THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

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THE NEW ZEALAND MEDICAL JOURNAL
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This Issue of the Journal

Guidelines for sore throat management in New Zealand
Melissa Kerdemelidis, Diana Lennon, Bruce Arroll, Briar Peat

Untreated streptococcal pharyngitis can lead to acute rheumatic fever which in 80% of patients includes heart damage. Rheumatic fever affects mainly poorer people, so sore throat management guidelines have been written to reflect this. Māori and Pacific children between 5–14 years of age are at particularly high risk mainly due to living conditions—10 days of penicillin twice a day or amoxicillin once a day is standard of care with or without a throat swab. Better-off children, who are mostly Pakeha (New Zealand European) and Asian, should have a throat swab for a symptomatic sore throat to avoid unnecessary use of antibiotics—their risk of rheumatic fever is very low.

Exploring knowledge of prescription charges: a cross-sectional survey of pharmacists and the community
Emily-Jane Willmot, Beverley A Lawton, Sally B Rose, Selina Brown

We surveyed pharmacists' and the general public's awareness of recent changes to prescription prices that occurred in July 2007 in New Zealand. 73.8% of the general public surveyed were unaware of the prescription price changes and 67.5% were unaware that the cost of prescriptions was prescriber-dependent. Despite being given a script by their GP, 8.75% of all respondents gave cost as a reason for not buying medicines in the last 6 months. After being informed of the decreased prescription price, 28% of those said that they would probably now buy such medicines.

Do general practitioners use thyroid stimulating hormone assay for opportunistic screening?
Veronique Gibbons, Steven Lillis, John V Conaglen, Ross Lawrenson

Thyroid function tests are commonly requested in General Practice. Ninety-two percent of TSH tests that are taken are within the reference interval. Of the 8% of tests which are outside the reference interval, the majority represent subclinical thyroid disease. Women appear to be tested more often than men but conversely are more likely to present to General Practice and are therefore more likely to be screened.

Health Reality Show: Regular Celebrities, High Stakes, New Game—a model for managing complex primary health care

Nicolette Sheridan, Tim Kenealy, Matthew Parsons, Harry Rea

A study in South Auckland, New Zealand showed that most people who repeatedly attended the Emergency Department at Middlemore Hospital had unmet social needs preventing them from getting medical help. This study showed a small team (working across social service agencies, general practice, and the hospital) changed these people's lives. In 2006/7 at Middlemore Hospital 1613 people accounted for about 40% of the adult medical services bed days at a cost of NZ$30,474 million.

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Sore throat in New Zealand

Jim Reid

The paper by Lennon et al[1] in this issue of the *NZMJ* is a narrative and clarification of an existing guideline already published by the Cardiac Society of Australia and New Zealand.[2] It provides the scientific justification for the guideline.

While sore throat is a common affliction and is a common presentation in general practice there seems to be little data with reference to prevalence in New Zealand. Some 31% of respondents to a Scottish cross-sectional postal questionnaire reported that they had suffered from a severe sore throat or tonsillitis in the preceding year.[3]

Few of these attended a doctor, and a Canadian study reported that although sore throat was the second most common acute infection seen by family physicians, representing about 4% of all doctor visits, fewer than 1 in 10 people with sore throats actually sought medical attention.[4]

Rheumatic fever is a significant problem in New Zealand, especially among the underprivileged, and, as Lennon et al states, is more common in overcrowded living conditions.[5] It has an increased prevalence among Māori and Pacific Islanders living in the North Island especially those who have previously contracted the disease.[6] The initial appropriate treatment of Group A streptococcal sore throat is especially important, and in the areas of high prevalence in New Zealand, which are often remote, one wonders how many people with this condition have ready access to medical attention.

While the primary responsibility for the prevention of rheumatic fever lies within general practice (or primary medical care) the sufferers of sore throat need to understand the potential danger of non treatment. This is a challenge for public education, really along the lines of that used when the mortality from asthma in New Zealand in the 1980s was the highest in the world. Because the condition is so common, it is regarded as "just" a sore throat, as was an attack of asthma "just" asthma. This perception of sore throat needs to change, as it has with asthma.

New Zealand, like many countries, has a shortage of rural medical practitioners.[7] Those potentially afflicted or who have suffered rheumatic fever are often underprivileged and live in areas where access to a doctor for one reason or another is difficult. Moreover the costs of transport and medical services are additional barriers. Perhaps it is time to look upon provision of alternative access to appropriate primary medical care for these communities. Protocol controlled care driven by nurses could be one such methodology.

The paper provides real focus for doctors and such nurses and includes a succinct algorithm, which in contrast to many other guidelines is of real use to all primary care health professionals. Accurate diagnosis of a group A streptococcal infection of the throat is important for appropriate treatment to be instigated. There will be some difficulties in diagnosis, especially with the use of swabs in remote regions, and as

always in medicine, compromise and reliance on probability is important. The rapid antigen test (RAT) for Group A streptococcal infection could also be useful in correct diagnosis and thus promote accurate use of a 10-day course of penicillin.[8]

In some recent literature, the non use of antibiotics for the treatment of sore throats is promoted.[9] The Cochrane Library review *Antibiotics for sore throat* states:

> Sore throat is a very common reason for people to attend for medical care. It is a disease that remits spontaneously, that is, 'cure' is not dependent on treatment.[10]

Nowhere in the abstract is rheumatic fever mentioned. The situation is clearly different in New Zealand where the rate of rheumatic fever is high by world standards.[11]

Thus if the prevalence of rheumatic fever in this country is to be reduced, there needs to be:

- Appropriate continuing public education especially to target populations;
- Improvement in living conditions, especially the reduction of overcrowding;
- Ready availability of affordable, acceptable primary care medical services; and
- These services must provide accurate diagnosis and appropriate treatment.

Competing interests: None known.

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Is this reference correct?

Frank Frizelle

The *NZMJ* receives a large number of manuscripts every year and 10–15% of these are published. The editorial staff do not check the details of the submitted author's references except to ensure they appear in the correct style and to find missing details such as article name, page numbers, and authors on PubMed's Single Citation Matcher (http://www.ncbi.nlm.nih.gov/entrez/query/static/citmatch.html). This is the normal situation with most journals, because to check every detail in the references is a burden that journal editorial staff and reviewers could not realistically cope with. Therefore we rely on authors to list their references accurately and we suggest they check using the Single Citation Matcher as outlined in the *NZMJ* Instructions to Authors: http://www.nzmj.com/journal/Instructions%20to%20authors.pdf

Mistakes inevitably happen and some journals make a significant point of highlighting and rectifying such mistakes—as in the "department of error" found in the *Lancet*. When such an error happens we at the *NZMJ* like to work with the authors to correct the error and republish the correct reference or data via an erratum.

Recently a reader send us the following email:

> The paper is *Doctor Who? Inappropriate use of titles by some alternative "medicine" practitioners*. Colquhoun D. N Z Med J. 2008 Jul 25;121(1278):6-10.
>
> The quote [in question] is *the public should be informed that chiropractic manipulation is the number one reason for people suffering stroke under the age of 45*.
>
> Long PH. Stroke and Manipulation. J Quality Health Care. 2004:3:8-10
>
> This quote actually comes from the following blog article http://www.skepticreport.com/medicalquackery/strokespinal.htm
>
> I have attached all my personal communications with Colquhoun. They demonstrate this is not a citation error. Prof Colquhoun believes the origin of the quote doesn't matter because Long was quoting from a Canadian Neurologists' report (this is also incorrect). As you can see he fails to provide any evidence at all to support the existance of the "J Quality Health Care." This would not be an issue at all if he had admitted it came from a blog site—but I guess the link would have eroded the credibility of the quote.
>
> Colquhoun 's belief that my forwarding this complaint is me "resorting to threats" is the final nail in the coffin. If he had any leg to stand on where is the threat?
>
> This may seem pedantic but it surely reflects a serious ethical breach. Is it acceptable to make up a reference to try and slip any unsupported statement into a "scientific" argument and thereby give it some degree of credibility?

> Incidentally, at the end of the article, conflicts of interest are listed as none. As Colquhoun is a Professor of Pharmacology and much of his research funding no doubt comes from the pharmaceutical industry how can he have no conflict of interest with therapies that do not advocate the use of drugs and compete directly against the billions spent on pain medications each year?
>
> If I may quote Colquhoun himself in his defence of his article (Journal of the New Zealand Medical Association, 05-September-2008, Vol 121 No 1281) *I'll admit, though, that perhaps 'intellect' is not what's deficient in this case, but rather honesty*.
>
> David Owen

Mr Owen had emailed the author to enquire as to the source of the reference and ask if there had there been a mistake. I made the same enquiry and received the reply below:

> I admitted doing something that I criticise other people for doing and that is citing a paper without having read it. The Journal is not listed in PubMed and I can't find it either. As reason (not excuse) all I can offer is to say that I yielded to the temptation to use a widely cited quotation without checking its source properly. The actual source seems to be…
>
> Long, PH (2004) Stroke and Spinal Manipulation
> http://skepticreport.com/sr/?p=88
>
> …so same author, same title, same quotation but different reference.
>
> David Colquhoun

Mr Owen is correct and the reference is wrong. The quote *the public should be informed that chiropractic manipulation is the number one reason for people suffering stroke under the age of 45* appears not to be from Long PH. Stroke and Manipulation. J Quality Health Care. 2004:3:8-10 but from the website http://www.skepticreport.com/medicalquackery/strokespinal.htm

In fact even the *Journal of Quality Health Care* appears impossible to find (at least for me). While the *International Journal of Quality Health Care* appears on the web, this is not the same journal. The usual search engines for identification of the journal fail to find it as do searches on the authors name in places such as PubMed and Ovid.

In conclusion it is important for everyone's creditability that references are correct and that when queried the authors make the appropriate correction.

Competing interests: None known.

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Guidelines for sore throat management in New Zealand

Melissa Kerdemelidis, Diana Lennon, Bruce Arroll, Briar Peat

Abstract

Aims Untreated group A streptococcal (GAS) sore throats can cause acute rheumatic fever (ARF), with permanent cardiac damage in 30%. An algorithm and guideline for appropriate screening and management of sore throats in the New Zealand setting was crafted to guide appropriate treatment in high risk rheumatic fever areas and reduce antibiotic use in low risk areas.

Methods Three American sore throat guidelines were used as a framework, and searches were made of databases including Medline, Old Medline, Cochrane, DARE, Central, NHS EED, WHOLIS, www.clinicalevidence.com, and www.pubmed.gov. No European guidelines were available.

Results A guideline for GAS pharyngitis was created, including an algorithm which stratifies patients according to their risk of ARF. Revised Centor criteria to determine the likelihood of GAS pharyngitis were used. Patients at medium or high risk for GAS pharyngitis should have throat swabs taken if possible. Recommended treatment tables are given.

Conclusions Patients presenting with sore throats need to have their risk of developing rheumatic fever assessed, and then the risk of GAS pharyngitis determined. Appropriate antibiotic therapy is instigated on the basis of proven or likely GAS pharyngitis. Ten days of oral penicillin V is the first-line treatment. Other household members are at high risk of infection. Unnecessary antibiotic use is a guiding principle in low risk patients.

New Zealand's rate of rheumatic fever is high by world standards. New Zealand's total population rate of ARF is 3–15 cases per 100,000 in high risk district health boards, peaking at 14.6 per 100,000 in Counties Manukau (South Auckland).[1] This contrasts to the USA, at 1/100,000 in 1965–83.[2]

Randomised-controlled trials have proven that treating group A streptococcal (GAS) pharyngitis prevents rheumatic fever from occurring. The original studies were carried out in the 1950s and involved army recruits and injectable long-acting penicillin.[3] Lack of eradication of GAS from the throat has been shown to equate with the risk of developing rheumatic fever.[4]

Subsequent studies have used GAS eradication from the throat as a microbiological endpoint. Ten days of oral penicillin V (bd or tds) is the current standard of care, or erythromycin for those allergic to penicillin. Shorter courses of penicillin have less ability to eradicate GAS.[5,6] If adherence is a problem, a single dose of IM benzathine penicillin could be considered. Oral amoxycillin once daily for 10 days may also improve adherance.[7–10] There is some evidence that a delay of up to 9 days in starting antibiotics for GAS sore throats, does not increase the risk of rheumatic fever

significantly.[11] This guideline does not explore alternative antibiotics. Penicillin (or amoxicillin) is cheap, effective, and GAS remains exquisitely sensitive.

In view of the high rates of rheumatic fever in New Zealand, we developed a sore throat management guideline to reflect this difference in risk of rheumatic fever acquisition. It is the second of a series of three guidelines on rheumatic fever in New Zealand by the same writing group.

Several other secondary issues surrounding GAS pharyngitis were also addressed in the guideline and the salient points are summarised below. These include the best test for GAS pharyngitis, whether an amoxycillin rash is a true allergy in the presence of demonstrated Epstein Barr Virus and whether children with GAS pharyngitis should be kept home from school or daycare. For patients with recurring GAS pharyngitis, suggested alternative antibiotics for eradication are shown (in Table 2). Possible seasonal antibiotic prophylaxis, and the role of tonsillectomy are outlined.

Methods

Medline, old Medline, Cochrane, DARE, Central, NHS EED, WHOLIS, www.clinicalevidence.com, cdc.gov, NZ Ministry of Health websites, and www.pubmed.gov were searched, for keywords including pharyngitis, streptocococcus, and rheumatic fever. Limits of English and humans were used where possible. The scale of the information and timeframe meant that three American guidelines were used as a framework: those from the Infectious Diseases Society of America (IDSA),[12] the American Academy of Family Physicians and the American College of Physicians,[13] the American Academy of Pediatrics' Red Book.[14]

Several possible scoring systems for ascertaining the likelihood of Group A streptococcal pharyngitis have been proposed by various authors. McIsaac's modified Centor criteria have been utilised in the New Zealand setting for some time (Arroll B, personal communication, 2009) and have a high sensitivity and specificity for the youth age group,[15] so they were adapted for use in the algorithm.

The scoring system for the modified Centor criteria and throat culture for children are 90.3% specificity (95%CI: 86.4–93.4%), for adults specificity is 43.8% (95%CI: 37.7–50.1%).[15] Other factors relating to the control of GAS pharyngitis, including within a risk of spread within a household, were also examined.

Other relevant literature was also examined.

Results

The diagnosis and management of group A streptococcal pharyngitis and surrounding issues are summarised in the sections below.

For a more in-depth discussion of GAS pharyngitis and related topics, refer to the full group A streptococcal sore throat management guideline, online at www.heartfoundation.org.nz

Diagnosing and treating group A streptococcal sore throats and the management algorithm

Most sore throats are viral in origin. International studies have shown that approximately 10% of adult and 15–30% of paediatric sore throats presenting to doctors are estimated to be due to group A streptococcal pharyngitis.[16–22]

Group A streptococcus is thought to be spread by droplets, saliva, and nasal secretions, food preparation[23] and water.[24] It is more likely to be spread in crowded settings.[25]

Sore throats, though mostly viral, need to be taken seriously in New Zealand, where a high rate of endemic rheumatic fever persists. As the sequelae of rheumatic fever are so serious (including permanent cardiac impairment or death), the small chance of a sore throat being caused by GAS, and potentially leading to rheumatic fever, cannot be overlooked in clinical decision-making.

The sore throat algorithm presented in this guideline takes into account the different risk of rheumatic fever in New Zealand populations. Nationally, those at highest risk are young and of Māori and Pacific ethnicity.[1] In 2003, of 142 cases of rheumatic fever, 70 were Māori, 58 Pacific.[1] Twenty-eight percent (n=82) were aged 10–14 years, 9.4%;(n=27) were aged 5–9 years, and 6.4% (n=17) were 15–19 years old.[1]

Areas of New Zealand with the highest incidences of rheumatic fever in recent years include lower socioeconomic regions of parts of the North Island: Northland, Auckland, Waikato, the Bay of Plenty/Rotorua, Gisborne, Hawke's Bay, and the Wellington area.

