process for loved ones. Differences between supportive and non-supportive OTD attitudes was seen for some questions.

CONCLUSION: Findings highlight areas for strategic OTD public engagement and provide details relevant to guiding appropriate clinical interaction in facilitating decisions about OTD.

Organ and tissue donation (OTD) is vital to our health service for the opportunity that it provides recipients to regain health and function. In New Zealand, each year from 2008 and 2014, between 31 to 46 deceased persons (6.7 to 10 per million people) per year donated organs. When compared to international donor rates, New Zealand’s OTD rate lags behind that of many countries with similar socioeconomic status and health indicators, including Spain, Portugal, and Australia. There are many reasons why OTD rates may differ between countries, including (but not restricted to) legal and ethical considerations, medical resources (eg, availability of intensive care beds), and sociocultural factors such as knowledge and attitudes towards OTD.

Factors influencing knowledge and attitudes towards OTD continually require exploration to guide the delivery of OTD practice in an informed, community-consultative and culturally appropriate manner, and determine how regulations and guidelines can best protect the beliefs and values of individuals and communities. Despite recent media interest regarding OTD in New Zealand, little critical analysis exists exploring what New Zealanders actually know about OTD. Young adults, for example, are consistently identified as central to OTD community engagement strategy as ‘tomorrow’s donors’, yet there is a paucity of research on their knowledge and attitudes to OTD. Harbour et al examined Auckland University medical students’ knowledge.
and attitudes to organ donation, finding support for this concept, but a lack of knowledge about it. However, no studies have examined OTD knowledge or attitudes in a non-medical, young adult population in New Zealand. This exploratory study utilised a knowledge and attitude survey in a university student population with the aim of providing information relevant to future educational or engagement campaigns.

Methods

A random, stratified sample of students enrolled at the University of Otago (Dunedin, New Zealand) was surveyed in November 2014. The survey was not a replication of any pre-existing, published surveys, however some questions were modelled on previous OTD surveys and adapted for the New Zealand context and student population; other questions were developed by an intensivist involved in organ donation programmes (author RD). Inclusion criteria included participants being under 25 years of age, and having a permanent address in New Zealand. The study was approved by the University of Otago Ethics Committee (14/154).

Survey questions were presented in four sections: demographic status (6 questions), knowledge relating to OTD in New Zealand (3 questions), knowledge and attitude relating to OTD and donation of own tissues (8 questions), and attitude to OTD of a loved one’s organs/tissues (5 questions). The survey was pre-tested and finalised with input from university students and academics (six individuals). Questions included 5-point Likert-type responses (ranging from strongly agree to strongly disagree), yes-no answers, and multiple-choice options.

Participants were randomly recruited (every tenth student invited to participate) by one of the authors (NL) from selected locations around the University of Otago over a two-day period. Locations were estimated to provide a representative sample of students with demographic data comparable to student demographics at this university (2013). Each potential participant was verbally informed of the project aims and provided written informed consent before completing the 10-minute paper questionnaire. An online version was available and completed by 6 participants who preferred this option.

Statistical analysis

Data were analysed to determine whether participant responses for individual questions differed by sex, selected demographics of the known profile of enrolled University of Otago students, or supportive (vs. unsupportive) attitudes to OTD. Survey data were entered into an Excel (Microsoft Corp, Palo Alto, CA) spreadsheet, cleaned and imported into SAS (SAS Institute Inc., Cary, NC) statistical software for analysis. Between-group comparisons were undertaken using Chi-square or Fisher’s exact test as appropriate. For all analyses, significance was p<0.05.

Post hoc analysis for support attitude for organ and tissue donation

A supportive attitude to OTD was determined by combining agree/strongly agree responses to two questions in the section on knowledge and attitude relating to OTD and donation of own tissues; non-supportive status was determined by combining disagree, strongly disagree, and neutral responses. The questions used to indicate positive support were i) if medically possible I would donate organs/tissues, and ii) OTD benefits society. Positive support for OTD was compared to selected questions to determine whether this factor influenced (was correlated to) response outcomes. These questions included knowledge and attitude relating to OTD, and attitude towards OTD of a loved one’s organs/tissues.

Results

Demographic data

In total, 180 (n=120, 67% female, n=60, 33% male) students participated and had complete data for OTD questions; two female participants had missing data for age. The mean age of participants was 20.1 years (range 18–24, SD 1.8). The mean female age was 19.9 years (range 18–24, SD 1.6) and male age 20.5 (range 18–24, SD 1.9) (Table 1) with no significant age difference between sexes. Responses did not differ significantly by sex in regards to knowledge relating to OTD donation in New Zealand, attitude to OTD of own organs/tissues, or
Students identified as New Zealand European (68%), Māori (6%), Pacific (2%), Asian (21%) or other (9%). Participants listed their permanent residence as Dunedin (50%), other South Island (20%), or North Island (30%). First-year students were the most well represented year-of-study category (40%), with fewer participants from second-year students (15%), third-year (21%), fourth-year (10%) and fifth or more (15%). Compared to 2013 data (University of Otago), ethnicity was proportionately representative of the 2013 University of Otago student profile, but under-representative of males (33% vs. 42% in 2013), over-representative of first-year students (40% vs. 20%), and permanent address in Dunedin (50% vs. 20%).

Knowledge and attitudes relating to organ/tissue donation in New Zealand

For the question relating to the percentage of deaths where donation is medically feasible, only 12% of respondents identified the correct answer (‘Less than 5%’; based on Australian data from the DonateLife website, http://www.donatelife.gov.au/) (Table 1). The question “Age limit for someone to be an organ/tissue donor” was correctly identified by 62%, while 23% correctly identified that “the family consent to organ/tissue donation irrespective of what is stated on the driver’s license” to the

Table 1: Knowledge relating to organ/tissue donation in New Zealand. Correct responses are indicated.

<table>
<thead>
<tr>
<th>Questions and possible responses</th>
<th>Females n=120</th>
<th>Males n=60</th>
<th>Total n=180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of deaths where organ donation is medically feasible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 5% (correct)</td>
<td>11 (9.2)</td>
<td>11 (18.3)</td>
<td>22 (12.2)</td>
</tr>
<tr>
<td>6 to 10%</td>
<td>26 (21.7)</td>
<td>9 (15)</td>
<td>35 (19.4)</td>
</tr>
<tr>
<td>11 to 20%</td>
<td>21 (17.5)</td>
<td>13 (21.7)</td>
<td>34 (18.8)</td>
</tr>
<tr>
<td>21 to 50%</td>
<td>19 (15.8)</td>
<td>11 (18.3)</td>
<td>30 (16.7)</td>
</tr>
<tr>
<td>More than 50%</td>
<td>10 (8.3)</td>
<td>5 (8.3)</td>
<td>15 (8.3)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>32 (26.7)</td>
<td>11 (18.3)</td>
<td>43 (23.9)</td>
</tr>
<tr>
<td>Age limit for someone to be an organ/tissue donor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age limit varies depending on clinical circumstances (correct)</td>
<td>74 (61.7)</td>
<td>38 (63.3)</td>
<td>112 (62.2)</td>
</tr>
<tr>
<td>55 years</td>
<td>4 (3.3)</td>
<td>8 (13.3)</td>
<td>12 (6.7)</td>
</tr>
<tr>
<td>60 years</td>
<td>10 (8.3)</td>
<td>9 (15)</td>
<td>19 (10.6)</td>
</tr>
<tr>
<td>65 years</td>
<td>5 (4.2)</td>
<td>0 (0)</td>
<td>5 (2.7)</td>
</tr>
<tr>
<td>70 years</td>
<td>3 (2.5)</td>
<td>1 (1.7)</td>
<td>4 (2.2)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>24 (20)</td>
<td>4 (6.7)</td>
<td>28 (15.5)</td>
</tr>
<tr>
<td>Circumstances in which organ/tissue donation is possible in NZ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The family consent to organ/tissue donation irrespective of what is stated on the driver’s license (correct)</td>
<td>33 (27.5)</td>
<td>9 (15)</td>
<td>42 (23.3)</td>
</tr>
<tr>
<td>A person has a valid registration on their driver’s license</td>
<td>23 (19.2)</td>
<td>11 (18.3)</td>
<td>34 (18.9)</td>
</tr>
<tr>
<td>A person has a valid registration on their driver’s license and family consent</td>
<td>51 (42.5)</td>
<td>37 (61.7)</td>
<td>88 (48.9)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>13 (10.8)</td>
<td>3 (5)</td>
<td>16 (8.9)</td>
</tr>
</tbody>
</table>

attitude to OTD donation of a loved ones organs/tissues.

