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Net-based information on varicose vein treatments: a tangled web
Thida Ching, Justin A Roake, David R Lewis

Varicose veins are a very common health problem. Individuals with varicose veins may use the Internet to obtain information regarding treatment options. The worldwide web (www) is unregulated and not all of the information available on New Zealand-based websites is reliable however.

Development of the Rural Immersion Programme for 5th-year medical students at the University Of Otago
Patrick Farry, John Adams, Lucie Walters, Paul Worley, Susan Dovey

Medical education is evolving from discipline and hospital-based teaching to using more integrated, community-based teaching. The Rural Immersion Programme (RMIP) aims to immerse 5th-year University of Otago medical students in an integrated, patient-centred, community-based, parallel learning environment where learners’ experiences in primary, secondary, and tertiary settings are always based on patient care. Government funding for the RMIP pilot was granted in November 2006 and the first 6 students started in the programme in 2007. Experiences of the programme from 2007–2009 are reported. The RMIP remains true to the principles underpinning its establishment and has to date delivered successful medical education outcomes for the first 18 students of 2007 and 2008.

Completing an intercalated research degree during medical undergraduate training: barriers, benefits and postgraduate career profiles
Serena J K Park, Mary M S Liang, Trevor Sherwin, Charles N J McGhee

During the course of their studies, medical students worldwide are offered the opportunity to defer medical studies for 1 year to complete a research degree option in order to foster a career long interest in research and evidence-based medicine. We surveyed the past graduates of the University of Auckland Medical School who had chosen to complete the research year, to discover their attitudes towards benefits and barriers of the research option and to follow their career profiles since graduating. Among 50 graduates who met the inclusion criteria, 30 (60%) completed the survey. Eighty percent of respondents encountered some problems during the research year, with the most common being loss of contact with friends in the medical course. The satisfaction associated with the research year was generally high, with 90% saying ‘it was a worthwhile endeavour.’ However, many were reluctant to do the intercalated degree again if given time over as a medical student in the current environment. The aim of providing the research option, to prolong a research interest among medical graduates, was met with 90% of the graduates being involved in research since graduation and 33% had completed a higher research degree, such as MD or PhD.
Medical students’ attitudes towards research and a career in research: an Auckland, New Zealand study
Serena J K Park, Charles N J McGhee, Trevor Sherwin

The New Zealand medical students sampled reported a significant interest in research, with a majority of the students planning to participate in extracurricular activities during medical school, and many hoping to be involved in research throughout their medical careers. However, only a small number of students were interested in pursuing research through an intercalated undergraduate degree option. Ultimately, the opportunity for research was deemed to be a less important consideration when choosing a specialty, compared to lifestyle and earning potential.
The New Zealand Medical Journal, Thomson Reuters ISI, and the impact factor

Frank A Frizelle

In this issue of the Journal a letter from Broad and Connolly\(^1\) correctly point out that “until the [New Zealand Medical] Journal went electronic, it was rated by Journal Citation Reports (JCR) with the journal impact factor mostly within the range 0.6 to 0.7.\(^2\) Immediately after the print edition ceased, citations to NZ Med J (NZMJ) in the Science Citations Index fell noticeably.”

In fact they stopped altogether. The reasons relate to the difficulties that have arisen trying to get the organisation that undertakes citation indexing—Thomson Reuters Institute for Scientific Information (ISI)—to replace the NZMJ print version with the NZMJ electronic version in their indexing calculations.

In 2002 the New Zealand Medical Association (NZMA) decided—for sound financial reasons—that the costs of producing the NZMJ needed to be reduced substantially. As a result, the NZMJ was changed to an electronic format. This reduced the production costs considerably and made its publication sustainable. There were many reasons why this happened at this time, including substantial and increased production and distribution costs, and the reduction in advertising revenue due to the impact of PHARMAC (reducing the need to advertise pharmaceuticals to doctors).

The issue at the time was whether to cease production of the NZMJ completely or turn to a different medium. As a solution to this problem, the electronic version was started in mid-2002 when I took over as editor for the first issue of the electronic or online (Internet-based) NZMJ.

Now with 8 years behind it the online NZMJ has become well established, attracting a large number of quality submissions both from within New Zealand and overseas. In general we accept between 13–15% of submitted articles. The Journal is published 20 times per year with a particular focus on New Zealand-based research relevant to the New Zealand medical environment.

The online NZMJ has no impact factor however, although we are listed in PubMed and other online tracking sources as outlined in the letter by Broad and Connolly.\(^1\) Many readers will know what an impact factor of a journal is, however for those of you who don’t, impact factor is a product of Thomson Reuters ISI (Institute for Scientific Information). Thomson Reuters ISI generate impact factor and provide it for a fee to people who want to know a journal’s value.

A journal’s impact factor is a measure of the frequency with which the “average article” in a journal has been cited in a given period of time. The impact factor for a journal is calculated based on a 3-year period, and can be considered to be the average number of times published papers are cited up to 2 years after publication.
For example, the impact factor 2010 for a journal would be calculated as follows:

- A = the number of times articles published in 2008–9 were cited in indexed journals during 2010.
- B = the number of articles, reviews, proceedings or notes published in 2008–2009.
- Impact factor 2010 = A/B.

(Note that the impact factor 2009 will be actually published in 2010, because it could not be calculated until all of the 2009 publications had been received. Similarly, impact factor 2010 will be published in 2011).

The importance of an impact factor—besides editors saying “my impact factor is bigger than yours”—relates to how researchers (and their funders) view publication in high-impact journals as an indicator of quality research.

Publishing in high-impact journals is considered the thing to do, especially seeing it has a significant influence on performance-based research funding (PBRF) in university departments as well as in staff promotion rounds and the ability to attract external research funding.

However there are many detractors of the impact factor, particularly how it is altered by the influence of high-impact journals altering numerator/denominator ratios by having regular discussions with Thomson-Reuters ISI to find out how to enhance these. Also there are others who wonder about the relevance of all this to what should be published in the first place—i.e. what is the goal of publishing certain articles, is it to educate/inform the clinician or is it for referencing by researchers? These issues aside, there is a demand for the impact factor and Thomson Reuters ISI provides this service at a cost.

The NZMA were keen to maintain an impact factor so they informed Thomson Reuters ISI in 2002 that the Journal was changing to an electronic mode and that the ISSN number would change. For a couple of years the NZMJ impact was published using only the print copy data (as described above, changes to the impact factor take a couple years to work through).

Over this period it was initially thought from the correspondence with Thomson Reuters ISI that the impact factor would follow the electronic journal over time. However this was not the case. Instead Thomson Reuters ISI just dropped the online NZMJ. This started what has been an ongoing discussion (and meeting with) Thomson Reuters ISI staff about what was required to reinstate an impact factor.

Initially we were told they did not have the tools to deal with an electronic journal (remember this was 2003/4) however then some major journals (e.g. BMJ and NEJM) decided that their publication or record would be the electronic copy and Thomson Reuters ISI adjusted to their requests.

Then we had further discussions whereby they wanted page numbers (reflecting an article PDF’s position in the full contents PDF) and each individual article having unique URL addresses/identifiers (we were already doing the latter). Therefore we reformatted the Journal to meet their requirements, however we have been unable to engage them in any meaningful progress despite repeated attempts.
Despite occasionally receiving some positive comments via email from Thomson Reuters ISI at no point have we made real progress. At one point, Thomson Reuters ISI agreed to generate an impact factor based solely on citations in other journals as they said they couldn’t do internal citations (citations from other NZMJ articles), however the following year further attempts to progress failed. So in reality the online NZMJ, which is now 8 years old, has never had an impact factor.

I would very much like Thomson Reuters ISI to generate a correct impact factor for the NZMJ and will continue to try to make this happen, however to date I have been unsuccessful. The NZMJ is still available on PubMed and other electronic publication tracking mediums, and we continue to receive plenty of good submissions.

Whatever impact we are making we are not able to assess it using the formula of Thomson Reuters ISI.

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**Acknowledgement:** I thank Brennan Edwardes (Production Editor at NZMJ) for copyediting this editorial.

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**References:**


Net-based information on varicose vein treatments: a tangled web

Thida Ching, Justin A Roake, David R Lewis

Abstract

Aims 30–40% of individuals will be affected by varicose veins during their lifetime. Many will contemplate treatment and will access the (Inter)net for information. The aim of this study is to determine whether New Zealand-based websites are an accurate source of information for the public.

Methods Inclusion criteria were New Zealand based websites that contained information on varicose vein treatments. These websites were identified using the search-engines Google and Yahoo. The first 60 websites from each were evaluated and subdivided into 4 groups based on web-site ownership: (1) Vein clinic/hospital; (2) Appearance medicine; (3) Online stores; (4) Health editorials; and (5) Medical resources.

Results 46 of the 120 websites satisfied the inclusion criteria. 18 websites (39%) explained what varicose veins were. Information about treatment options was most comprehensive in the “Vein clinic/hospital” group. The “Appearance medicine” group mostly contained information on outpatient interventional therapies. “Health editorial” sites had lifestyle modification options. All the online herbal/health stores mentioned herbal treatment options.

Conclusion Few websites fully informed patients about treatment options while some simply advertised non-evidence based treatments. This study suggests that the Internet is not a reliable source of information and does not accurately inform patients about varicose veins and the treatment options.

The Internet offers a wealth of information and misinformation about health and disease. Once diagnosed with a disorder, many patients will consult the Internet for knowledge and advice about treatment options.1

Varicose veins affect 30–40% of individuals at some point in their lives.2,3 A proportion of patients seek treatment for aesthetic reasons while a substantial group of patients seek treatment for non-cosmetic reasons. These include; symptomatic relief, treatment of complications or concerns about the perceived health risks of varicose veins.3

Symptoms of varicose veins may include: aching, itching, fatigue and swelling. Complications of varicose veins include superficial thrombophlebitis, skin changes of chronic venous insufficiency and venous ulceration.3,4

A substantial group of asymptomatic patients seek treatment for the perceived risks if varicose veins are left untreated. These fears include the risk of bleeding, ulcers and deep vein thrombosis. The fears are frequently unwarranted and the most appropriate management of these patients is often reassurance.3
Currently there are an expanding number of treatment options available to patients with varicose veins.\(^3\)\(^-\)\(^5\) To make an informed decision regarding varicose vein treatment, patients need to be informed about suitable treatment options.

Information regarding the treatment of varicose veins on the internet will come from websites from many different countries. New Zealand-based patients will probably seek treatment in New Zealand and may search New Zealand-based websites to find out what treatment options are available locally.

The aim of the study was to determine whether New Zealand-based websites are an accurate source of information for New Zealand patients contemplating varicose vein treatment.

**Methods**

_Study design_—Using two different Internet search-engines (Google and Yahoo), an Internet search of the term “varicose veins”, limited to New Zealand-based websites was conducted on 11 February 2009.

The Google search was conducted at 8pm and yielded 12,700 hits, while the Yahoo search was conducted at 8:20pm and yielded 86,000 hits.

The first 60 websites on the Google search were recorded before the same search was performed with Yahoo. The first 60 hits on Yahoo were also recorded before the websites were evaluated. For the purposes of this study varicose veins were defined as dilated, palpable, veins of the superficial venous system in the lower limbs.

_Inclusion criteria_—New Zealand based websites with information on varicose vein treatments.

_Exclusion criteria_—Redirecting portals to non-NZ based sites or repeats of websites already evaluated were excluded. Discussion boards and directory sites were also excluded.

Website content was assessed on the following:

- Explanation of pathophysiology of varicose veins in terms of valvular incompetence.
- Explanation of treatment options.
- Website ownership was recorded and subdivided into groups.

**Results**

Of the 120 search-hits, 46 websites met the inclusion criteria and were explored. The websites were classified into 5 distinct website ownership groups as follows:

1. “Vein clinic/hospital” contained websites from vein clinics and private hospitals;
2. “Appearance medicine” contained websites from appearance medicine clinics;
3. “Online stores” contained websites from online herbal/health stores;
4. “Health editorial” were editorials on health and disease; and
5. “Medical resources” were websites aimed at health professionals (i.e. clinical guidelines and journal articles).

Of the 4 groups, the “Online stores” group and the “Appearance medicine” group had the lowest percentages of websites that explained varicose vein disease (25% and 27.3% respectively).

44.4% of medical resources websites, 55.5% of vein clinics and 60% of health editorials explained that varicose veins were results of valvular incompetence.
The “Vein clinic/hospital” group was the most comprehensive of all the ownership groups. 77% of these websites mentioned at least one form of sclerotherapy, 88.9% mentioned a catheter access procedure for ablation of varicose veins [endovascular laser ablation (EVLT) or radiofrequency occlusion therapy (VNUS closure)], 33.3% mentioned ambulatory phlebectomy, 22.2% mentioned transluminated powered phlebectomy and 88.9% mentioned various vein surgery (Table 1).

Table 1. Website ownership and content of treatment options

<table>
<thead>
<tr>
<th>Variables</th>
<th>Vein Clinic/hospital</th>
<th>Appearance medicine</th>
<th>Health editorials</th>
<th>Medical resources</th>
<th>Online stores</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of websites</td>
<td>9</td>
<td>11</td>
<td>5</td>
<td>9</td>
<td>12</td>
<td>46</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>3 (60%)</td>
<td>2 (22%)</td>
<td>2 (16.7%)</td>
<td>7 (15.2%)</td>
</tr>
<tr>
<td>Compression stockings</td>
<td>7 (77.7%)</td>
<td>1 (9%)</td>
<td>3 (60%)</td>
<td>5 (55.5%)</td>
<td>3 (25%)</td>
<td>19 (41.3%)</td>
</tr>
<tr>
<td>Sclerotherapy</td>
<td>1 (11.1%)</td>
<td>0 (0%)</td>
<td>2 (40%)</td>
<td>1 (11%)</td>
<td>3 (25%)</td>
<td>7 (15.2%)</td>
</tr>
<tr>
<td>Sclerotherapy with/without ultrasound</td>
<td>5 (55.5%)</td>
<td>4 (36.4%)</td>
<td>1 (20%)</td>
<td>4 (44%)</td>
<td>0 (0%)</td>
<td>14 (30.4%)</td>
</tr>
<tr>
<td>Ultrasound guided sclerotherapy (USGS)</td>
<td>1 (11.1%)</td>
<td>4 (36.4%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (8.3%)</td>
<td>6 (13.0%)</td>
</tr>
<tr>
<td>Endovenous laser ablation (EVLT)</td>
<td>7 (77.7%)</td>
<td>6 (54.5%)</td>
<td>1 (20%)</td>
<td>2 (22%)</td>
<td>1 (8.3%)</td>
<td>17 (37.0%)</td>
</tr>
<tr>
<td>VNUS closure/Radiofrequency occlusion therapy</td>
<td>1 (11%)</td>
<td>1 (9%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (8.3%)</td>
<td>4 (8.7%)</td>
</tr>
<tr>
<td>Ambulatory phlebectomy/mini-stab avulsion</td>
<td>3 (33.3%)</td>
<td>1 (9%)</td>
<td>0 (0%)</td>
<td>3 (33.3%)</td>
<td>1 (8.3%)</td>
<td>8 (17.4%)</td>
</tr>
<tr>
<td>Transluminated powered phlebectomy</td>
<td>2 (22.2%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (11%)</td>
<td>0 (0%)</td>
<td>3 (6.5%)</td>
</tr>
<tr>
<td>Vein surgery</td>
<td>6 (66.6%)</td>
<td>2 (18.1%)</td>
<td>2 (40%)</td>
<td>2 (22%)</td>
<td>1 (8.3%)</td>
<td>11 (23.9%)</td>
</tr>
<tr>
<td>Ligation and stripping</td>
<td>2 (22.2%)</td>
<td>0 (0%)</td>
<td>1 (20%)</td>
<td>5 (55.5%)</td>
<td>1 (8.3%)</td>
<td>9 (19.6%)</td>
</tr>
<tr>
<td>Herbal supplementation (Table 2)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>12 (100%)</td>
<td>12 (26.1%)</td>
</tr>
</tbody>
</table>

The “Appearance medicine” group mainly had information on interventional therapies that could be done in an outpatient setting. 72.7% of these websites offered sclerotherapy with ultrasound guidance as an option “for deeper veins”, or as an adjunct to sclerotherapy treatments.

Health editorial and the medical resources ownership groups had similar coverage regarding the treatment range. Health editorial was the group that had the highest reporting of lifestyle modifications for the treatment of varicose veins.

Over half of the websites in these groups mentioned compression stockings and sclerotherapy (with or without ultrasound guidance). See Table 1.
All the online herbal/health stores mentioned herbal treatment options (Table 2) and some referred to other (more conventional) treatment options for varicose veins. No other website ownership groups stated herbal treatments as an option for varicose vein therapy.

Of the herbal treatments mentioned, horse chestnut seed extract (witch chestnut extract/HCSE) was the treatment most often promoted (83% on herbal online websites). Bioflavonoids were promoted by 50% of the online websites.

Table 2. Herbal treatments offered by online herbal stores

<table>
<thead>
<tr>
<th>Herbal treatments</th>
<th>No. of websites (total = 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse chestnut seed extract</td>
<td>10</td>
</tr>
<tr>
<td>Flavonoids/bioflavonoids</td>
<td>6</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>4</td>
</tr>
<tr>
<td>Calenulu cream</td>
<td>3</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>3</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>3</td>
</tr>
<tr>
<td>Butcher’s broom</td>
<td>2</td>
</tr>
<tr>
<td>Gotu kola</td>
<td>2</td>
</tr>
<tr>
<td>Good health leg zone</td>
<td>1</td>
</tr>
<tr>
<td>Grape seed</td>
<td>1</td>
</tr>
<tr>
<td>Herbal mixture</td>
<td>1</td>
</tr>
<tr>
<td>Hormone replacement</td>
<td>1</td>
</tr>
<tr>
<td>Hydroxyethylrutoside</td>
<td>1</td>
</tr>
<tr>
<td>Rutin</td>
<td>1</td>
</tr>
<tr>
<td>Vein and Skin tonic</td>
<td>1</td>
</tr>
</tbody>
</table>

One website mentioned the potential harm and benefits of compression stocking. However, the website focused mainly on the potential harm of compression stockings. The website went on to compare compression stocking to other treatment options and rated interventional therapy to be greatly superior.