Various risk factors for rheumatic fever in New Zealand were taken into account in developing the sore throat algorithm. Patients presenting with sore throats are first assessed for the presence of the following rheumatic fever risk factors: whether they are living in lower socioeconomic parts of the North Island, whether they are Māori or Pacific peoples, whether they are aged 3–45 years, and if they have a past history of acute rheumatic fever.

In the algorithm, having zero or one of the above risk factors means the patient is at low risk of contracting rheumatic fever, and the sore throat is then clinically assessed for whether it is likely to be group A streptococcal in origin, using the scoring system of McIsaac's modified Centor criteria.[15] The modified Centor criteria factors in clinical signs and symptoms, and takes into account the age group at highest risk of GAS pharyngitis (3–14 year olds). The score from here determines whether a patient is at low, medium or high risk for having GAS pharyngitis present and what treatment is then appropriate.

Having two or more risk factors for GAS pharyngitis in the sore throat algorithm means the patient is already at risk of rheumatic fever. Following the algorithm, the sore throat is then assessed for the clinical likelihood of GAS, using Centor's original clinical criteria for GAS pharyngitis.[26] The score from this will determine whether a patient is at medium or high risk of GAS and rheumatic fever.

Using the algorithm and scoring stratification, patients at low risk of GAS pharyngitis being present should have an alternative diagnosis sought. Those at medium risk should have a throat swab taken, and antibiotics given only if the throat swab is positive for group A streptococcus. Those at high risk of GAS pharyngitis should have a throat swab taken, but commencement of empiric antibiotics at this first consultation is recommended. Oral penicillin V for 10 days is the first-line treatment for GAS pharyngitis (see Table 1).

View all algorithms and tables at http://www.nzma.org.nz/journal/122-1301/3746/algorithms.pdf

GAS pharyngitis is highly infectious. After a patient has been infected with group A streptococcal sore throat, the chance of another household member becoming infected

in the ensuing month is up to one in three. Breese found 19%,[27]; Lindbaek found 27%,[28] and in Falck's study 33% of family members became infected in the following month.[29] Poku estimated each household member had a 5–6% chance per month of contracting GAS pharyngitis from an index case within the household.[30]

The infectious nature of GAS pharyngitis and its potentially dangerous sequelae mean that investigation of households may be useful, depending on rheumatic fever risk. To address this potential for 'ping-ponging' of infection, these guidelines recommend swabbing and treating the household if GAS positive (regardless of symptoms) if there are three or more cases of confirmed GAS pharyngitis within the household in a 3-month period (refer to www.heartfoundation.org.nz). Notification of 3 or more cases of GAS pharyngitis to the Medical Officer of Health is being trialled in a pilot area, as a way of aiding this process.

Other issues relating to group A streptococcus have also been addressed in the guideline.

Tests for diagnosing group A streptococcal pharyngitis

The gold standard for GAS pharyngitis detection is a throat swab, carefully taken to avoid the tongue, and sent to the laboratory for culture on sheep blood agar plates. In general swabs should be sent to the lab within 2 hours, but a delay of up to 24 hours is acceptable before processing.[31] Follow-up swabs are not usually indicated, the circumstances when they may be required are outlined in the guideline (see www.heartfoundation.org.nz).

Rapid tests for diagnosing GAS pharyngitis vary in sensitivity and specificity in studies,[32] and have not been assessed against laboratory cultures in randomised-controlled trials in the New Zealand setting. Pre-test probabilities for GAS also vary between populations. At this stage rapid tests are not able to be considered consistent enough to be relied on as the sole diagnostic test. In the United States, throat swab cultures are recommended back up, particularly for negative rapid strep tests.[12,33]

Amoxycillin, sore throats, and drug rashes

Amoxycillin should not be used if infectious mononucleosis (Epstein-Barr virus (EBV) is suspected, as a rash may occur.[8,34,35] With EBV infection, the rate of a rash reaction to amoxycillin may be 70–100%. Renn et al found real sensitisation to amoxycillin can occur in this setting.[36] If a rash to amoxycillin is non-pruritic and maculopapular, and seen in a patient with infectious mononucleosis, then it is probable that subsequent penicillins are generally tolerated.[37,38]

This type of rash is generally not IgE mediated, and although there may be a risk of recurrence of similar rash, and there is likely some other underlying immunologic mechanism, there is not an increased risk of severe allergic reaction to subsequent courses. If there was a an urticarial rash or other features suggesting an immunoglobulin (IgE) mediated mechanism then, even if a patient had infectious mononucleosis, evaluation for drug allergy should be undertaken prior to considering further courses of penicillin-based antibiotics.

Should patients with group A streptococcal pharyngitis be isolated (kept home from school/daycare)?

Where a patient has a sore throat and GAS positive throat swab, the New Zealand Ministry of Health[39,40] and American Academy of Paediatrics.[41] recommends keeping children of school and daycare for 24 hours after the initiation of appropriate antibiotic therapy. Snellman found that 36.2% of children with GAS pharyngitis still had a positive throat culture the morning after beginning antibiotic therapy.[42]

Three or more GAS sore throats in three months are considered 'recurrent' in this guideline. The antibiotics recommended for recurrent cases are shown in Table 2. Oral antibiotic choices include clindamycin, amoxycillin, and clavulanic acid (Augmentin). IM benzathine penicilin G (with or without oral rifampicin) may be also considered.

Households where three or more cases of GAS pharyngitis occur within 3 months should be screened for GAS pharyngitis as discussed above and in the guideline, in the 'Household Sore Throat Management' algorithm (refer to www.heartfoundation.org.nz), and treated if GAS positive (regardless of symptoms).

Recurrent cases of group A streptococcal pharyngitis: the role of seasonal prophylaxis and tonsillectomy

Where patients have frequent sore throats, the issue of prophylactic antibiotic treatment over winter has been debated, but there is currently insufficient evidence to recommend this course of action. Two randomised-controlled studies have shown some benefit for seasonal prophylaxis in circumscribed overseas communities.[43,44]

The role of tonsillectomy in recurrent pharyngitis has not been well investigated. There are three key randomised-controlled studies (RCTs) available on this topic, with total patients numbering only 665 children, all by Paradise.[45–47] One of the three RCTs remains in abstract form.[47]

From this limited data there is insufficient evidence to form conclusions about tonsillectomy versus medical management in recurrent pharyngitis.

Conclusions

Most sore throats are viral. However, an untreated streptococcal throat infection can lead to rheumatic fever and have potentially fatal consequences.

New Zealand has a high rate of rheumatic fever by international standards, and the burden of disease rests unfairly on the disadvantaged sectors of the population.

Those most at risk of contracting rheumatic fever in New Zealand are young, Māori and Pacific peoples, living in lower-socioeconomic parts of the North Island, and may have a history of rheumatic fever.

The sore throat guideline on which this article is based, and the algorithm reproduced here, takes into account this difference in risk among different patient groups. It takes the sore throats of these at-risk groups more seriously and advises on screening and treatment for GAS pharyngitis. Ten days of oral penicillin V or oral amoxicillin OD remain the first-line treatment for GAS sore throats.

GAS pharyngitis is highly infectious. After a patient has been infected with a group A streptococcal sore throat, the chance of another household member becoming infected in the ensuing month is up to one in three.

The infectious nature of the illness and its potential sequelae mean that investigation of households may be useful, depending on rheumatic fever risk. If there are 3 or more cases of confirmed GAS pharyngitis within the household in a 3-month period, the entire household should be swabbed and treated if GAS positive (regardless of symptoms).

This guideline and algorithm have been developed for the New Zealand setting and reflects our unique situation. If appropriately applied, we hope the guideline and algorithm may lead to increased awareness about the importance of group A streptococcal sore throats and ultimately to a reduction in new cases of rheumatic fever—a preventable disease.

Note: This article is based on the guideline *Group A Sore Throat Management*. It and two related rheumatic fever guidelines are available on the Internet for free download on the National Heart Foundation's website: www.heartfoundation.org.nz

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Exploring knowledge of prescription charges: a cross-sectional survey of pharmacists and the community

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Abstract

Aim To determine the level of knowledge in the community, and the implications of recent changes to prescription prices that occurred in July 2007 in New Zealand.

Method Two separate face-to-face surveys were conducted involving pharmacists (n=20) and the community (n=80).

Results In the community survey, 73.8% were unaware of the prescription price changes and 67.5% were unaware that the cost of prescriptions was prescriber-dependent. Cost was cited as a reason for not filling a script in the last 6 months by 8.75% of all respondents in the community survey. After being informed of the decreased prescription price, 28% stated that this change would increase the likelihood of seeing a doctor when they are ill. Pharmacists surveyed perceived that this change had decreased their profit, and 20% reported occasions on which patients had taken a specialist prescription to their GP to have rewritten in order to obtain the reduced primary health organisation (PHO) price.

Conclusions This study showed that the majority of community participants were not aware of either the price change, or the prescriber-dependent access to cheaper prescriptions. This lack of knowledge could be a significant barrier to healthcare. It is critical that both the inequalities in access to cheaper medications are reviewed and that the complex pricing system is simplified to eliminate disparities between providers. Further, this study highlights the increasing role of GPs as gatekeepers to resources including reduced cost prescriptions.

The price of prescriptions is an important determinant in access to health care, particularly for people on low incomes.[1,2] If patients are unable to purchase medicine due to cost, it "places a potential barrier to safe and timely prescription use."[3]

New Zealand has a complex tiered pricing system for patient prescriptions, which involves multiple patient subsidy levels, and differential costs to patients dependent on the role of the prescriber. The New Zealand government subsidises at least a part of the manufacturer's price for medications on the national pharmaceutical schedule, and the patients pay the deficit for unsubsidised or partially subsidised medication. Additionally, there is a base co-payment for each item on a prescription that the patient must pay that varies according to patient cardholder subsidy, and prescription provider.

Table 1 displays adult prescription charges for fully subsidised medicines in New Zealand.[4]

Table 1. Adult prescription charges for fully subsidised medicines in New Zealand (at time of survey, December 2007)

Benefit card(s)	Prescriber	Base co-payment price
No card	PHO GP	$3
	Practice doctor*	$15
	Hospital doctor	$15
	Hospital Specialist	$15
	Private Specialist	$15
	After hours doctor	$15
At least one of: • Community services card • High use health card • Prescription subsidy card	PHO GP	$0–$3
	Practice doctor*	$2–$3
	Hospital doctor	$2–$3
	Hospital Specialist	$2–$3
	Private Specialist	$2–$3
	After hours doctor	$2–$3

*This is when a patient is not enrolled with a primary health organisation (PHO).

In July 2007, the cost of the base co-payment for prescriptions decreased from $15 to $3 for medications on the national pharmaceutical schedule,[5] but only in cases where prescribed by a doctor in a primary health organisation (PHO)[6] to an enrolled patient.[7] This reduced cost does not apply to prescriptions for medicines prescribed by hospitals, specialists, after hours services or not enrolled patients. These prescriptions all incur a base co-payment charge of $15.[8]

The complex tiered pricing system in New Zealand has the potential to confuse patients about the cost of medicines, and may therefore act as a barrier to accessing healthcare. This research aims to explore the level of knowledge in the community about the recent changes to prescription prices in New Zealand.

Methods

Surveys were conducted in the Wellington region between December 2007 and January 2008. All surveys were conducted face-to-face, the interviewer read aloud the questions and recorded participants' responses on paper.

Pharmacy surveys—A list of pharmacies was collated using the Wellington phone book and online Yellow Pages. Of the 49 pharmacies, 20 were randomly chosen using a random number generator, and 1 pharmacist from each was surveyed. Pharmacists were approached during opening hours and interviewed in the pharmacy. The questions aimed to identify the implications of the co-payment change on the pharmacists and their customers.

Community surveys—103 members of the Wellington community were approached in a variety of places including parks, office centres, the university, and outside railway stations and asked *Would you like to answer a 2-minute survey for my research?*

Personal prescription information was not required, and medical confidentiality was maintained. This survey sought to determine the public's knowledge of the change in prescription prices, and if it caused any impact on their healthcare or health-seeking behaviour.

Data collection and analysis—The data were collected on paper, entered into Microsoft Access and analysed with Microsoft Excel. Responses were tallied and converted to percentages of the total participant population to determine the extent of public awareness of the change in price, if it affects health-seeking behaviour, and if any issues have arisen in response to this change.

The Central Regional Ethics Committee granted ethics approval in December 2008 (REF CEN/07/43/EXP) for surveys involving pharmacists and members of the public.

Results

Pharmacist survey—70% (14/20) of pharmacists surveyed commented that the price change seems too complicated for customers to understand. The price differential between prescription providers raised expectations that all scripts will cost $3, and so caused problems when customers visit a different doctor and that value changed. Patients were reported as having taken their scripts to their GP to be rewritten for the cheaper price (4/20 participating pharmacists).

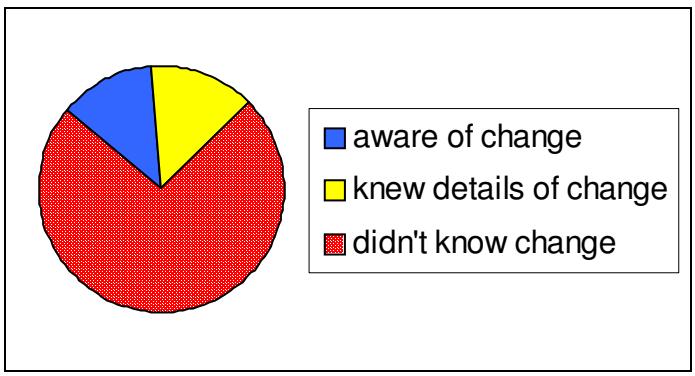
Ninety percent (18/20) of respondents claimed that the $3 scripts had decreased the amount of profit gained by the pharmacy, and 60% (12/20) of pharmacists believed that their business should add extra service fees to the $3 prescription price. Of the pharmacists surveyed, 95% (19/20) had experienced customers not filling prescriptions when they were told the price.

Community survey—80 members of the public participated—an acceptance rate of 78% (80/103). Just under half (47.5%) the sample were male (38/80) and 52.5% (42/80) were female. Survey respondents were evenly spread across age groups comprising 19 people aged 16–24 years (23.8%,), 19 aged 25–39 years (23.8%), 21 aged 40–54 years (26.3%), 15 aged 55–64 years (18.8%), and 6 people aged 65 years and over (7.5%).The median age group was 40–54 year olds. Seventy (87.5%) survey respondents believed they were registered with a particular doctor or practice, and 28.8% said they had a community services card or another type of benefit card.

Of the 80 respondents, 57.5% (46/80) had filled a prescription in the last 3 months (72% of these were females), 73.8% (59/80) knew nothing about the prescription price change, and only 12.5% (10/80) could describe the details of the change. See Figure 1.

Thirty percent of respondents (24/80) had not filled a prescription they had received in the last 6 months. Of those who did not fill their prescriptions, 33% (8/24) of these had failed to fill it because it was written in case it was needed, 12.5% (3/24) forgot or could not be bothered filling the prescription, and 29% (7/24) did not fill a prescription because of the price.

Figure 1. Community survey participants' level of knowledge of the price change



One-third of respondents were aware that the cost of a prescription was prescriber-dependent (26/80). Of this third, less than half (11/26) knew from personal experience and only one person had learnt from media or publicity. Twenty-eight percent of all respondents said that the change in price to $3 per prescription would increase the likelihood they will visit their doctor when they are ill.

Discussion

This study suggests that the community is largely unaware of the recent changes to prescription charges in New Zealand, with only a third of participants reporting knowledge of the July 2007 prescription price changes. Pharmacists were concerned that the complexity of the pricing structure is confusing for customers.

Although prescription prices for subsidised medicines in New Zealand are modest compared to other Western systems,[9] almost 9% of participants in this survey had not filled a prescription due to the cost in the last 6 months. This figure is lower than a previous national survey which found that 19% of New Zealanders did not fill a prescription they received because of the cost.[10] This difference may be due to the smaller sample size in the present study.

Failing to pick up prescriptions due to perceived expense has the potential to increase health inequalities.[11,12] Those individuals most sensitive to costs tend to be young, have poor health status, low education, and low income.[13] For participants in this study who had not filled a prescription due to cost, it was unclear whether it was because they were not aware of the price change, or they had received that medication before and knew that it was not subsidised and too expensive for their budget.