Students identified as New Zealand European (68%), Māori (6%), Pacific (2%), Asian (21%) or other (9%). Participants listed their permanent residence as Dunedin (50%), other South Island (20%), or North Island (30%). First-year students were the most well represented year-of-study category (40%), with fewer participants from second-year students (15%), third-year (21%), fourth-year (10%) and fifth or more (15%). Compared to 2013 data (University of Otago), ethnicity was proportionately representative of the 2013 University of Otago student profile, but under-representative of males (33% vs. 42% in 2013), over-representative of first-year students (40% vs. 20%), and permanent address in Dunedin (50% vs. 20%).

Knowledge and attitudes relating to organ/tissue donation in New Zealand

For the question relating to the percentage of deaths where donation is medically feasible, only 12% of respondents identified the correct answer (‘Less than 5%’; based on Australian data from the DonateLife website, http://www.donatelife.gov.au/) (Table 1). The question “Age limit for someone to be an organ/tissue donor” was correctly identified by 62%, while 23% correctly identified that “the family consent to organ/tissue donation irrespective of what is stated on the driver’s license” to the
### Table 2: Knowledge and attitude relating to organ/tissue donation, and donation of own tissues. Positive responses (agree, strongly agree) from a 5-point Likert scale and yes/no answers.*

<table>
<thead>
<tr>
<th>Questions</th>
<th>Females n = 120</th>
<th>Males n = 60</th>
<th>Total n = 180</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Organ/tissue donation benefits society</td>
<td>110</td>
<td>91.7</td>
<td>56</td>
</tr>
<tr>
<td>If this was medically possible I would like to donate my organs/tissues after death</td>
<td>80</td>
<td>66.7</td>
<td>48</td>
</tr>
<tr>
<td>There are many more potential organ donors than there are potential recipients in NZ</td>
<td>45</td>
<td>37.5</td>
<td>30</td>
</tr>
<tr>
<td>Organ/tissue donation is against my religion</td>
<td>7</td>
<td>5.8</td>
<td>2</td>
</tr>
<tr>
<td>Organ/tissue donation in NZ should be ‘opt-in’</td>
<td>89</td>
<td>74.2</td>
<td>41</td>
</tr>
<tr>
<td>Organ/tissue donation in NZ should be ‘opt-out’</td>
<td>47</td>
<td>39.2</td>
<td>29</td>
</tr>
<tr>
<td>Know/knew someone who donated organs/tissues*</td>
<td>21</td>
<td>17.5</td>
<td>17</td>
</tr>
<tr>
<td>Know/knew someone who received organs/tissues*</td>
<td>19</td>
<td>15.8</td>
<td>13</td>
</tr>
</tbody>
</table>

### Table 3: Attitude to organ/tissue donation of a loved one’s organs/tissues. Positive responses (agree, strongly agree) from a 5-point Likert scale.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Females n = 120</th>
<th>Males n = 60</th>
<th>Total n = 180</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>If donation of organs/tissues from a loved one was possible I would expect to be asked for consent</td>
<td>90</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>The most important consideration in whether I would consent to donating organs/tissues of a loved one would be their previous wishes</td>
<td>110</td>
<td>91.7</td>
<td>52</td>
</tr>
<tr>
<td>If my loved one had NOT made their wishes about donation known to me I would not consent to donating their organs/tissues</td>
<td>47</td>
<td>39.2</td>
<td>30</td>
</tr>
<tr>
<td>The most important consideration in whether I would consent to donating organs/tissues of a loved one would be whether others’ lives could be helped</td>
<td>89</td>
<td>74.2</td>
<td>45</td>
</tr>
<tr>
<td>Information about the specific benefits of donation would be important to me at the time of deciding whether to consent to organ/tissue donation of a loved one</td>
<td>93</td>
<td>77.5</td>
<td>43</td>
</tr>
</tbody>
</table>
question on “Circumstances in which organ/tissue donation is possible in NZ”.

Knowledge and attitude relating to organ/tissue donation and donation of own tissues

Nearly all (93%) participants agreed that OTD benefits society, with 72% of participants indicating they would like to donate organs or tissues after death. Around one fifth of participants know or knew someone who had donated (21%) or received (18%) organs or tissues (Table 2). Just under half (42%) agreed with the statement that “There are many more potential organ donors than there are potential recipients in NZ”, while only 5% indicated OTD was against their religion. Most (73%) favoured OTD being “opt-in” in New Zealand, while under half (42%) indicated support for OTD being “opt-out”.

Attitude to organ/tissue donation of a loved one’s organs/tissues

Participants demonstrated supportive attitudes to four of the five questions on donation of a loved one’s organs or tissues (Table 3). These questions related to being asked for consent (78%), the most important consideration being the expression of previous wishes (91%), whether other lives could be helped by the donation (75%), and the importance of the information about the specific benefits of donation being available at the time of deciding whether to consent (76%). The only question that received less than half of the participants’ support was related to providing consent when loved ones had not made their wishes clear about donating (43%).

Correlates of supportive attitudes to organ/tissue donation against selected survey questions

Supportive attitudes were reported by 78 (65%) females and 46 (77%) males; there was no significant difference between proportions of ‘supportive attitude’ by sex. The supportive attitudes group was compared with ‘not supportive’ on selected questions on OTD (policy for opt-in, opt-out questions), and all questions relating to donation of loved ones organs/tissues (Table 4). There were significant differences in responses between the supportive and not supportive groups when disagree (including strongly disagree), vs neutral, vs agree (including strongly agree), agree responses for three of the seven questions.

Discussion

This study examined attitudes and knowledge in a New Zealand young adult population at one university, providing unique information on OTD in this demographic. Findings suggest that OTD is generally supported, with results providing some insight into how young adults approach and engage with the decision making process in relation to donation of a loved one’s organs/tissues.

Demographic data

Results indicate that these data are not representative of the actual profile of University of Otago students, with sex, year of study, and home address different to the 2013 university student profile. Therefore, results from this exploratory study cannot necessarily be generalised to the University of Otago student population. However, they do provide an indication of the variety of attitudes and knowledge of OTD in young, university-attending adults in New Zealand. While the ethnic profile of participants was representative of University of Otago students, the low number of Māori and Pacific Island participants indicates that responses may not be representative of OTD attitudes and knowledge for these communities.16,19

Knowledge relating to organ/tissue donation in New Zealand

Findings indicate that young New Zealand adults do not realise that donation is a rare possibility when death occurs; in Australia organ donation is feasible in around 1% of hospital deaths.20 Furthermore, there is a lack of understanding that donor age limits depend on clinical circumstances, and an incorrect assumption that both drivers licence indication of intent and family consent are required for OTD to proceed (49% responses). Results also indicated that participants were not really aware of the rarity of OTD opportunities, or the fact that there is significant need for organs, with current demand far exceeding supply, suggesting that the circumstances in which OTD can occur in New Zealand after persons die are not well understood. This is important
because such information is relevant to the expectations of potential donor families, and to clinicians who may assume a baseline knowledge of individuals and families. Improving community knowledge in this area may be important in order to assist communication and interaction between clinicians and families faced with a donation decision; therefore these findings provide an insight into potential OTD education requirements and establishing a benchmark for future investigations. Religious beliefs do not appear to be a barrier for OTD in New Zealand, based on our findings. This is perhaps not surprising given New Zealand’s secular population, confirming strategies to improve donation rates should not overemphasise religion as a potential barrier.