Discussion

The Internet offers an overabundance of unregulated information and misinformation. The results of the study reflect this and the unregulated provision of varicose vein treatments in New Zealand. There has been no previous research about New Zealand-based websites on varicose veins but there are 3 published reports about internet-based information on varicose veins.6–8 These studies were from other countries but the findings were similar to our own.

Some websites adequately informed patients about treatment options while others simply advertised non-evidence based treatments. The coverage of treatment modalities was most comprehensive and least comprehensive in the “Vein clinic/hospital” group and “Online” group respectively. Of the herbal treatment covered by online store websites, horse chestnut seed extract was promoted the most.

Current evidence suggests that appropriate compression stockings can be effectively used to treat the symptoms of varicose veins in selected patients. For many individuals with varicose veins, treatment with lifestyle modification, compression
stockings and reassurance may be sufficient.\textsuperscript{9} This was frequently not reflected in the content of the websites evaluated. Less than 15\% of websites commented on lifestyle modification and only 41\% mentioned compression stockings as treatment option.

There are some limitations to our study. The number of websites evaluated was only 120 websites of the 98,700 identified sites using Google and Yahoo. However, for practical reasons we do not consider this to be a major limitation, since most patients would be more likely to visit the websites that appeared at the start of the search list.

The second limitation was that the authors did not attempt to quantify the educational value of each website. Previous studies have used numerical scoring systems, however these scoring systems were highly subjective.\textsuperscript{6, 7}

A European study used 4 internet search engines to identify a sample of 41 internet documents on varicose veins. A weighed scoring system was used to evaluate the educational quality of each document based on: disease summary; treatment options; and complications.

This study suggested that information given by non-profit organisations were more reliable than information from private medical groups.\textsuperscript{3} A more recent study found that over half of the websites failed to mention the main treatment options while most websites failed to mention potential complications of treatment.\textsuperscript{8}

Sclerotherapy is an established treatment option for varicose veins in carefully selected patients.\textsuperscript{3–5,9} It has been suggested that treatment outcome is significantly improved by using ultrasound guidance.\textsuperscript{3–5,9} Despite this published evidence, many websites offer sclerotherapy without ultrasound guidance. Others websites mentioned ultrasound guidance for “deeper veins” while a minority (5 websites) offered ultrasound guidance for all sclerotherapy procedures.

Endovenous laser treatment (EVLT) and radiofrequency ablation (VNUS) are effective catheter procedures for the treatment of varicose veins. EVLT has good evidence of medium-term success in vein closure. The reported recurrence rate is less than 7\% at 2-year follow-up.\textsuperscript{5,10} VNUS uses high frequency alternating current to obliterate varicose veins. This procedure may have fewer side effects than other endovenous ablation techniques and has a 5-year outcome comparable to conventional surgery.\textsuperscript{10,11}

The current evidence does not favour the use of transluminal powered phlebectomy to treat varicose veins.\textsuperscript{12} Although the published data suggests that this expensive treatment is no better than conventional phlebectomy some websites still contained this treatment option.

Horsechestnut seed extract (HCSE) is herbal supplement that was promoted the most in the “Online” group. HCSE can be taken orally to treat varicose veins and venous ulcers.\textsuperscript{13} There are claims that horsechestnut seed extract can be used as an alternative to compression stockings.

A meta-analysis using both randomized controlled trials (RCTs) and large-scale observational studies showed that HCSE was effective and safe at treating the symptoms of varicose veins. There is no evidence that HCSE significantly improves the healing of venous ulcers.\textsuperscript{14}
The sample of websites in this study did not adequately educate patients about the treatment of varicose veins in a clear and concise manner. Information on the internet was often confusing with numerous names for similar procedure. Overall our study has found that with regard to New Zealand websites the internet is not a reliable source of information and does not fully inform patients about varicose veins and all the treatment options.

Although the internet is unregulated, we believe health professionals who publish on the internet are bound by the same ethical considerations as when they advise patients face to face. New Zealand patients have a right to be informed about the full range of treatment options available to them.15

Competing interests: None.

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Reference:
12. Lack of evidence for transluminated powered phlectomy.  


Development of the Rural Immersion Programme for 5th-year medical students at the University of Otago

Patrick Farry, John Adams, Lucie Walters, Paul Worley, Susan Dovey

Abstract

Aims To report the development of the first Rural Medical Immersion Programme (RMIP) of the University of Otago in New Zealand.

Method We review medical education trends and challenges for educating New Zealand’s doctors and recruiting them to careers in rural practice. We describe key features of the RMIP developed in response to these challenges.

Results Medical education is evolving from discipline and hospital-based teaching to using more integrated, community-based teaching. The RMIP aims to immerse 5th-year medical students in an integrated, patient-centred, community-based, parallel learning environment where learners’ experiences in primary, secondary, and tertiary settings are always based on patient care. Government funding for the RMIP pilot was granted in November 2006 and the first 6 students started in the programme in 2007. Experiences of the programme from 2007–2009 are reported.

Conclusion The RMIP remains true to the principles underpinning its establishment and has to date delivered successful medical education outcomes for the first 18 students of the 2007 and 2008 cohorts. We cannot yet assess its role in future recruitment to rural medical careers.

By the turn of the 21st Century, specialist disciplinary-based styles of medical education that had developed in response to the Flexner Report of 1910 were intolerably stretched. This was largely due to much shorter patient stays in highly technical and expensive tertiary hospitals limiting students’ clinical exposure to patients.

Increasing sub-specialisation in an educational environment aiming to produce generalist graduates also skewed students’ understanding of the healthcare needs of their communities. Community expectations of a patient-centred health system made explicit in policy could be taught in the abstract but were not well modelled to students.

Community-based education is increasingly being used internationally to correct the mismatch between 20th Century educational models and the needs of 21st Century communities.

A further consideration is that there is a shortage of medical doctors in many countries. Currently, New Zealand is still reliant on overseas medical graduates for providing healthcare, especially in rural settings.

Like other countries, recent health workforce policy has changed to allow increased medical school intakes. Although this will address the shortage of New Zealand doctors, generally, further initiatives were required to address the shortage of New
Zealand graduates choosing rural practice. These initiatives have included the Rural Origin Medical Preferential Entry (ROMPE) scheme and the development of extended exposure to rural medicine during training.

In 2001, the Dunedin School of Medicine established a 7-week rotation in Rural Health. All Dunedin 5th-year medical students were attached to a variety of rural medical practitioners, in both general practice and rural hospitals. This programme built a cadre of capable and enthusiastic rural medical teachers and became one of the preferred 5th-year attachments, being described by students as one of the best learning experiences during medical training.10

The South Australian Flinders Medical School’s Parallel Rural Community Curriculum11 had demonstrated effective academic outcomes and sustainability over 10 years.12,13 The success of the Rural Rotation programme, combined with the reported success of the Flinders programme led to the initiation of an extended rural medical curriculum by the University of Otago Faculty of Medicine, now known as the Rural Medical Immersion Programme (RMIP).

The model of a single faculty-wide programme is new to the University of Otago’s Faculty of Medicine. Historically, although overall objectives have been aligned, delivery of the curriculum has been managed differently in each of the university’s four constituent medical schools—the Otago School of Medical Sciences (basic sciences), and three Advanced Learning in Medicine (ALM) schools for the advanced phase of clinical learning.

The RMIP now operates across the three ALM schools in Dunedin, Christchurch and Wellington, drawing similar numbers of students from each school. There have been both challenges and advantages in this departure from previous educational structures for the small RMIP subset of all Otago University 5th-year medical students. The Rural Rotation programme still operates for all other Dunedin School of Medicine 5th year students.

**The Rural Medical Immersion Programme (RMIP)**

The overall goal of the RMIP was to deliver a nationally innovative, patient-centred medical curriculum located in rural New Zealand communities, where opportunities for authentic learning would be maximised. The programme had to be educationally sound and deliver parallel learning opportunities over a one-year long immersion experience.

The RMIP aimed to:

- Use real-life experiential learning in primary, secondary and tertiary care settings, based on continuity of patient care over time, across all settings;
- Ensure high-quality inter-disciplinary learning of the 5th-year curriculum based in rural teaching centres; and
- Broaden clinical learning opportunities for students beyond those available to students in tertiary teaching hospitals by using a large range of community-based patient presentations and follow-up.
Achieving these aims was expected to have several long-term benefits to both medical education and New Zealand health care services. These benefits were expected to include: enhanced links between rural general practice, rural hospitals and urban tertiary teaching hospitals; enhanced development of distance education technologies in undergraduate medical education; realisation of rural medical career opportunities; and encourage both recruitment and retention of rural doctors.

The 1st year

A pilot year RMIP was carried out in 2007 with funding from the Minister of Health’s discretionary budget. Six students from the Dunedin and Christchurch Schools of Medicine studied their 5th-year curriculum at two rural teaching centres in the South Island, Westland (Greymouth and South Westland) and Southland (Queenstown). There were three students at each site. They completed their first 7-week attachment in Dunedin to study public health and have an introduction to the RMIP before moving to their rural teaching centres.

At the end of the first pilot year the RMIP was evaluated by the two authors who had initiated a similar programme in Australia (PW and LW). They reported that “the RMIP has been an outstanding success … the commitment of academic staff and clinicians and the enthusiasm and flexibility of the volunteer students have ensured a very positive outcome for all involved”.

The 2nd year

In 2008 funding for the programme was provided by the University of Otago Faculty of Medicine. There were 12 students—4 from each of the 3 Otago University clinical schools. Two additional teaching centres were established at Tararua (Dannevirke/Pahiatua) in the North Island, and Clutha (Balclutha/Lawrence/Milton) in the South. Three students studied at each teaching centre for the entire academic year, apart from a 1-week residential three times during the year—once at each of the clinical schools in Dunedin, Christchurch, and Wellington. Residential teaching sessions involved all 12 students.

The 3rd year

In 2009 the programme became fully operational with 20 students. As in previous years, they were drawn equally from all three clinical schools, but with flexibility to draw one or two additional students from any school to meet demand. Two further teaching centres were established in Marlborough (Blenheim/Havelock/Nelson) and the Wairarapa (Masterton/Carterton/Martinborough/Featherston). Residential teaching was as in the second year.

Teaching centres

Each teaching centre has a 0.3 full-time equivalent (FTE) Regional Coordinator and a team of teachers including rural general practitioners, rural hospital doctors, paramedics, local and visiting medical specialists, nurses, midwives, physiotherapists, pharmacists, the Mental Health team, Māori health workers and the Medical Officer of Health.
Regional Coordinators are employed by the Faculty of Medicine, teaching by District Health Board (DHB) employees is supported by a “clinical access” payment to DHBs, and other teachers who are not DHB employees are paid on a sessional basis. In 2010 a professional development coordinator was employed to support RMIP teachers.

By far the majority of teaching and learning happens one-with-one while providing individual patient care. Paediatrics, gynaecology and complicated obstetrics, orthopaedics, emergency medicine, public health, clinical pharmacology, Māori Health, bioethics, pathology and microbiology are taught by either video- or audio-conference or face-to-face at residential workshops.

Subjects covered at residential workshops often reflect the teaching strengths at the different clinical schools and we try to achieve continuity from one residential to the next, with a focus on the students’ self-perceived learning needs. These workshops also allow for important contact between RMIP students and their urban peers. Pastoral care unrelated to the teaching and learning programme has been undertaken by video link by a separate GP based in Dunedin.

The students are provided with subsidised accommodation, travel costs, and a laptop computer with cellular wireless internet access to library and medical databases. Their computers have an electronic logbook in which they record patient conditions that must be seen and skills that must be acquired during the 5th year. Case reports are recorded on a web-based patient-centred case reporter which allows marking at a distance by both a specialist in the topic and an external rural GP academic. There are libraries of textbooks and DVDs in the rural bases, including recorded tutorials from the base medical schools.

During the first 3 years we have developed high bandwidth video-conferencing at all teaching centres with assistance from the New Zealand Mobile Surgical Project. The three or four students at each teaching centre are encouraged to form a study group. Collaborative learning is facilitated by workshops on individual personality types and preferred learning styles, which help students to understand each others’ strengths and differences.

The learning objectives for RMIP students are the same as for students studying the urban-based curriculum of topic-based specialty learning over seven week attachments. The RMIP curriculum uses real-life, experiential “parallel” learning. Parallel learning means that students study core topics in parallel throughout the course of each day: they do not concentrate on a single discipline for an extended time, as in traditional teaching hospital runs.

In parallel learning, a student may attend a patient with chest pain in the morning, a motor vehicle accident in the afternoon, and the birth of a baby in the evening. Students are expected to follow their patients through different phases of management. A patient seen in a rural general practice surgery may be tracked through to the rural or provincial hospital where the student will perform the admission. They also accompany patients who are transferred to tertiary base hospitals.

One-with-one teaching and learning methods are considered by the students to be a major educational strength of the programme. In rural general practice settings, students initially observe consultations between patient and teacher and then teachers
observe students consulting with patients. When both teacher and student feel confident, students see patients alone and present patients’ problems to teachers. In rural hospitals, students work alongside hospital doctors and nurses, admitting and clerking patients, writing referral letters to tertiary centres, and providing patient care.

With midwives, students perform antenatal and postnatal checks, attend births and participate in delivering babies. They may also travel with parents to the base hospital if tertiary obstetric care is required. In all teaching and learning situations the students report feeling very much part of the therapeutic team and they feel that their opinion on patient management is valued by their preceptors (personal communication from student groups).

Assessments

There are four internal RMIP assessments throughout the year. Each assessment includes teachers’ reports (under the headings: knowledge and skills, clinical competence, and professional relationships), 50 multiple choice questions, 6 Objective Structured Clinical Examination (OSCE) stations using locally-trained simulated patients, and a portfolio of core case reports.

Each assessment also includes patient referral and discharge letters written by the students, after-hours on-call logs, video-recorded consultations with patients and video-recorded physical examinations on each other. These results, along with progress noted on the electronic logbook, are discussed with the programme director as soon as possible after each assessment.

On one occasion each year, patient presentations are made by the students at each teaching centre. The presentations are beamed by video link to all Otago University 3rd year medical students in the form of a medical forum, by students, for students.

The 3rd year students complete evaluations of the presentations and these also contribute to the RMIP students’ overall assessment. There are also assignments in public health (including critical appraisal of research), paediatric longitudinal and chronic care case reports, and Māori health.

RMIP students sit the same final examination as urban-based students at the three ALM schools. This examination includes all the clinical subjects of the 4th and 5th years—general medicine, general surgery, anaesthetics and emergency care, women’s and children’s health, musculo-skeletal medicine, primary care and rural health, psychiatry, public health, bioethics, Māori health, pathology and clinical pharmacology.

Discussion

The RMIP is an important innovation in medical education in New Zealand. The 3 years of RMIP experience that we present in this paper have shown that parallel community-based training is not only possible in New Zealand, but also that it delivers an educational experience that ongoing monitoring shows at least equates to traditional teaching models.

Continuing programme evaluation is planned to closely monitor RMIP outputs, including (ultimately) whether it has contributed to solutions to medical workforce problems currently encountered in rural communities.
The main strength of the RMIP is that it is a model of medical education for the future, not the past. It explicitly applies the values expressed in current government policy—patient-centredness, continuity of care, and community responsiveness. It is also educationally efficient in that it models medical education on the medical experiences of people, with most healthcare needs being experienced and met outside hospitals.

The main weaknesses of the RMIP model of medical education are its cost (it is more expensive than the traditional hospital-based model) and capacity constraints in rural communities.

RMIP teaching is authentic because it is based in the real world and undertaken by the whole multi-professional team providing healthcare across all settings. We expect that this programme may be a precursor of future developments that will inevitably unfold over the coming decades.

The next developments are almost certain to be extension into other clinical years and into urban community-based teaching. A potential future challenge is to deliver such a programme to a larger number of students over their entire medical degree course. Australia and Canada have established rural medical schools to do this.

Integration with the education of other health professionals is also along this timeline. Many attempts at inter-professional teaching and learning have in the past had only very limited success. The team approach to clinical patient management is made explicit in the RMIP and this suggests very strongly that inter-professional teaching and learning can be successful in this environment.

The purpose of New Zealand’s medical schools is first to train doctors to meet our own country’s needs. We have fallen well short of achieving this goal in the past, especially for our rural communities. Extended rural clerkships, combined with preferential entry to medical school of students from a rural background have been recognised as effective ways of improving the numbers of doctors going into rural practice and are now adopted. We do not yet know if the RMIP (and other similar programmes) is able to additionally improve the doctor shortage in rural areas.

Alternatives to the evolution of medical education in the ways we predict are that it stays as it is now for most New Zealand medical students, who gain the bulk of their clinical experiences in the settings where least patients receive health care, or it moves backwards even further into the lecture theatre dominated teaching models.

Both these alternatives are associated with less financial burden to universities and the community, but are also less able to deliver the medical graduates our communities need.

**Competing interests:** None.

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Acknowledgements: We gratefully acknowledge the contribution of Ms Michele Wilkie to the development of the RMIP and for providing background material for this paper. We also acknowledge the teachers and students who have worked in and for the RMIP with great dedication, and Pete Hodgson (the then Minister of Health) who provided initial funding for the programme.

In discussion with the other authors, the first author—Dr (Pat)rick Farry—completed the draft of this paper before his death on 9 October 2009. The co-authors have made revisions to the first author’s final draft, reflecting the awareness and respect we have for his invaluable insights into medical education and his contributions to the development of rural medicine in New Zealand.

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http://www.rrh.org.au
Completing an intercalated research degree during medical undergraduate training: barriers, benefits and postgraduate career profiles

Serena J K Park, Mary M S Liang, Trevor Sherwin, Charles N J McGhee

Abstract

Aim To undertake a comprehensive evaluation of the intercalated research degree at the School of Medicine, University of Auckland, New Zealand and to ascertain the career profiles of Auckland medical graduates who completed the intercalated degree programme.

Method A questionnaire was devised and mailed to all Auckland MBChB graduates (1972-2005) who completed an intercalated research degree during the undergraduate medical course.