Many survey participants said that they take price into account when considering filling prescriptions, and just over a quarter of all respondents claimed they will be more likely to visit their doctor when they are ill now that they know of this price change. This suggests that a more comprehensive media programme should be undertaken to inform the public of the applicability of lowered fees.

Pharmaceutical Management Agency of New Zealand (PHARMAC) information for patients and consumers does not fully elucidate the details about accessing cheaper prescription subsidies, nor does it highlight the fact that visits to private specialist and non-PHO doctors incur the $15 charge per prescription.[14] Incomplete information is available on the PHARMAC website and is also published in the pharmaceutical schedule which is distributed free to about 11,000 medical practitioners, pharmacists, medical libraries, professional bodies, and support groups three times a year.[15] The general public are informed about changes to the pharmaceutical schedule via media releases from the Ministry of Health, and pamphlets distributed at Work and Income New Zealand.

A limitation of the study is the relatively small sample size of pharmacists and members of the community that were surveyed due to time constraints and the scope of this project. However, the community survey respondents were randomly approached in a range of public settings, included a range of ages, approximately equal numbers of males and females, and a similar proportion of participants held a community services card (22.5%) to that of the general population (26.8%).[16]

Participants over the age of 65 years were under-represented in this survey, and may have responded differently as they have had access to cheaper prescriptions before the 2007 changes. Furthermore, participants were not asked about use of regular medications (such as antihypertensives, hypoglycaemics); those on regular medications may also have responded differently to the survey questions. The low level of knowledge of prescription charges found in this survey is however suggestive of a lack of knowledge in the general community.

Since the time of this survey, positive changes have occurred to prescription co-payments. PHO-enrolled patients can now access the lower $3 co-payment when receiving public hospital prescriptions, after hour's services and other PHO GPs. The co-payment is prescriber-dependent unless the patient has a health benefit card .This effectively penalises those patients who are not registered with a PHO, or are attending a private specialist clinic (e.g. menopause clinics, vasectomy clinics, sports clinics) or a non PHO-doctor and therefore have to pay the $15 co-payment.

In this study, 20% of pharmacists recalled instances where patients had visited their GP after having received a prescription from a specialist to have it re-issued at the PHO price. This scenario has the potential to raise liability issues if general practitioners prescribe a medication without appropriate consultation or experience of the health issue.[17] The majority of pharmacists perceived the price change to have decreased their profit, and this warrants further investigation if this perception is true, as it may impact on pharmacy numbers, directly affecting the public's level of access to health care.[18]

Furthermore, this research highlights the increasing 'gate-keeping' role of PHOs in New Zealand—a change in role that has happened largely without consultation or debate. Until recently reductions in cost have been patient-oriented, with individual entitlement depending on health benefit cards or age.[19] Now patient entitlement is detached from the patient, and instead is controlled by the patient's primary care doctor. Hence primary care doctors are becoming gatekeepers to services including cheaper prescriptions, and in some regions, laboratory services. This system needs to be evaluated to ensure the changes do not inadvertently create barriers to health.

Competing interests: None known.

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Do general practitioners use thyroid stimulating hormone assay for opportunistic screening?

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Abstract

Aim The presenting features of early thyroid disease can be subtle and non-specific; consequently, general practitioners (GPs) have a low threshold for ordering thyroid function tests (TFTs). This study examined the use and results of TFTs by GPs in a 1-year period in a population-based sample of adults without known thyroid disease enrolled in general practice.

Method This record linkage study analysed the use of TFTs over a 12-month period from laboratory data, which were linked to patient's GP records from two large urban New Zealand general practices with a total registered population of 21,290 patients. Outcomes were analysed by age and gender.

Results One in six adult patients visiting their GP in a 12-month period had a thyroid stimulating hormone (TSH) test, whilst only 1 in 20 had a free thyroxine (FT_4) test. 7.0% had an elevated TSH concentration and 1.0% had a low TSH concentration, most with subclinical disease. Rate of testing was higher in females compared with males.

Conclusion This study suggests that general practitioners are opportunistically screening with TSH alone to find new cases of thyroid disease.

Thyroid disease (TD) is common and managed primarily in general practice.[1,2] Whilst the classical signs and symptoms of both hyperthyroidism and hypothyroidism are well known, the features of early TD are subtle and reliance on signs and symptoms will mean many cases are missed.[3] Consequently general practitioners have a low threshold for ordering thyroid function tests (TFTs) in adult patients.

The tests used to measure thyroid function are most commonly thyroid stimulating hormone also called thyrotropin (TSH); free (unbound) thyroxine (Free T_4 or FT_4); and free triiodothyronine (Free T_3 or FT_3).

Screening for thyroid disease is not currently recommended by the New Zealand Ministry of Health. However, there is recognition that TFTs have been used indiscriminately and the Ministry have therefore recommended that only a TSH is measured in the first instance.[4]

The aim of this study was to examine the use and results of TFTs by general practitioners in a one-year period in a population-based sample of adults enrolled in general practice without known thyroid disease.

Method

The study population comprised 21,290 patients over 18 years of age registered with two general practices in a large New Zealand town (Hamilton). Those with established TD were identified through

computerised searches for prescribing data and diagnostic codes (READ code, version 3) for thyroid dysfunction. Cases were validated as true cases by manual checking of patient records. Records of the TSH and FT_4 results were obtained from both private laboratories which operate in the local area and who hold contracts for primary care services.

Patients with known TD and on prescriptions for drugs commonly used to treat thyroid dysfunction including thyroxine, carbimazole and propylthiouracil (PTU) were excluded. All tests were carried out between 1/12/05–30/11/06 and were linked to the records of patients in the two general practices by means of the unique National Health number used by health providers in New Zealand.

Laboratory tests were from two laboratories in Waikato with different analysers and reference intervals. Pathlab Medical Laboratory used an Abbott Architect i-2000 analyser with a TSH reference interval of 0.3-3.1 mU/L and FT_4 reference interval of 9–19 pmol/L.

Medlab Hamilton used a Roche e170 analyser with a TSH reference interval of 0.3-5 mU/L and FT_4 reference interval of 10-25 pmol/L. We used the first TSH (and FT_4 test where available) for each individual test during the data collection period (See Table 1).

Data was examined using Microsoft Excel (Microsoft, 2003). Descriptive analysis was performed based on age and gender. Further analysis was performed using SPSS (v14).

Ethical approval to access the computerised and paper records of individuals was provided by the Northern Y Ethics Committee (NTY/06/07/059).

Table 1. Key to laboratory reference values (cut-offs) for TFT serum assays from laboratories as at November 2006

Thyroid status* was defined as follows:

- Euthyroid = TSH within the reference interval
- Hypothyroid = TSH ≥10 mIU/L
- Subclinical hypothyroid = TSH above the reference interval but below 10 mIU/L (± FT_4 within the reference interval)
- Hyperthyroid = TSH ≤0.1 mIU/L
- Subclinical hyperthyroid = TSH >0.1 <0.3 mIU/L (± FT_4 within the reference interval)

*These categories do not take into account secondary hypothyroidism or T3 thyrotoxicosis. A TSH of 10 mIU/ml has been used as a cut-off for recommending treatment for subclinical hypothyroidism, regardless of FT_4, level and this has been used as the upper limit.[5]

Results

Data from laboratories showed 5169 TSH tests and 1977 FT_4 tests were carried out in the 12-month period in a population of 21,290 adult patients. 662 patients were identified as having thyroid disease (3.1%) and were excluded. This left a total of 20,628 patients without known thyroid disease in the study.

In our study population, general practitioners ordered 4184 TSH tests on 3459 individuals - an average of 1.2 TSH tests per person-tested per year, and 1374 FT_4 tests on 1010 individuals - an average of 1.4 FT_4 tests per person-tested per year. This represented TSH testing in 16.8% (3459/20628) and FT_4 testing in 4.9% (1010/20628) of the population without known thyroid disease. The number of TSH tests by individual ranged from 1-11, with 79.0% having a single test (2734/3459) and 1.0% (34/3459) having more than three TSH tests.

The age of the study population ranged from 18–99 yrs (median 52yrs, interquartile range 39–65 years). Of those having TSH testing, 2381/3459 (68.8%) were women.

The number of TSH tests per patient increased with increasing age. The rate of testing was greater in women than men although the relative proportion decreased in older patients. (Table 2).

Table 2. Rate of TSH testing per 1000 by age and gender

Age group and gender (denominator)	Female (11029)	Male (9599)	By study population (20,628)	Ratio of testing (Female/Male)
18–29yrs	126.5	43.5	87.4	2.9
30–39yrs	163.0	55.6	115.4	2.9
40–49yrs	207.4	93.8	154.0	2.2
50–59yrs	258.9	156.8	210.4	1.7
60–69yrs	285.1	205.7	245.4	1.4
70–79yrs	332.8	240.1	288.0	1.4
80+yrs	532.6	325.1	460.9	1.6
Grand total	**215.9**	**112.3**	**167.7**	**1.9**

The percentage of tests which fell within the reference interval decreased as age increased. This was similar for women and men (Table 3). Test results showed that 92% were within the reference interval (Table 4).

Table 3. Percent of TSH tests that were within the reference interval by age group and gender

Age group (years)	Female	Male	By study population
18–29	96.2	93.8	95.7
30–39	95.4	98.1	96.3
40–49	94.2	94.1	94.2
50–59	93.3	93.5	93.4
60–69	86.1	93.7	89.3
70–79	84.5	87.9	85.9
80+	84.9	82.3	84.3
Grand total	**91.7**	**92.6**	**92.0**

Table 4. Percentage of thyroid dysfunction from first TSH test (and FT_4 where available)

Thyroid Status	Number of subjects (%)
Results	**N=3459**
Euthyroid	3182 (92.0)
Hypothyroid	7 (0.2)
Subclinical hypothyroid	235 (6.8)
Hyperthyroid	6 (0.2)
Subclinical hyperthyroid	29 (0.8)

Discussion

We identified that in the two practices 1 in 6 adult patients without known thyroid disease who visit their general practitioner in a 12-month period will have a TSH test. This frequency of testing may reflect that GPs consider that diagnosing new thyroid disease is a relatively unlikely possibility, but because the test is cheap and easy, and because the disease should not be missed and is readily treatable, that a high rate of testing is justifiable even though most results will be normal.

This level of testing is akin to an opportunistic screening programme rather than targeted use of a test in a specific group of patients with signs and symptoms of disease. In the study group, 8.0% (277/3459) of the population without identified thyroid disease had abnormal thyroid function results, with the majority (84.8%) having subclinical hypothyroidism.

Symptoms of thyroid dysfunction are 'soft' and mimic those of many other pathologies and may overlap with sensations of normal living, e.g. fatigue. Symptoms alone have been found not to differentiate the majority of patients with elevated thyroid stimulating hormone values from those with normal values.

For the 7.6% of patients labelled as having subclinical thyroid disease there is evidence to support treatment in subclinical hyperthyroidism to improve quality of life, cardiovascular risk factors, bone mineral density and possible progression to overt disease. However for subclinical hypothyroidism the evidence is not so clear cut. [6-8]

There are some data suggesting treatment in this group may be worthwhile, although opinions differ on the management of mild disease. [9, 10] Until further data are forthcoming, clinical judgement and patients' preferences currently remain the recommended manner to decide whether treatment should be started. [11]

In New Zealand there is a cost associated with visits to a GP. These costs represent a barrier for some who require a consultation. [12-14] Furthermore, phlebotomy is not routinely performed within general practice (as they are elsewhere, e.g. in the UK). This may mean patients have to travel to a private laboratory for blood tests thus adding to issues of access and cost.

Fortunately these two general practices under study had laboratory services in the immediate vicinity of the practice. It is therefore unlikely that these barriers to having a blood test were an issue. Women appear to be tested more often. However, there is a bias in that women are more likely to attend a general practitioner than men and so presumably are more likely to be screened. [15] Despite these problems what we have presented are the actual outcomes of the use of thyroid function tests in a reasonably sized general practice population.

We did not have data for all patients who were prescribed amiodarone and lithium; effects of which are likely to alter TSH results. This may increase the numbers of tests undertaken by general practitioners.

The rate of TSH testing in our population 18 years of age and over in a 12-month period including repeated measures was 237/1000, which is similar to the Waikato District Health Board (DHB) rate of 260/1000 for the same population age group

(Personal communication, R Webb, 12/10/2006, Waikato DHB Planning and Funding). DHB figures include all patients regardless of thyroid disease status.

Screening for thyroid dysfunction is currently not recommended. [16, 17] Recent noted increases in the prevalence of hypothyroidism in the UK may be attributed to the incentives provided to GPs under the Quality and Outcomes Framework (QoF) [18], better biochemical assays, or a true increase. [1]

Case finding in patients presenting in general practice particularly in women over 40 who attend for an unrelated reason appears reasonable. [19] This study suggests that TSH alone as a case-finding tool in the general practice population appears to be a strategy used by GPs. It identifies a large population of patients with subclinical disease which then leads general practitioners into questions about the need for treatment or further investigation.

Competing interests: None known.

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Health Reality Show: Regular Celebrities, High Stakes, New Game—a model for managing complex primary health care

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Abstract

Aim To evaluate a collaborative model that integrates secondary care support into general practice, targeting the main health problems of patients with long-term conditions.

Methods The model was tested in two general practices in an area of high deprivation. Eligible patients were high users of the Middlemore Hospital Adult Medical Service. Model elements included nurse home visiting, record review, inter-professional case conference, and assertive follow-up and intervention. Data were collected from clinical records and interviews with patients and clinicians. Interviews were analysed using a general inductive approach.

Results Record review and home visiting uncovered clinical and social information buried in the 'systems records' or unknown. Inter-professional case conferences resulted in prioritising interventions before assigning to practitioners for follow-up. Home visiting led to advocacy for social services, not possible in earlier general practice or emergency department (ED) consultations. Specialist hospital physician support in accessing hospital services strengthened the relationship with general practice. Case finding was an unexpected outcome of home visiting with individuals from the same household as the index patient assisted to access services.

Conclusion All model elements—nurse home visiting, record review, inter-professional case conference, and assertive follow-up and intervention—were essential to resolving problems seriously impacting health status.

Chronic conditions are 'the health care challenge of this Century'[1] and the mismanagement of chronic conditions in New Zealand is the leading cause of hospitalisations.[2]

Counties Manukau District Health Board (CMDHB), one of the country's largest health boards, reported adult medical services at Middlemore Hospital in 2006/07 included 18,967 people, 26,734 discharges, and 68,383 bed days at a cost of $76,167 million dollars. Of these, 1613 (9%) people represented 21% of the discharges and 40% of the bed days at a cost of $30,474 million dollars (Dr Gary Jackson, personal communication, 2008). This relatively small group of individuals with complex needs fitted the classification of 'Frequent Adult Medical Admissions' (FAMA) i.e. they had been admitted to a medical service on two or more occasions, for five or more bed days in the previous 12 months.

The Commonwealth Fund found that in six countries studied, a disproportionate share of national spending was concentrated on patients with chronic diseases, in particular those with multiple illnesses. New Zealand health care rated second

overall, except for chronic care and hospital care, coordination of services, and access to care, where it was ranked last. [3]

Clinical anecdotes suggest that the services 'FAMA patients' receive are fragmented, incomplete, and reactive in both secondary and primary care, and that these patients are often disconnected from primary care. In the United States, there has been some success in reducing hospital use while improving patient care by intense case-management of similar complex high-needs patients.

Kaiser Permanante has focused resources on patient self management and primary care, an approach also being introduced in some parts of the United Kingdom. [4] The National Health Committee[2] contends that more often current models focus on managing the condition rather than helping the person to manage their life in spite of the condition. The disparity between the needs of people with chronic conditions and what the health system offers is increasingly being understood.

In 2007, CMDHB set up a small project to support general practice to improved systematic and coordinated care for FAMA patients. The model for this project comprised four essential components: nurse home visiting, record review, inter-professional case conference, and assertive follow-up and intervention. The project resourced one hospital specialist physician and two specialist primary health care nurses for 16 days within a four month period. The expectation was that the patients would experience more targeted, integrated care and that this would reduce potentially avoidable admissions.