Knowledge and attitude relating to organ/tissue donation, and donation of own tissues

Our findings indicate a high level of support for OTD at a conceptual (‘good for society’) and personal level, similar to those from Auckland University medical students. Around 20% of respondents had knowledge of either an organ/tissue donor or recipient, an interesting finding given New Zealand’s low donor rate of between 31 and 46 people per year (2008–2014) with 919 total recipients (live and deceased donors) between 2010 and 2014.

Table 4: Comparison of supportive and not supportive attitudes to donation with positive responses to selected survey questions. *Indicates significant difference between supportive and not supportive groups (Chi square); percentages have been rounded to one decimal place. Male and female responses have been combined. DoF = degrees of freedom.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Response</th>
<th>Supportive (%)</th>
<th>Not supportive (%)</th>
<th>Chi square (DoF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organ/tissue donation in NZ should be ‘opt-in’</td>
<td>Agree</td>
<td>72.6</td>
<td>72.7</td>
<td>8.4* (2)</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>13.7</td>
<td>25.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>13.7</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Organ/tissue donation in NZ should be ‘opt-out’</td>
<td>Agree</td>
<td>46</td>
<td>34.6</td>
<td>2 (2)</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>18.6</td>
<td>21.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>35.5</td>
<td>43.6</td>
<td></td>
</tr>
<tr>
<td>If donation of organs/tissues from a loved one was possible I would expect to be asked for consent</td>
<td>Agree</td>
<td>75.8</td>
<td>83.6</td>
<td>1.5 (2)</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>17</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>7.3</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>The most important consideration in whether I would consent to donating organs/tissues of a loved one would be their previous wishes</td>
<td>Agree</td>
<td>94.3</td>
<td>83.6</td>
<td>7.7* (2)</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>2.4</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>3.3</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>If my loved one had NOT made their wishes about donation known to me I would not consent to donating their organs/tissues</td>
<td>Agree</td>
<td>36.3</td>
<td>58.2</td>
<td>13.7* (2)</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>29</td>
<td>32.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>34.7</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>The most important consideration in whether I would consent to donating organs/tissues of a loved one would be whether others’ lives could be helped</td>
<td>Agree</td>
<td>79</td>
<td>65.5</td>
<td>3.9 (2)</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>14.5</td>
<td>25.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>6.5</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Information about the specific benefits of donation would be important to me at the time of deciding whether to consent to organ/tissue donation of a loved one</td>
<td>Agree</td>
<td>78.2</td>
<td>70.9</td>
<td>1.2 (2)</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>17</td>
<td>21.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>4.8</td>
<td>7.3</td>
<td></td>
</tr>
</tbody>
</table>
This personal exposure to organ donation suggests many New Zealand young adults at the University of Otago are personally connected to donation, and provides a useful platform for engaging with them, given their demonstrated a priori knowledge of donation practice in this country.

Various models exist internationally with respect to donor registries and the ‘opt-in’ and ‘opt-out’ systems of OTD. This study found support for both concepts, perhaps highlighting that they are not mutually exclusive. Some respondents may have ticked yes for both questions (i.e., both are a good idea); both examine whether individual autonomy, or family consensus, or community need is the prevailing concept, however it is hard to compare the two concepts and draw any meaningful conclusions. Overall, ‘opt-in’ received more positive responses (73% vs. 42%) which provides more support for the concept of donor registries as opposed to having an ‘opt-out’ policy. Currently, there is no OTD register in New Zealand; previous reports have shown a low level of support in countries that implemented these programmes, indicating they may perform poorly. Recent data from the UK reported 38% of the adult population are registered organ donors, suggesting the establishment of ‘opt-in’ OTD registers may be popular and potentially beneficial in some countries.

Attitudes to organ/tissue donation of loved one’s organs/tissues

The consensus for OTD following brain death in New Zealand is approximately 50%; in Australia it is around 60% and increasing the family consent rate is a key target of the Australian Organ and Tissue Authority. This indicates that understanding local factors that contribute to family consent decisions is important in regards to being able to improve the chances of family consent being granted in situations where donation is possible. In this study, most participants indicated they would expect information about the specific benefits of donation to others when making a decision for a loved one (76%). Information about the potential benefits of OTD is therefore seen as important at time of making a decision, and reinforces the importance of the nature of the conversation between the clinician and the family. The result indicates that people want to talk about the possibility of donation and its potential impact, and supports the proactive initiation of this conversation by clinicians when organ donation is a possibility.

The high positive response to being asked for consent for donation of a loved one’s organs/tissues (78%) reinforces and supports current practice, while almost all participants (91%) stated the most important fact was whether the individual had previously stated their wish to donate. Interestingly, under half (43%) of participants agreed that if a loved one had NOT made their wishes clear then they would not consent, indicating more than half of respondents would still donate a loved one’s organs or tissues in this circumstance. In Australia, consent for donation of a loved one’s organs or tissues is significantly less frequent if the family is not aware of their wishes. This supports the necessity for the donation scenario to be discussed by families as part of routine family conversation, and could indicate support for a public campaign to promote the discussion of this subject within families to improve knowledge of personal wishes after death. Prior knowledge of a potential donor’s wish to donate organs is essential as this is associated with consent for OTD, and therefore efforts to raise the profile of ‘donation intent’ are warranted.

The majority positive response (75%) to the question about whether others could be helped by the transplant highlights the importance of family-clinician interaction. Families are commonly asked about the potential for donating in situations where this is possible, however these results support having discussions with families that specifically include conveying information of value when donation is possible.

Supportive attitudes to organ/tissue donation

Most respondents supported OTD as ‘being of benefit to society’ and answered positively to the question ‘If medically possible I would donate organs/tissues’ (65% females and 77% males), with this finding similar to findings for young adults in other studies. Positive responses
to both questions were indicative of a ‘supportive attitude’ for OTD. Three of the seven questions analysed for correlation with supportive attitude indicated significant differences between ‘supportive’ and ‘non-supportive’ respondents, however differences between the supportive and not-supportive groups were not seen for all questions. Such non-unanimous outcomes highlight the necessity to avoid generalisations with respect to OTD groups in the community (eg, those with supportive and non-supportive attitudes). The diversity of responses also suggest the need for careful assessment of specific issues when intervention is planned to influence young adult OTD knowledge and attitudes in New Zealand, indicating individual response (agree, neutral or disagree groups) or support (supportive, non-supportive) cohorts require independent consideration depending on the desired outcome.

Limitations

There are some limitations to this study, related to sample size and degree of representativeness of the young adult student population, thereby limiting the generalisability of results to the New Zealand student population. In addition, non-participant data was not recorded (ie, those individuals who were approached but chose not to participate) though this data would have been limited to number of individuals approached and sex; such data would have allowed examination of potential response bias. Further, additional work is necessary to examine the attitudes and knowledge to OTD of different ethnicities to determine whether their responses are similar to those reported given the low participant numbers and potential for cross-cultural differences.²⁸

Conclusions

This exploratory study reveals useful information about the attitudes, perceptions and knowledge of young adults to OTD that could be utilised to facilitate both public and clinical attitudes to OTD in this country.²⁹ Results suggested limited knowledge about OTD, positive support for OTD, and a willingness to be engaged in the donor decision-making process for loved ones’ organs and tissues. In addition, the importance of understanding the wishes of loved ones was highlighted regarding the decision-making process for OTD. These results support proactive engagement with university students on education about OTD, the public and family conversation about individual OTD wishes, and interaction with clinicians about the donation decision when OTD is possible. Such knowledge will help shape socially acceptable practice, guide ethical positions and decision, and support clinical decision making and frameworks. Findings are important in relation to the future of OTD in New Zealand as young adults who are knowledgeable on OTD are likely to serve as advocates for increasing the awareness and knowledge of others in the community.⁶
**ARTICLE**

**Competing interests:** Nil

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This article is dedicated to the memory of our fellow author and colleague Dr Cyril Schafer, who sadly passed away in June 2015. The authors would like to thank the Humanities Division of the University of Otago for the provision of a research grant to assist the completion of this study.