Results Among 50 graduates who met the inclusion criteria (mean of 1.5 per annum), 30 (60%) completed the questionnaire. An interest in a career in research and academic medicine was the most commonly cited reason for undertaking an intercalated degree. Eighty percent of respondents encountered some problems during the intercalated year, with the most common reported being loss of contact with friends in the medical course. The satisfaction associated with an intercalated degree was generally high, with 90% giving an affirmative response to the statement that ‘it was a worthwhile endeavour.’ However, a majority of respondents were reluctant to do the intercalated degree again if given time over as a medical student in the current environment (33% affirmative versus 43% negative). Only one respondent was in general practice, whereas 73% of the respondents were either consultants or trainees in other specialties. Ninety percent of the respondents had been involved with research since graduation and 33% already possessed a higher research degree, such as MD or PhD.

Conclusions Despite the extremely low uptake rate of the intercalated degree option, the graduates who took the intercalated degree option were generally satisfied with their experience. However, although the majority of respondents reported that the intercalated degree was worthwhile and 90% had also completed further research since graduation, 43% would be reluctant to pursue an intercalated degree in the current environment.

An intercalated research degree in medical science is an option available in most medical schools in the United Kingdom, Australia and New Zealand. Students can elect to defer their medical studies, normally for 1 year, to complete a research project culminating in a thesis or dissertation. The aim of the intercalated research degree is to introduce students to careers in medicine in which investigative work and evidence-based medicine is an important component.
Studies from the UK and Australia have found that medical graduates with an intercalated degree were more likely to enter academic medicine, publish more articles in scientific journals and raise more research grants.1-3

At the University of Auckland, similar intercalated degrees have been on offer since 1972, in both pre-clinical and clinical disciplines. However, it is not a popular option with undergraduate students—at the time of this study, less than two percent of undergraduate students were enrolled in the intercalated degree programme. Anecdotal evidence suggests the take-up rate for the intercalated degree option at Auckland is much lower than that of the University of Otago, the other New Zealand medical school. It is certainly much lower than that of the UK medical schools, with intercalated degree uptake rates ranging from 10 to 30% of medical undergraduates.4,5

In this paper we aimed to undertake a comprehensive evaluation of the intercalated degree programme at the School of Medicine, University of Auckland, including the programme’s benefits (or otherwise), barriers to uptake, and the impacts it had on the graduates’ personal and professional lives. We also aimed to create a ‘snap-shot’ of postgraduate career profiles of the graduates who completed the programme.

Methods
Ethics approval for the study was obtained from the University of Auckland Ethics Committee. All Auckland MBChB graduates (in qualifying classes of 1972-2005) with an intercalated degree were identified from the University records and invited to participate in the study. The intercalated research degrees at Auckland University Medical School have been in existence with different names during this period: Master of Medical Science (1971-1998), Master of Human Biology (1977-1991), Bachelor of Human Biology (Honours) (1999-present). For completeness, graduates who had completed Master of Science and Doctor of Philosophy degrees prior to provisional registration with Medical Council of New Zealand were included.

A wide-ranging questionnaire was constructed by the authors and evaluated by three graduates of the intercalated degree programme as well as one former faculty member. Evaluators were asked to discuss any problems encountered in completing the questionnaire. Issues that were discussed include the length of questionnaire, appropriateness of language used, and inclusion of all reasonable responses. The questionnaire was revised and refined on the basis of this initial feedback.

The final questionnaire contained 42 items, which included tick box replies, 5-point Likert scale-like ranking, open questions for free comments, and was available in both postal (hard copy) and electronic formats. Most New Zealand-based graduates were sent postal questionnaires, whereas electronic copies of the questionnaire were sent to the graduates based overseas and New Zealand-based graduates who requested an electronic copy. Non-responders were contacted via phone and/or email, approximately three months after the initial questionnaire was sent, and were requested to fill out and return the questionnaire if they wished to participate.

Results
A total of 30 replies were received from 50 graduates who completed the intercalated degree programme at the School of Medicine; a response rate of 60%. The demographic information of the respondents is summarised in Table 1. Responses to a number of questions related to introduction, structure and contents of the individual intercalated degree are provided in Table 2.
Table 1. Demographic information of respondents

<table>
<thead>
<tr>
<th>Demographic information</th>
<th>No. of respondents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>25 (83)</td>
</tr>
<tr>
<td>Female</td>
<td>5 (17)</td>
</tr>
<tr>
<td><strong>Year of entry into intercalated degree</strong>*</td>
<td></td>
</tr>
<tr>
<td>1970-1979</td>
<td>5 (17)</td>
</tr>
<tr>
<td>1980-1989</td>
<td>13 (43)</td>
</tr>
<tr>
<td>1990-1999</td>
<td>12 (40)</td>
</tr>
<tr>
<td>2000-2006</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td><strong>Ethnic group</strong>**</td>
<td></td>
</tr>
<tr>
<td>Asian/Indian</td>
<td>5 (17)</td>
</tr>
<tr>
<td>European</td>
<td>22 (73)</td>
</tr>
<tr>
<td>Māori</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>Pacific Peoples</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (3.3)</td>
</tr>
</tbody>
</table>

* Includes respondents with two intercalated degrees.
** Multiple answers were permitted.

Table 2. Responses to questions related to introduction, structure and contents of intercalated degree

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. of respondents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of the intercalated degree awarded</strong>*</td>
<td></td>
</tr>
<tr>
<td>MHB</td>
<td>13 (43)</td>
</tr>
<tr>
<td>MMedSc</td>
<td>10 (33)</td>
</tr>
<tr>
<td>BHB (Hons)</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>PhD</td>
<td>4 (13)</td>
</tr>
<tr>
<td>MSc</td>
<td>3 (10)</td>
</tr>
<tr>
<td><strong>Stage at which intercalated degree undertaken</strong>*</td>
<td></td>
</tr>
<tr>
<td>After 3rd year</td>
<td>23 (74)</td>
</tr>
<tr>
<td>After 4th year</td>
<td>2 (6.5)</td>
</tr>
<tr>
<td>After 5th year</td>
<td>4 (13)</td>
</tr>
<tr>
<td>After 6th year, before intern year</td>
<td>2 (6.5)</td>
</tr>
<tr>
<td><strong>How did you find out about the intercalated degree?</strong></td>
<td></td>
</tr>
<tr>
<td>Formal introduction</td>
<td>14 (47)</td>
</tr>
<tr>
<td>Recommended personally by a lecturer</td>
<td>14 (47)</td>
</tr>
<tr>
<td>Other students who had previously done the programme</td>
<td>3 (10)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (10)</td>
</tr>
<tr>
<td><strong>Nature of research project</strong>*</td>
<td></td>
</tr>
<tr>
<td>Laboratory work</td>
<td>28 (93)</td>
</tr>
<tr>
<td>Clinical work with patient contact</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>Clinical work with no patient contact</td>
<td>2 (6.7)</td>
</tr>
</tbody>
</table>

* Includes respondents with two or more intercalated degrees.
** Multiple answers were permitted.

Evaluation of the intercalated degree programme—The most popular reason for enrolling in the intercalated degree programme was “interest in career in academic medicine/research” (80%), followed by “availability of interesting research project” (40%) and “wanting to study an area in depth” (40%). Only a small minority selected “disillusionment with clinical medicine” (13%) and “helpful for entering a
competitive specialty” (13%) as their reasons for undertaking intercalated degree. Multiple answers were allowed for this question.

Some of the benefits gained from pursuing an intercalated degree as perceived by the graduates included “greater understanding of research methods” (93%), “help in choice of future career and specialty” (50%), “made personal contacts in the area of interest” (37%) and being “able to pursue interest outside of medicine” (30%).

Eighty percent of the respondents encountered some problems during the intercalated year. The most common problem was the “loss of contact with friends in the medical course” (55%), followed by “failure of experiments to produce meaningful results” (29%). Other problems included “financial difficulty,” “poor support from medical school,” “heavy workload,” and “monotony of the repetitive task” (13% each). Again, multiple answers were allowed for this question. The majority (80%) of the graduates were able to produce one or more research publication(s) from their intercalated degree projects.

Table 3 summarises the responses to a set of statements designed to evaluate the impact of intercalated degree on the graduates’ careers as well as personal lives. Overall, graduates with intercalated degrees were generally satisfied with their experience.

The majority agreed or strongly agreed with the statement that it was a “worthwhile endeavour,” whereas 83% were affirmative of the statement that it was a “personally valuable experience.” However, when asked whether they would do the degree again if given choice as a medical student in the current environment, with issues of student loan, only 33% of the respondents gave an affirmative answer.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Affirmative (agree or strongly agree)</th>
<th>Neutral</th>
<th>Negative (disagree or strongly disagree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, doing an intercalated degree was a worthwhile endeavour.</td>
<td>27 (90%)</td>
<td>2 (6.7%)</td>
<td>1 (3.3%)</td>
</tr>
<tr>
<td>Doing an intercalated degree was helpful in furthering my career</td>
<td>18 (60%)</td>
<td>6 (20%)</td>
<td>6 (20%)</td>
</tr>
<tr>
<td>Doing an intercalated degree was a valuable experience for me personally</td>
<td>25 (83%)</td>
<td>5 (17%)</td>
<td>0</td>
</tr>
<tr>
<td>The skills I learned during intercalated year have been helpful during my career as a doctor</td>
<td>22 (73%)</td>
<td>8 (27%)</td>
<td>0</td>
</tr>
<tr>
<td>The prolonged training resulted from doing intercalated degree had negative impacts on my medical career</td>
<td>0</td>
<td>8 (27%)</td>
<td>22 (73%)</td>
</tr>
<tr>
<td>The prolonged training resulted from doing intercalated degree had negative impacts on my personal life outside of medicine.</td>
<td>3 (10%)</td>
<td>6 (20%)</td>
<td>21 (70%)</td>
</tr>
<tr>
<td>The loss of earning resulted from intercalated degree had negative impacts on my financial status</td>
<td>6 (20%)</td>
<td>9 (30%)</td>
<td>15 (50%)</td>
</tr>
<tr>
<td>If given the choice again as a medical student in the current environment (with issues of student loan), I would do the intercalated degree again</td>
<td>10 (33.3%)</td>
<td>7 (23.3%)</td>
<td>13 (43.3%)</td>
</tr>
</tbody>
</table>
Postgraduate career profiles—Table 4 outlines the current positions held by the graduates of the intercalated degree programme. The majority (90%) of graduates had been involved in research following graduation, most frequently motivated by “interest in science and research” (70%) and “intellectual stimulation” (60%). Thirty-three percent of graduates had gained additional higher research degrees such as MD or PhD, and 87% were involved in teaching of medical students and/or other allied health professionals.

Table 4. Current positions of graduates with intercalated degrees

<table>
<thead>
<tr>
<th>Current position held</th>
<th>No. of respondents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General practitioner</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Consultant in other hospital-based specialties</td>
<td>19 (63%)</td>
</tr>
<tr>
<td>Vocational trainee (registrar/fellow)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Pre-vocational junior doctor</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>Full-time research (no clinical responsibilities)</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (10%)</td>
</tr>
</tbody>
</table>

Discussion

To the best of our knowledge, this is the first New Zealand-based study on the subject of intercalated research degrees completed during undergraduate medical school training. It was anticipated that the study might identify aspects of the intercalated degree unique to New Zealand and that the findings might facilitate reassessment of the degree to optimise the opportunities for students to take up such options and receive formal research training in early career.

Our response rate of 60% is comparable to those of similar surveys. However, unlike similar surveys undertaken in Australia and UK, this study is a case-series. This design was employed due to limited funding and time. Hence, although a majority of our respondents had been involved in research and teaching post-graduation, it was not possible to compare their involvement in such activities to those of their counterparts who had not completed an intercalated degree. Also, this study may have been affected by non-response bias—it is certainly possible that those who had chosen to respond to our survey had more positive, or negative, experiences as a consequence of their intercalated degree, compared to those who chose not to respond.

Overall, the intercalated degree programme at Auckland Medical School had been a positive experience for the majority of its graduates. Most students had taken up the degree because of their interest in career in research and academic medicine; very few did it out of disillusionment with clinical medicine or in order to enter a competitive specialty. Accordingly, the programme, at least in part, seemed to have delivered the kind of experience and benefits that most students were seeking—an overwhelming majority of the respondents stated that the programme allowed them to gain a greater understanding of research methods. However, the degree also appears to have equipped the students with skills and insights that helped them throughout their medical careers, regardless of their eventual career paths.
Many respondents enjoyed more tangible benefits such as help in making a choice of career or specialty and making personal contacts in the area of interest, and nearly a third of the respondents appreciated extra time and flexibility of the degree which allowed them to pursue interests outside of medicine. Indeed, 84% of the graduates agreed with the statement that the degree was a valuable personal experience.

The low number of Auckland medical students taking up the intercalated degree option has always been a concern. In undertaking this study, we were hoping to quantify the take-up rate and identify the possible contributing factors, which may help the medical school to improve the structure and funding of the degree. We were able to identify 50 graduates who completed the intercalated degree program from 33 classes (mean of 1.5 per annum).

In contrast, the University of Queensland (Australia) had 174 students over 33 years (5.3 per annum), the University of Sydney (Australia) had 356 completing their BScMed programme over 34 years (10.5 per annum), and University of Edinburgh (Scotland) had 60 students over 10 years (6.0 per annum) in their intercalated programme in pathology alone. While some of the discrepancy in take up rates between medical schools may result from differences in class sizes, our study confirms the anecdotal low take-up rate of the intercalated degree option at Auckland Medical School. Certainly, some of the problems encountered by our respondents during their intercalated year were preventable and/or remediable.

Such problems included heavy workload, financial difficulty and poor guidance and support from the medical school. However, it is interesting—and at the same time disconcerting—that most of the problems encountered by our respondents are very similar to those identified by their counterparts in Queensland.

When invited to comment on possible causes for this low take-up rate of intercalated degree option at Auckland, our respondents gave a range of interesting answers, some of which are summarized in Box 1. The relative unpopularity of the programme at Auckland itself may be one of the reasons for low number of medical students taking up this option.

In our survey, 9% of students found out about the programme through other students who had done the degree; 41% did so at the recommendation of lecturers or other academic staff. It may be that without the “critical mass” of students undertaking the intercalated degree, and the academic staff experienced in supervising them, the programme cannot be promoted effectively to potentially interested students.

One of the concerns about doing an intercalated degree is the effect of prolonging the duration of training. Notably, the undergraduate medical course in both New Zealand medical schools is of 6 years duration, whereas, in the UK many of the undergraduate degrees are 5 years in total. Importantly, in this context, none of the respondents felt that the prolonged training had negative impacts on their career, and only 10% believed that prolonged training negatively affected their personal lives outside of medicine. However, there were different responses about the effect of prolonged training on financial status.
Box 1. Possible reasons for low take-up rate of intercalated degree as suggested by respondents

<table>
<thead>
<tr>
<th>Financial:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “Lack of funding: A friend (an Auckland student) who went to another university during the same year had her year paid for, plus an allowance.”</td>
</tr>
<tr>
<td>• “5-6 years at medical school… is a long time and incurs significant financial impact… Extending this by another year is a big decision, especially for young students who have already accumulated significant debt.”</td>
</tr>
<tr>
<td>• “Concern about cost and student loans. I come from an era where my MMedSc cost me $500, and I got $15000-16000 in grants. Now it would cost thousands and increase departmental burden.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organisational problem:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “Intercalated degree should have been better publicised at an earlier stage in training.”</td>
</tr>
<tr>
<td>• “Lack of awareness for the programme”</td>
</tr>
<tr>
<td>• “No role models explaining the benefits.”</td>
</tr>
<tr>
<td>• “Because the university… provided no encouragement, assistance, or incentive to do one.”</td>
</tr>
<tr>
<td>• “Academic departments of university when I was there seemed remote, not glamorous and disinterested in students.”</td>
</tr>
<tr>
<td>• “Medical school (is) poorly set up to accommodate intercalated years or any deviation from progression straight through the med school degree.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attitudes of medical students:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “Viewed as being less interesting than… clinical years by medical students.”</td>
</tr>
<tr>
<td>• “…Most of my peers were more interested in vocational training for a job either to care for people or to earn money.”</td>
</tr>
<tr>
<td>• “Medical student culture perceives research to be boring with difficult funding issues.”</td>
</tr>
<tr>
<td>• “Medical school is not an environment students usually want to prolong their exposure to.”</td>
</tr>
<tr>
<td>• “Philosophy: many think getting through is the aim (rote learning etc.) and that was the way it was BEFORE student loans.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medical school selection process:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “For students not interested in academic careers, this is a waste of time and energy. Look at the selection process by which you choose medical students.”</td>
</tr>
<tr>
<td>• “It may reflect the intake in both medical schools, being comprised more of caring personalities, rather than the academically curious.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Miscellaneous:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “The spirit of the university … has been displaced by a spirit of technological fitting for a specifiable role in society.”</td>
</tr>
<tr>
<td>• “Negative attitudes to academic careers owing to lack of pay equity/parity between academic and non-academic clinicians and lack of protected time in clinical workload expectations.”</td>
</tr>
<tr>
<td>• “Mostly there are far fewer career incentives in NZ to be a part of the evolving science of medicine—academic medicine is hard work and poorly paid.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value of the degree?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “Most students are interested in clinical medicine, and clinical research can always be taken up during house officer/registrar years.”</td>
</tr>
<tr>
<td>• “No value put on the (intercalated) degree once you qualify”</td>
</tr>
</tbody>
</table>

Twenty percent of the respondents felt that prolonged training had negative impacts on their financial status. A significant proportion of these respondents either had PhD’s or qualified after 2000, when the New Zealand medical school fees went up significantly. The issue of funding seems to be one of the biggest challenges facing the future of intercalated degree programme, both in New Zealand and abroad, which may have serious consequences to academic medicine workforce in the near future.
Student debt has been found to be one of the most important factors influencing medical student career decisions in New Zealand.\(^8,9\) Indeed, despite overall high satisfaction with the program, only 33% of the respondents indicated that they would be likely to do the degree again in the current environment with issues of student loan.

Currently, there is a perennial shortage of well-trained clinician researchers, both in New Zealand and overseas.\(^10,11\) Previous studies conducted in New Zealand indicated that there was very little interest in a career in research and academic medicine amongst medical students; and for nearly a quarter of medical students, perceived better research opportunities was a factor in considering leaving New Zealand.\(^8,9\)

In our study, we did not ask specifically whether our respondents were working in academic or research settings, and it was not possible to determine whether they were more active in research post-graduation compared to their counterparts without an intercalated degree. However, 90% of graduates having involvement in research following graduation, and one-third having additional higher research degrees are impressive figures.