The DHB intended to expand the project if the evaluation proved favourable. The evaluation provided an opportunity for primary and secondary care services to examine issues that appear to impact both on people who under-use wider primary health care services and have high hospital attendance.

The average length of stay for adult medical patients has progressively fallen at Middlemore Hospital and is now around three days. There is anecdotal evidence that this has led to a fall off in adequate long term care planning and service coordination for complex patients.

Methods

Patients—There were two sources of patients: firstly, those identified from routine records at Middlemore Hospital as meeting FAMA criteria and were registered patients of either of the two participating general practices. Secondly, the practices were invited to include patients they identified as having complex conditions and high unmet health or social needs; in principle, these people were likely future FAMA patients.

Setting—Two general practices were invited and agreed to participate. They were identified as large practices in an area recognised by CMDHB as a high needs area. Both practices were eligible to enrol their FAMA patients into the CMDHB Chronic Care Management (CCM) Programme, which purchased additional appointments with the general practitioners and practice nurses themselves when their patients had one of the following conditions: diabetes, chronic obstructive pulmonary disease, cardiovascular disease, congestive heart failure, and depression.

A central purpose of the CCM programme is to reduce potentially avoidable hospital admissions. Currently, despite eligibility, many patients are not being enrolled. One practice was a relatively high user of the CCM programme, the other a relatively low user; both had adopted different models of nursing care to support chronic care management—one practice had a dedicated practice nurse with a focus on CCM who worked with all doctors in the practice, the other had one practice nurse with multiple responsibilities dedicated to the patients of each general practitioner.

Intervention—For each patient, a specialist primary health care nurse reviewed their Middlemore Hospital clinical record then visited the patient at home with a translator if needed, to: review their clinical and social history; review clinical and social services; and develop a wellness plan in collaboration with the practice nurse and patient.

The specialist physician also reviewed the hospital records, clinically assessed the patient on occasions, and met with the general practice team and specialist nurse in a case conference to plan improvements and the integration of each person's clinical and social care. Future actions were prioritised at case conference and delegated to an individual nurse or doctor for follow-up and implementation.

The specialist physician and two specialist nurses undertook the intervention one day a week from 14 May to 16 September 2007. \

The model comprises four ***essential*** components:

- Nurse home visiting;
- Record review;
- Inter-professional case conference; and
- Assertive follow-up and intervention.

Data collection—Data on hospital and general practice attendance and interventions were collected directly from the hospital and practice clinical record. The specialist nurses kept a journal of contacts with patients, practices and other agencies; patient and family/whānau stories, and their own observations and reflections. We interviewed all patients who were still living, had received more than minimal input from the project and agreed (n=10), except that we did not attempt to obtain consent from those who were terminally ill, or were cognitively unable to consent.

Semi-structured interviews with patients were conducted in their home, usually with one or more family/whānau or care-giver present. Interviews were conducted in English. Four group semi-structured interviews were conducted: one with the specialist physician and two specialist nurses; one with a pharmacist and a nurse from the Acute Care Team (ACT)—located in ED, this team intervene in patient management to prevent avoidable hospital admissions; and one in each of the practices with general practitioners and practice nurses responsible for a specific list of patients. In these interviews, individual responses were sought from each participant.

Data analysis—All interviews were recorded, transcribed and analysed for themes using a general inductive analysis. The themes were agreed by two authors. Ethical approval was given by the Northern Region Ethics Committee: reference NTX-07-117-EXP.

Results

Twenty-six patients were identified from the Middlemore Hospital FAMA list and a further seven were invited by the practices. No patients refused. The 33 patients are listed in Table 1. This was clearly a group with substantial medical morbidity: 28 had 5 or more comorbidities; 5 died during the course of the programme; and a further 8 died during the following year.

Twenty patients were already enrolled in one or more CMDHB CCM programme with varying degrees of participation. During the study period a further two were enrolled, two were re-engaged, and three were updated.

Table 1. Total patients in project and those interviewed or subject of interview

Variables	Number in project (n=33)	Number of interviews (n=10)
Women / Men	19 / 14	5/ 5
Age group		
under 55	12	3
55 to 64	7	2
65 or older	14	5
Ethnicity		
Māori	11	1
Samoan	5	2
Tongan	2	1
Niuean	2	0
Cook Islander	1	2
Fijian	1	0
European	11	5
Principal medical conditions precipitating contact with the project (numbers add to >33 as a person may have >1 principal diagnosis)		
AF, CHF, IHD, other cardiovascular	37	12
COPD, other respiratory	26	10
Arthritis, connective tissue disorder, gout, pain	15	4
Diabetes	12	2
Renal failure	12	3
Cerebrovascular, dementia, epilepsy, confusion	9	4
Obesity, malnutrition	7	2
Glaucoma, visual problems	6	1
Prostate problems, urinary problems	3	2
Thyroid disease, anaemia	5	2
Liver disease, hepatitis	4	2
Cancer	2	0

Table 2. Admissions and bed days before during and after project

Variables	Year before study	4 month study period, projected to 1 year	4 months after study, projected to 1 year
Admissions	149	111	93
Bed days	598	276	459

Note: Five patients died during study and eight died over the following year. No seasonal adjustment has been made; study months were May to September.

When interviewed, neither professionals nor patients were aware of all the activities related to any one patient and each placed a different emphasis on the importance of part of the project.

Table 3. Interviewee's perception of the importance of parts of the project

Person	Importance of parts of the project
Patient	Relationship with nurse, often practice nurse, and the importance of getting the help they needed, especially to social services
Practice nurses	Relationship with, and new knowledge of the patient, clinical changes to wellness plans and the importance of social services to patients
General practitioners	Improved speed of access to secondary services and the usefulness of the additional doctor and nurses
Specialist hospital physician and specialist primary health care nurses	Information and advice given to primary care, and the secondary and social services they helped to access
Acute Care Team	Safe transfer of patients from secondary to primary care

All parties agreed that the project was useful and should continue, albeit with various suggestions to improve it or extend the scope. Patients could be effusively grateful:

> '(name) is a miracle' [patient 1]

Similarly, all health professionals agreed that an important outcome of the project was a sense of shared understanding of the difficulties of each others' roles, a sense of personal relationship, and a sense of trust between themselves.

> '(name) understands what it's like in general practice...the time it takes to get hospital tests' [General Practitioner]

The most enduring and potentially sustainable element of this project was the relationship formed between some patients and the practice nurses.

> 'not only service, they gave me a relationship' [patient 2]

The strongest theme, articulated by each group, was that most patients had significant social disadvantages that negatively impacted their health and shaped their interactions with the health care system. In many instances these problems could be ameliorated or removed. This involved substantial case management and advocacy that had not happened prior to this project in a sustained way (see Boxes 1-4).

To identify FAMA patients as near to admission time as possible, the project provided a nurse who spent at least one hour per day on the Middlemore Hospital computer system and communicated with the ACT team. Team responses included arranging Needs Assessment and Services Coordination (NASC) or pharmacist review, contacting community pharmacists and general practices, handing over to the project specialist primary health care nurses who could visit the patient at home and liaising with the general practices.

The project helped the ACT team hire a dedicated NASC worker to work in ED, and provided data that helped shape hospital inpatient services to respond specifically to these high-needs patients. It also supported the ACT team claiming priority for a computerised system within ED that would automatically identify FAMA patients when they first arrived at ED, rather than retrospectively.

> (the project) enabled safe handover...the most crucial thing to us, and what we could not confidently do previously [ACT team 1]

The review of hospital records proved time-consuming but essential. The specialist nurse took up to an hour per patient record then the specialist physician spent a further 30 minutes on the files of patients who were to be discussed at a case conference. Information was extracted free note form rather than to a pre-defined template. It was often the first time anyone had taken such an overview of these patients, spanning their multiple medical and social conditions over the full timeframe afforded by the records.

The effort repeatedly uncovered information that had been recorded but 'lost in the system', and provided a solid foundation on which to build further processes (see Boxes 1 & 2).

Home visits by the specialist nurses similarly proved time-consuming but vital. Visits took up to an hour, and individual patients were visited from one to ten times. More home visits occurred when there were multiple negotiations with health or social services and the patient was central to decision making.

Nurse home visiting before the case conference contributed to gaining new information to complement hospital discharge summaries and practice data. In the home patients' told the nurse how they 'looked after themselves', what influenced their decisions to, for example, not attend out-patient appointments or take medications and what living with a chronic condition meant to them.

Reasons for non-attendance at outpatient clinics included receiving appointments on days clinics did not run (a Saturday on one occasion), receiving too many appointments (three in the same week relating to the same condition) and uncertainty about the value of appointments in terms of 'feeling better'. Transport was not identified as preventing attendance.

Patients were also unsure about the benefits, dosages and times they took medications. In several cases, the opportunity to discarded bags of pills in favour of 'blister packaging' and a wellness plan was welcomed.

In addition, direct observation by nurses provided five types of further information:

- First, the nurses observed physical aspects of housing, such as warmth and became aware of issues like 'lack of insulation'.
- Second, the nurses formed a clear impression of the physical environment, including safety in the home, such as identifying the need for hand rails and ramps; or safety of the neighbourhood, and distance to public transport.
- Third, the nurses opportunistically gathered information that previously no one had thought to ask, or record in a way that remained part of 'system knowledge', such as the number of occupants or dependents (grandchildren) residing at the same address (see Box 3).
- Fourth, they found that some facts, though already 'known', took on a whole new level of significance when observed directly; for example, the difficulties created by the behaviour of a physically and mentally disabled child. Fifth, a visit to one patient would frequently reveal equally important health and social needs in other members of the same household. This was often a carer who was unwell or frail and had limited physical and emotional capacity to

support the index patient. A lack of available short-term or short-notice respite care was highlighted (see Box 3).

Other interventions undertaken at the initial encounter included spirometry, measuring mattresses for allergy covers, organising groceries and ensuring continued electric power to the home. Nurses investigated the reasons some social services, such as NASC or respite care were not in place months after referral, and managed issues related to district health board cross-boundary funding, which was a barrier to access in several cases.

Coordinating the activities of cultural workers, psychologists, and agencies like Lung Health Auckland resulted in shared outcome data. Presented at case conference, this information influenced priorities and decisions about the focus of care.

Nurse home visiting was identified by patients as invaluable. Whilst they reported general practitioners and practice nurses helped them, they did not perceive anyone advocated for them to receive hospital or social services.

The practice nurse was seen as invisible, except in particular situations where patients indicated their relationship with the practice nurse had become markedly better as a consequence of the project increasing involvement. Patients expected general practitioners and practice nurses to know what they needed and what was available for them. They expected facilitated access to services and were frustrated at the length of time it often took.

Nurse home visiting after case conference has a different purpose and was related to interventions agreed at case conference. This home visit and subsequent visits were part of the mechanism for follow up and were most often associated with assisting the person to better manage their condition and access services.

Assertive follow-up was seen when a specialist nurse and a man with a below knee amputation (see Box 4) visited two Housing New Zealand units - one in an unsafe area and the second with impossible bathroom access. The third unit was found suitable, but required a lift to be installed to raise the wheelchair from a lower level to the front door.

> Once I have my house I can take better care of myself. I don't have an address...I miss appointments...I'll be able to do my dialysis...

Perhaps most importantly, home visits appeared to enable a new level of relationship and trust between patient and nurse. This could be seen in the amount of personal information that people disclosed and the help they asked for, information that did not exist in the clinical record. It could also be seen in the level of information and insight gathered directly from patients and their family during a visit.

Helping others, typically from the same household, to access health and social services (see Box 1) was often requested. Trust usually took more than one visit to establish and appeared dependent upon assisting with what the patient perceived was most valued.

The case conference was attended in most instances by the specialist physician and specialist nurses, the practice nurse, the general practitioner; and often included allied health professionals and social service workers relevant to the situation of the patient

being discussed. On a few occasions, the patient and other family members were also present.

The conference thus brought together, for the first time: people who could provide a historical view of the clinical record; personal knowledge and connection to both secondary care and primary care; linkage to the social services that commonly proved to be the most important missing elements in the patients' total care; and, mostly, a patient voice through health professional advocacy. Case conferences typically took about one hour and discussed up to six patients. They were held in general practice during the lunch break.

Notes were taken at the case conference and a tentative plan and goals were drawn up and entered into a template. Actions that were agreed were then prioritised and assigned to individual health professionals for follow-up and intervention. If the patient was not present, the findings of the case conference were presented to them subsequently, usually by one of the specialist nurses.

When patients were unable to attend the conference the specialist nurse presented the patient's main concerns and perspective. All parties, including patients, described the case conference as the catalyst for developing a negotiated, collectively agreed plan for future care.

After the case conference the 'real' work began. This work included: adjusting medication; arranging specific medical tests that appeared indicated but omitted from the record, such as a laryngoscopy for a man with severe asthma who was chronically hoarse; advocating to accelerate scheduled medical services, such as an orthopaedic assessment for a man with neck and arm pain that was disrupting sleep; arranging access to health-related supplies equipment, such as obtaining a nebuliser for a man with severe asthma, and pursuing information from assessments that had been done but not reported and shared with others involved in a patient's care, such as several ophthalmology assessments on a patient with hyperthyroidism.

However, by far the bulk of the work involved advocating for social services especially from Work and Income New Zealand (WINZ) and Housing New Zealand (HNZ). The most intensive advocacy involved a specialist nurse accompanying the patient to HNZ and to a health psychologist, a cultural support worker who went to WINZ on behalf of a patient, and tens of phone calls and emails amongst these parties and other health care professionals, particularly pharmacists.

All four interventions were essential. Successes were apparent (see Box 1-4), but so were failures. In the case of one woman, repeated attempts to facilitate safe clinical and cultural care were rejected. Health professionals commonly agreed, however, that future entry back into the 'system of care' would be positively regarded.

Box 1: Record review of hospital notes
A 75 year old European woman with CHF had an echocardiogram in 2003 that showed her left ventricular ejection fraction was less than 10%. The woman, her family and the general practitioner were unaware of this result. Five years on she and her family were still expecting her 'to get better'.

Box 2: Case conference
A 33 year-old Tongan woman had multiple presentations to hospital with 'turns' and recurrent abdominal pain for which no cause had been found. The case conference included the patient, family members, specialist physician, specialist nurse, general practitioner, practice nurse, and a Pacific social worker. Record review confirmed epilepsy from age 10. The case conference revealed conflicting cultural and medical understandings about epilepsy. An action plan was developed that included involving female Pacific psychologist and strategies to manage episodes without attending hospital.

Box 3: Home visit
A 73-year-old European man had widespread tuberculosis and severe neck pain. The nurse who home visited found his new wife, of a similar age, had moderate to severe depression. Together they were the primary caregivers for grandchildren aged 4 and 7. Follow up action included organising Barnardo's childcare, respite care for the wife and accelerated orthopaedic assessment of the man.

Box 4: Assertive follow-up to gain services
A 45 year old Rarotongan man with deformed joints from severe gout and an above knee amputation is awaiting renal dialysis. Living in transit between friends and relatives and sleeping on floors, at the start of the project he was living out of a car. Despite having great difficulty with everyday activities he does voluntary work for a budget advice service and is active in the church. Employed full time three years ago he left work because of his repeated admissions to hospital. He has been trying for months unsuccessfully to get accommodation through HNZ. The specialist nurse contacted and negotiated repeatedly with HNZ until, after several impracticable places were offered, a suitable dwelling was found.

Interviews with patients provided valuable insights into how they experienced their health and social conditions. Several made it clear that hospital was not the place to go when unwell – this was the very time when they most wanted to be at home. They stated repeatedly that they did not want to ask for help – but did want to be told what help was available, and do want others to notice they need help and to provide help. They felt they were often subject to 'assessment' but often did not understand what was said, and were clear that a 'tick box' or 'one size fits all' approach did not necessarily identify their needs or appropriate solutions.

Furthermore, several patients noted services that had been deemed 'needed' months earlier but were yet to happen – such as the man with an above knee amputation who was delighted to be in a HNZ house as a result of nurse intervention within this project, but four months on was still waiting for his wheelchair ramp (see Box 4).