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Impact of the New Zealand 2011 Rugby World Cup on an Urban Emergency Department

Mark Gardener, Tim Parke, Peter Jones

ABSTRACT

AIMS: The next Rugby World Cup will take place in England commencing August 2015. This paper describes the preparation and workload relating to the previous Rugby World Cup, held in New Zealand 2011, as it affected the primary receiving hospital for the main venue. This paper describes preparation arrangements and actual workload patterns to assist planners with future similar events.

METHODS: Preparations for the tournament were summarised, and data gathered from the Auckland City Hospital database were analysed for total and hourly presentation rates, short-stay observation workload, admission rate, 6-hour target compliance and type of presentation.

RESULTS: Overall workload during the tournament increased by 8%, but much larger spikes in attendances per hour and short-stay workload related to the major events were experienced. Alcohol-related presentations were very much more prominent than usual. Pre-arranged additional staffing and flow arrangements allowed the department to maintain 6-hour target compliance.

CONCLUSION: Major sporting events, such as the Rugby World Cup, require special arrangements to be put in place for the main local receiving Emergency Department, especially around the major events of a tournament.

The Rugby World Cup (RWC) is the 3rd largest sporting event in the world. It is next due to be held in England, commencing August 2015. The tournament was last contested in New Zealand from 9 September to 23 October 2011, and consisted of 48 matches across the country. The opening game and ceremony, both semi-finals and the final were played in Eden Park Stadium, Auckland. The Emergency Department serving both this stadium and the city centre ‘Fan Zone’ was Auckland City Hospital (ACH), a tertiary urban trauma centre. This paper describes some of the preparations made by the Adult Emergency Department (AED) and reports on the workload experienced during the tournament.

Preparation

A higher than usual workload was anticipated for the duration of the tournament and a number of strategies were employed to mitigate the effect of this. Previously published papers on major sporting events were reviewed. Local workload data from the hospital database were also extracted for periods around previous mass gathering events in the city.

There were essentially three strands to planning the medical cover for the event:

1. Central DHB-level emergency planning covering the possibility of mass casualty incident
2. St John Ambulance planning covering the positioning of ambulance and first aid assets for events and general cover
3. Specific AED plans for increased general workload and identification of likely peaks of activity.

Although planning began over one year before the event, plans required significant alteration in the build-up to the tournament due to the 2011 Christchurch Earthquake, which resulted in additional matches being played in Auckland and elsewhere.
With regard to the AED preparations, the following strategies were employed:

1. AED staffing: Medical staffing was supplemented by an additional senior doctor on standby throughout the tournament during weekdays and by an additional duty senior doctor on all weekend shifts (whether or not a match was being played in the city due to anticipated workload from the ‘Fan Zone’). The approximate cost of this staffing was estimated at $50,000.

2. Short stay unit: It was anticipated that there would be a larger number of intoxicated patients requiring a period of observation. The short-stay capacity of the department was doubled to eight beds and plans made to expand into the next door Admission Unit as required. Standard operating procedures regarding the triage and management of severely intoxicated patients were jointly drawn up with ambulance service and AED medical and nursing team.

3. Publicity campaign: A publicity campaign was mounted within the hospital through meetings, posters, events and email staff alerts to expedite and streamline flow out of AED for patients requiring the interaction of in-patient specialist services and radiology. An example of one of the posters is given in Figure 1.

4. Inter-departmental co-operation: Discussions took place with the other three emergency departments in the city to manage workload in the event of ACH becoming overloaded, with an understanding that ambulance diversion may be employed.

**Results**

Over the course of the tournament the department saw 7,419 new patients against a seasonal comparator of 6,854, representing an 8% increase in overall AED activity.

There were, however, several dramatic spikes in presentations, which presented challenges in spite of the preparations. The first occurred during the Opening Ceremony on 9 September, when larger than anticipated crowds turned out in the city centre ‘Fan Zone’ and difficulties...
occurred with transport infrastructure due to a railway incident and a significant road traffic accident. During this period, the department experienced a surge of Australasian Triage Category 2 and 3 presentations. Total presentations peaked at 25 per hour (Figure 2), which resulted in a large number of ambulances queuing to offload. A temporary diversion was put into effect for two hours to the two neighbouring emergency departments to redistribute ambulance resources and allow the AED to move some patients through to the adjacent admitting unit.

The second significant spike unsurprisingly occurred around the RWC Final between the home nation and France on Sunday 23 October. This produced a sustained late spike in activity that lasted several hours, and there were small numbers of patients diverted to other neighbouring departments.

These spikes in activity were matched by spikes in short-stay observation activity, with a peak during the evening of the opening ceremony of 44 patients, representing nearly a threefold increase on the departmental average of 15 per 24 hours.

During the tournament, no increase in the referral for admission rate was seen and the national ED target of 95% patients admitted or discharged within 6 hours was met (Figure 4). The department saw its highest ever 24hr daily attendances around those two peaks.

There was also a change in the case mix of the presenting problems, with alcohol-related presentations becoming much more prominent. For patients who were coded (ie, those with a stay greater than 3 hours),
alcohol intoxication moved from the 10th most common diagnosis (1% cases) to the 2nd most common diagnosis (4% cases). Problems relating to alcohol excess were particularly prominent at weekends (15% cases), increasing to 50% of all attendances being related to alcohol in the 4 hours following the conclusion of the final.

**Discussion**

Activity at ACH AED increased during the RWC in a reasonably predictable manner, with an overall increase of 8%, but with disruptive peaks in presentations and short stay workload around the times of the major events. The investment of time in planning for the event, particularly targeted additional medical resources at weekends, proved essential in managing this work, along with additional AED short-stay capacity and the hospital campaign to minimise delays to admission to in-patient beds.

Much of the additional workload appears to have been caused by alcohol consumption. Strategies to mitigate against alcohol-related harm would therefore seem to be an important part of planning for such events. Wellington Hospital has previously reported the use of a pre-hospital intoxication protocol for both their RWC matches and the Wellington Sevens tournament. Indeed, a similar system was implemented by St John Ambulance in Auckland during the tournament and is likely to have significantly buffered attendances at the AED. Large-scale public health measures to reduce alcohol harm were put in place during the London Olympics and they appear to have been highly successful in minimising impact on local health facilities.

We hope this report of our experiences may prove useful in planning future events including the upcoming RWC in England.

**Conclusions**

Major sporting tournaments require special planning arrangements to the receiving Emergency Departments, especially around likely spikes of activity consequent on mass crowd events. A comprehensive alcohol harm reduction strategy should be considered including public health measures and pre-hospital care.
ARTICLE

Competing interests: Nil

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Informed consent to breech birth in New Zealand
Rhonda Powell, Shawn Walker, Alison Barrett

ABSTRACT
The authors note significant room for improvement in facilitating informed consent in the management of breech presentation. New Zealand maternity care providers, including midwives, general practitioners and specialist obstetricians, have legal duties to provide full and unbiased information about risks and benefits of all relevant treatment options. In the case of breech presentation, such options include the interventions of external cephalic version or planned caesarean section, as well as the option to decline intervention and proceed with a planned vaginal breech birth. Information should be presented in a balanced and accessible way and not limited to the provider’s personal preferences. Women have legal rights to make an informed choice, to give or refuse consent, to a second opinion and to co-operation among providers. The right of competent persons to refuse medical treatment, including the right to refuse caesarean section, is well established. Clinical policies therefore should include appropriate and non-coercive care for women who choose to birth their breech-presenting baby vaginally, compliance with such policies should be the norm, and consideration should be given to any institutional reforms or educational priorities needed to achieve this.

Current practice in obtaining informed consent in managing a breech-presenting foetus in late pregnancy needs significant improvement. The authors all regularly interact with women who have experienced care that fails to meet the legal requirements for informed consent. Our observations are consistent with others published in international literature, reflecting a cultural acceptance of minimal choice and coercive consent practices within many maternity services.1-3

Anecdotaly, it appears that in New Zealand, Australia and the UK, some women are given no realistic choice other than ‘elective’ caesarean section and some women are given unbalanced information about the risks and benefits of vaginal breech birth (VBB) and caesarean section. This quote (and others in this article) is taken from an Antipodean internet support group for women with breech-presenting foetuses (quoted with permission):* “The [obstetrician] for my first breech pregnancy told me that no-one offered VBB or [external cephalic version] ... because it was not safe for the baby or the mother ... He didn’t go into any detail about the risks...”