Most were motivated by an interest in science and research and intellectual stimulation, the same reasons that motivated them to undertake the programme in the first place. It may be that the intercalated degree programme has helped the interested and intellectually curious students to maintain their interest in research post-graduation.

A well-structured and supported intercalated degree programme at medical school will likely have positive influence in developing clinical research workforce in New Zealand, as early identification and support have been identified as important factors.\(^10,12-14\)

Recognising the benefits of the intercalated degree programme, both published and anecdotal, the School of Medicine undertook a comprehensive review of the programme 2 years ago. Two of the authors of this paper were interviewed by the review panel, to whom also the provisional results of this study was presented. Based on the suggestions made by former students and their supervisors, a number of changes were implemented from 2010. These included appointment of a director and change of the name of the degree to Bachelor of Medical Science (Honours) to make the degree more recognizable internationally.

In conclusion, despite the low number of students taking up the opportunity, the graduates of the intercalated degree programme at the Auckland Medical School were overall satisfied with their experience. However, many graduates would be generally reluctant to do the degree again in the current environment with the issues of significant undergraduate student loans being required to complete the medical course.

Measures such as improved structure of the degree, better supervision and support, and adequate funding will be essential to encourage interested students to take up and fully utilise the opportunities that an intercalated degree programme has to offer; some of which are already being put in place by the School of Medicine.
Competing interests: None.

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Acknowledgements: This project was funded by Educational Research Grant from the Faculty of Medical and Health Sciences (FMHS), University of Auckland. The authors also thank Drs David Holland, Darren Hooks, Jonathan Koea and Graham White for their assistance with the development of questionnaires; Mr Tim Greene (External Relations Manager at the FMHS) for his help with administration of the survey; and Ms Joanna Stewart (Biostatistician) for her help with statistical analysis.

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References:

Medical students’ attitudes towards research and a career in research: an Auckland, New Zealand study

Serena J K Park, Charles N J McGhee, Trevor Sherwin

Abstract

Aim To determine the attitudes towards research and research careers among students at a New Zealand medical school.

Methods A questionnaire was devised and distributed during compulsory lecture sessions to all medical students enrolled at the School of Medicine, University of Auckland during the 2007 academic year.

Results Among the 756 students enrolled for the 2007 academic year, 558 responded, with an overall response rate of 74%. Twenty-five percent of students had participated in some form of research activity during medical school, with summer studentships being the most common type of research experience. Seventy percent of all students surveyed expressed interest in participating in research during medical school. Although 68% of respondents were aware of the intercalated research degree option at the School of Medicine, only 8.6% expressed interest in undertaking this option.

The most common reasons for not pursuing an intercalated degree option were lack of interest in this format of research experience (46%), social reasons (29%), and financial reasons (27%). There was no widespread support from the students for having research training as a compulsory part of medical school curriculum. With respect to long-term career plan, 35% of respondents planned to be involved in research throughout their medical career, and 22% were interested in pursuing higher degrees (MD or PhD) following graduation. However, more students rated lifestyle (84% affirmative) and earning potential (43% affirmative) as more important factors than opportunity for research (23% affirmative) when choosing a career specialty.

Conclusions The New Zealand medical students sampled reported a significant interest in research, with a majority of the students planning to participate in extracurricular research activities during medical school, and many hoping to be involved in research throughout their medical careers. However, only a small number of students were interested in pursuing research through an intercalated undergraduate degree option. Ultimately, the opportunity for research was deemed to be a less important consideration when choosing a specialty, compared to lifestyle and earning potential.

Research experience has traditionally been recognised as an important part of medical education.\(^1\) With increasing emphasis being placed upon evidence-based medicine and the application of scientific research to clinical practice, it is becoming increasingly important for medical professionals to possess sound understanding of scientific principles and methods, and to be skillful at acquisition and critical appraisal of new information.\(^2\) Research experience, which emphasises intellectual independence, helps to develop these skills.\(^1\)
Despite the recognised importance of research in medical education, few studies exist on medical students’ attitudes towards research and research education at medical school. Previous studies have suggested that medical students generally have positive attitudes towards scientific research in medicine and a career in research.\textsuperscript{2,5-7} In contrast, evidence suggests that academia and research are becoming an unattractive career option for medical graduates worldwide.\textsuperscript{8-10} It has been suggested that exposure to research activities during medical school leads to interest in academic and research careers and greater scientific output after graduation.\textsuperscript{9,11}

Although previous cross-sectional surveys of New Zealand medical students have shown very low levels of interest in careers in academia and research, no New Zealand-based study specifically examined medical students’ interests in research per se.\textsuperscript{12,13} Our study aimed to take a cross-sectional ‘snapshot’ of students’ participation in extracurricular research and to determine the general attitude towards research and careers in research at a New Zealand medical school.

**Methods**

Ethical approval for the study was obtained from the University of Auckland Human Participants Ethics Committee. All students enrolled at the School of Medicine, Faculty of Medical and Health Sciences, University of Auckland during 2007 academic year were invited to participate. A questionnaire was developed with questions focusing on research experience, attitudes towards research and long-term career intentions. The questionnaire was further refined on the basis of feedback from a pilot survey conducted on a small group of medical students. The final questionnaire contained 27 items, which included tick box replies, 5-point Likert scale-like ranking, and additional free comment sections. Questionnaires were distributed to students at the beginning of a mandatory introductory lecture and collected approximately two hours later. Some students elected to return the questionnaires via post. Responses were entered into a Microsoft Excel spreadsheet. Each completed questionnaire was assigned an identifying number in order to prevent duplicate data entry. Following discussions amongst the authors, five questions that, in retrospect, were poorly defined and drew ambiguous answers, and/or repetitive in nature were excluded from this final report.

**Results**

**Demographic information and response rate**—Table 1 summarises the demographic information of the respondents. Out of 756 students enrolled at the School of Medicine for 2007 academic year, 558 students responded, with an overall response rate of 74%.

The mean age of respondents was 22 years (SD 3.3 years, range 16-38 years). Sixty percent were females and 40% males. The largest ethnic group was European (43%), closely followed by Asian (40%). Māori and Pacific Peoples made up 4.5% and 3.2% of the respondents, respectively. The majority of respondents (68%) had entered the School of Medicine as school-leavers.
Table 1. Demographic information of students

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. of students (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>558</td>
</tr>
<tr>
<td>Mean age</td>
<td>22</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>224 (40)</td>
</tr>
<tr>
<td>Female</td>
<td>334 (60)</td>
</tr>
<tr>
<td>Year at medical school</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>126 (23)</td>
</tr>
<tr>
<td>Year 3</td>
<td>100 (18)</td>
</tr>
<tr>
<td>Year 4</td>
<td>127 (23)</td>
</tr>
<tr>
<td>Year 5</td>
<td>103 (18)</td>
</tr>
<tr>
<td>Year 6</td>
<td>102 (18)</td>
</tr>
<tr>
<td>Ethnic group</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>242 (43)</td>
</tr>
<tr>
<td>Asian</td>
<td>225 (40)</td>
</tr>
<tr>
<td>Māori</td>
<td>25 (4.5)</td>
</tr>
<tr>
<td>Pacific Peoples</td>
<td>18 (3.2)</td>
</tr>
<tr>
<td>Other</td>
<td>48 (8.6)</td>
</tr>
<tr>
<td>Entrance qualification*</td>
<td></td>
</tr>
<tr>
<td>School-leaver</td>
<td>379 (68)</td>
</tr>
<tr>
<td>Tertiary study/degree</td>
<td>148 (27)</td>
</tr>
<tr>
<td>Another career</td>
<td>23 (4.1)</td>
</tr>
<tr>
<td>Other</td>
<td>33 (5.9)</td>
</tr>
</tbody>
</table>

*Multiple answers were permitted.

**Research experience**—Table 2 outlines the type of research experience undertaken by medical students and their reasons for doing research. Of the 558 respondents, 142 (25%) students reported having been involved in research activities during medical school. There was no statistically significant difference (P=0.842) in research participation between male (56 out of 224, 25%) and female students (86 out of 334, 26%).

Summer studentship (70%) was the most popular means of being involved in research during medical school, followed by Year 3 research option (27%). Other research experience (15%) included summer research jobs, private projects designed by students themselves, and clinical audit/research projects under clinical consultants. The most frequent reasons for participating in research was “to earn money (as part-time or summer job)” (58%), “interesting project being available” (54%), “interest in career in research/academic medicine” (39%) and “potentially helpful for medical school studies” (39%).

When those students with research experience were asked whether their participation in research increased interest in pursuing a career in research/academic medicine, 39% agreed or strongly agreed with the statement, 35% were neutral and 32% disagreed or strongly disagreed with the statement. However, 70% of all students surveyed were interested in participating in research during medical school.
Table 2. Research experience

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. of students (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students with research experience</td>
<td>142 (25)</td>
</tr>
<tr>
<td>Type of research experience*</td>
<td></td>
</tr>
<tr>
<td>Summer studentship</td>
<td>100 (70)</td>
</tr>
<tr>
<td>Year 3 research option</td>
<td>38 (27)</td>
</tr>
<tr>
<td>Other</td>
<td>21 (15)</td>
</tr>
<tr>
<td>Reasons for doing research*</td>
<td></td>
</tr>
<tr>
<td>To earn money</td>
<td>82 (58)</td>
</tr>
<tr>
<td>An interesting project was available</td>
<td>76 (54)</td>
</tr>
<tr>
<td>Interest in career in research/academic medicine</td>
<td>56 (39)</td>
</tr>
<tr>
<td>Thought it might be helpful for medical school studies</td>
<td>55 (39)</td>
</tr>
<tr>
<td>To enter a competitive specialty/training programme</td>
<td>36 (25)</td>
</tr>
<tr>
<td>Recommended by others</td>
<td>34 (24)</td>
</tr>
<tr>
<td>Persuaded by an enthusiastic supervisor/mentor</td>
<td>32 (23)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (1.4)</td>
</tr>
</tbody>
</table>

*Multiple answers were permitted.

Attitudes towards intercalated degree and research training at medical school—
The majority of respondents (68%) were aware of the intercalated degree option available at the School of Medicine, University of Auckland. However, only 8.6% of students answered that they were interested in taking time out from medical course to do a research degree, whereas 55% were not interested and 36% gave a neutral answer.

Lack of interest in research, presumably in the intercalated degree format, at 46%, was the most frequently cited reason for deciding against an intercalated degree, followed by social reasons (29%) and financial reasons (27%). A number of students provided additional written comments regarding their decision against undertaking an intercalated degree, some of which are summarised in Box 1.

Table 3 summaries the students’ responses to a set of statements designed to evaluate their attitudes towards research and research training during medical school. The majority (62%) of the respondents were affirmative of the statement that “laboratory-based scientific research was relevant to clinical practice.” More than half (51%) also disagreed or strongly disagreed with the following statement: “Taking a year off from medical school to do research is a waste of time, if it does not advance my future career.” However, only 26% of the students responded positively to the idea of research training becoming a compulsory part of medical education.
Box 1. Reasons for not undertaking an intercalated degree

<table>
<thead>
<tr>
<th>Time factor</th>
<th>Affirmative % (agree/strongly agree)</th>
<th>Neutral %</th>
<th>Negative % (disagree/strongly disagree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Current degree would take longer to complete.”</td>
<td>26</td>
<td>43</td>
<td>31</td>
</tr>
<tr>
<td>“I’ll be too old by the time I finish.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Don’t want to add more time onto my degree.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Want to qualify as doctor ASAP.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Started medical school later in life.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity of medical school course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Wanting to keep continuity during the medical school course.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“To maintain the progression from Phase 1 [pre-clinical] to Phase 2 [clinical] of the medical school.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“I have been advised it is better to wait and decide which clinical specialty to pursue before undertaking specialised research in that area.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Bad previous experience in research”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“From my previous degree, I have found that NZ is NOT conducive for research. I don’t see any future in research, not in NZ at least.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“I try not to let my schooling get in the way of my education - ONLY if I find something that interests me.”</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Attitude towards research and research training during medical school

<table>
<thead>
<tr>
<th>Statement</th>
<th>Affirmative % (agree/strongly agree)</th>
<th>Neutral %</th>
<th>Negative % (disagree/strongly disagree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research training should be a compulsory part of medical school curriculum</td>
<td>26</td>
<td>43</td>
<td>31</td>
</tr>
<tr>
<td>Laboratory-based scientific research is relevant to clinical practice</td>
<td>62</td>
<td>27</td>
<td>11</td>
</tr>
<tr>
<td>Taking time off to do research is waste of time, if it does not advance my future career</td>
<td>21</td>
<td>28</td>
<td>51</td>
</tr>
</tbody>
</table>

Long-term career plan and research—Over one-third (35%) of the medical students sampled planned to be involved in research throughout their career. Fewer students (22%) were interested in pursuing higher degrees (MD or PhD) following graduation. Only 23% of students agreed or strongly agreed that opportunity for research was an important consideration when choosing a specialty.

In contrast, 84% of the respondents identified lifestyle and 43% identified earning potential as important considerations when choosing a specialty (Table 4).
Table 4. Research with respect to long-term career plan and specialty choice

<table>
<thead>
<tr>
<th>Comment</th>
<th>Affirmative % (agree/strongly agree)</th>
<th>Neutral %</th>
<th>Negative % (disagree/strongly disagree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I plan to be involved in research throughout my medical career</td>
<td>35</td>
<td>42</td>
<td>23</td>
</tr>
<tr>
<td>I am interested in pursuing higher degrees (MD or PhD) after graduation</td>
<td>22</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>Opportunity for research is an important consideration for me when choosing a specialty</td>
<td>23</td>
<td>42</td>
<td>35</td>
</tr>
<tr>
<td>Earning potential is an important consideration for me when choosing a specialty</td>
<td>43</td>
<td>36</td>
<td>21</td>
</tr>
<tr>
<td>Lifestyle is an important consideration for me when choosing a specialty</td>
<td>84</td>
<td>14</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Discussion

To the best of our knowledge, this is the first New Zealand-based study to address the attitude of medical students towards research. Our study revealed that, at the time of survey, 25% of University of Auckland medical students had participated in some form of extracurricular research activities. This is comparable to research participation rate—23% to 38% - reported by similar studies from the United States, Finland and the Netherlands.7,9,11

Female and male students were as equally active in extracurricular research. This is in contrast to the results of earlier studies conducted overseas, which suggested that women have less interest and involvement in research activities than men.7,14,15

Another encouraging finding was that 70% of our respondents expressed interest in participating in extracurricular research during their time at medical school.

Although the students most frequently selected “to earn money” as their reason for participating in research activities, this may reflect the fact that a significant majority of students in the survey gained their research experience through participating in summer studentships, which provide the students with a stipend over the summer break. Other than the obvious financial incentives, more students were motivated by interesting projects and interest in research and academic careers than more tangible benefits such as help with medical school studies or entering competitive training programmes.

It has been suggested that providing stimulation and opportunities for research during medical school may help to encourage medical students to pursue academic careers.7,9

In the current study, when asked whether participation in extracurricular research increased interest in careers in research or academic medicine, students’ opinions were fairly evenly divided between positive, neutral and negative.

Although we did not explore the reasons why one-third of students formed negative attitudes towards pursuing an academic career after participating in extracurricular research, it has previously been reported that research experience can be both a positive or negative influence in considering a research career among medical students. This may be due to those students with research experience being more
aware of the negative aspects of an academic career, such as continually competing for funding and the possibility of research projects revealing insignificant results, despite time and dedication invested in the projects.6

Despite reasonably high interest and participation in extracurricular research, interest in pursuing the intercalated research degree option was low. Although 68% of the students surveyed were aware of the existence of the intercalated degree option at the School of Medicine in the University of Auckland, only 8.6% of students were interested in pursuing this option.

The commonly stated lack of interest in research may be related to the intercalated degree format and possibly the lack of remuneration, because, aside from the lack of interest, students most frequently identified financial and social implications (such as joining another class) as the reasons for not pursuing an intercalated degree. It seems that students feel that the benefits of an intercalated degree—which requires students to defer their medical studies for one year or more—comes at too much of cost, both financial and social. Thus the high interest in pursuing research during a medical degree course would seem to be geared towards shorter terms of involvement such as a summer studentship or a third year research option which fit within the six year medical course structure.

In our study, medical students generally appreciated the relevance of laboratory-based research to clinical practice. Also, more than half of students did not seem to think that taking time off to do research is “waste of time”, even if it would not advance their future careers. However, just over one-quarter of medical students surveyed felt that research training should be a compulsory part of medical curriculum, while a slightly greater proportion of medical students were negative about the idea.

The term “research training” is a broad term, and since we did not define the term in the questionnaire, students may have been unsure about what the “research training” might actually involve. “Research training” may take the form of a taught course in principles of scientific research and methodology, and a previous study has found that attendance at such a course was related to a positive attitude towards science.2 Some students may have construed the term “research training” as something that involves practical research experience.

A recent Australian study has found that most medical students think of research as being “stuck in a laboratory” all day and something that reduces interactions with people.6 Some of our respondents may have similar ideas regarding research experience, which may have influenced their responses to this question.

It is encouraging that 35% of students plan to be involved in research throughout their medical careers, with a smaller number interested in pursuing higher research degrees. However, more students rated lifestyle (84% affirmative) and earning potential (43% affirmative) as important factors when choosing a specialty, than the opportunity for research (23% affirmative).

Our study has several limitations that have to be considered in the interpretation of the results. The high response rate of our survey, at 74%, can partially be attributed to distribution of the questionnaires during compulsory lectures. Consequently, there was no dedicated time allocated for filling out these questionnaires, which may have influenced how students answered the questions. However, many previous published
studies on medical education have had questionnaires distributed in a similar way, with lower response rate. The cross-sectional design of the study meant that we were unable to observe change in attitude towards research as students progressed through 5 years of medical curriculum.

Not withstanding these limitations, our study found that interest in research is high among medical students at the University of Auckland, however, this high level of interest does not extend into the intercalated research degree. A significant majority of the students plan to participate in extracurricular research activities during medical school, and many of them plan to be involved in research throughout their medical careers. In order to encourage and sustain medical students’ enthusiasm and interest in research, it may be important to provide a variety of quality research opportunities during medical school and beyond.

Competing interests: None.

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Acknowledgements: This project was funded by an Educational Research Grant from the Faculty of Medical and Health Sciences (FMHS), University of Auckland. The authors also thank the staff of Medical Programme Directorate, School of Medicine, for their help with administration of the survey; Dr Philip Insull for assisting with the development of the questionnaire; Dr Mary Liang for her help with data entry, and Ms Joanna Stewart for her help with statistical analysis.