Patients were surprised and disappointed not to receive help from people they thought and expected to understand their needs. They could be indignant that services were available but not suggested to them, such as the woman who had not seen her hospitalised husband for three weeks because the taxi trip was $39 each way, although she was eligible for taxi vouchers; or the family who did not call the ambulance as they had already accumulated several hundred dollars in arrears, but no-one had suggested a $45 per year family enrolment.

They noted poor communication between general practice, the hospital and social services and felt this left them 'out on a limb'. They were frustrated by different messages from professionals about their eligibility to services, for example around financial assistance with home adaptations.

Patients also noted, with some detail and distress, lack of culturally safe rest home or respite care for Maori or Pacific elderly. One family valued the skilled management of their father's symptoms and disease but expressed anger and deep sadness at the inability of the same health professionals to place their father in a living situation where he could talk in a common language.

Although the two general practices structured the practice nurse/general practitioner relationships differently, patients did not appear to benefit from one arrangement over the other. Patients in both practices commented on the project leading to new and better relationships with practice nurses. In the majority of cases the relationship with the general practitioner was well-established—they were known by name and held in positive regard. In contrast, practice nurses were invisible at the start of the project. However, by the end of the project, several patients were delighted to have established a relationship with a specific practice nurses who came to advocate for them.

Several others noted how specific named practice nurse were the most important health professional in their lives. In one case, it was the mental health nurse, for another the district nurse calling to dress ulcers, and for another it was a respiratory specialist nurse. The common feature was the repeated home visit from the same trusted nurse.

Discussion

This pilot programme tested a collaborative care model that appeared to successfully identify and address the high and complex needs of a select group of patients whose clinical care was compromised by social factors. A picture emerged of multiple, partial assessments by different professionals and agencies and repeated failed communication between them. Patients constantly prioritised social needs as the most important to meet. For these patients it became clear that their priority issues would not be addressed by any current disease-oriented chronic care management programme.

All four components of the pilot programme—nurse home visiting, record review, case conference and assertive follow up and intervention—proved essential to reaching agreed decisions and taking action. The project legitimised social need as equal to clinical need as a focus for nurse intervention.

We have four general unanswered questions. The first relates to optimal structuring of data collection, the second to the requisite skills of nurses home visiting, the third to the participation of patients in the case conference, and the fourth to the selection of patients who would most benefit from this model of care.

In this project, data were collected in a free narrative format. It remains unproven whether a more structured systematic approach to identifying health and social needs at the first home visit is needed to guarantee a minimum quality of data collection and completeness. Further benefits include closing the gap between novice and expert data collector and allowing review by others who did not collect the data and easy update on successive versions of the same forms.

The nurses in this project had a post-graduate primary health care qualification. By professional background their approach to care reflected a deep understanding of the

relationship between health and social needs. Advocacy was embedded in usual practice and they worked confidently across organisational and professional boundaries. It is not known whether this role could have been successfully undertaken by nurses or others such as community health workers, without specialist clinical and primary health care knowledge.

While it is clear from patient stories that they immensely valued other nurses who visited them at home with a specific disease focus and often at a critical time, it seems that these nurses were limited to a focussed assessment of these patients. In contrast, the specialist primary health care nurses in this project were able to develop a comprehensive understanding of the patient's condition and care.

It remains unclear how best to involve patients in the case conference. Barriers to patient participation include power issues, the language used by health and other professionals, and the pragmatic desire to discuss multiple patients during one conference, given the difficulties of getting professionals together and the need, on any one occasion, to at least briefly discuss patients who had been substantively discussed previously. Nevertheless, our ideal would be that the conference occurs in patients' homes.

It also remains unclear how best to select patients who would benefit from this project, but we have no doubt that the social issues exacerbating chronic illness, patients understating their needs and additional household members having unrecognised needs is far more widespread than is apparent, until uncovered by a project such as this. It also remains unclear how many general practices would engage constructively with this project if it were to be expanded, but we remain optimistic.

Conclusion

In conclusion, this model of care demonstrated a way of working that improved access to appropriate social and clinical services and targeted a group of people with complex, high needs. It was clear that their priority issues were not being addressed by current disease-focused or chronic care management programmes. Importantly, benefits were found to be beyond the 'index' patient.

In our judgement the resource use appears modest in view of the significant social and clinical health gains. We expect that the main resource for this project, the specialist nurses and specialist physician, will need sustained, committed funding from the DHB. We recommend that the project be expanded across different geographic practice settings and evaluation to be ongoing. In addition, we recommend the evaluation address our unanswered questions and collect data on resource use.

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The case for integrating oral health into primary health care

Santosh Jatrana, Peter Crampton, Sara Filoche

Abstract

Severe disparities in oral health and inequities in access to oral health care exist globally. In New Zealand, the cost of oral health services is high. Physician services and medicines are heavily subsidised by the government—however, in contrast, private financing, either as out-of-pocket payments or as private insurance, dominates dental care. Consequently, the use of services is often prompted by symptoms, and services are mostly oriented towards relief of pain. The high cost of dental care with insufficient emphasis on primary prevention of oral diseases, poses a considerable challenge for providing equitable access to health care as laid down by the Alma-Ata Declaration on Primary Health Care (PHC). While improving oral health is one of the health objectives of the New Zealand Health Strategy, providing accessible and affordable oral health services does not feature prominently in the current Primary Health Care Strategy.

This paper discusses current knowledge regarding oral health in relation to general health and health care strategies and frameworks, in order to highlight that oral health care is an important component of primary health care. The authors also propose that oral health care should be integrated into primary health care in New Zealand. This could be achieved by placing oral health within the broader framework of PHC as encapsulated by the Alma-Ata Declaration and the New Zealand Primary Health Care Strategy.

Severe disparities in oral health and inequities in access to oral health care exist globally.[1–4] These inequities are inconsistent with the vision of equity and social justice in global health as laid down by the non-binding Alma-Ata Declaration on Primary Health Care.[5] The original vision for Primary Health Care (PHC) encapsulated in the Alma Ata Declaration did not include a strategy to integrate oral health within general health programmes, however in 2002, in response to the global challenges of the burden of oral health diseases, the WHO Global Oral Health Programme was reoriented to give 'priority' to the integration of oral health with general health programmes.[6]

The World Health Organization's (WHO's) *The Global Goals for Oral Health* and *The Global Oral Health Programme* detail the means to address the unmet oral health needs of the world's population. *The Global Goals for Oral Health* proposed goals and objectives which are guided by the principles of disease prevention and health promotion in consideration of local realities—i.e. the epidemiology of oral diseases and the socioeconomic conditions.[7]

The Global Oral Health Programme, currently one of the priority programmes under the charge of the Department of Chronic Diseases and Health Promotion within the WHO, formulated policies and necessary actions to ensure the continuous improvement of oral health. The strategy emphasises that greater efforts should be put

on developing global policies based on the common-risk factor approaches, focussing on modifiable risk behaviours related to diet, nutrition, use of tobacco and excessive alcohol consumption.[8,9] It also emphasises that oral health is integral and essential to general health as the risks to health are linked, and that oral health is a determinant of general health.

Reaffirming its commitment to achieve oral health integrated within PHC, in 2007 the World Health Assembly adopted a resolution which called for an action plan for promotion and integrated disease prevention in oral health.[10] It emphasised the need to incorporate oral health into prevention and control of noncommunicable diseases (NCDs) within the framework of enhanced primary health care. The resolution also called for increased budgetary provisions for oral health care.

This paper discusses current knowledge regarding oral health in relation to general health and health care strategies and frameworks, to highlight that oral health care is an important component of primary health care. The authors also propose that oral health care should be integrated into primary health care in New Zealand. This could be achieved by placing oral health within the broader framework of PHC as encapsulated by the Alma-Ata Declaration and the New Zealand Primary Health Care Strategy, as discussed in the following sections.

Oral health and disease

The WHO definition of oral health highlights the physical, social, and psychological importance of oral health, defining oral health as:

> A natural, functional, acceptable dentition which enables an individual to eat, speak, and socialise without discomfort, pain or embarrassment, for a lifetime, and which contributes to general well being.[11]

The biological description of oral health is one that conceptualises oral health as the absence of oral diseases, such as dental caries (tooth decay), and periodontal diseases (gum disease).[11] The endpoint of these diseases (e.g. a hole in the tooth causing severe pain and discomfort) is typically when most people are likely to seek dental care.[12]

At first glance, treatment (e.g. filling the hole) appears to fit well with the biological description of oral health. However, in the majority of cases the endpoint treatment does not target the disease processes,[13] which leaves the diseases active. Moreover, there is a life-time risk of developing these diseases.[14,15] The WHO definition of Oral Health is therefore more constructive as it encapsulates the meaning of oral health and disease in its entirety.

It is important to note that oral diseases also include oral mucosal lesions and oropharyngeal cancers, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS)-related oral disease and orodental trauma.[16] These are all major public health problems worldwide, and are impacted on by a number of different factors such as sociobehavioural, environmental, and host-genetics factors, and the general health of the individual.[16] However, because of their prevalence [17], the reasons for seeking dental care, and historically because they have been considered the most important global oral health burdens [16] we will focus on dental treatment of dental caries and periodontal diseases for the purpose of this paper.

Dental caries and periodontal diseases are complicated to treat as they are caused by a number of different bacteria present in the mouth (dental plaque) and are impacted on by a range of different factors.[14,15] These factors include socioeconomic position, host-genetics, and age. [16] The modifiable risk factors associated with these diseases, which are also common to other chronic diseases such as diabetes, include excess alcohol consumption, tobacco use, dietary habits, and hygiene. [18] The dynamic relationship between the host and the oral microflora means that there is a life-long need for everyone to have good oral health care.[15]

Poor oral health issues have been long neglected in New Zealand and elsewhere and are at "epidemic" proportions.[19] Common misconceptions include that dental caries have largely disappeared, are trivial and are easily treatable.[20] However, most New Zealanders have dental caries by adulthood, comparing unfavourably with Australia and the UK.[11]

Recent reports also show that childhood caries are at their highest since records began in 1990.[11,21] In 2004, nearly 50% of 5-year-old children had dental caries. This is particularly alarming as research suggests that oral health at age five predicts oral health in adulthood. [11] The prevalence of periodontal diseases in New Zealand is harder to gauge due to lack of epidemiological studies in this area. However, based on international records and current knowledge, advanced adult periodontitis, leading to severe loss of supporting periodontal tissues and tooth loss, does not tend to exceed a prevalence of 10–15 % in most populations.[22]

Gingivitis, a form of periodontal disease (gingival inflammation without any bone loss about teeth and no pockets deeper than 3 mm [23]) is more common. Based on a report from the US, approximately 50% of the adult population has gingivitis around three or four teeth at any given time.[24]

PHC, the Declaration of Alma Ata and the New Zealand Primary Health Care Strategy

The concept of PHC was granted recognition in 1978 at the International Conference on PHC. Its values, along with a set of principles and core activities, were spelled out in 10 articles that are known as The Declaration of Alma Ata.[5] It defines PHC as [5]:

> Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part of both the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and the community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing healthcare process.

New Zealand's Primary Health Care Strategy (PHCS), which borrows extensively from the Alma Ata Declaration in wording and ideology, defines quality primary health care as essential health care based on practical, scientifically sound, culturally appropriate, and socially acceptable methods[25] that is:

- Universally accessible to people in their communities.
- Involves community participation.

- Integral to, and a central function of, New Zealand's health system.
- The first level of contact with our health system.

This definition of primary health care represents a shift from the general practice model that has characterised New Zealand's primary health care system in the past. In New Zealand, as in much of the world, health policy is increasingly recognising primary health care as central to health service provision. Within the framework of the Alma Ata Declaration, health services are being reoriented with an increasing focus on reducing financial and other barriers to primary care.

Accompanying this reorientation is the increasing use of capitation funding for primary care services and the formation of non-profit primary health organisations (PHOs) with responsibility for enrolled populations.[25,26] These policy changes have resulted in a substantial reduction of GP charges and pharmaceutical charges.[27,28]

Dental care delivery

In New Zealand the cost of oral health services is high. Physician services and medicines are heavily subsidised by the government—however, in contrast, private financing (either as out-of-pocket payments or as private insurance) dominates dental care.

Public funding contributes only 25% of dental care expenditure in New Zealand, and is concentrated on children and adolescents.[29] Public funding for dental care for children up to the age 12 years is offered through a school-based dental therapist system.[30] Services offered include: oral examination and prophylaxis, fissure sealing, cavity preparation and placement of fillings, extraction of primary teeth, and referral of patients as required. For adolescents up to the age 18 to qualify for publicly-funded care, they must register with private dentists paid under public contract.

Most contracts are based on a capitation fee that covers a defined package of services; however, for some dentists, contracts for adolescent care remain on a fee-for-service basis. However, public subsidisation of adult dental care is very limited and targeted at particular groups at hospital-based dental clinics, such as special needs and medically compromised patients and some emergency dental services (relief of pain and infection only).[31] The majority of the adult population is responsible for the full costs of dental care services. The healthcare effect of this age-related change in entitlement to state assistance for dental care has been found to be associated with adverse oral-health.[32]

Cost barriers in access to dental care

The results of a recently conducted New Zealand study demonstrated that approximately 16%, 23%, and 7% of adults respectively reported deferring seeing their doctor, dentist, or collecting a prescription during the preceding year because they could not afford the cost of a visit or prescription.[33]

The access problem because of cost was significantly higher for dental care than for seeing a GP or collecting a prescription mainly because, unlike a GP's visit, which is largely government funded, individuals predominantly fund their own dental care.

In a five country survey (UK, USA, Canada, Australia, and New Zealand), the incidence of not visiting a dentist due to cost was much greater than not visiting a physician in all the countries surveyed; this is expected as access to dental care is more dependent on user contributions than is medical care in each country. However, cost seems more of a barrier in New Zealand than in the UK, Canada, and Australia.

New Zealand adults were the most likely (37%) and UK adults were the least likely (19%) to say that they needed dental care but did not see a dentist because of costs in the past year.[34] The US (35%), Australia (33%), and Canada (26%) were between the two extremes. The findings of this survey were correlated closely with countries' insurance systems and cost-sharing policies. Except for the UK, all these countries do not include dental care in the basic public program. The relatively high access to dental care in the UK reflects comprehensive dental funding.

Oral health and general health

The relationship between oral and general health has been increasingly recognised during the past two decades[35] and there is a growing body of evidence that indicates that specific oral conditions can be related to specific medical conditions [35,36] These have been shown to include heart disease[35,37], diabetes[38] and pre-term low weight babies.[39,40]

Oral health is integral to general health[38] primarily because oral diseases have risk factors in common with other chronic diseases and because, in the case of periodontal diseases, of their inflammatory and infectious nature.[16 36] The control of oral diseases is considered to be essential in the prevention and management of the other associated systemic conditions [35] although more research in this area is needed.

In the case of the association between periodontal disease and heart disease, a meta-analysis of 5 prospective cohort studies (86,092 patients) indicated that individuals with periodontal disease had a 1.14 times higher risk of developing coronary heart disease than the controls (relative risk 1.14, 95%CI 1.074–1.213, p<0.001).[37] The case-control studies (1423 patients) showed an even greater risk of developing coronary heart disease (OR 2.22, 95%CI 1.59–3.117, p<0.001).[37]

The authors concluded that periodontal disease may be a risk factor for coronary heart disease and called for prospective studies to be carried out to evaluate risk reduction with the treatment of periodontal disease. Other studies report similar findings and conclusions, calling for further research in this important area of public health. [41-43]

In 2007 over 200 articles were published in the English literature examining the relationship between periodontal disease and diabetes over a 50-year period.[44] Periodontal disease is considered one of the chronic complications of diabetes mellitus, both in Type 1and Type 2 forms.[45] Inflammatory periodontal diseases may increase insulin resistance in a way similar to obesity, thereby aggravating glycaemic control. However, further research is needed to clarify this aspect of the relationship between periodontal diseases and diabetes.[45]

A report on the relationships between diabetes and periodontal diseases and the effects of periodontal infection on glycaemic control and diabetes complications showed consistent evidence of greater prevalence, severity, extent, or progression of at least one manifestation of periodontal disease in 13 of the 17 studies reviewed.[46]

In the same report, treatment and longitudinal observational studies provided evidence to support periodontal infection having an adverse effect on glycaemic control, although not all investigations reported an improvement in glycaemic control after periodontal treatment, and requires further investigation.[46]

Dental caries are often associated with xerostomia (dry mouth) as a result of head and neck radiation, drug use (such as methamphetamine known as "meth mouth" [47] and salivary gland diseases such as Sjögren's syndrome (a multisystem auto-immune condition) and HIV disease.[48].