Women also describe feeling coerced into attempting external cephalic version (ECV) (quoted with permission): “ECV felt like the only way we could get VBB on the table. Nevertheless, it felt wrong to agree to the ECV for the sake of the hospital's birth policy.”

This anecdotal evidence is consistent with research suggesting that women's perceived control over decision-making in childbirth is surprisingly low4 and that maternity care providers' (providers) understanding of women's legal rights in maternity care is poor.5

This article considers the legal duties of New Zealand providers, including independently practising midwives and

* The support group includes a range of mothers, midwives and obstetricians. Pregnant women are supported whether they plan to birth vaginally or by caesarean section and discussions relate to a wide-range of concerns specific to breech: for instance discussions include positive experiential anecdotes about caesarean section and questions about developmental hip dysplasia.
District Health Board midwifery and obstetric staff, to give information and to obtain consent in the management of breech presentation.

Legal framework

New Zealand's maternity arrangements and health law framework are both unique. General legal principles about information and consent are similar to other common law jurisdictions, such as Australia and England. However, in New Zealand, the Code of Health & Disability Services Consumers’ Rights (Code) adopts the concept of ‘informed consent’, which has been rejected in England and Australia. The Code can be breached even if no injury or damage has been caused. In addition, the accident compensation scheme (ACC) provides fault-free compensation to victims of personal injury, including injuries caused by medical treatment. Medical negligence litigation is almost non-existent in New Zealand because the Accident Compensation Act 2001 prohibits damages for personal injury covered by ACC (section 317).

In New Zealand, almost all pregnant women are registered with a Lead Maternity Carer (LMC), usually a midwife, who provides primary antenatal, intrapartum and postnatal care. LMC midwives are legally required to comply with the Guidelines for Consultation with Obstetric and Related Medical Services (Ministry of Health, 2012) (Guidelines). District Health Board clinical policies and College statements have no legal status and are subject to the Code and the common law. However, they are relevant in determining a provider's compliance with professional standards. Breach of the Code does not necessarily constitute a disciplinary offence.

Consultation and cooperation

The Guidelines confirm that “the woman should have continuity of maternity care ... regardless of how her care is provided” (p2). This is important because breech presentation, whether diagnosed before or in labour, engages an obligation on the LMC midwife to recommend consultation with an obstetrician. Guideline 4.2 suggests that a three-way conversation should take place between the woman, the LMC midwife and the obstetrician.

The Code also recognises that “[e]very consumer has the right to co-operation among providers to ensure quality and continuity of services” (Right 4.5). If disagreements arise about the care plan, it is important to maintain communication so that emergency care can be provided if necessary. The Health & Disability Commissioner emphasised the importance of communication in a case in which a baby died after a VBB. The woman became disillusioned with medical staff after their insistence upon a caesarean section. Interpersonal tensions meant that the midwives did not inform medical staff that the woman was in labour and when problems arose, it was too late to help.

Information

The Code protects the right to be fully-informed (Right 6) and the right to make an informed choice and give informed consent (Right 7).

The importance of providers providing information to allow women to make their own choices was recently emphasised by the Supreme Court of the UK in Montgomery v Lanarkshire Health Board (para 81):

“social and legal developments ... point away from a model of the relationship between the doctor and the patient based upon medical paternalism. ... What they point towards is an approach to the law which, instead of treating patients as placing themselves in the hands of their doctors (and then being prone to sue their doctors in the event of a disappointing outcome), treats them so far as possible as adults who are capable of understanding that medical treatment is uncertain of success and may involve risks, accepting responsibility for the taking of risks affecting their own lives, and living with the consequences of their choices.”

Although the therapeutic privilege to withhold information for a patient's own benefit is recognised in law, this is a very narrow exception and only applies in cases...
where disclosure would be “seriously detrimental to the patient’s health” (para 88). It is unlikely to apply to a competent woman choosing antenatally how to deliver her breech baby.

The Code requires information to be provided about the following:

The options available, including an assessment of the expected risks, side effects, benefits and costs of each option (Right 6(1))

This includes ECV, planned VBB, planned pre-labour caesarean section and planned caesarean section when labour commences. These options should be discussed even if they necessitate a referral to another provider. Health & Disability Commissioners have interpreted Right 6(1) to require information to be based on objective data and, where no such data exist, to disclose this fact.

The authors have observed that woman commonly need to be assertive to discuss the option of VBB (quoted with permission):

“I believe if I had not known to ask I would not have been given the option [of VBB] ... I felt that the [obstetricians] gave a lot of statistics about the ‘average’ ... but not ... me and my pregnancy.”

As well information relevant to the current pregnancy, the consequences of a woman’s choices for future pregnancies should be discussed. These include the chances of recurrent breech presentation, the increased likelihood of this following a caesarean section and the risk of morbidity and mortality for the woman and her future babies following a caesarean section.

In disciplinary proceedings for failure to obtain informed consent, the fact that other providers would have provided the same level of information is not a determinative defence. The duty is to provide the information that “a reasonable consumer in that consumer's circumstances” would expect to receive or would need to make an informed choice or give informed consent. Although this is ostensibly an objective standard, these “circumstances” will vary from patient to patient and include the woman’s beliefs, fears, and desires and the level of information the woman desires to receive.

Open and honest answers to questions about providers available to care for the woman (Right 6(3))

This includes the provider’s identity and qualifications, recommendations and how to obtain a second opinion. Health & Disability Commissioners have interpreted this requirement to extend to risks associated with the provider. Ideally, providers or services should present their particular statistics about relevant outcomes.

The right to express a preference as to who will provide services and to have that preference met where practicable (Right 7(8))

This right, combined with the right to have services provided with reasonable care and skill (Right 4(1)), is pertinent given the common understanding that most obstetricians and midwives do not have sufficient skills and experience to safely support a planned VBB. The presence of an experienced provider is the only factor that has ever been shown to improve outcomes for vaginal breech deliveries (VBD), although there is currently a lack of agreement about how much practical experience is required for a provider to be sufficiently ‘experienced’ to safely support a VBB.

Accordingly, a woman may express a preference to be under the care of somebody who has expertise in supporting VBB. This will not always be practical—a provider’s duty is to take reasonable actions in the circumstances to comply with the Code (Right 10(3)). Similarly, a provider will not be in breach of their duty of care by failure to provide care which is outside their power to provide.

District Health Board structures that facilitate access to medical and midwifery staff with breech expertise would assist in fulfilling Right 7(8), as well as maximising the chances of a good outcome in a planned VBB.

A written summary of information, upon request (Right 6(4))

Written information can be prepared in advance and annotated for a woman’s clinical circumstances. This is already practised at some services (quoted with permission):

“I received an information sheet recapping all that we had discussed..."
so I could take it away and have further conversations with my partner and family. It had been printed out and personalised …”

Discussing the Term Breech Trial

The Term Breech Trial (TBT) may sometimes be presented to women as ‘determinative’ of the choice they should make. This approach potentially breaches the woman’s right to make an informed choice.

In order to present balanced information, if the TBT is directly discussed (which depends on the level of detail a woman wishes to hear), providers should also discuss (with an explanation about their comparative evidential value):

- the two-year follow up study of infants finding no significant long-term differences between planned caesarean section and planned VBD
- epidemiological studies demonstrating a decrease in neonatal mortality associated with increased caesarean section at population level but with much less difference than that observed in the TBT (1.6/1000 vs 6/1000) and
- retrospective cohort studies showing that with good clinical support and in some places, planned VBD brings no significant greater risk to the infant than planned caesarean section.

Presenting risks

The National Institute for Clinical Excellence and the Royal College of Obstetricians and Gynaecologists (RCOG) provide guidance on the presentation of statistical information to patients (1.5.24). Although clinical studies such as the TBT compare the relative safety of planned caesarean section and planned VBD, this approach is aimed at population-based policy-making and not at counselling women.