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Using the asthma control test to improve asthma outcomes

Shaun Holt, Kyle Perrin

Abstract

There is a major gap between what can be achieved with modern asthma management and what is currently being achieved. One of the main reasons for this is a lack of recognition of asthma control and the requirement for more effective treatment—it is only through identifying those patients with uncontrolled asthma that appropriate treatment will be prescribed.

In part, the difficulty in the assessment of control relates to the lack of a clear therapeutic target in asthma. This contrasts with other chronic diseases such as hypertension or diabetes where treatment is prescribed in order to achieve a definite therapeutic target. One approach to this difficulty is to develop a simple test which is a screening tool to identify patients with poorly controlled asthma.

The Asthma Control Test (ACT) has been developed and validated for this purpose. It involves patients completing a simple written questionnaire of 5 questions, from which a score (out of 25) is obtained. It has been shown that the ACT is a simple, quick and accurate tool for assessing asthma control and it has been shown to be responsive to changes in asthma control over time. It can easily be incorporated into the routine assessment of patients with asthma and enable busy healthcare professionals to more easily identify patients whose asthma control can be improved, enabling changes to their management to be made and thereby improve outcomes.

The burden of asthma in New Zealand

Around 1 in 6 New Zealanders has asthma. The prevalence of asthma, along with other allergic disorders such as eczema, allergic rhinitis and food allergy is increasing and New Zealand has the joint highest levels of these allergic disorders in the world. Although deaths are uncommon, asthma is a very important disease as it is both common and chronic.

The economic burden has been estimated to be over $1 billion a year in New Zealand, the vast majority of this being indirect costs such as those associated with time off school and work due to exacerbations. Around half of costs are incurred by the 10% of patients with the most severe asthma, and the cost of care for a person with asthma has been estimated to be 100 times greater if a patient’s asthma is poorly controlled.

In terms of years lost to disability (YLD), asthma ranks first in males, third in females and third overall.

The disconnect between asthma control and its perception

Two large studies estimating the level of asthma control in New Zealand patients provide a fascinating insight into the disconnect that occurs between asthma control and how this level of control is perceived by patients.
The Patient Outcomes Management Survey (POMS) found that the vast majority of New Zealand patients did not have well-controlled asthma—7% were well controlled, 71% had asthma that was not well controlled and 19% were classified as having asthma that was markedly out of control.\(^4\)

However, a surprise finding was that 80% of patients were satisfied with their level of asthma control and 76% thought that their asthma was well-controlled.

Similarly, the 2007 NZ mini-INSPIRE study found that although 76% of patients were using their reliever on most days, 81% thought that their asthma was well-controlled and 77% were satisfied with their level of control.\(^5\)

How can it be that so many patients have poor asthma control, but think that they are actually well-controlled and are happy with the level of control? And how can understanding this disconnect help clinical practice? The answer to the first question is that patients have a natural tendency to tell their doctor what they think they want to hear. But more importantly, it is likely that patients with asthma seldom have few or no symptoms and so they do not know what good asthma control feels like – they have nothing to compare their current symptom level with.

Asthma researchers and clinicians are well aware of this fact if they have added a LABA to a patient’s treatment as part of a clinical study – many patients report that they never knew what it was like to experience few or no symptoms. The GOAL study demonstrated that excellent control can be achieved in the vast majority of patients.\(^6\)

As for the second question, how can understanding this disconnect help clinical practice...one lesson we can learn is that the way we assess asthma control now is often not detecting these high levels of poor control, and so we need better ways to assess asthma control.

The need for a simple asthma monitoring tool

What is asthma control? It depends who you talk to; patients, parents, doctors and regulatory authorities have very different ideas, as follows:

| Patients—no symptoms which interfere with normal lifestyle, no exacerbations, normal quality of life, particularly, no cough |
| Carers (parents)—able to get to school, no night cough |
| GPs—no unscheduled visits, few exacerbations, no admissions, maintenance of PEF |
| Respiratory physicians—no night symptoms, maintenance of lung function (FEV\(_1\)), few exacerbations, no admissions |
| Regulatory authorities—improvement in morning PEF & FEV\(_1\), improvement in symptom scores and quality of life, enhanced cost-effectiveness analyses |

The recently published joint American Thoracic Society/European Respiratory Society statement on asthma control and exacerbations has a detailed discussion of the many parameters that can be used to define control.

In this document asthma control is described, generally, as “the extent to which the various manifestations of asthma have been reduced or removed by treatment” which
is determined by “features such as symptoms, and the extent to which the patient can carry out activities of daily living and achieve optimum quality of life.” A variety of questions can be used to assess asthma control, such as the presence of night-time cough and frequency of reliever use, as well as measurements such as peak flow meters.

Not surprisingly, these varied approaches to assessing asthma mean that poor control is often not detected, even by respiratory specialists. If control is not accurately assessed, how can we effectively alter a patient’s management to obtain the best level of asthma control possible?

Asthma is almost unique when compared to other long-term chronic conditions in that there is not a single, simple, objective measure of the disease manifestation, which can be monitored over time and with treatment changes. For hypertension we measure blood pressure, for hypercholesterolaemia we measure blood lipids, and for patients with diabetes we measure HbA1c levels. No such measure is commonly used for asthma.

Such a measure would enable health care professionals to identify poor asthma control in their patients and treatments could be altered accordingly.

The Asthma Control Test (ACT)

A simple 5-question test for asthma has been developed and validated in several studies. The ACT was initially developed in a study which looked at 22 of the most common questions that doctors ask when talking to patients about asthma control, with 5 questions standing out as being the most accurate predictors.

The 5 questions take less than a minute to answer and can be asked by the health care professional or the patient can complete the test themselves. There is a score of 1–5 for each question, and an overall score in the range of 5–25, with low scores corresponding to a high level of symptoms and therefore poor asthma control.

Studies have shown that the ACT score effectively discriminates between patients who differ in asthma control, is responsive to changes in control, and can discriminate between groups of patients in different lung function ranges. The ACT score is highly effective as a screen for uncontrolled asthma and can correctly predict GINA-defined partly controlled or uncontrolled asthma in over 90% of cases.

A score of 20–25 means that a patient’s asthma is controlled. A score of 15-19 means that it may be possible to increase the level of asthma control and a full review of the treatment plan, including education on inhaler technique and the important of compliance with treatment, is warranted.

A score of 14 or less indicates that asthma is poorly or not controlled and that an urgent review of and changes to the patient’s management are needed. Although there are no randomised studies that demonstrate that use of the ACT translates into better asthma control, its use is highly likely to improve patient outcomes as asthma therapy can be confidently adjusted up if control is demonstrated to be poor.
Summary

There are high levels of morbidity from asthma in New Zealand, partly as a result of difficulties in identifying patients whose asthma is poorly controlled. There is no simple and objective assessment measure commonly used for asthma, unlike many other chronic conditions.

The ACT score provides a quick and simple assessment of asthma control with a result that is objective, easily understood by the health care professional and patient, and changes over time as asthma control changes.

The ACT score can easily be incorporated into the routine assessment of patients with asthma. This could enable busy health care professionals to more easily identify patients whose asthma control can be improved, enabling changes to their management to be made and thereby improving outcomes.

Competing interests: None.

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Dr Nathan Tucker’s Asthma Specific: a treatment for asthma preceding inhaled steroids and beta-agonists

Niall Hamilton, Lutz Beckert

Abstract

We present the case of an 83-year-old woman who was diagnosed with bronchial asthma in 1929 and had been treated in her childhood with “Dr Nathan Tucker Asthma Specific”, a cocaine-based aerosolised asthma treatment.

Case report

Ms C, 83-year-old-woman, was admitted with acute shortness of breath, following a recent viral respiratory illness. She was dyspnoeic at rest, with widespread expiratory wheeze throughout both lungs fields. Symptoms were consistent with previous asthma exacerbations. Ms C was treated with nebulised salbutamol and a tapering course of prednisone, with rapid resolution of symptoms.

Ms C provided an interesting personal account of the colourful history of early asthma treatment. Her asthma had been diagnosed in her infancy, in 1929. She recounted being treated in her childhood with a yellow power (which she believes was possibly sulphur) which was ignited and inhaled. In her early teenage years, her family ordered “Dr Nathan Tucker Asthma Specific” from America (see Figure 1). She describes this medication as providing “wonderful relief” for mild to moderate exacerbations of asthma, however she still required adrenaline for severe attacks.

Figure 1. Advertisement for Dr Nathan Tucker’s “Asthma Specific”

Source: http://thequackdoctor.com/index.php/tuckers-asthma-specific/
Ms C stated that the “Dr Nathan Tucker Asthma Specific” was removed from the market because of its cocaine content. She recalled using another aerosolised medication for a brief period, before the inhaled corticosteroids and beta-agonists became available.

Discussion

Nathan Tucker (1838–1920) was an American physician (reportedly an asthma sufferer himself) who developed the “Dr Nathan Tucker Asthma Specific” in 1889.1 This was an aerosolised preparation containing 1–3.5% cocaine.1 Several contemporary asthma treatments also contained cocaine, some at considerably higher percentages—“Azma-Syde” containing 40% and “Ryano's Hay Fever-n-Catarrh Remedy” at 99.95%.1,2

It is unclear when the “Asthma Specific” was completely removed from the commercial market. The medical community became aware of the dangers of such preparations in the early 20th Century.2 A case of cocaine poisoning following the use of the “Asthma Specific” was documented in the Lancet in 1908.2,3 Despite this, Ms C’s family were still able to mail-order the “Asthma Specific” in the 1930s.

Cocaine inhalation, the smoking of freebase “crack” cocaine, has been documented to cause acute bronchospasm,4 and is associated with asthma exacerbation.5 Other respiratory complications associated with chronic cocaine inhalation include, emphysema, pulmonary hypertension alveolar haemorrhage and pulmonary fibrosis.6 The cocaine amount and effect in the “Asthma Specific” will be considerably less that of “crack” cocaine. However the “wonderful relief” that Ms C felt was more likely related to cocaine euphoria rather than any physiological effect on the airways.

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Zolendronate-associated inflammatory orbital disease

Jennifer Yeo, Ali Jafer

Abstract

Bisphosphonate infusions are associated with adverse events in approximately a third of patients. Ocular complications are rare and even more so, inflammatory orbital disease. Bisphosphonate-induced orbital inflammation is not a well recognised complication and there have been only a few published case reports of this. We present a case of orbital inflammatory disease associated with zolendronate infusion.

Case report

Our patient is a 62-year-old man with longstanding Type 1 diabetes. He had developed Charcot arthropathy of the right foot as a complication of his diabetes. As part of his treatment, the patient received an infusion of zolendronate. There were no immediate complications.

The following day he developed nausea and bilateral periorbital swelling. Symptoms progressed over the next 48 hours; he experienced blurring of vision and discomfort of his eyes. The patient presented to hospital 4 days after having had zolendronate. On admission he was afebrile. His blood results revealed a normal white cell count, a mildly elevated neutrophil count of 8.2, a normal ESR and a CRP of 95. Thyroid function tests were normal. Examination findings were notable for bilateral periorbital oedema with associated erythema and conjunctival injection. Findings were worse on the left eye.

He denied any preceding head and neck infections. He had no known thyroid disorders or connective tissue disorders. Initial concerns given his comorbidity of Type 1 diabetes were of an underlying infection. Intravenous antibiotics were started prophylactically. Despite antibiotics, there was an alarming progression of the periorbital oedema resulting in complete ptosis of the left eyelid and partial ptosis on the right. There was significant chemosis involving both eyes (worse on the left) with subsequent impairment of extraocular movements. Visual acuity was unchanged from his pre-morbid state; 6/6 on the right and limited to hand movements on the left. Confrontational visual field assessment was normal.

An enhanced contrast CT scan did not show evidence of orbital cellulitis, however it was inconclusive for cavernous sinus thrombosis. The patient was commenced on anticoagulation treatment with intravenous heparin as empirical therapy for the latter condition until it could be fully excluded with further imaging.

An ophthalmology consult was organised. Fundoscopy revealed normal optic discs and no retinal venous congestion. An MRI scan showed normal enhancement of the cavernous sinus. There was evidence of supraorbital soft tissue swelling but no orbital collection. Anticoagulation therapy and intravenous antibiotics were stopped. The
patient made a gradual recovery during the remainder of his hospital stay and was well enough to be discharged home on Day 10.

A clinical diagnosis of an orbital inflammation secondary to zolendronate infusion was made. Inflammation was predominantly pre-septal in this case. Our patient made a full recovery.

Discussion

Bisphosphonates are inhibitors of osteoclast-mediated bone resorption. They now constitute the standard treatment for osteoporosis, Paget’s disease of the bone, hypercalcemia of malignancy and skeletal complications of malignancy. There has also been evidence for its use in diabetic neurogenic arthropathy.

The most common adverse effect of intravenous infusions of bisphosphonates is a flu-like syndrome in about 9% of patients. Ocular complications occur less frequently; conjunctivitis is reported to occur in approximately 1%. Uveitis and episcleritis have been reported to occur rarely, in less than 0.01%.

Inflammatory orbital disease resulting from bisphosphonates, occur even more rarely.

There have been a handful of case reports in the literature describing the development of orbital inflammation following both intravenous pamidronate and zolendronate. As of the end of 2009, a literature search we conducted identified 5 reported cases; 3 cases were secondary to pamidronate and 2 cases were secondary to zolendronate.

In all cases, a presumptive diagnosis of orbital inflammatory disease secondary to the bisphosphonate infusion was made based on the close temporal relationship between the infusion and the onset of orbital symptoms. Among the reported cases, the onset of symptoms was within 72 hours of the bisphosphonate infusion and there was a rapid clinical resolution of symptoms with institution of steroids.

The extent of inflammation varies. In this case report, inflammation was restricted to the pre-septal region of the orbit, however both pre-septal and post-septal regions can be involved leading to a greater severity of clinical findings. Asymmetric eye involvement is often the case. Clinical findings include upper and lower eyelid oedema, conjunctival injection, chemosis and impaired extra-ocular movements. Patients frequently experience orbital pain. There may be deterioration of visual acuity and a relative afferent pupillary defect may be present. Proptosis can also occur. Findings on CT or MR imaging vary across a wide spectrum; from no gross abnormalities to oedema of the soft tissues of the eye, enlarged rectus muscles and extensive pre- and post-septal fat stranding.

The mechanisms underlying this uncommon complication are uncertain. In one study, bisphosphonate stimulated release of cytokines through activated T cells has been demonstrated following a first dose of pamidronate which appeared to correlate with the development of an acute phase reaction. From this observation, it has been postulated that the same mechanism may underlie the development of bisphosphonate-induced inflammatory orbital disease.

Through its proven efficacy, the use of intravenous bisphosphonates is increasing. This case highlights the importance of recognition of this very rare adverse reaction
associated with bisphosphonate infusions. Awareness of this possible complication will lead to improved patient care by minimising unnecessary delay in the diagnosis and through early institution of corticosteroids for symptomatic relief.

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References

A case of five fingers and a murmur
Kundan Kumar, Sadanand Dey, Anjan Debnath

Clinical
An anomaly of the hands (Figure 1) was noted in a 15-year-old girl presenting with high grade spiking fever of 4 days duration associated with cough, expectoration and respiratory distress. Clinical examination and plain chest radiograph were consistent with diagnosis of bronchopneumonia. She had stunted physical growth and recurrent similar episodes since childhood.

Figure 1. Both hands showing some digital anomalies, particularly in relation to the thumbs

What is the digital anomaly and what other organs should be imaged?
Answer

Skeletal anomalies (Figure 1) in this patient reveal a “triphalangeal thumb” in the right hand and a hypoplastic thumb in the left hand with webbing. Triphalangeal thumb is also known as “fingerization of thumb”. This anomaly is a typical skeletal association of *Holt-Oram Syndrome*.

Stunted growth and recurrent pneumonia in this case was due to presence of ostium secundum atrial septal defect (acyanotic congenital heart disease with increased pulmonary blood flow) which is also a known association of Holt-Oram Syndrome.

Cardiovascular examination revealed an ejection systolic murmur of grade 3/6 intensity in pulmonary area along with wide and fixed splitting of second heart sound suggestive of an atrial septal defect. Eocardiography confirmed the presence of an ostium secundum atrial septal defect.

Discussion

*Holt-Oram Syndrome*, also called heart-hand syndrome, is an inherited disorder characterized by abnormalities of the upper limbs and heart. Holt and Oram first described this condition in 1960 in a 4-generation family with atrial septal defects and thumb abnormalities.\(^1\)

The syndrome is inherited as an autosomal dominant trait that is completely penetrant. The disease is due to mutations in the transcription factor *TBX5*, which is important in the development of both the heart and upper limbs. The estimated prevalence is 0.95 cases per 100,000 total births. Approximately 85% of cases are attributed to new mutations.

Although the clinical manifestations are variable, upper limb abnormalities are always present. Abnormalities may be unilateral or bilateral and asymmetric and may involve the radial, carpal, and thenar bones. Aplasia, hypoplasia, fusion, or anomalous development of these bones produces a spectrum of phenotypes, including triphalangeal or absent thumbs. Approximately 75% of patients have some cardiac abnormality.

In most patients, the abnormality is either an atrial septal defect (ASD) or a ventricular septal defect (VSD), which varies in number, size, and location. ASDs are usually of the secundum variety, while VSDs tend to occur in the muscular trabeculated septum. Cardiac anomalies also may include cardiac conduction defects such as progressive atroventricular block and atrial fibrillation. These anomalies are frequently present even in the absence of septal defects.

Skeletal anomalies serve as external marker of underlying serious cardiac illnesses and any such anomaly in a child should lead us to extensively search for hidden cardiac defects and follow them regularly for any complications and decide the right time for intervention.

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Paratyphoid Fever

Part of an article by Dr Young published in a 1910 volume of the NZMJ.

SIGNS AND SYMPTOMS.

As already indicated, the disease is, as a rule, clinically indistinguishable from typhoid, and though, as a rule, it is a less severe malady, yet fatal cases have been reported; in some cases the intestines are found normal post-mortem, but in one reported by Castellani there were typhoid-like ulcers in the lower part of the ileum, and yet the B. typhosus was absent.