Integration of oral with primary health care

Integration of oral health and dental care into primary health care is important because of the integral nature of oral health with general health. Conventional dental treatment focuses primarily on the endpoint of disease and fixing it—e.g. in the case of dental caries, filling the cavity.[49] This, combined with the current dental delivery system is not effective in achieving sustainable oral health improvements across populations, nor in reducing the oral health equity gap.[50,51] This is because an endpoint treatment approach does not take into account the disease processes nor the multifactorial nature of oral diseases, or the commonality of risk factors with other chronic conditions.[13 16 50,52] Moreover, such an approach is less appropriate for prevention-based interventions at community levels and thus serves relatively few people at high costs.[13 50 52] As Mertz and O'Neil state, 'What is needed is a turn towards a system (of care) that meets the principles of primary health care'.[53]

Current evidence indicates that delaying dental care can lead to serious illness as adverse oral health has a profound impact on general health, quality of life, and economic wellbeing, as discussed in the preceding sections.[54,55] Failure to provide medically necessary dental care undermines the effectiveness and efficiency of general medical care. [56]

It is for the above described reasons that oral health policies and programmes should be an integral part of national primary health care. Integration of oral health into strategies for promoting general health will enhance both oral and general health. While improving oral health is one of the health objectives of the New Zealand Health Strategy,[57] providing accessible and affordable oral health services does not feature prominently in the current Primary Health Care Strategy. [25] This study emphasises that oral health care is primary health care and we need a health care system that meets the principles of primary health care.

What does it mean to integrate oral health with primary health care? It broadly means bringing dental care and primary health care under one roof, thus providing dental care services as part of comprehensive primary health care. It means having more public responsibility in financing, and delivery of oral health care with universal access to preventive as well as restorative dental care. Currently, unlike a GP visit, New Zealanders primarily meet the cost of their own dental and oral health services. However, treating the funding of basic dental services differently from other medical services is contrary to the view expressed by the WHO that oral health is integral to overall health and an important part of primary health care. [6]

Moreover, as mentioned before with the current oral health system, dental and oral health programmes tend to follow a biomedical approach (individual behaviour risk factors) and largely ignores the influence of socio-political factors as key determinants of health. The common risk factor approach, in which coordinated action is focussed upon a set of shared risk conditions and their associated behaviours, aims to address the common determinants of chronic conditions, including oral diseases.[58,59] Oral health and disease are impacted on by diet, hygiene, smoking, alcohol use, stress, and trauma.[16] As these risk factors are common to a number of other chronic diseases, adopting a collaborative approach would be more rational than one that looks at the diseases in isolation.

This above mentioned collaborative approach emphasises meeting the patient's needs early on, by reorienting oral health services towards prevention, self-management and early intervention, thus reducing avoidable hospital visits and admissions. Like primary health care, dental care should aim to maintain good oral health of the population and not merely treat the endpoints of oral diseases.

Currently, in New Zealand and elsewhere, the cost of oral health services is high. Consequently, the use of services is often prompted by symptoms; and publically funded oral health care is largely oriented towards select populations e.g. children, adolescents, low-income adults, special needs and medically compromised patients, with some emergency dental services (relief of pain and infection only).[31]

The insufficient emphasis on primary prevention of oral diseases, poses a considerable challenge for several groups of people, particularly women, older adults, and those from lower socioeconomic groups, who face greater barriers in accessing oral health due to cost barriers. [33] It remains a challenge in many countries, including New Zealand, to establish prevention-oriented oral health systems based on the Primary Health Care Approach and to reduce cost barriers to accessing oral health care.

It is encouraging to note that the New Zealand Government has started the process of integrating oral health with general health programmes with the publication of a strategic vision for oral health in New Zealand. [11] The challenge for national health authorities is to translate this strategic vision into practice for the benefit of those who have unmet oral health needs because of cost. Moreover, a number of primary care practices, such as Wellington People's Centre and Hokianga Health, provide dental services as part of integrated extended primary health care services.

In the future strong emphasis should be given to ensure integration of primary health care and oral health care to ensure overall good health, healthy individuals, and healthy populations.

Conclusion

This paper has highlighted the need for dental and oral health to be integrated within a PHC framework. It has shown that dental and oral health care clearly meet the requirements for PHC, and that there is need for a preventative orientated approach towards oral health care.

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Methyldopa-induced autoimmune haemolytic anaemia revisited

Anish Thomas, Bridgit R James, Stephen L Graziano

Abstract

Drug-induced haemolytic anaemia is a commonly encountered clinical situation. Methyldopa-induced haemolytic anaemia, once the most common cause of drug induced haemolysis, is now rarely seen due to decline in its use. We report a case of methyldopa induced immune haemolytic anaemia in a young woman where the diagnosis was initially missed. The major mechanisms of drug induced immune haemolysis and unique characteristics of methyldopa induced haemolysis are also outlined.

Autoimmune haemolytic anaemia is characterised by production of antibodies against surface antigens of autologous red blood cells and destruction via the reticulo-endothelial system and/or complement pathway. Among the many drugs that can induce the formation of autoantibodies, the most studied is alpha methyldopa, a centrally acting antihypertensive agent. It was implicated as the most common cause of drug induced immune haemolytic anaemia in the 1970s.[1]

Although it continues to be the initial antihypertensive of choice in pregnant women, availability of better and more tolerated antihypertensive agents has led to its declining use in general practice. A study of US antihypertensive prescribing trends reported a drop in prescriptions of centrally acting agents from 9% of all hypertension visits in 1990 to a negligible level in 2004.[2]

We report a case of methyldopa-induced immune haemolytic anaemia in a young woman where the diagnosis was initially missed.

Case report

A 26-year-old occupational therapist was referred by her primary care physician for evaluation of anaemia found on routine blood tests. She had noticed easy fatigability over the previous few weeks, but had no exertional dyspnoea, palpitations, lightheadedness, or cold intolerance. She had regular menstrual cycles and had no blood loss. She did not have jaundice, dark urine or previous history of anaemia. She was diagnosed with hypertension 2 years previously. Her family history was unremarkable. Her medications were oral contraceptive pills (Yasmin®: oestrogen and progestin combination) and methyldopa. She was started on methyldopa as she was planning to conceive in the near future.

Physical examination revealed a pleasant lady in no distress. Blood pressure was 142/68 and pulse was 89/minute. She was obese and pale but had no icterus, enlarged lymph nodes, cutaneous bleeds, or leg ulcers. She had regular heart rhythm with no murmurs or gallops. Abdomen exam revealed no hepatosplenomegaly.

Relevant investigations are summarised in Table 1. Peripheral smear stained with Wright's stain showed micro-spherocytes and reticulocytes.

She had been taking methyldopa for 8 months and had increased the daily dose from 1 to 1.5 gm, 1 month prior to presentation. Methyldopa was promptly discontinued. Though the patient remained anaemic 2 weeks after stopping the drug, 6 weeks later anaemia had resolved completely (Table 2).

Based on the temporal association between discontinuation of the drug and resolution of anaemia and the lab findings, methyldopa induced autoimmune haemolytic anaemia was diagnosed.

Table 1: Complete blood count and haemolytic workup (Normal range)

Variables	Values
White blood cell ct (4–10) k/ul	10.6
Red blood cell count (4.1–5.3) m/ul	2.85
Haematocrit (36–45)%	27.0
Haemoglobin (11.5–15.5) g/dl	9.6
Platelet count (150–400) k/ul	456
Mean cell volume (80–96) fl	94.7
Red cell distribution width (11.5–14.5) %	16.8
Bilirubin total (0.1–1.0) mg/dl	1.6
Lactate dehydrogenase (122–214) u/l	326
% Reticulocytes (0.6–2.8)%	19.2
Haptoglobin (16–200) mg/dl	<6
Antibody identification	Anti-Warm Autoantibody
Broad spectrum direct antiglobulin test	Positive
Anti IgG direct antiglobulin test	Positive
Anti C3 direct antiglobulin test	Negative

Table 2: Reticulocyte and haematocrit response to discontinuation of methyldopa

Variables	Reticulocyte % (0.6–2.8)	Haematocrit (36–45)
At diagnosis	19.2	27.0
2 weeks	18.1	28.1
6 weeks	2.2	37.0

Discussion

Drug-induced immune haemolytic anaemia results from interactions between the drug, antibodies, and RBC membrane components. The incidence of drug-induced immune haemolysis has been estimated at 1 case per million.[3]

Four widely recognised mechanisms that have been proposed to explain drug-induced immune haemolytic anaemia are summarised in Table 3.[4] These mechanisms are not mutually exclusive.

Table 3: Major mechanisms of drug induced immune haemolysis

Mechanism		Prototype drug	Predominant Ig class
Drug adsorption	Drug (which acts as a hapten)- red cell complex elicits immune response. Splenic sequestration of IgG-coated red cells causes haemolysis	Penicillin	IgG
Immune complex formation	Drug forms ternary complex with antibody and red cell membrane. Haemolysis due to direct lysis by complement and splenic sequestration of complement coated red cells	Quinidine	IgM or IgG
Membrane modification	Modification of RBC membrane causes adsorption of serum proteins. These proteins result in a positive DAT	Cephalosporins	None
True autoantibody formation	Antibody directed against an autoantigen on RBC membrane	Methyldopa	IgG

Unlike other mechanisms of drug-induced immune haemolytic anaemia, in methyldopa-induced haemolysis the antibody is not directed against the drug or a drug-altered antigen, but against an antigen on the red cell membrane. Methyldopa-induced antibodies typically appear between 4 months and 1 year after initiation of the drug.

Though 10% to 20% of patients taking methyldopa for longer than 4 months are DAT (direct antiglobulin test) positive, less than 1% develop haemolytic anaemia.[5] This is possibly due to qualitative and quantitative differences in autoantibodies and reticulo-endothelial functions between patients.[6] The characteristics of the red cell target antigen and the auto-antibody in methyldopa induced haemolytic anaemia are highlighted in Table 4.[6]

Table 4. Characteristics of methyldopa-induced haemolysis

- Autoantibody is usually a warm-reacting IgG antibody
- Antibodies are reactive with determinants of the Rh complex
- There is no activation of the complement cascade
- Frequency of autoantibody formation increases with increasing drug dosage
- Mechanism of autoantibody formation is unknown
- Haemolysis takes place by splenic sequestration of IgG-coated red cells

Though the mechanism of autoantibody formation is unknown, two possible explanations exist. Methyldopa induces changes in the structure of red cell membrane proteins, resulting in formation of neoantigens, which are targeted by autoantibodies.[7] Methyldopa may also inhibit suppressor T lymphocytes, thus inciting proliferation of antibody-producing β lymphocytes.[8]

Most of the patients who develop a positive DAT with no haemolysis are not likely to experience haemolysis if they continue therapy and it is acceptable to continue the drug in this group.

In patients who develop methyldopa-induced haemolysis, stopping the drug usually results in resolution of haemolysis. Corticosteroids may accelerate recovery. However, it may take many months before the DAT becomes negative.[6]

Currently ceftriaxone and cefotetan are the most common causes of drug-induced immune haemolytic anaemia.[9] Though its use has declined, methyldopa remains an important aetiological consideration in the differential diagnosis of haemolytic anaemia.

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Erythromycin-induced postprandial biliary colic

Andrei M Beliaev, Peter Shapkov, Richard Ng

The diagnostic workup of biliary colic includes gallbladder dyskinesia; chole-; choledocholithiasis; and benign and malignant polypoid lesions of the gallbladder; haemobilia; parasitic infestations of the liver and biliary tract such as hydatid liver disease, ascariasis, clonorchiasis, and fascioliasis; and abdominal tuberculosis. Medications such as morphine and butorphanol also can cause biliary colic.[1,2] An association of erythromycin administration and biliary colic has been reported as well.[3]

We report a case of erythromycin-induced postprandial biliary colic, provide liver ultrasound images of this condition, and discuss a possible mechanism of action of erythromycin on biliary tree.

Case report

Ms D, a 20-year-old female, presented with severe colicky epigastric pain, which radiated to the back and was associated with nausea. Patient's symptoms developed in 3 hours after taking the first dose of 800 mg of erythromycin lactobionate for her tonsillitis.

Apart from left knee meniscectomy 4 years ago Ms D had an unremarkable past medical history. She was on a long-term oral contraceptive pills and was not allergic to any medications.

On examination: a slim patient, body mass index of 21.8, afebrile, haemodynamically stable with a heart rate of 92 beats per minute. Oxygen saturation was 97% on air. There was mild erythema of the paratonsillar arches without cervical or axillary lymphadenopathy. Jugular venous pressure was not raised. Heart sounds were dual. No murmurs. There were vesicular breathing sounds on auscultation of the lungs. The abdomen was guarded and tender in the epigastrium and the right upper quadrant. Bowel sounds were present.

Ms D had normal findings on chest and abdominal X-ray investigations. Her blood tests results on admission demonstrated leukocytosis with white cell count (WCC) of $30.6 \times 10E^9$/L, normal eosinophils count, normal liver function tests (LFTs), and electrolytes.

To control pain the patient required administration of 11 mg of morphine intravenously before the pain gradually settled down.

Liver ultrasound investigation: the gallbladder was not identified with certainty, despite fasting for 10 hours (Figure 1). There was mild prominence of the intrahepatic bile ducts as well as the common duct (CBD=5mm). The liver appeared normal. Portal vein caliber was normal. No mass or fluid collection was identified in the epigastrium, where there was maximal focal tenderness. The pancreas, kidneys, spleen, aorta ,and para-aortic regions appeared normal.

The next day blood tests demonstrated a rise in LFTs: gamma-glutamyl transferase 225 U/L (normal range 0–50 U/L), alkaline phosphatase 76 U/L (40–100 U/L), aspartate transaminase 122 U/L (<45 U/L), and alanine transaminase 106 U/L (<45 U/L). WCC decreased to 17.3 × $10E^9$/L.

A repeat liver ultrasound study in one day showed that despite the patient having fasted, the gallbladder was not well distended, normal in appearance, and no calculi were visible in it (Figure 2). There was no biliary dilatation.

Ms D was discharged on the second day after admission. On discharge her WCC were normal and her LFTs were rapidly improving.