The TBT analysed overall incidence of ‘severe neonatal morbidity and mortality’. However, presenting risks of different sorts together to a woman gives the misleading impression that the risk of long-term morbidity or mortality is more common than the evidence suggests. The TBT showed:

- no statistically significant difference in the risk of the three most serious birth traumas (intracerebral or intraventricular hemorrhage, spinal cord injury and basal skull fracture) between the planned vaginal and planned caesarean groups
- a similar incidence of the most common birth trauma, clavicle fracture (6/1000) to the incidence of clavicle fracture in cephalic presentation (5/1000)
- that the risk of neonatal death after a planned VBD is 6/1000 in countries with low perinatal mortality. In a recent study in the Netherlands, which had a 20% vaginal breech rate in the relevant period, the risk of death after a planned VBD was as low as 1.6/1000
- that the most common adverse outcomes after a planned VBD are tube feeding for >4 days (31/1000), 5 minute Apgar of <7 (30/1000), and admission to neo-natal intensive care for >4 days (30/1000).

Women may not necessarily want this level of detail and providers are not expected to provide information that a woman does not wish to hear. However, information on specific risks should be offered because it counteracts the common misunderstanding that the risk of mortality from VBB is high. It also enables the woman to make an autonomous decision about which risks she is willing to take.

Women should be told about risks specific to caesarean section and VBB in absolute rather than relative terms. RCOG recommends the term ‘uncommon’ to describe a risk of between 1 in 100 and 1 in 1000, which applies to most relevant risks. Natural frequencies, consistent denominators, and combining positive and negative framing are best practice.

Women and clinicians may perceive risk differently. Although the immediate risks to the current pregnancy should be discussed, women may be concerned about a broader range of factors than short-term adverse clinical outcomes, such as their ability to care for other children.
or relatives, their partner’s ability to take time off work, and plans for future children. Research shows that women are particularly concerned about the long-term outcomes for their child, and partners are most concerned about risks to the woman.27

Timing and transfer

Decision-making requires discussion, an opportunity to ask questions, and time to reflect.3 This is facilitated in New Zealand by the LMC model. As the availability of clinical expertise in managing VBB may be a factor in a woman’s decision about whether or not to attempt ECV, a discussion about mode of birth should not be delayed until after ECV.

Although, in most cases, after consultation, women will choose to transfer care, in New Zealand the obstetrician does not automatically assume responsibility for ongoing care. Some women will make a legally supported choice to remain in the care of their LMC midwife.

Undiagnosed breech presentation

Although rates vary, a reasonable proportion of breech presentations are diagnosed in labour (25–33%).29 There is a lack of evidence that a caesarean section in active labour offers the same benefits to the foetus as it may have prior to or in early labour.29 Caesarean section in active labour also brings increased risks for both mother and baby.30 The Royal Australian & New Zealand College of Obstetricians’ & Gynaecologists (RANZCOG) College Statement ‘Delivery of the Fetus at Caesarean section’ (C-0bs 37; current July 2010) specifically addresses the difficulties of caesarean section for breech in active labour.

For a breech diagnosed in labour, without evidence of lack of progress, compromised wellbeing of mother or baby, or lack of experienced provider,30 a vaginal birth should be assumed and supported. Extensive risk-based discussion about intervention should be reserved for situations in which the provider observes an increase in risk for which a caesarean section is known to improve outcomes.

Consent and refusal

The Code and the common law (applicable in other jurisdictions too),5,31 confirm the right of patients to refuse consent to medical treatment, even if the implications are serious. Although this should be obvious, the Australian Medical Association recently reaffirmed that a “pregnant woman has the same rights to privacy, to bodily integrity, and to make her own informed, autonomous healthcare decisions as any competent individual”32 and the UK Supreme Court has confirmed that “[g]one are the days when it was thought that, on becoming pregnant, a woman lost, not only her capacity, but also her right to act as a genuinely autonomous human being” (para 116).11

Although a provider cannot be compelled to provide care that they believe is clinically inappropriate, this does not extend to requiring a competent woman to undergo surgery to ‘avoid’ a natural process.11 Neither may a provider refuse care simply because they disagree with the woman’s decision or because of factors unrelated to the woman, such as personal beliefs about the merits of caesarean births or previous bad personal experiences. In the absence of another provider who can take over the woman’s care, the ethical and legal duty is to continue to provide care.

Consent may be undermined by:

• clinical policies which make no allowance for VBB
• providing misleading information about risks, and
• threatening to withdraw care if a woman disagrees with advice.

This is an example of coercive behaviour, which is in breach of the Code and could lead to a complaint to the Health & Disability Commissioner or to disciplinary action (quoted with permission):

“The hospital midwives had to transfer me to the obstetricians who threatened to call child protective services and get a court order to perform a cesarean and then remove my child from my and my husband’s care if I didn’t “consent” to an elective cesarean...”
In one of the first British forced caesarean cases, a woman brought legal action for battery after being coerced into agreeing to a caesarean section for breech, although the case settled out of court (p270). In New Zealand there are no compensatory damages for any injury caused by battery because of ACC. Declaratory relief or exemplary damages may be available.

The common law also recognises that ‘undue influence’ may undermine consent. The High Court of Australia has held that (para 40):

“What appears to be a valid consent given by a capable adult may be ineffective if it does not represent the independent exercise of person’s volition: if ... the person’s will has been overborne ...”

Factors which make a woman more susceptible to undue influence include:

- pain
- being tired
- being on medication, and
- the relationship with the persuading party (which could include any power-imbalance in a doctor-patient relationship or pressure from family members).

Particular care should be taken to ensure that a woman’s consent to medical intervention in labour is freely given. Consent is not required to birth vaginally.

**Clinical policies, compliance and costs**

Patient-centred, legally-sound, evidence-based and non-coercive clinical policies are critical to safe maternity care. In one well-known New Zealand example, a baby died (due to placental abruption) after a planned breech homebirth and the Coroner criticised a clinical policy allowing no realistic alternative to caesarean section because it influenced the choice of the woman to birth at home where emergency care was sub-optimal.

The quotes presented in this article and the authors’ interaction with pregnant women both suggest that, in practice, VBB is rarely a choice that is open to women. A legal compliance review of current breech presentation clinical policies in New Zealand and Australia would be worthwhile as it is unclear whether the issue is a failure to comply with clinical policies or the policies themselves.

The RANZCOG College Statement ‘Management of Breech Presentation at Term’ (C-Obs 11; current March 2013) could also be improved by including a sounder evidence-base for recommendations, a wider range of information about the risks of caesarean section, particularly the risks for future pregnancies, and acknowledgment that the role of the obstetrician is to advise the woman, not to make the decision.

Whatever the reason, the authors have noted that whether or not a woman is offered support for a VBB often depends upon luck. Women should not rely on luck to determine whether or not they have a caesarean section (quoted with permission):

“I felt ‘lucky’ that I was given the option to attempt VBB. On reflection though, how sad that a woman should feel ‘lucky’ to birth her child the way she instinctively wishes. She should only feel supported in her decision.”

It is well recognised that New Zealand’s health services are stretched. There are financial implications of providing real choice to women because this requires the availability of ‘experienced’ staff to support a VBB at any time. There is also a lack of consensus about how much practical experience is sufficient to count as ‘experienced’. Counselling should therefore include provider and location specific experience and outcome data, so that women can judge for themselves what level of experience they find acceptable.

Although all specialist obstetricians should have the ability to safely support a VBD, a core component of RANZCOG obstetric training, it appears that not all are currently confident in doing so. It is therefore inevitable that providing real non-coercive choice to women may require additional training for midwives and obstetricians and a reconsideration of institutional and supervision arrangements. The costs of providing 24/7 specialist support for VBB may potentially be partially offset by the costs saved on unnecessary caesarean sections and
resultant complications, including in future pregnancies. The status quo is unacceptable from a medico-legal perspective and so the resource implications and educational needs (such as simulation training)\textsuperscript{29} should be considered as a matter of public health policy. The provision of specialist breech-services, such as that offered at John Hunter Hospital in Newcastle, New South Wales,\textsuperscript{23} is worth further exploration as a way to facilitate safe care for VBB.