The disease sometimes simulates Malta fever, which is, however, quite a distinct disease, and is due to the micrococcus Miliensis. Cases of mixed infection sometimes occur with Malta fever, malarial, pneumococcic and staphylococcic infection, as well as with typhoid. Just as with typhoid fever the bile tract is sometimes affected, and Gates 16 (of Florence) reports the case of a young woman who had a "bilious attack" followed by jaundice; there was slight pyrexia, but the patient was well in a little over a week; the blood serum negative to B. typhosus and B. paratyphosus A gave in a dilution of 1 in 100 a positive reaction to B. paratyphosus B in half-an-hour; her mother had previously had an attack clinically like typhoid, also with cholecystitis, and the blood serum gave similar reactions to the above.

Amongst cases classed as "simple continued fever" are probably cases of paratyphoid as well as of typhoid. In his article in the Encyclopedia on "The Unclassed Fevers of the Tropics," Dr. Crombie refers to a disease which he calls "Bastard Typhoid," a disease which runs a mild course amongst Europeans, such fevers being called after the cities in which they occur, e.g., Calcutta Fever and Bombay Fever. Similarly fevers occurring in South Africa reacted to the Widal test in 75% of those examined, and Crombie considers that others may be cases of paratyphoid. He suggests that these mild cases of fever are really due to a pure infection by the B. typhosus, more severe cases being due to a mixed infection. This view, he states, is supported by the observations of Sanarelli and Remy, who found that the addition of B. Coli communis to a culture of B. typhosus increased its virulence.

In the South African campaign, Dr. Boyd found that 18% of those cases, that he observed, given in the Army returns as "simple continued fever" proved to be typhoid. Of 150 cases admitted to Edinburgh and East of Scotland Hospital in South Africa during the Boer War as typhoid, Dr. Boyd obtained with the Widal test a negative result in 10, i.e., 6%. A dilution of 1 in 30 was used, and the t was tried more than once. All but one of these ca had the typical rash, and in this one alone was splenic enlargement doubtful; six had diarrhoea five had bronchial catarrh. Not one of the ten had relapse, nor was one fatal. Dr. Boyd gives reasons not classifying them as Malta fever, but was at a to understand the failure of the Widal test in such large proportion of cases. In the light of recent discoveries, the probability is that they were case: paratyphoid fever.
TREATMENT.

If the case is a mild one, less care is required with the diet than is necessary for typhoid fever, intestinal ulceration is not common. We must lose sight of the fact that paratyphoid is infectious occurs in epidemics.

CONCLUSION.

The conclusion one forms from the observation of various observers is that paratyphoid cannot be distinguished from typhoid fever by the mildness of attack, nor by the symptoms, and that diagnosis is to be made by specific agglutination; that is to say, if blood of the patient does not agglutinate, or does so only with low dilution, the B. typhosus, the test should be tried with the B paratyphosus. In all cases of uncertainty, cultures should be made from the blood.

If we limit the name paratyphoid to the fever produced by the B. paratyphosus, we must then find other names for other conditions, not at present otherwise classified, simulating typhoid fever.

In the present state of knowledge I see no objection, clinically, to accepting the view expressed by Captain Samut, and include under the name those typhoid-like conditions prod by either the paratyphoid or the coli sub-family former we might distinguish as "true paratyphoid."
Carotid endarterectomy: a Southern North Island regional consensus statement

Annemarei Ranta, Dilip Naik, Pietro Cariga, Tim Matthews, Gerry McGonigal, Tom Thomson, John Bourke, Stuart Mossman, Tom Thompson, Per Holmberg, Richard Evans, David Abernethy, Yun Lee, Anantha Ramanathan, Danella Favot, Tamlin Clulow, Lindsay Haas

Abstract

Aims The aim of this project was to employ interdepartmental and cross district health board collaboration to reach a regional consensus on the management of patients who may benefit from carotid endarterectomy.

Methods All regional stroke physicians, neurologists, and vascular surgeons met to review relevant literature and local audits and to discuss best management strategies suited to the region.

Results A consensus statement was agreed upon and is presented here along with a summary of the supporting scientific evidence.

Discussion Regional interdisciplinary collaboration proved an effective way to reach a carotid endarterectomy management consensus across a wider geographical area that is served by a single vascular surgery department. This approach could serve as a model for other regional initiatives.

Stroke is the second most common cause of death and a frequent cause of disability worldwide. Each year 7600 people suffer a stroke in New Zealand and 15–26% of these are preceded by transient ischaemic attacks (TIAs) or minor strokes. The progression to devastating symptoms following TIAs and minor strokes usually occurs within just hours to days and it is during this brief time window that evaluation and intervention has its most dramatic impact.

Carotid stenosis is the causative factor in 7–20% of patients with ischaemic stroke. Carotid endarterectomy (CEA) is an effective preventive measure for some of these patients, particularly in those presenting with TIAs and minor strokes if performed within 2 weeks of symptom onset. Factors that affect the overall benefit of surgical versus medical therapy for both symptomatic and asymptomatic patients are numerous. Local audits (unpublished) have confirmed that resources for providing both timely carotid imaging and surgery are limited.

In the setting of a wide body of sometimes conflicting international scientific evidence, which is not always readily applied to local healthcare environments, management strategies across the Southern North Island have been inconsistent at times.

All regional stroke physicians, neurologists and vascular surgeons collaborated to arrive at a regional consensus that aims to maximize treatment benefit within the constraints of our regional resources in accordance with the available scientific
evidence. This paper presents a summary of the available evidence on this topic and reports the final consensus.

**Methods**

Stroke physicians and neurologists from the lower North Island who refer potential CEA candidates to Wellington Hospital (MidCentral district health board (DHB), Capital and Coast (CC) DHB, Wairarapa DHB, Hutt DHB, and Wanganui DHB) and the Wellington (CCDHB) vascular surgeons attended a consensus meeting on 7 November 2009 with full attendance of all who were invited.

Local DHB audit data and reports from each participating DHB regarding local experience with management of potential CEA patients were presented. In addition, available literature was reviewed and presented both from a surgeon’s and a physician’s perspective. Discussion ensued and a consensus was reached regarding the topics outlined below. This included a standard referral form and process. Several draft versions of this paper were circulated to participants via email with ample opportunity for further discussion and feedback. Expert comments from outside the region were invited as well.

**Results**

**A. LOCAL AUDIT DATA**

Audits performed in Wairarapa and MidCentral DHBs highlighted significant hurdles in accessing timely carotid ultrasounds (CUS) and often inappropriate CUS utilisation. In Wairarapa, from March to September 2009, 33 CUS were performed. Only 9% of patients underwent CUS within 24 hours of presentation and only a further 18% within 1 week, whilst 67% of patients waited for more than 2 weeks and up to a year (data unpublished).

In MidCentral DHB, over a 3-month period from January to March 2009, a total of 80 patients were referred for CUS. Of the 26% of patients who were referred without evidence of prior TIA or stroke symptoms (i.e. asymptomatic patients) none had CUS results that affected their subsequent management. Referral reasons included carotid bruits, follow-up scans, pre-coronary artery bypass graft (CABG) scans, and non-specific neurological symptoms such as dizziness.

Of the TIA/stroke “symptomatic” patients who were triaged to be scanned within either 24 hours or 7 days only 56% could be accommodated within that time frame. Of the symptomatic patients four patients (7%) had significant findings on CUS, but three of these were deemed poor surgical candidates after the CUS had been obtained and only one patient was scheduled for surgery, which took place over three months after initial surgical referral.

The Hutt Valley physicians and CCDHB surgeons’ audits highlighted the significant delays in accessing CEA. In the Hutt valley data collection pertained to 158 consecutive strokes (10/08-9/09) and 38 consecutive high risk TIAs (1/09-8/09). Amongst these seven stroke (4.4%) and five TIA patients (13.2%) underwent CEA. The mean time from symptom onset to CEA was 46.5 days (range 2-165).

The surgeons’ audit at CCDHB reviewed all CEAs performed between July 2004 and June 2009. During this time 519 CEAs were performed with a 30-day stroke or death rate of 1.4%. There were 234 asymptomatic and 285 symptomatic patients. The average time from event/abnormal CUS to CEA was 75 (1-180) days. Patient outcome was not independently assessed by a stroke physician or neurologist and patients undergoing CEA concurrently with CABG were excluded from this audit.
B. REVIEW OF NATIONAL AND INTERNATIONAL LITERATURE

1. CEA for symptomatic patients:

The North American Symptomatic Carotid Endarterectomy Trial (NASCET) and the European Carotid Surgery Trial (ECST) are the cornerstone studies supporting CEA to prevent strokes and have been pooled for a combined analysis. The main findings from these studies were that symptomatic patients with a ≥70% ipsilateral stenosis benefited significantly from CEA over best medical therapy (BMT) alone, patients with 50-69% ipsilateral stenosis benefited moderately at best, patients with 30-49% stenosis or >99% stenosis did not benefit, and patients with <30% stenosis were harmed by surgery (Table 1).

Subgroup analyses demonstrated that patients with the following criteria benefited the most: male gender, age over 75, status post hemispheric stroke or TIA rather than pure retinal stroke or TIA, patients with non-lacunar infarcts, greater degree of stenosis/irregular plaque surface on imaging, and presence of collaterals and co-existent intracranial atherosclerotic disease. These findings were especially marked in the 50-69% group where female, patients <65 years of age, and those with pure retinal symptoms either did not benefit at all or not enough to warrant surgery.

Timing of surgery is one of the most significant factors identified during further subgroup analysis with maximal benefit being achieved if surgery occurs within 2 weeks of symptom onset and thereafter dropping progressively with no significant benefit from surgery after 3 months for the 70-99% group and no significant benefit after 2 weeks for the 50-69%. This has lead to a change in international guidelines, dictating the need for more urgent intervention in these patients. The evidence to support emergency CEA (<24 hours from symptom onset) is, however, lacking. While such rapid intervention appears logical in high risk patients (e.g. ABCD2 scores >4 or crescendo TIAs) no clear benefit has been demonstrated and surgical risk appears to be higher.

In general, peri-operative risk was highest in patients with organ failure or serious cardiac dysfunction, leukoaraiosis, and contralateral carotid occlusion. Because of the modest benefit for patients with 50-69% stenosis, perioperative risk must be well established to be less than 3% to achieve a net benefit. In contrast, for patients with 70-99% stenosis a perioperative risk of up to 6% is acceptable.

2. CEA for asymptomatic patients:

Three completed Class I studies have evaluated CEA for asymptomatic patients. The Veteran’s Affair study found a non significant trend favouring CEA over BMT in preventing ipsilateral stroke at 4 years (CEA 4.7% vs. BMT 9.4%) and this benefit was offset by a 30-day perioperative death rate of 4.7%. ACAS found a significant benefit in favour of surgery in preventing ipsilateral stroke at 5 years (CEA 5.1% vs. BMT 11%; p=0.0004). When looking at disabling strokes only and taking into consideration the high perioperative risk of disabling strokes the benefit is, however, less convincing (CEA 3.4% vs. BMT 6.0%; p=0.12). Lastly, ACST again found a benefit of surgery over BMT at 5 years (CEA 6.4% vs. BMT 11.8%; p < 0.0001) with results remaining significant if limited to disabling or fatal strokes (p=0.004); however, both contralateral and ipsilateral strokes were included as endpoints, which some experts have criticised.
It is important to note that the overall benefit, while statistically significant, was very small with an absolute risk reduction of stroke of 1% per year at best.

Subgroup analyses showed that there was no benefit of CEA over BMT in patients over the age of 75. Characteristics that may indicate better surgical candidates include male gender, progressing stenosis, and stenosis 75-95%.\textsuperscript{23-25} Also, patients with a life expectancy of less than 5 years are unlikely to benefit due to high upfront risk of peri-operative complications.\textsuperscript{4} Lastly, any benefit would be lost if CEA was performed in centres were surgical risk is $\geq$3\%.\textsuperscript{18,26}

Recently, these studies have been under scrutiny because the stroke incidence found in the BMT group was higher in the 1990s (when these studies were conducted) than over the last few years. This has been attributed to advances in medical therapy for stroke patients over the past decade and it has been argued that as long as asymptomatic patients with carotid stenosis are placed onto currently available BMT there may not be a net benefit from CEA over BMT alone.\textsuperscript{27-30}

Table 1. Number needed to treat (NNT) with carotid endarterectomy to prevent one stroke per year\textsuperscript{18}

<table>
<thead>
<tr>
<th>Disease</th>
<th>NNT to avoid one stroke/year*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic (60-99%)</td>
<td>85</td>
</tr>
<tr>
<td>Symptomatic (70-99%)</td>
<td>27</td>
</tr>
<tr>
<td>Symptomatic (50-69%)</td>
<td>75</td>
</tr>
<tr>
<td>Symptomatic (&gt;50%) in men</td>
<td>45</td>
</tr>
<tr>
<td>Symptomatic (&gt;50%) in women</td>
<td>180</td>
</tr>
<tr>
<td>Symptomatic (&gt;50%) &gt;75 years</td>
<td>25</td>
</tr>
<tr>
<td>Symptomatic (&gt;50%) &lt;65 years</td>
<td>90</td>
</tr>
<tr>
<td>Symptomatic (&gt;50%) &lt;2 weeks after event</td>
<td>25</td>
</tr>
<tr>
<td>Symptomatic (&gt;50%) &gt;12 weeks after event</td>
<td>625</td>
</tr>
<tr>
<td>Symptomatic ($\leq$50%)</td>
<td>No benefit</td>
</tr>
</tbody>
</table>

*Benefit extends beyond the first year and correspondingly NNTs are much lower for five year outcome data quoted elsewhere in the literature; the main purpose of this table is to serve as a comparator between different patient subgroups.

3. CEA for asymptomatic patients requiring CABG:

Another group of patients that is frequently referred for CUS and CEA are pre-operative CABG patients. Intuitively, it makes sense to image these patients as co-morbidity of coronary and cerebrovascular disease is high and peri-operative strokes are not an infrequent complication of CABG. However, most perioperative strokes are actually attributable to cardioembolic disease rather than carotid disease\textsuperscript{26,31} and only very few patients show evidence of injury due to perioperative hypoperfusion related to concurrent carotid stenosis.\textsuperscript{32,33} Moreover, aggressive medical treatment of pre-CABG patients to address the carotid disease versus CEA has not been studied.

The evidence to support CEA pre- or concurrent to CABG remains inconclusive. To date there have been no randomized controlled trials to address this questions. Two reviews summarising a number of case series, retrospective case control studies, and case reports were identified. One concluded that pre-CABG CEA was not supported by the available literature, but that concurrent CABG and CEA should be considered
where there is a proven surgical risk of <3% and the patient has either unilateral carotid stenosis >60% or bilateral stenosis with the more stenosed side being >75% narrowed. Unfortunately, such a low surgical risk with concurrent CABG and CEA is not easily achieved in this very high risk patient group.

The other review concluded that low risk, younger patients with a significant asymptomatic carotid artery stenosis should be considered for carotid endarterectomy at some stage, but that there is no strong evidence that this must be performed prior to, or during CABG, when surgical risk is highest. More recently, an expert panel discussed this topic and all participants concluded that the available evidence does not support pre-CABG or concurrent CEA, primarily due to the increased surgical risk.

Carotid artery stenting or balloon angioplasty (CAS) has been suggested as an alternative to CEA, but this has not been properly evaluated in this patient group to date. Even in non-CABG patients the use of CAS remains controversial.

4. CAS versus CEA:

As an alternative to CEA, CAS has been assessed in a number of trials and a recent meta-analysis of these studies revealed significantly higher risk of any stroke or death within 30 days of CAS compared with CEA (OR 1.41; 95% CI 1.07-1.87; p=0.016).

Some guidelines still advocate the potential utility of CAS in patients with either medical contraindications to CEA, stenosis at a surgically inaccessible site, re-stenosis after earlier CEA, or post-radiation stenosis, as long as operator complication is well established to be low. However, the NZ stroke guidelines currently do not support the use of CAS in any subgroup of patients due to insufficient evidence.

Recently, the results of the long awaited CREST trial were presented and the results were more promising, showing no significant difference between treatment groups for the combined endpoint of death, stroke or MI. However, it will be important to include this study in a meta-analysis with the previous trials to assess if prior negative results are truly offset and thus it is too early to draw any clear cut conclusions. This has been further highlighted by another recent publication once again establishing CEA as the preferred method over CAS at least until more long term outcome data becomes available.

5. Medical management during the pre- and post-operative periods:

a. Best medical therapy—BMT for most patients with carotid stenosis includes antiplatelet agents (single or combination), a Statin, and oral antihypertensives. Patients awaiting surgery benefit from BMT pre-operatively (including antiplatelets) and long-term post-operatively. This is applicable to both symptomatic and asymptomatic patients with carotid stenosis.

b. Anticoagulants—Some clinicians have advocated the use of intravenous (IV) unfractionated Heparin or subcutaneous (SC) low molecular weight heparin (LMWH) to avoid further TIA's or strokes during the pre-operative waiting period.
Multiple randomized controlled trials have failed to show any benefit of anticoagulation over antiplatelet therapy for extra and/or intracranial atherosclerotic vascular disease, but identified an increased risk of bleeding with anticoagulation. In 21 placebo-controlled trials of several anticoagulant agents in patients with acute ischemic stroke, there was also no net benefit of anticoagulants, since the reduction in the risk of recurrent stroke was offset by the increased risk of brain haemorrhage.

A post-hoc analysis of the TOAST trial suggested that IV administration of Danaparoid may hold some promise in this patient group, but a confirmatory sufficiently powered trial is still outstanding.

Some clinicians still use IV Heparin in TIA patients presenting with crescendo TIA and high grade carotid stenosis, but this practice has not been conclusively evaluated and is not supported by international stroke guidelines.

c. Clopidogrel plus aspirin—Some experts recommend short-term use of the combination of Clopidogrel plus Aspirin in patients with symptomatic carotid stenosis, borrowing from the cardiac literature; however, studies to support this practice are lacking. Long-term use of this combination in stroke patients has been shown to be harmful. The short-term use for “plaque stabilisation” during the pre-operative period may carry an increased surgical risk due to excessive bleeding. While some surgeons may feel that the bleeding is reasonably controllable, others do not.