Figure 1. The gallbladder was not identified with certainty, despite fasting for 10 hours

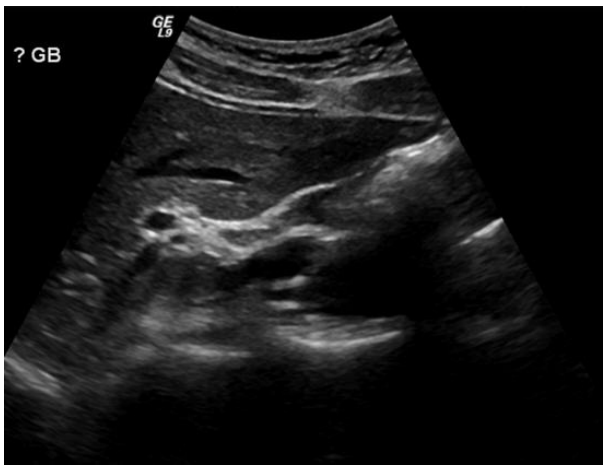
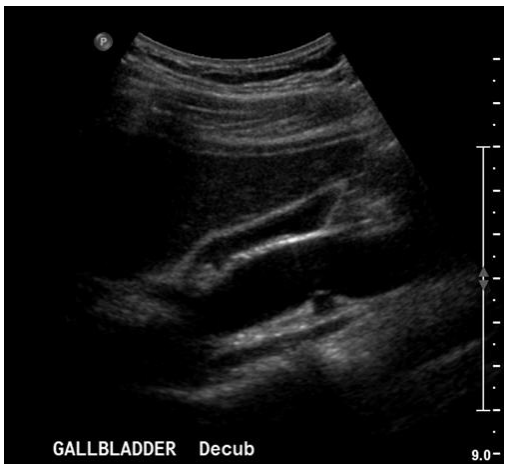


Figure 2. Despite the patient having fasted, the gallbladder was not well distended, normal in appearance and no gallbladder calculi were visible



Discussion

Erythromycin is a macrolide antibiotic which is widely used as an antimicrobial agent. It binds to 50S subunit of bacterial ribosomes and inhibits the translocation step in the polypeptide chain formation by preventing its movement from the A site to the P, or donor, site of the transferase reaction.[4]

Another clinical application of erythromycin is related to its prokinetic effect on the gastrointestinal tract which increases intestinal transit and postoperative ileus resolution. Erythromycin competes with motilin, a 22-amino acid peptide produced by enterochoromaffin cells of the duodenum and jejunum for binding to the transmembrane domain of the motilin receptor.[5] Activation of motilin receptors leads to influx of calcium ions into smooth muscle cells of the gastrointestinal tract and indirectly activates calcium-activated potassium channels, which initiates phase III interdigestive migrating motor complex and promotes oesophageal, gastric, small, and large bowel motility.[6]

Several studies investigated the effect of erythromycin on gallbladder emptying.[7,8] Arienti et al (1994) found that a single dose of 500 mg of erythromycin stearate administered orally accelerated and increased postprandial gallbladder ejection fraction. Similar findings have been reported after intravenous administration of 500 mg of erythromycin lactobionate.[8]

Effects of erythromycin on the hepatobiliary system might depend on maturity of the gastrointestinal system.[9] Ng et al (2007) in the double-blind, randomised, placebo-controlled trial found that oral administration of 12.5 mg/kg of erythromycin every 6 hours for 14 days in very-low-birth-weight infants reduced the incidence of parenteral nutrition-associated cholestasis and septicaemia. In adults, erythromycin can cause cholestatic hepatitis which usually develops in 10 to 20 days of treatment.

Usually, initial symptoms of nausea, vomiting, and crampy abdominal pain are followed by jaundice and fever. Blood tests often reveal an elevation of transaminases in serum, leukocytosis, and eosinophilia.[4] A case of erythromycin-induced primary biliary cirrhosis has also been described.[10]

An association of treatment with erythromycin estolate and biliary colic has been reported in the literature.[3] For example, Oliver et al (1973) described five patients with biliary colic treated for a different period of time with erythromycin estolate. The authors thought that the estolate ester of erythromycin was responsible for attacks of biliary colic. There are also reports about crampy abdominal pain followed by an oral administration of erythromycin stearate and an intravenous challenge with erythromycin lactobionate.[7,8]

In our patient, biliary colic developed after an oral administration of a single dose of erythromycin lactobionate. These findings suggest that biliary colic might not be related to the use of a particular ester of erythromycin, but caused by the effect of erythromycin lactone ring on motilin receptors in the biliary tree.

Our case report points out that a single therapeutic dose of erythromycin can cause biliary colic with transient derangement in liver function tests and leukocytosis. Erythromycin-induced biliary tree spasm must to be included in the differential diagnosis of biliary colic.

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Ecchymotic wrist drop

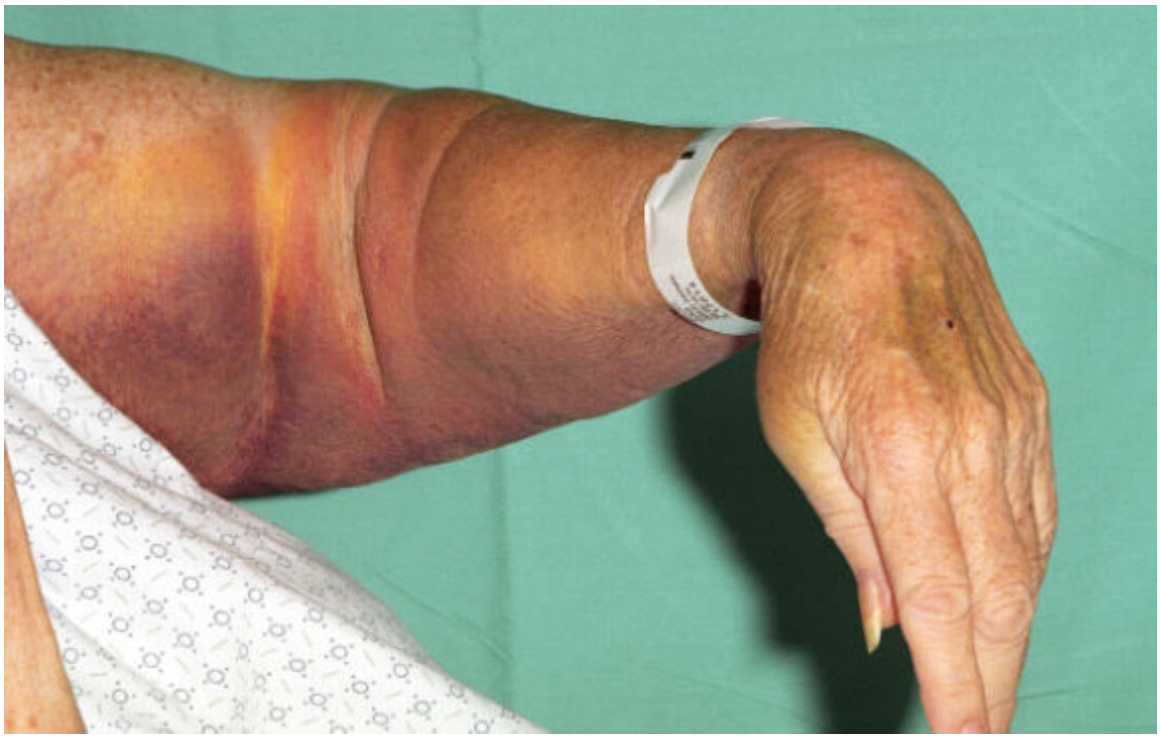
Hala Alsafadi

Clinical

A 73-year-old female presented with increasing shortness of breath, with a previous history of myocardial infarction and mild renal impairment. The patient was on aspirin but not on anticoagulation therapy. She was having regular blood sampling to monitor her renal function. Four days after admission she complained of weakness of her left wrist.

On examination there was a left wrist drop and a haematoma in the left antecubital fossa at the site of previous venepuncture. Peripheral pulses were intact. (Figure 1).

Figure 1. Left wrist drop and anticubital fossa ecchymosis



What is the diagnosis?

Answer

A diagnosis of *compartment syndrome and radial nerve palsy* was made. The patient was treated conservatively and is currently receiving physiotherapy.

Discussion

The antecubital fossa provides an easily accessible site for venepuncture with generally low associated morbidity. However nerve injuries may occur either due to direct injury or compression. Haematoma can result from inadvertent arterial puncture or from inadequate pressure. Patients with bleeding disorders and those taking anticoagulants are at increased risk.

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Prophylaxis of hydatid disease

Excerpts taken from article written by Dr LE Barnett in N Z Med J. 1909;8(32):9–15.

Refer to the PDF to view this article: http://www.nzmj.com/journal/122-1301/3757/content.pdf

((Libraries, print out the PDF and replace this page))

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Rear-facing child car seats for children under 4 years old?

The authors of this report state that many babies are switched from a rear-facing to forward-facing seat at 9 kg (age 8 months for a boy on the 50th centile). However, they are concerned that it may be safer for young children to travel in a rear-facing seat until 4 years of age. Their reasoning is based on the opinion that excessive stretching or even transection of the spinal cord can result if a child is involved in a head-on crash while in a forward-facing car seat. The opposing arguments are that forward-facing seats represent a coming of age and that car motion sickness is lessened with forward-facing car seats.

The spinal cord issue would seem to be very important. Perhaps the prominence of this paper in the *BMJ* will stimulate meaningful discussion.

BMJ 2009;338:b1994doi:101136/bmj.b1994.

Thigh-length graduated compression stockings (GCS) to reduce the risk of deep vein thrombosis after stroke?

The use of GCS after surgery has been proven to lower the incidence of thromboembolism. Extrapolisation from this evidence has lead to widespread recommendations for their use in immobolised stroke patients. This report is on a randomised trial of GCS vs no GCS in 2518 patients with strokes. The outcome was that GCS did not significantly reduce the incidence of deep venous thrombosis in the legs. And, skin breaks, ulcers, blisters, and skin necrosis were significantly more common in patients allocated to GCS than in those allocated to avoid their use (odds ratio 4.18).

So we now strongly recommend that thigh-length GCS should not be used in stroke victims. The same researchers have also been comparing thigh-length vs below-knee GCS but this trial has been terminated prematurely for obvious reasons. Reasonable alternatives—hydration, aspirin if no haemorrhage, passive movement, and low molecular weight heparin in selected cases.

Lancet 2009;373:1958–65.

Severe sepsis and septic shock—an indication for corticosteroids?

The authors of this paper, which is from France, point out that the benefit of corticosteroids in severe sepsis and septic shock remains controversial.

Their review included 20 trials involving 2384 adult patients with severe sepsis/shock who were randomised to usual treatment with or without steroids. The particular steroid used and its dosage was diverse and ranged between moderate dosage of oral hydrocortisone and very high dose of intravenous methylprednisolone.

The primary outcome sought was the 28-day mortality rate and this revealed no clear benefit for those treated with steroids. Subset analysis raises the possibility that lower-dose steroids (200–300 mg hydrocortisone) might be beneficial, so further trials are recommended. An editorial concludes that this uncertainty does not necessarily burden patients and families with the final decision, but they deserve to know that their physicians are not sure.

JAMA 2009;301(22):2362–7 & 2388–90.

Tight glycaemic control in Type 2 diabetes?

A recent abstract (*NZMJ* 3/7/2009) indicated that tight control of blood sugar in the Intensive Care Unit might cause more harm than good. This paper provides a meta-analysis of 5 trials (28,753 subjects) involving patients in the community with Type 2 diabetes who were randomly assigned to tight versus less tight glycaemic targets. In three, the tight control arm aimed at haemoglobin A1C levels as low as 6.5% to 7.0%. In the other two, the criterion of tight control was a fasting blood sugar of <6.0 mm/L. The latter three randomised trials were conducted on patients recently diagnosed and the other three were on long-standing diabetic subjects. The authors of this review felt that benefits to those with tight control were inconclusive.

Their conclusion was that tight glycaemic control burdens patients with complex treatment programs, hypoglycaemia, weight gain, and costs—and offers uncertain benefits in return.

Ann Intern Med 2009;150:803–8.

Erythropoietin for cancer-related anaemia?

Anaemia is common in cancer patients—due to the disease and/or its treatment. Hence blood transfusions are often required. However, elsewhere, e.g. Canada, erythropoietin is often used as it is usually effective. As erythropoietin is expensive and has an adverse events profile, this group of researchers investigated its usage. Their meta-analysis of 52 randomised trials (12,006 patients) shows that those receiving erythropoietin had clinically detectable improvements in disease-specific measures of quality of life. It also reduced the use of blood transfusions (RR 0.64). However it led to an increased risk of thrombotic events (RR 1.69) and serious adverse events (RR 1.16). Included in the serious adverse events was a significantly earlier mortality rate.

So it's thumbs down for this treatment. In any case, erythropoietin is not funded for this indication in New Zealand.

CMAJ 2009;180(11):1107–12.

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Burden of novel influenza A virus (H1N1) in Auckland and Counties Manukau DHBs (July 2009): a capture-recapture analysis.

People suffering from novel influenza A virus (H1N1) interact with the health system at a number of different levels—primary care, hospital, and public health units. Such interactions are recorded and may be combined to estimate the health contact prevalence of this disease. However, many will have the infection without seeing health services, so are not recorded in any dataset of health care use. Yet knowledge of the total community burden of pandemic influenza would help assess the effectiveness of control efforts and allow health resource to be appropriately allocated. For the Auckland and Counties Manukau DHBs (ADHB & CMDHB) we sought NHI number listings of possible H1N1 influenza presentations for the month of July.

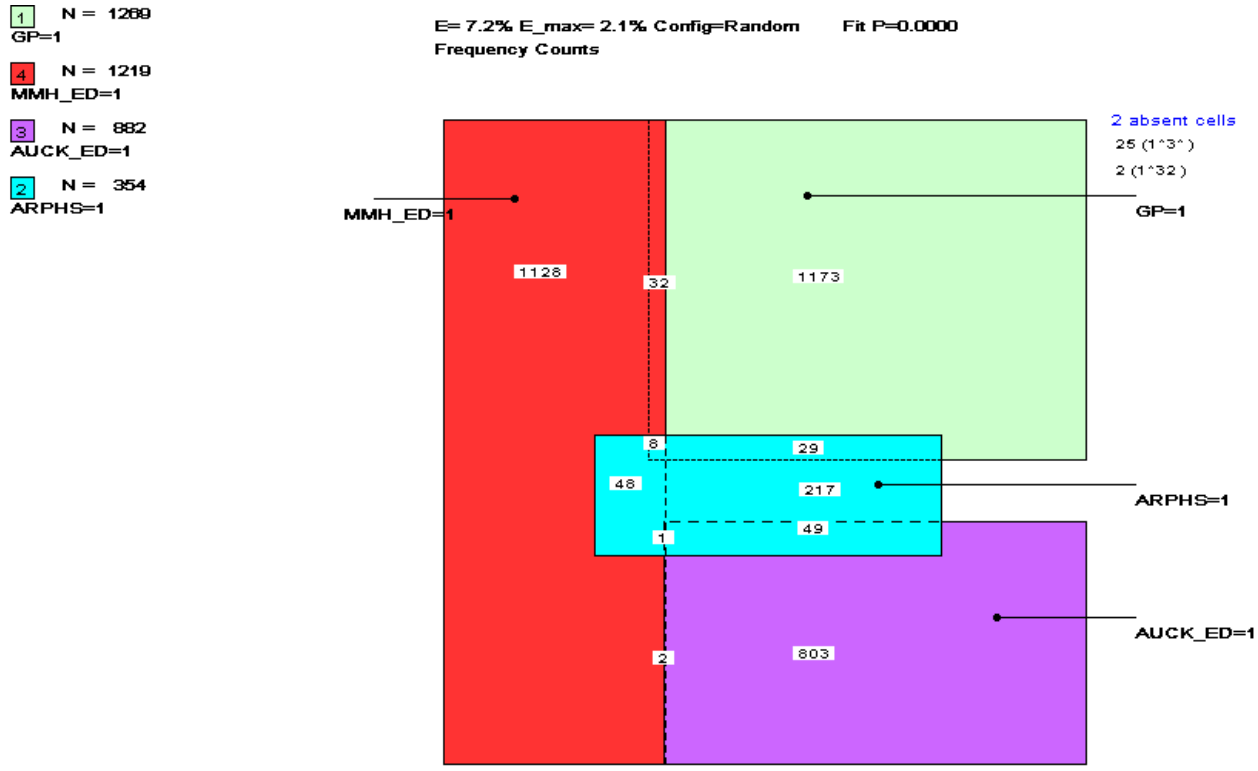
By using anonymised NHI linkages we were able to identify patients who appear on one, or more than one, database. This allowed the application of capture-recapture methods to estimate the total number of people in the community who had been infected. Capture-recapture methods account for the numbers of people recorded in each database and extrapolates this information using log-linear models to estimate the total number of cases. We used the Rcapture utility[1] for the R statistical programme[2] to carry out the calculations.

Datasets merged—A total of 3724 events occurred, which represented 3617 individuals in Auckland and Counties Manukau DHBs for the month of July. The first three lists contain individuals with symptoms consistent with influenza (subtype unspecified), and only the last contains people with a specific diagnosis of novel influenza A. The datasets consisted of:

1. Middlemore Hospital EC (1 Jul–31 Jul 09)—1219 with influenza-like illnesses (ILI) presenting to the hospital emergency department (key text searches of the presenting complaint field looking for “flu, “ili”, etc, or combinations such as fever/febrile with cough/shortness of breath/etc).
2. Auckland/Starship Hospital EDs (1 Jul–27 Jul 09)—882 ILIs (key text searches as for 1).
3. Northern Region reports from GPs (1 Jul to 31 July 09)—1269 cases of ILI identified by general practitioners and reported to NRHCC for Counties Manukau and Auckland DHB residents.
4. Auckland Regional Public Health (ARPHS) notifications (1 July to 31 July)—354 confirmed or ‘under investigation’ cases of novel influenza A virus (H1N1).