Ultimately, a woman’s informed choice to birth vaginally should be respected. As stated in \textit{Montgomery v Lanarchshire Health Board} (para 115):\textsuperscript{11}

“A patient is entitled to take into account her own values, her own assessment of the comparative merits of giving birth in the ... traditional way and ... by caesarean section, whatever medical opinion may say, alongside the medical evaluation of the risks to herself and her baby. She may place great value on giving birth in the natural way and be prepared to take the risks to herself and her baby which this entails. The medical profession must respect her choice, unless she lacks the legal capacity to decide.”

\textbf{Conclusion}

Given apparent inadequacies in current practice, this article considered the legal duties of New Zealand providers to give information and to obtain consent in the management of breech presentation. The provider must give information about the risks and benefits of ECV, planned VBB and planned caesarean section (either before or during labour). Women have the legal right to refuse consent to caesarean section, in which case providers must deliver reasonable care in the circumstances. In order to respect women’s legal rights, consideration should be given to any necessary changes to educational requirements and institutional arrangements to facilitate real choice for women and safe care for VBB in the New Zealand maternity care system.

\textbf{Competing interests:} Nil

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Metastatic melanoma presenting as a testicular lump

Muazzam Tahir, Adam Davies

Malignant melanoma metastasising to testis is a rare and aggressive disease with poor prognosis and a high mortality rate within a short time interval.

Case Report

An 82-year-old man was referred by his GP with a painless lump in left scrotum for one month. On examination the left testis was hard with surrounding hydrocele. No inguinal or abdominal masses were palpable. Ultrasonography confirmed a solid left intra testicular mass concerning for testicular cancer (Figure 1). LDH was elevated but betaHCG and AFP were within normal limits. Staging CT scan was performed which showed multiple nodules in the thorax and abdomen (Figure 2).

He had wide local excision of a cutaneous melanoma from the anterior abdominal wall with a sentinel lymph node biopsy 6 years ago. Histology confirmed 1.17mm Breslow thickness malignant melanoma with a negative sentinel lymph node.

Left inguinal orchidectomy was performed with initial working diagnosis of lymphoma. On histopathology report, the tumour had multinodular appearance, with cells showing significant pleomorphism, enlarged nuclei, prominent nucleoli and several mitotic figures. Cells were melan A and S100 positive. Flow cytometry showed cells positive for CD56, which is associated with some cases of malignant melanoma. Final histological diagnosis was malignant melanoma representing as testicular lump. See Figures 1 and 2.

Our patient was referred to medical oncology; however, he died in less than a month following surgery.

Discussion

Metastatic tumours of the testis are a rare finding and simulate primary testicular neoplasm. Primary testicular tumours are a disease of young men and commonly present in 20s and 30s, but testicular metastasis of malignant melanoma varies widely between 43 to 80 years. The most common primary site for metastatic tumour is prostate. Less commonly metastasis can come from lung, colon and kidney. The incidence of cutaneous malignant melanoma as a primary site in testicular metastasis varies between 9% and 41%.

The most common presentation is a rapidly growing testicular lump. Patients can present with melanospermia and a supraclavicular lump. Malignant melanoma metastasising to the testis is one of the most aggressive and life threatening tumours and is usually found during the autopsy. Despite the late presenting age, it very important to exclude primary testicular neoplasm, as it is more common. Unlike the primary disease, the tumour markers are usually not elevated. Definite diagnosis can only be established after the histopathological analysis. No mechanism to date has been established for the metastasis.

The prognosis is very grim for such patients with the time interval between diagnosis and death is reported to be less than a year in most cases.
CLINICAL CORRESPONDENCE

Figure 1:

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An uncommon complication of post trans-sphenoidal surgery for pituitary adenoma

Hiang Leng Tan, Kurien John

Case Report
A 55-year-old woman presented with a 3-week history of headache, visual disturbances and pyrexia. She had an uncomplicated trans-sphenoidal surgery for Growth hormone secreting adenoma 6 months previously. She had evidence of pan hypopituitarism with a peak cortisol response of a short synacthen test of 280nmol/L at 30 minutes, adrenocorticotrophic hormone level of <5 ng/L, low gonadotrophin and low free T3. Initial Magnetic Resonance Imaging (MRI) of pituitary (Figure 1) showed evidence of likely recurrence of her pituitary adenoma. However, due to the presence of pyrexia, an MRI pituitary with contrast (Figure 2) was subsequently performed. This confirmed evidence of multiloculated pituitary abscess with optic chiasm compression. She was commenced on hydrocortisone, thyroxine, acyclovir and antibiotics, and transferred to a neurosurgical centre for drainage of the abscess.

Discussion
Pituitary abscess is a rare complication post transphenoidal surgery. High index of suspicion is important as early surgical drainage is required for definitive treatment. In a patient with hypopituitarism and a sellar mass, pituitary abscess should be kept in mind if there are systemic signs of infection. When suspecting this condition, a MRI with contrast enhancement must be performed to look for evidence of ring enhancing lesion typical of abscess.

Figure 1: MRI pituitary without contrast showing a pituitary mass, initially thought to be recurrence of her pituitary adenoma

Figure 2: MRI with contrast shows multiple cystic ring enhancing lesion, appearances consistent with multiloculated pituitary abscess
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Physician Assisted Dying—a Survey of Waikato General Practitioners

Jack Havill

I write in reply to David Richmond’s critical letter (NZMJ 3 July) about my previous paper (NZMJ Feb 2015) reporting General Practitioner (GP) Attitudes to Physician Assisted Dying (PAD).

Regarding whether the GPs knew what was being asked, each GP was provided with the ‘Explanatory Note’ which was part of the ‘Maryan Street End-of-Life Choice Bill’, and which defined very clearly what ‘assistance to die’ meant: i.e., it involved either giving the patient a drug to take themselves, or drug directly administered by the doctor with the intention of ending their life.

Euphemistic language

Richmond’s comments about using the term PAD instead of ‘killing’ are typical of his letters elsewhere. I make no apology for that. Murder is not the same as PAD. Murder is violent, unwanted, does not respect the victim’s autonomy and is regarded universally as morally abhorrent. PAD is ethically totally different in that it is requested by a mentally competent patient; is compassionate in that it relieves unbearable suffering; respects the patient’s autonomy; and allows the patient to say farewell to their friends and relatives while still conscious. It may be regarded as an extension of medical treatment. Richmond is intellectually dishonest when he repeatedly states that both of these acts are the same and tries to classify them under the word ‘killing’. Similarly, there is a big difference between irrational suicide and PAD, where the patient is given a drug to take themselves. This has been argued extensively and now well accepted in the Psychological literature. But opponents of PAD want to pretend that there is no difference.

Words are important in the PAD debate and the opponents of PAD are guilty of trying to frighten people by continual use of emotive words such as ‘killing’ and ‘suicide’ and seem to get very annoyed when other words are used which more accurately describe what is happening.

We look forward to the day when New Zealand’s overbroad and disproportionate homicide and suicide legislation is amended to allow for these differences, and which any sensible person can understand.

Safeguards from abuse

This issue is an important one, but Richmond’s often stated view is that safeguards are always inadequate, and this is proved by information from Belgium. This is simply incorrect. The information he presents about assisted suicides in Belgium is out-of-date, as showed by two later papers from the same authors he quoted, following further detailed analysis of 2007 Belgium reports. To quote:

“Most of the cases we studied did not fit the label of ‘non-voluntary life-ending’ for at least one of the following reasons: the drugs were administered with a focus on symptom control; a hastened death was highly unlikely; or the act was taken in accordance with the patient’s previous wishes”.

That doesn’t say that there are not some cases of hastening of death without explicit request. In Belgium, in 2013, these amounted to 1.7% of the survey sample (6,188 patients), not 33% as stated by Richmond. The figures also represent a significant decrease from those before legalisation occurred, so it can hardly be argued that it is a result of legalisation of PAD. Hastening of death without explicit...
consent also happens in New Zealand of course—and occurs in approximately 4–5% of patients treated in end-of-life situations by New Zealand GPs. This is done by compassionate doctors, although the practice is strictly illegal and not reported. Belgium has been an admirable example of a country where what actually happens is reported and should be respected for that.