6. Carotid imaging:

a. Modality—Conventional carotid angiogram to image carotid arteries is being increasingly replaced by less invasive modalities. Aside from CUS, computed tomography angiogram (CTA), conventional magnetic resonance angiography (MRA), and contrast-enhanced magnetic resonance angiography (CEMRA) are now available. A recent systematic review found that the non invasive alternatives, including CUS, provide good accuracy in detecting 70-99% internal carotid artery stenosis when compared with conventional angiography. However, CUS in particular is less reliable for 50-69% stenosis with a significant false positive rate.

When comparing amongst the less invasive modalities CEMRA is most accurate followed by CTA and CUS, with routine non-contrast time of flight MRA being the least reliable. CEMRA and CTA are significantly more expensive and not as widely accessible as CUS.

b. Symptomatic patients—“Symptomatic patients” are those who exhibit symptoms consistent with vascular compromise of anterior cerebral, middle cerebral or retinal artery distribution. This can be confirmed by positive brain imaging or suggested by typical anterior circulation symptoms such as dysphasia, other cortical symptoms (e.g. neglect, apraxia, anosognosia), or transient monocular blindness. Hemisensory loss and hemiparesis can also be seen with anterior circulation compromise.
In contrast, symptoms such as vertigo, diplopia, isolated hemianopsia, or cerebellar ataxia suggest posterior (i.e. not carotid) circulation pathology. Patients with TIA or minor stroke symptoms attributable to anterior circulation compromise, who are also considered fit enough and willing to undergo surgery, are the patients who should be considered for urgent carotid imaging (within 24 hours to 7 days depending on risk stratification).  

**c. Asymptomatic patients**—“Asymptomatic patients” are those who have not had an event attributable to anterior circulation vascular compromise within the preceding three months. This includes most patients undergoing CABG and those with pure posterior circulation symptoms. Limited data is available to help guide which asymptomatic patients are most likely to suffer from severe carotid stenosis. However, some studies have found that the following features are associated with a higher risk of >70% carotid stenosis: carotid bruits, known carotid disease, prior TIA or stroke, prior myocardial infarction, peripheral vascular disease, diabetes, hypertension, tobacco use, and dyslipidaemia.

The presence of a lacunar stroke had a strong negative correlation with significant carotid stenosis. Specificity and sensitivity were dependent on the number of risk factors present.

**d. Follow-up imaging**—Post-operative and surveillance CUS to assess for plaque recurrence or progression is frequently pursued (local audits), but neither practice has been subjected to randomized controlled trials to assess for efficacy. Available data is derived from small case series and retrospective case control studies.

### i. Post-CEA surveillance for restenosis

The post-operative restenosis rate ranges from 6-14% dropping progressively (10% first year, 3% second year, 2% third year). Post CEA stroke occurs in 4.8% (0.3-7.9%) over an average follow-up of 4.5 years (18-120 months). However, >50% of post-CEA strokes are not attributable to ipsilateral restenosis and restenosis itself does not clearly predict an increased risk of stroke. In fact the only significant risk factor for post-CEA stroke is contralateral stenosis of >50% at time of surgery and may thus be the only good reason to warrant post-operative CUS aside from recurrent anterior circulation symptoms. This approach was supported by two papers assessing cost effectiveness of post-CEA CUS surveillance. The yield of early re-scanning (<3 months) and frequent repeat scans (<12 months) was not justifiable based on outcome data.

While patients with symptomatic restenosis generally benefit from repeat surgical intervention there is no consensus about asymptomatic patients, although the same criteria as for non-post-CEA patients are generally applied.

### ii. Surveillance for disease progression

The stroke risk in asymptomatic patients followed serially with CUS ranges from 0.4%-1% per year. Despite this overall low stroke risk, progression from...
moderate to severe stenosis on repeat CUS has been reported to be as high as 20-22% at three years and progression of carotid stenosis appears to identify a subgroup of patients at higher risk of future stroke. However, whether this increase in stroke risk is significant enough to warrant ongoing surveillance or if surveillance is even an effective measure to prevent such strokes has been drawn into question.

C. REGIONAL CONSENSUS

1. Carotid ultrasound utilization:
   a. Symptomatic patients—CUS should be offered to patients who are likely to have suffered an anterior circulation TIA/non-disabling stroke, are reasonable surgical candidates, and are willing to undergo surgery.
      i. TIA/non-disabling stroke symptoms—symptoms should be of sudden onset and of maximal intensity at onset with other diagnoses being less likely.
      ii. Anterior circulation symptoms—one or more of the following has to be present: unilateral numbness, unilateral weakness, dysphasia, or other cortical symptom and patient does not have cerebellar symptoms, diplopia, dizziness/vertigo, or syncope.
      iii. Reasonable surgical candidate—low to moderate peri-operative risk and non-disabling stroke or TIA symptoms with reasonable baseline level of functioning (e.g. patient should not be plegic, fully dependent, terminally ill or demented)
      iv. Timing—CUS should be obtained within 24 hours in patients with ABCD2 score of >3, crescendo TIA, or ongoing non-disabling stroke symptoms. CUS should be obtained within 7 days in all remaining patients that meet criteria i.-iii.
   b. Asymptomatic patients: In centres were CUS services are limited, scanning of asymptomatic individuals could be limited to the private sector. To ensure that the yield is sufficiently high, imaging should be limited to patients who meet the following criteria:
      i. “Favourable” patient profile with at least some if not all of the following: Male, <75 years old, >5-year life expectancy, very low peri-operative risk AND
      ii. Carotid bruit is present AND
      iii. Prior history, even remote, of non-lacunar TIA/stroke OR
      iv. Diabetes OR
      v. Two or more of the following: hypertension, dyslipidaemia, smoker, concurrent coronary or peripheral vascular disease
   c. Surveillance scans of mild-moderate stenosis—In patients with 50-69% stenosis who did not undergo CEA and who are male, <65 years old, have a life expectancy of >5 years, and have a very low peri-operative risk a single
follow-up CUS should be considered at about 1-2 years to evaluate for progression to ≥70%. Ongoing surveillance or routine follow-up for all patients with some degree of carotid stenosis has a low yield and is unlikely to be cost-effective, or even achievable, in the current setting of limited access to carotid imaging.

d. Post surgical requests—Post CEA it is reasonable to obtain a single follow-up ultrasound. If a restenosis is felt to be likely due to peri-operative difficulties this should be performed about 3-6 months post surgery. If surgery was uncomplicated follow-up scanning should be delayed to 6-12 months to increase yield.

e. Pre-CABG imaging—this practice is controversial and requires further discussion with cardiologists and cardiothoracic surgeons – a consensus was not reached.

f. Pre-operative rescanning—Repeat carotid imaging prior to surgery should be considered in patients who have been waiting for an extended period to exclude interim change. Patients with carotid stenosis of 50-69% on CUS should be considered for CTA or CEMRA prior to CEA to confirm degree of stenosis if at all feasible and if unlikely to delay surgical intervention >2 weeks from symptoms onset.

2. Step-by-step management guidelines for potential CEA candidates:

   a. Symptomatic patients—

      1. TIA/non-disabling stroke diagnosis is made
      2. Anterior circulation compromise is deemed likely
      3. Patient is agreeable to undergo surgery, and deemed a good surgical candidate
      4. CUS is obtained within 24 hours to 7 days depending on risk assessment
      5. On call vascular surgery consultant is called if ipsilateral stenosis is confirmed and measures

         i. 70-99% or
         ii. 50-69% plus favourable patient profile (>75 years of age, male, and hemispheric stroke or TIA)

      6. Patient is scheduled for surgery

         i. within a maximum of 2 weeks of symptom onset for most candidates
         ii. within 48-72 hours if crescendo TIAs or very high grade stenosis (but <99%) is present

      7. Images are transferred to Capital and Coast DHB via PACS (if available)
8. Standardised referral is completed and emailed or faxed to the surgeon (Appendix A)
9. Clopidogrel is avoided during the pre-operative period
10. Aspirin, Dipyridamole, Statin, and anti-hypertensives should be continued
11. IV Heparin, Enoxaparin, or Warfarin should not be used routinely as a bridging therapy

b. Symptomatic late presenters—
   1. Patients who present >2 weeks since symptom onset and have ipsilateral stenosis of
      i. 70-99% are triaged to undergo CEA within 4 weeks
      ii. 50-69% should not be offered CEA
   2. Patients who present >3 months since symptom onset are to be considered as asymptomatic candidates (see below).

c. Asymptomatic patients—
   1. Patient meets criteria as outlined under C.1.b-d
   2. Non-urgent imaging is arranged
   3. Routine outpatient referral to vascular surgeon is sent via mail if:
      i. stenosis of at least 70% is identified AND
      ii. it is confirmed that the patient has at least some if not all of the following “favourable characteristics:” male, <75 years old, life expectancy of >5 years, very low peri-operative risk, progression on CUS
   4. All patients considered for surgical referral should be counselled on the available data and active patient involvement in the decision making process should be encouraged
   5. Prioritisation for surgery of these patients will be low and wait times may be up to 6-12 months
   6. Because of the small benefit of CEA in these patients some consideration could be given to performing these procedures preferentially in the private sector
   7. All patients with identified carotid artery stenosis, whether referred for surgery or not, should be placed on best medical management to reduce the risk of future stroke

d. Pre-CABG patients—Insufficient evidence was identified to support routine CEA combined with CABG or pre- CABG in patients with asymptomatic carotid stenosis awaiting coronary bypass surgery. In light of limited access to CUS and CEA this practice should be further reviewed. However, this consensus group felt that specific recommendations should be
arrived at after further consultation with cardiologists and cardiothoracic surgeons.

3. Miscellaneous:

a. Carotid artery stenting—CAS is inferior to CEA and should not be routinely considered. CAS may be considered in some patients with stenosis at a surgically inaccessible site or post-radiation stenosis. This decision is at the discretion of the involved vascular surgeon.

b. CEA risk assessment—Periodic auditing of surgical complications should be undertaken and should include a non-surgeon stroke physician or neurologist to ensure that surgical risk remains below <3% for asymptomatic and symptomatic patients with 50-69% stenosis and <6% for symptomatic patients with 70-99% stenosis.

c. Assessing degree of carotid stenosis—All involved clinicians should preferentially use NSCET criteria for assessing degree of carotid stenosis and this should be confirmed with each local radiology department.

D. REFERRER DEMOGRAPHICS

Stroke specialist/neurologist involvement is encouraged prior to referral for surgery. However, if this is likely to cause significant treatment delays then GPs or other medical specialists may refer symptomatic patients directly for surgery using the same criteria as outlined above.

Conclusion

Carotid endarterectomy is an effective therapy for the prevention of stroke. However, in order to maximise the benefit, patients have to be selected carefully. In an environment of limited resources and often long waiting times for diagnostics and procedures it is vital to give high priority to those patients who are likely to benefit the most.

If many geographically separated physicians refer to a single small group of surgeons it is also important that selection criteria and referral processes are agreed upon to ensure that patients are treated equitably throughout the region. A region-wide management consensus can also help local physicians to justify management decisions amongst their own colleagues and managers. It is hoped that this consensus will achieve a more standardised approach resulting in shorter waiting times for diagnostics and surgery, fewer preventable strokes, and fewer unnecessary diagnostics and surgeries. It is anticipated that this will not only improve patient care, but may also serve as a model for enhancing efficiency and cost effectiveness of health care delivery across a wider region.

As further scientific data emerges recommendations will have to be reviewed and future forums may expand to include general, neuro-, and interventional radiologists, cardiologists, and cardiothoracic surgeons to get an even more comprehensive perspective on the issues at hand.
Competing interests: None.

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Acknowledgements: The authors would like to thank Drs Alan Barber, John Fink, and John Gommans for their valuable comments and feedback.

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References:


## Appendix A

### Carotid Endarterectomy Regional Referral Form

#### Patient label or fill in:

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Gender: □ male □ female</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHI:</td>
<td>Address:</td>
</tr>
<tr>
<td>DOB:</td>
<td>Hospital:</td>
</tr>
<tr>
<td>Phone:</td>
<td>GP:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Referrer:</th>
<th>Surgeon contacted by phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone: Fax:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Email:</th>
<th>Patient Cell (if available):</th>
</tr>
</thead>
</table>

**Date of event (if any):**

**Type of event:** □ TIA □ Stroke

**ABCD2 score:**

**Number of events/time:**

**Symptoms:** □ right/□ left

**Relevant pre-op neurological exam findings:**

**Suggested time frame for CEA:** □ 1-3 days □ 3-14 days □ >14 days OK

**Brain Imaging:** CT □ MRI □ Result:

**Carotid Imaging:** Carotid U/S □ MRA □ CTA □ Conv. Angiogram □

**Result:** Left ICA: Right ICA:

**Other:**

**Reports attached?:** yes □ no □ if no, reason:

**Medications:**

**PMH (especially as might pertinent to surgical risk):**

**Any other relevant information:**

_________________     _______________

Referrer Signature     Date
Optimal dose of clopidogrel and aspirin in acute coronary syndrome

Clopidogrel and aspirin are widely used for patients with acute coronary syndromes and those undergoing percutaneous coronary intervention. The usual dosage in New Zealand is 300 mg of clopidogrel initially followed by 75 mg daily. Aspirin dosage is 300 mg initially followed by 100 mg daily. However, the investigators in this study point out that in the USA some authorities recommend higher dosage of both agents.

In this study over 25,000 patients were randomly assigned to either double-dosage clopidogrel (a 600-mg loading dose on day 1, followed by 150 mg daily for 6 days and 75 mg daily thereafter) or standard-dose clopidogrel (a 300-mg loading dose and 75 mg daily thereafter) and either higher-dose aspirin (300 to 325 mg daily) or lower-dose aspirin (75 to 100 mg daily).

The primary outcome was cardiovascular death, myocardial infarction, or stroke at 30 days and they report no significant difference between the high and standard dose clopidogrel arms. Similarly there was no difference in the primary outcomes between the high and low dose aspirin treated patients.

So this trial confirms that the standard lower dose regimens are as effective as the higher dosage.


Tight blood pressure control among hypertensive patients with diabetes and coronary artery disease?

Hypertension guidelines advocate treating systolic blood pressure (BP) to less than 130 mmHg for patients with diabetes mellitus; however, data are lacking for the growing population who also have coronary artery disease (CAD).

The authors of this retrospective study of patients with hypertension, diabetes and CAD throw light on this issue by reviewing the records of 6400 such patients over nearly 1700 patient-years of follow-up. Patients were categorised as having tight control if they could maintain their systolic BP at less than 130 mmHg; usual control if it ranged from 130 mmHg to less than 140 mmHg; and uncontrolled if it was 140 mmHg or higher.

Adverse outcome measures were all-cause death, non-fatal myocardial infarction or stroke. They report that 286 (12.7%) who maintained tight control, 249 (12.6%) who had usual control, and 431 (19.8%) who had uncontrolled systolic BP experienced a primary outcome event.

Clearly, uncontrolled hypertension is predictive of worse outcome but tight control of the BP is no better than usual control for those with diabetes or CAD.

Gastric acid inhibitors and hospital-acquired pneumonia (HAP) in the postoperative setting

An increased risk of community-acquired pneumonia has been found in current users of acid-suppressive medications (see Methuselah, *NZMJ* 8 May 2009).

A similar association has also been noted for HAP (see Methuselah, *NZMJ* 7 August 2009) although only statistically significant for proton-pump inhibitors (PPI). This case note retrospective analysis of over 500,000 cases in the postoperative setting found that gastric acid suppressants may increase patient’s risk of pneumonia after major surgery. However, they point out that those on gastric acid inhibitors were also predisposed by independent risk factors to postoperative pneumonia. Adjustment for these risk factors revealed no direct association between gastric acid suppressants and a patient’s risk of postoperative pneumonia.

The independent risk factors noted were a history of chronic obstructive pulmonary disease, heart failure, Parkinson’s disease, and prior pneumonia; nasogastric tubes; and prescriptions of antipsychotics.

So the issue is somewhat uncertain. However, clearly gastric acid suppression particularly with PPI should not be indiscriminately prescribed, particularly in those with additional risks for postoperative pneumonia.


Chronic kidney disease (CKD) and the use of erythropoiesis-stimulating agents

Anaemia frequently complicates kidney disease and deficient erythropoietin release is believed to be involved. Hence erythropoietin is frequently used to alleviate the anaemia associated with CKD. There is ample evidence that the haemoglobin (Hb) is elevated and the need for transfusions of blood are lessened with its usage. Consequently their patients’ quality of life is improved.

This meta-analysis probes the possibility that sometimes the patient may do better with lesser Hb levels. They have compared outcomes between patients whose target Hb was high (130 g/L) and those whose target Hb was low (101 g/L). And they conclude that targeting higher haemoglobin levels in CKD increases risks for stroke, hypertension, and vascular access thrombosis and probably increases risks for death, serious cardiovascular events and end-stage renal disease.

Apparently the National Kidney Foundation clinical practice guideline recommends a Hb target of 100–120 g/L and the authors of this paper imply that the target should be lowered.

Prolonged venous thromboembolism prophylaxis in acutely ill medical patients with reduced mobility

Hospitalised medical patients have a high risk for venous thromboembolism (VTE). Consequently most are treated with low molecular weight heparin provided there are no contraindications. This international study attempts to prove, or disprove, that extended treatment would be more beneficial. The subjects were acutely ill medical patients 40 years or older with recently reduced mobility (bed rest or sedentary without [level 1] or with [level 2] bathroom privileges). And the intervention was enoxaparin, 40 mg/d subcutaneously (2975 patients), or placebo (2988 patients), for 28 ± 4 days after receiving open-label enoxaparin for an initial 10 ± 4 days.

The results demonstrated less VTE in the enoxaparin group, but as expected, more bleeding events in these patients (140 versus 88). In the enoxaparin subjects there were 4 intracranial bleeds and 1 fatal haemorrhage (versus none in the placebo group). Subset analysis showed that prolonged low molecular weight heparin treatment benefits seemed to be restricted to women, patients older than 75 years, and those with level 1 immobility.

NZMJ’s impact factor

We ask about the citations of articles in, and impact factor associated with, the New Zealand Medical Journal (N Z Med J).

Until the Journal went electronic, it was rated by Journal Citation Reports (JCR) with the journal impact factor mostly within the range 0.6 to 0.7.1 Immediately after the print edition ceased, citations to N Z Med J in Science Citations Index fell noticeably.