It would be to the advantage of New Zealanders if David Richmond would stop scaremongering and trying to frighten politicians, medical practitioners and the public with poorly evidenced statements.

Competing interests: Nil
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The economic burden of colorectal cancer in New Zealand

John P Dunn

Sheerin et al (NZMJ 30 January 2015, Vol 128 No 1408) are to be congratulated on attempting to quantify the economic burden of colorectal cancer in New Zealand. They freely acknowledge that their study is based on many imperfect assumptions. Nevertheless their somewhat conservative estimate would see the approximate annual cost of this condition rise from $80m to $100m over the next decade. One can easily imagine multiple other costs such as invention of new chemotherapeutic agents with Herceptin-like expense and the rapid rise of liver surgery for colorectal metastases.

The bigger question, both economic and existential, is the cost of a life. Most bowel cancer presents as stage 3 or stage 4. The stunning results of the Waitemata bowel cancer screening pilot has reversed this with most detected cancers being stage 1 and stage 2, quite apart from the significant numbers of large, dangerous pre-malignant polyps removed. My own unscientific guess is that this pilot has saved between 100 and 200 lives in its first year.

There is no doubt that young lives are valued more than old lives which is why most cancer screening stops by age 75 years. However old people are where the cancers are. A fit, golf-playing self-employed 78 year old seems deserving of this screening. In terms of colorectal cancer follow up, a metachronous tumour developing in an elderly patient is a disaster.

Interestingly colorectal cancer incidence has recently dipped slightly. There could be many reasons for this. However de facto colonoscopic colorectal cancer screening has been carried out for decades and hopefully the large number of polyps removed annually plays a significant part. This is hard to prove.

The challenge for health economists and epidemiologists is now to rate the dollar value of trying to prevent colorectal cancer as opposed to getting it, treating it and dying from it (the eventual fate of half the 3,000 new annual presentations).

Yours sincerely,
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Oseltamivir treatment for influenza in adults

Oseltamivir (Tamiflu), a neuraminidase inhibitor, has been used for many years in the prophylaxis and treatment of influenza. However, doubts of its efficacy in the treatment of influenza persists. This meta-analysis reviews the topic.

Data from 9 placebo-controlled trials involving more than 4,000 patients have been included. The primary outcome was time to alleviation of all symptoms. The researchers noted a 21% shorter time to alleviation of all symptoms for oseltamivir versus placebo recipients. The median times to alleviation were 97.5 hours for oseltamivir and 122.7 hours for placebo. They also report fewer lower respiratory tract complications requiring antibiotics more than 48 hours after randomisation and also fewer admittances to hospital for any cause in the treated group. The treatment group had an increased risk of nausea (RR 1.60) and vomiting (RR 2.43).

The conclusions were that oseltamivir in adults with influenza accelerates time to clinical symptom alleviation, reduces risk of lower respiratory tract complications, and admittance to hospital, but increases the occurrence of nausea and vomiting.

Lancet 2015; 385: 1729-37

Antibiotic treatment strategies for community-acquired pneumonia in adults

Community-acquired pneumonia (CAP) is a leading cause of hospitalisation and death worldwide. The questions raised in this paper from Holland concerns the choice of antibiotics for CAP patients admitted to non-intensive care hospital wards.

The researchers compared strategies of empirical treatment (allowing deviations for medical reasons) with beta-lactam monotherapy, beta-lactam-macrolide combination therapy or fluoroquinolone monotherapy. 2,283 patients aged 18 years or older (median age of 70 years) were randomised to the three treatments. The primary outcome was mortality at 90 days.

The median length of hospital stay was 6 days for all strategies. And the overall conclusion of the study was that treatment with beta-lactam monotherapy was noninferior to strategies with a beta-lactam-macrolide combination or fluoroquinolone monotherapy with regard to 90-day mortality.

Amoxicillin, amoxicillin plus clavulanate or a third-generation cephalosporin were the preferred beta-lactams. Penicillin was not allowed as beta-lactam monotherapy.

N Eng J Med 2015; 372;1312-23

Impact of anaemia on mortality in elderly patients with acute coronary syndromes

In this study, anaemia was defined as haemoglobin <130 g/L in men, and <120 g/L in women. Over 2,000 patients with the acute coronary syndrome were involved. 18.6% of them were aged 75 years or older. Anaemia was significantly more common in the elderly.

Anaemia independently predicted overall mortality, cardiac mortality and non-cardiac mortality in the whole cohort. However, the conclusions reached were that “the impact of anaemia on cause specific of mortality seem to be different according to age subgroup. The association between anaemia and mortality was not observed in elderly patients from our series.”

Heart, Lung and Circulation (2015) 24, 557-565

URL:
The abuse and use of hospitals

Closely related to this question of payment for work done is the fact that there is a growing tendency among the people of the Dominion to take the advantage of hospital treatment. In 1912-13, 25.8 per 1000 of the population were treated in hospitals; in 1903-4 the proportion was 18.21; the average number of beds occupied varied in the same years from 1.49 to 2.04 of the population. No medical man can fail to see that in most respects, sick people are more advantageously treated in a hospital than in a private house. The observations, on which exact diagnosis is based, are better made by nurses and others, who can report as to variations in pulse, temperature, secretions, etc., in a way often impossible in private homes. Treatment can also be much more effectively given in nearly all cases, and the burden upon a home, a lodging-house, or an hotel of sick nursing is relieved. The conditions of life in a well equipped hospital—the cleanliness, quiet and order are much superior as a rule to anything which even the wealthy can procure.

That under present regulations there is an enormous abuse of the public hospital system is undoubted. Many people constantly throw their burdens on the public who can pay quite easily wholly or in part for the help they need. But we have this difficulty to face, that while the people at large are yearly gaining more confidence in the hospitals and recognising the superiority of treatment there to the treatment they can get at home, there are no means of getting that treatment except either by going to a public institution or paying the fees of a private nursing home as well as the fees for medical attendance. It is not wonderful that when the cost of medical attendance is nothing, the very moderate fees of most of our private nursing homes do not enable them to compete with State endowed institutions.
How, then, can our hospitals be legitimately used to their full extent and not abused? It is surely not beyond the art of man to devise the means. It is certain that no one inside or outside the medical profession wants to place any obstacles in the way of the poor getting the best possible medical treatment when they are ill. But if there is going to be, as seems likely, a continuous extension of hospital privileges to all classes, then the State will be bound to face an enormously increased expenditure (this has already risen for all hospital and charitable aids, from 5s. 10¾d. per head of population in 1902-3 to 9s. 6¾d. in 1912-13) or steps must be taken to make those who use the hospitals pay for the help they get; if they are in a position to do so. It would be much easier to get such payment if hospital boards were to provide some accommodation, similar to that in St. Thomas’ Hospital in London, for private patients who could there get all the advantages of hospital treatment by their own doctors, if they preferred it.

I do not think this would interfere with private hospitals. As the hospital habit grows more people would prefer to go to hospitals and a well managed private hospital would always be able to hold its own, so long as there are to be found people who prefer to pay more money for the sake of travelling first-class rather than second.

In one especial respect the private and public hospitals have done good social service—that is by providing for women during their confinement. We have heard at this meeting an account of the disabilities which face a prospective mother, and we all have known of many cases where domestic servants have deliberately and sometimes maliciously left a household to shift for itself when a child has been born or expected. On the side of the servant it may be said that, while to the father and the mother the coming of child is of transcendent importance, to her it means only additional work and worry. She has probably seen in her own home her mother pass through the same ordeal with little help. She knows that there will be late and early work, probably an autocratic nurse to be attended to and a still more autocratic baby.

The cure for this social difficulty is, I think, the use of the private or public nursing home. At first there was a strong prejudice against these places, but year by year they are becoming more popular. The ordinary domestic economy is less disturbed by the mother leaving her home for two or three weeks, than by the train of events which necessarily accompany a confinement in her own home.