A search (September 2010) of the JCR website shows that N Z Med J no longer appears on the list of journals currently monitored. Further, a search on the website (or ISI Web of Knowledge or Web of Science) for articles published in the Journal finds none published since mid-2002. Those articles that do have citations are to articles published before mid-2002 in print. The article by Derek Smith2 could be seen as supporting this when in his article about N Z Med J’s most cited articles, all those with “classical” status were published in print form, none since moving electronic.

On a brighter note, Medline, PubMed, and the more recent Scopus tool (articles only since 1996) do include articles published in the electronic version of the Journal. Scopus’ SCImag Journal Rank (SJR) that reports the value of weighted citations per document currently rates N Z Med J as 0.063.

In comparison, the Medical Journal of Australia is rated at 0.176, the Australian and New Zealand Journal of Public Health at 0.127, and the Australia and New Zealand Health Policy, 0.070. It also provides a normalised impact per paper published (SNIP) in which N Z Med J rates at 0.221, compared to the Medical Journal of Australia at 0.735, the Australian and New Zealand Journal of Public Health at 0.629, and the Australia and New Zealand Health Policy, 0.399.

Given the climate of emphasis on publications for academic advancement and PBRF funding, it is important to researchers that their work is cited and that it appears in journals with a high impact factor. That authors continue to submit to the journal may well reflect a wish that their work is used to inform local policy and practice. Nonetheless, non-inclusion of the journal in JCR will increase the likelihood that authors choose to submit to other journals.

Has the editorial committee tried to rectify this problem with JCR?

Joanna Broad
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References:


Response to Ron Paterson’s editorial on the Cartwright legacy

I wish to comment on the editorial by Ron Paterson in the Journal of 30 July 2010 and it is difficult because I admire the way that he fulfilled his role as Health and Disability Commissioner.

It would take another big article to respond to all the points he makes but I think people need to know that most of the changes that were attributed to the Committee of Inquiry into National Women’s Hospital were underway before the Inquiry; the development of realistic guidelines about informed consent was set by the release of the Report and the subsequent exclusion of the medical profession.

Ron Paterson seems concerned about the emphasis on clinical leadership as though in some way it is not compatible with the focus on patients whereas the actual implementation of the principles of professionalism will be enhanced without so much top-down management.

The process of the Committee of Inquiry was unfair and so was the finding of the Medical Council; they were poorly advised and failed to consider, objectively, the historical context. Also, it is entirely untrue that the observational study of Herb Green was done without curative intent and was unethical.

There was no opportunity to correct the errors in the Report or appeal the findings and censure of the Medical Council, so we are left with the sensationalist headlines from the news media to which Ron Paterson refers.

We must not overlook the fact that Judge Cartwright damned the entire medical profession which includes the clique who continue to vilify Herb Green, having built their careers on his meticulous work. The deaths from cancer of the cervix were falling before the Inquiry, none of the women for whom Judge Cartwright expressed a special concern were found to have cervical cancer and the current screening programme has not much difference, missing many of the women most likely get invasive disease.

The propaganda around the time of the Inquiry included the myth that cervical cancer was preventable for all women. Women died from cervical cancer in the 1960s and 70s and they still do. They also die from heart attacks and it is interesting to see the article in the NZMJ of 30 July about care of people with acute coronary syndrome, noting that within that study there were deficiencies in the care and 16 deaths recorded. That is reality.

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M A H (Tony) Baird
Auckland Uro Gynaecology
Parnell, Auckland

Reference:

Revisiting the Cartwright Report

On page 157 of her report Sylvia Cartwright stated that only a minority of women patients or relations of patients she spoke to had a grievance about their treatment. She then unjustifiably claimed that the people without grievance (“the vast majority” of the people she contacted) were so unaware of the nature of the condition, that they could not formulate a complaint. If the arrogance of this approach did not ring warning bells with her advisors, Charlotte Paul and Lowell Goddard, surely the impossibility of confirming the claim should have.

On page 95 of the report Sylvia Cartwright concluded that the Metro article was extensively researched and professionally written and displayed understanding that “few lay people could hope to achieve.” Yet the Metro article began the misconception of the “group two women who had limited or no treatment,” a misconception which has drifted into the popular headline, “Women were denied treatment….”

As a “lay person” herself, Sylvia Cartwright was let down by her advisors who failed to correct her misinterpretations. This lack of professional guidance resulted in justice being denied to (among others) our father and father-in-law, Herb Green.

Misconceptions continue to this day and must be partly responsible for the lack of acceptance of the Cartwright report—a situation probably unique in the history of commissions of enquiry in New Zealand.

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Helen Holdem and John Holdem
Mt Albert, Auckland
Correcting an error but inadequate treatment of cervical cancer still occurred

In my last letter I made an error while transposing my clinical file. In one place I neglected to add the words ‘in situ’ following the word ‘carcinoma’. I apologise for this.

Having said that, I wish to state that the omission does not in any way affect what is revealed by my clinical case history: failure to treat adequately carcinoma in situ and stage 1A carcinoma over the course of the 15 years I attended National Women’s Hospital.

Clare Matheson
Retired Secondary School Teacher
Auckland

Reference:
Confusion surrounding the Unfortunate Experiment

Much of the information and misinformation surrounding the Unfortunate Experiment is confusing.

There is only one question to be asked and answered. Was there ever an ‘Unfortunate Experiment’ with an ‘untreated group’ and excess deaths? The answer comes from a 1988 review of the era in question, ordered by the NWH superintendent and carried out by two senior clinicians from the National Women’s Hospital Cancer Unit. The era covered 30 years—1955–1986—and included 3037 women with the worst kind of dysplasia, CIN3.

In these 3037 women there were 8 deaths. This fact was accepted by the Inquiry but was never made public. These facts are verifiable and indisputable and must be amongst the best in the world for that period.

Elizabeth Overton
Wife of Graeme Overton (Senior Consultant associated with National Women’s Hospital 1960–99)
A particular relationship: part 3

As someone who first raised the above issue (*NZMJ* 30 July 2010) I would like to make a final comment. It would appear that I have completely misunderstood Professor Charlotte Paul concerning the so called “particular relationship” with Professor Bryder. Her denial that she was referring to Dr Tony Baird (*NZMJ* 27 August 2010) has me perplexed and obviously confused the aggrieved doctor (*NZMJ* 10 September 2010). Little wonder, because this clearly means that there must be other senior gynaecologists who she (Paul) feels had some influence in relationship to the contents of the “Bryder book”. I feel it important that Professor Paul tell us who these doctors were.

The fact of the matter is that she is either unable or unwilling to present specific evidence of a relationship, particular or otherwise, between Professor Bryder and any senior clinician. It is all surmising, supposition and innuendo. Her comments have been carefully worded and couched but she has been unable to camouflage her tactics which at best lack credibility, and at worst, border on the base; all with the support of the vice chancellor.

So let’s see how this works. As one of the many clinicians interviewed by Professor Bryder’s research assistant it would appear that unbeknown to me I may have, as a result of this contact, possibly formed a relationship with someone I had never met.

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Paul Patten  
Obstetrician & Gynaecologist  
Auckland Obstetric Centre  
Newmarket, Auckland
GP training

In mid-September I received a letter signed by Professor Gregor Coster on behalf of HWNZ (Health Workforce New Zealand), Dr John Adams on behalf of MCNZ (Medical Council of New Zealand, and Dr Tana Fishman on behalf of RNZCGP (Royal New Zealand College of General Practitioners).

They want to take yet another good hard look at the state of general practice, and they are seeking the help of each one of us.

I am long gone from general practice, but I still talk to GPs and I go to occasional meetings and I shall be addressing two medical gatherings in one month’s time.

If Drs Coster, Adams, and Fishman are serious about seeking my help, then I feel that the best thing that I can tell these authors is that they stop wasting time and money sending out rubbish like that letter. If they feel that they must communicate with other people, they should find somebody with writing skills to help them. “To date,” they say, “work has focused on scoping the subject.” I confess to being a purist, and I do not need to see a participle formed from a verb that I cannot find in my dictionary.

Training for general practice, and the support of the bodies that are there to stop it falling to pieces, is already costing a lot of money, and these people would not be sending out thousands of letters unless they knew that things were unsettled.

They wish to “create a GP role that is more flexible and multi-faceted, enables closer linkage with local hospitals and takes account of emerging models of care with increased delivery of services in community and primary care settings.” This is jargon, and they need to be told.

Can we not tot up the debacles about which the learned bodies have had nothing to say at all?

Banishment from obstetrics, withdrawal of anaesthetic services, abolition of the duty to detain or certify insane patients when necessary, loss of control over the ministrations of physiotherapists, competition from free hospitals offering a vast array of services, the struggle to push patients up the surgical waiting-list, and rising numbers of indigent patients who cannot, or will not, pay anyone for anything.

A young woman GP told me that general practice is “disintegrating.” She does a few locums as and when she pleases, but the one regular job that she has is a clinical post in a high school. There, at no cost to the patients, she can check them for STDs and, on occasion, refer somebody for termination of pregnancy.

In general practice, there is nice work if you can get it, and you can get it if you try. It will be paid sessional work, that demands little or no contact with private specialists (whose fees fewer and fewer people can afford), no necessity to go anywhere near a hospital, and no involvement in work that might disturb you after 5 o’clock at night. Having embarked on their careers when the raping of general practice was done, many doctors are doing just the few half-days a week, and that suits them nicely, thanks.
I note that the circular suggests a change that “would allow GPEP1 trainees access to the employment benefits enjoyed by other specialist trainees, including paid holiday, maternity leave and payment of examination fees.”

All right, you can lay on the taxpayer-funded perks, and hope for results, but the young doctors still won’t settle in the country, and who shall blame them for that?

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Roger M Ridley-Smith
Retired GP
Wellington
Jeff Weston’s life was one of dedication to the well-being of the children under his care and throughout New Zealand and to the many Paediatricians who have been challenged and inspired by his teaching and example.

Jeff was born in New Plymouth where his father was the local newspaper proprietor and where he attended New Plymouth Boys’ High School. He went on to Otago Medical School and then to Wellington Hospital for his House Officer and Registrar years.

His ambition was to follow a career in respiratory medicine and travelled to London where he worked in the Hammersmith and Brompton Hospitals.

After a year, he changed to paediatrics and obtained a position at the Hospital for Sick Children, Great Ormond St, London, where he rose to the position of Resident Assistant Physician. After this training he returned to New Zealand where he held the post of part-time Paediatrician at Hutt Hospital for 2 years before moving to a similar position at Wellington Hospital. At the same time he was honorary Paediatrician at the Home of Compassion and the local Karitane Hospital.

In 1975, with the enlargement of the Wellington Clinical School, he took on the position of inaugural Professor of Paediatrics as well as the Head of the Hospital Department. He held these roles until his retirement in 1992. The teaching role made good use of his excellent clinical knowledge and suited his skills of organisation, people management and instilling enthusiasm in the students who came under his tutelage.

Many of these have gone on to careers in paediatrics and have benefited from his support and encouragement. On his retirement in 1992, he was appointed Emeritus Professor of Paediatrics and his contribution was further recognised in 2000 when he received with the inaugural Dean’s Medal for distinguished service to the School of Medicine.

His clinical interests were wide-ranging and appropriate to his role of General Paediatrician, but his experiences in London did engender a special interest in cardiology which he indulged by running clinics for congenital heart disease with his adult cardiology colleagues.

More widely than that however, he was a staunch advocate for all things to do with children’s health and their well-being, and paid particular attention to social problems and child abuse. In 1954 as a Paediatric Registrar, he was the first to identify a case of physical abuse of a young child in the Wellington region. Along with non-accidental
injury, he contributed to an understanding of accidental injury in children and its prevention.

As Head of Department he was advisor to the Hospital Board in Paediatrics and was similarly advisor to the Department of Health. He fought vigorously for resources and accommodation for the hospital service and was very proud when the new Children’s Hospital at Wellington was opened in 1988. This was the culmination of a lot of hard work both behind the scenes and in the media where his newspaper inheritance came into full play.

His wide view of paediatrics and children’s health saw him as President of the Paediatric Society and involved in a number of RACP committees, especially those to do with training and examinations, in addition to all his University commitments. He was a strong supporter of medicine in the Pacific especially, with visits to Singapore, China, Samoa and Manila under various auspices but all with the aim of developing paediatric teaching and services in these countries.

Following his ‘retirement’ he continued on as his own locum for a while and later enjoyed maintaining his clinical expertise with locums at a number of smaller hospitals in the area where his skills were much appreciated. One other important retirement job he was asked to do was to head the hospital O & G department. His impeccable honesty and open approach was an important factor in smoothing some of the problems they were facing at the time as everyone involved knew that if he promised something, it would happen.

In his spare time he enjoyed life in the Territorial Army’s 2nd General Hospital Territorial and later the Defence HQ. He rose to the rank of Colonel and was awarded the Efficiency Decoration in 1972. He was also honorary aide-de-camp to the Governor General, Sir Bernard Fergusson. In his retirement he also explored one of his passions, geology, and gained great personal satisfaction when he graduated BSc from Victoria University in 1995.

A keen golfer, he was awarded a University Blue in 1949 and continued enjoying the game until very recently when his health became an issue. Skiing and family activities also were close to his heart. He died at home with his family after a long battle with prostate cancer.

Jeff was always an advocate for the welfare of children and the recognition that their requirements were very different from those of adult patients. He fought constantly for adequate facilities and services for them and earned the comment from the local newspaper (Evening Post) that he had “a brusque disregard for parliamentary sensitivities”. His arguments were always well-informed, often impassioned and he was capable of ignoring traditionalists disapproving of such innovations as more generous visiting for parents and even their staying overnight. He expected and rewarded good care by his staff, and his fairness and honesty was one of the reasons he was asked to act as head of the Obstetric Unit.

Above all, he had a good sense of humour and was very much a family man who was in regular contact with his children and grandchildren. Truly, this was a “man in whom there was no guile”.

Dr Archie Kerr (a retired paediatrician) wrote this obituary.
University of Otago Faculty of Medicine: Postgraduate Scholarship in Obstetrics and Gynaecology

The above Scholarship is open to medical graduates who will normally be Registrars undertaking the Royal Australian and New Zealand College of Obstetrics and Gynaecology (RANZCOG) Integrated Training Programme, or are Members or Fellows of the College who intend to enrol for a research degree, eg Master of Medical Science (MMedSc) or PhD.

The Scholarship is $34,000 per annum for one year commencing 1 February 2011.

Further details are available from:

   Donna Robson
   Section of Obstetrics and Gynaecology
   Department of Women’s and Children’s Health
   Dunedin School of Medicine
   PO Box 913, Dunedin 9054

   Email: og.admin@otago.ac.nz

Applications close on Friday 29 October 2010
Patient Safety First: Responsive Regulation in Health Care


This collection of 15 essays from many of the leading thinkers in patient safety in Australia (joined by Kieran Walshe from the United Kingdom) provides an excellent overview of regulatory approaches to patient safety, and makes the case for “a more responsive regulatory environment” (p 20).

The “responsive regulation pyramid” of strategies for patient safety has been influential across the Tasman, and informs much of the thinking in this book.

The pyramid’s base comprises voluntary efforts of clinicians (such as participation in clinical quality registries and implementation of practice guidelines), and ascends through self-regulation, economic instruments (such as pay for performance), co-regulation (such as New Zealand’s system of the Health and Disability Commissioner and registration bodies), and meta-regulation (such as bodies that oversee the regulators, an approach favoured in the United Kingdom), to the apex of “command and control” via courts, tribunals and inquiries.

New Zealand readers will find much of interest in this book. There is a plug for individual patients, nurses, doctors, and managers to steer safety from the “bottom up” (with a nice example involving Nurse Response, an innovative practitioner of “networked governance” who “leads from behind” (pp 24-27)). The case is made for a learning culture that rewards honesty about mistakes but punishes their cover-up. Intriguingly, it is suggested that patients are “ethical heroes” when they forgive a clinician who openly discloses a mistake (page 32). Does this mean that patients who cannot find it their heart to forgive are villains?

Some chapters verge on turgid descriptions of familiar territory, with excessive jargon. This reflects the sort of “rote-learning”, formulaic approach that has characterized much thinking, writing and talking about patient safety. There are relatively few practical examples from a clinical perspective and, despite the “Patient Safety First” rhetoric of the title, a consumer perspective is disappointingly absent from the collection.

In the main, however, the enthusiastic contributors present refreshingly honest appraisals: for example, about the lack of strong research evidence of effectiveness for many patient safety initiatives and regulatory strategies; that clinical standards are underdeveloped and, where they exist, often not adhered to; that credentialling in Australia (and, one might add, New Zealand) is still “rudimentary” in most institutions (p 215); that “many professional bodies take a laissez-faire approach to how their members conduct their practice” (p 216).
The essays offer many thought-provoking challenges: to clinicians, to recognize a governing board’s responsibility to monitor and review clinical services and question proposals for service development; and to boards, to ensure the integrity and performance of a health entity’s governance systems. In a fascinating chapter on surgeon report cards, in relation to the common “defensive surgery” objection, the authors speculate: “Perhaps some surgeons are the victim of cognitive biases which reduce their ability to understand how risk-adjustment works”? (p 228)

Queensland Health’s response to major service failures is discussed as an example of the role of health ministries in promoting cultural change (by significant investment in leadership development), improved accountability (by the use of statistics to monitor variations in outcomes of care) and greater transparency (by public reporting on a range of performance measures). There is also a call for governments to lead innovation, such as by funding investment in e-health as “an investment in the railway system needed to carry health reform” (p 313).

The apex of the regulatory pyramid also comes under the spotlight. Some readers may query whether litigation is “the ultimate regulatory tool” (p 255). The bold claim is made that expert witnesses sometimes fail to maintain their impartiality, with partiality seen “more often in the defence camp than in the plaintiff’s camp”; p 266). (Doubtless it could never be proved, but it does accord with my own impression from hundreds of medico-legal cases.) The case is also well made that if public inquiries aim to improve health care, inquiry bodies must apply rigorous methodological standards and actively disseminate their findings.

Nor are academic experts immune from criticism. Patient safety experts need to develop “[m]ore integrated approaches to assuring safety and quality”, recognizing the importance of individual health professionals in the system of care (p 163).

There is a wealth of interesting material to dip into here. In their analysis of the role of regulation in health care, the editors and contributors have made a valuable addition to the growing patient safety literature.

Professor Ron Paterson
Faculty of Law
University of Auckland