A scaled-rectangle diagram (similar to a Venn diagram) displays the overlap in the different datasets used, using the SPAN program.[3]

Figure 1. Scaled rectangle diagram illustrating the degree of overlap between symptomatic influenza like illness recorded by (1) general practice lists, (2) Auckland Regional Public Health Service, (3) Auckland City Hospital Emergency Department, and (4) Middlemore Hospital Emergency Care; for the month of July 2009



Capture-recapture estimate—A variety of different capture-recapture models were tested. The best fit gave an estimate of 34,360 (SE 12,000, using a saturated model which allows for between list dependence) cases of influenza-like illness (ILI). If the datasets had greater levels of overlap more precise estimates could be derived—this gives a 95% confidence range of 57,880 to 10,840 cases. It is likely that the majority of these ILIs are due to the novel influenza A virus (H1N1).

The 2101 presentations to hospital in July for ILI represent 6.1% of the estimated 34,360 cases of ILI. Of the 2101, 283 (13.5%) were admitted to the ward (more were treated for longer than 3 hours in the emergency department, but 283 were specifically admitted to the ward). This is an admission rate of 0.8% for all cases of ILI. Of the residents of ADHB and CMDHB admitted in July 33 were treated in intensive care - 12% of admissions, 0.96/1000 cases of ILI.

For the month of July, 9 deaths to Auckland and Counties Manukau residents have been provisionally related to novel influenza A (H1N1) by the respective DHB incident control teams (either as a primary cause or potential contributor—Coroner's findings are still awaited in some cases). This corresponds to a rate of 0.26 (95%CI 0.16–0.83) novel influenza A deaths per 1000 ILI cases.

As a crude incidence rate (Auckland 450,480 and CMDHB 482,560 estimated resident 2009 population) an estimate of 34,360 cases gives about 3.7% of the population being symptomatically infected in the month of July (1,2–6.2%). This is about 1100 per day (350–1850). However very few over the age of 60 are being infected. As a proportion of the under 60 population (Auckland 389,190 and Counties 416,790) this would give around 4.3% (1.3–7.2%).

If this rate of infection was maintained for the winter months then waned into summer for an equivalent of 6 months-worth at this level would see about 22% (8-43%) of the under 60 year age group being infected (or 22% [7–37%] of total population). This number would be much less than the levels expected with an estimated reproductive rate of 1.96.[4] More likely perhaps is a further peak in the rates over the next 2 months—time will tell.

Caveats—Although the log-linear models used are able to adjust for the lack of independence across the datasets used, residual inaccuracies in estimates may persist. In particular the relative lack of overlap reduces the accuracy of the estimate. Also, the case definition is inconsistent. Three of datasets used have ILI as their measure; only the ARPHS dataset is specific to the novel influenza; however the majority of circulating influenza viruses are likely to be of the pandemic strain. As a rough guide to comparability we tested the ARPHS notifications ('true' novel H1N1 cases) against the Middlemore EC dataset and found that of those that had attended EC within 6 days of their notification 75% were tagged as having an ILI—a reasonable sensitivity in the circumstances. We are unable to estimate specificity.

Conclusion—This analysis provides a rough estimate of the potential impact of the novel influenza A virus (H1N1) in the Auckland urban area, with 3 to 4% of the population infected in July. Until future serological studies are able to confirm the proportion of the population infected this methodology may serve as a useful order of magnitude estimate for planning purposes.

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THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

The chasm between *is* and *ought*

For those interested in enlarging a sense of what is possible in the world of medicine, and graduate medical education in particular, it was an interesting week.

On our patch on Thursday morning the chasm between supply and demand focussed us on how to provide doctors-in-training for the services, rather than the training. Few clinicians have engaged with this challenge—it was a problem for management they said, the union said there would be no gap if you paid them enough, and the staff-in-training felt undervalued because their menial tasks didn't require a degree in medicine.

I took another sip of coffee and read Jim Black's review of Susan Neiman's *Moral Clarity: A Guide for Grown-up Idealists* in "Spikes Review of Books" on Arts and Letters Daily.[1] Jim said this book is, "an effervescent, often inspiring fusion of Kantian ethics and real-world critique". Kant, that most rebarbative thinker from the enlightenment, an era of highly demanding but hugely rewarding thinkers, was a driver of Neiman's central idealist conviction: *ideas matter.*

"The distinction between (what) *is* and (what) *ought* (to be) is the most important one we ever draw', says Neiman" and that became our focus on Thursday afternoon with the release of "Foundations of Excellence"[2] and "Treating People Well".[3] Neiman argues that the disparity between how the world is and how we believe it ought to be is not to be wilfully ignored; it is to be seized upon, cultivated, and pursued, and these reports show how graduate the medical education garden required attention.

'The distinction between is and ought is the most important one we ever draw". Here Neiman draws out Kant's distinction between scientific and moral reasoning, between truth and ethics. 'Truth tells us how the world is; morality tells us how it ought to be", states Neiman. Ideals matter not because they exist, but because they don't.

Kant's own thought experiment was used persuasively. A man is asked to lie, on pain of death, by an unjust ruler. This lie will see another man who has fallen foul of the regime sentenced and then put to death for a capital crime (a reality in Iran today). We don't know what we would do in that situation, but—and this is key—we do know what we ought to do.

Len Cook, Don Hunn and company have described the chasm between what is and what ought to be for graduate medical education and suggested how bridges might be built. Both reports resist the prevailing tendency towards defeatism. "The Enlightenment gave reason pride of place, not because it expected absolute certainty, but because it sought a way to live without it". A grown-up idealism is required to resist the violent utopianism of youth, but also the cynicism of disappointed youthful dreams.

On Friday the Minister of Health's contribution to the Christchurch School of Medicine's *Mid-Winter Dialogues* (public lectures) demonstrated how politicians are beholden to the electorate. How would we professionals amend our ideals if tenure required re-election? The public wants more elective surgery, he said, and twenty

more theatres will be provided. Although he supported Thursday's reports it is not clear how the theatres etc will be staffed in the meantime.

Generous time for discussion began with the usual lobbying from sectional interests, mostly concerned with their own plots rather than the landscape. This was handled with political skill and a patient chairman, but the Minister was impatient with the public health issues that don't generate votes, and a question from the left received a brisk response.

That was the week that enlarged my sense of what is possible for graduate medical education while I contemplated the relation between morality and politics, and the relation between the one and the many providers.

John Morton
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Nembutal

There was a time when there were few debates on euthanasia and suicide, and it was not so long ago. People could find a cliff or a bridge from which to throw themselves, they knew about the efficacy of carbon monoxide and the cyanides, and they only had to visit their general practitioner to secure supplies of Nembutal, a strong barbiturate.

All the barbiturate drugs were used for the purposes of sedation for many years. They were given to women in labour. A popular asthma medication, Amesec, contained ephedrine, aminophylline, and quinalbarbitone. Nembutal is now an illegal drug. It is described as a veterinary remedy, you have to fly to Mexico to get it, and if you want to bring it back, you have to smuggle it through Customs.

The New Zealand Formulary for 1954 noted that "the various barbiturate preparations appear to be prescribed too readily and often in too large quantities." Anyone bent on suicide could do the rounds and rapidly accumulate as much as was needed. The Schedule of Pharmaceutical Benefits for the Commonwealth of Australia for 1966 permitted doctors to prescribe 50 Nembutal capsules, each of 100 mgm, at one time, with two repeats on the same prescription.

At a clinical meeting in the 1960s, I listened to an eminent pathologist, the late Dr J O Mercer, describe the postmortem findings in cases of suicide by ingestion of Nembutal. It formed, he said, a thick paste on the lining of the stomach. There was no discussion on why these cases arose. I have had a look at the suicide statistics in New Zealand over the past 50 years, and the withdrawal of Nembutal had no impact at all on the figures.

I suspect that many doctors in those days understood what was going on, but that there was not a lot they could do about it. Some may have been facilitators, and we shall never know now. Nembutal was withdrawn in the 1980s, but it seems as if a few people in distress are now trying to beat the ban, at considerable expense.

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A pythonesque situation

I have just read a letter from the 27 October 2006 issue of the *Journal*: Wilson N, Thomson G, Edwards R. Should New Zealand's Commerce Commission act on cigarette brand name deception? http://www.nzma.org.nz/journal/119-1244/2295/

Hilarious! Was it supposed to be so ironic or was it serious which makes it even funnier. That a government commission would question whether a law abiding business in a democratic country should be allowed to name a product *Freedom* has got to be pythonesque.

Do they really want a healthy populace living in a concentration camp? I would rather be released from my shackles and sent to the gas chamber. I would imagine a sentiment shared by every individual that has fought for freedom for this nation.

Steve Christie

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Leslie Ding

2 December 1940-19 July 2009; Member of the New Zealand Order of Merit (MNZM)

Dr Les Ding was diagnosed with carcinoma of the stomach in January of this year and died at Christchurch Hospital on 19 July 2009.

The first New Zealand medical graduate of Chinese descent to qualify in psychiatry, Les valued his family and cultural heritage.

His grandfather had come to Otago from Canton, now Guangzhou, to mine for gold in the Nokomai Valley, living and working there for 8 years without leaving, before returning to his family in China.

For Les' father, a market gardener on the Taieri Plains, hard work and traditional Chinese scholarship were central values. The sixth of eight children, and the first to be born in New Zealand, Les spoke only Cantonese until starting primary school.

Along with several of his siblings, Les was to go on to a distinguished career.

After attending Otago Boys High School, Les began his medical education in 1958, fulfilling a boyhood aspiration. He graduated MB ChB from the University of Otago in 1963, the year he also married Kim Ng, a nurse, from another prominent pioneering Chinese family. They then moved to Christchurch for Les' house surgeon and registrar years, and later to Sydney, with two young children, where Les completed training in psychiatry and then held a consultant post.

In 1968 Les completed the Diploma in Psychological Medicine, and in 1970 became a Fellow of the Royal Australian and New Zealand College of Psychiatrists. He and Kim returned to Christchurch in 1971, by then with four children, for Les to take up appointment as Consultant Psychiatrist at The Princess Margaret Hospital, where he established the Eating Disorders Clinic. He also held a part-time private practice at the Calvary Clinic, and lectured and supervised students of Otago's Christchurch Clinical School. He worked in the field of forensic psychiatry, where he was highly regarded by the legal and judicial professions.

From the mid 1980s Les moved into health sector administration, with appointment as Medical Superintendent of Sunnyside Hospital in 1985, and, 4 years later, and until 1991, Divisional Manager of the Canterbury District Health Board's psychiatric and geriatric services. These roles included facilitation of major change in provision of the Board's mental health services, as community based services replaced institutional care.

One of Les Ding's achievements over that period was the setting up of the Comcare Charitable Trust, in 1987, to provide housing and support services for those in the Canterbury region with serious mental illness. Les retained an active involvement with Comcare for over 20 years, including 11 as Chair. Comcare provided services to more than a 1000 clients over the last 12 months, and earlier this year established The Les Ding Education Award, to facilitate professional development of Comcare staff.

A strong advocate for preventive and early intervention services, from the 1970s Les acted in training, advisory, or governance roles for various organisations, including Lifeline, the Samaritans, and the Life Education Trust. Active also within his College, Les served as an Accredited Supervisor in Postgraduate Training from 1971–89, as the College's New Zealand Secretary and Councillor from 1974–9, and on the Board of Examiners from 1982–7. He was a member of the Mental Health Review Tribunal for more than a decade, from 1992, and a member also of the Medical Practitioners' Disciplinary Committee.

In 2001, for his services to medicine and the community, Les was appointed a Member of the New Zealand Order of Merit.

Always at heart a clinician, Les maintained and demonstrated throughout his career a strong commitment to best practice. After relinquishing his management roles he resumed clinical work, including, for nine years, regular medico-legal consultancy in Australia. He was working fulltime up until his diagnosis was made. On his death, the many and heartfelt tributes from former patients, and from colleagues on both sides of the Tasman, affirmed their enormous respect for his skill, down-to-earth approach, compassion and wisdom as a clinician, and his contribution to the delivery and development of mental health services.

Reflecting with close friends shortly before his death, Les attributed much of what he had achieved to his 46-year partnership with Kim, her strengths, and his indebtedness to her, adding, "our partnership and our family together are the most important things in my life". Les was very conscious of the family, cultural and academic heritage of which he himself was a beneficiary, and has passed on to his family and to the wider community the legacy of his own values of compassion and service.

In addition to his full professional commitments, he maintained a lifelong interest in music and reading and he travelled widely. Les served for many years on the committee of the Canterbury Chinese Association. He was also a very keen supporter of his grandchildren and often seen on the "sideline" whether it be rugby, cricket, basketball, swimming, music or ballet. Although not wanting to retire, he had intended this year to spend more time with Kim and the family, and enjoy their new home completed in April.

He is survived by Kim, his four children Steven (Gastroenterologist), Darren (Dentist), Lisa (Occupational therapist), Johanna (Clinical Psychologist), their spouses and nine grandchildren.

NZMJ note: Les made occasional contributions to the *NZMJ* over the years as a reviewer or author; we join our readers in expressing our sympathies to Steven (also a contributor) and the rest of the family.

Professor Andrew Hornblow and Dr Steven Ding (a son of Les) wrote this obituary.

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GRANTS AWARDED JULY 2009

At the July meeting of the Scientific Advisory Group of the National Heart Foundation, a total of 22 grants were awarded. The awards included 6 Project Grants, 6 Fellowships/Scholarships, 2 Small Project Grants, 1 Grant-in-Aid and 7 Travel Grants. A total of 7 Summer Studentships were also awarded to the Medical Schools at the University of Otago and the University of Auckland.

PROJECT GRANTS

Dr Srija Bhattacharyya & Associate Professor Rob Doughty

Departments of Medicine and Pharmacology & Clinical Pharmacology, University of Auckland

Beta-blockers and airflow obstruction in congestive heart failure (BEACH) trial: a feasibility study.

$159,650 for 2 years.

Associate Professor Rob Doughty & Dr Gillian Whalley

Department of Medicine, University of Auckland

Individual patient meta-analysis of the mortality associated with heart failure with preserved versus impaired systolic function.

$84,909 for 1 year.

Dr Raina Elley

Clinical Trials Research Unit, School of Population Health, University of Auckland

Does a polypill improve cardiovascular guideline implementation in primary care among Maori?

$146,693 for 3 years.

Ms Helen Eyles

Clinical Trials Research Unit, School of Population Health, University of Auckland

How big are food portion sizes in New Zealand?

$50,983 for 15 months.

Dr Debbie Hay

School of Biological Sciences, University of Auckland

Adrenomedullin and cardiovascular disease: understanding adrenomedullin binding to its receptors.

$78,936 for 1 year.

Associate Professor Patrick Manning

Department of Medical & Surgical Sciences, University of Otago, Dunedin

The effect of thermally oxidised polyunsaturated fat on postprandial glycaemia.

$95,714 for 18 months.

FELLOWSHIPS

Dr Cliona Ni Mhurchu

The Heart Foundation Senior Fellowship (for 3 years) was awarded to Dr Cliona Ni Mhurchu, Clinical Trials Research Unit, School of Population Health, University of Auckland.

Dr Sally Aldous

A Research Fellowship (for 1 year) was awarded to Dr Sally Aldous, Department of Cardiology, Christchurch Hospital.

Dr Vanessa Selak

A Research Fellowship (for 3 years) was awarded to Dr Vanessa Selak, Clinical Trials Research Unit, School of Population Health, University of Auckland.

Dr Patrick Gladding

An Overseas Training & Research Fellowship (for 1 year) was awarded to Dr Patrick Gladding, Greenlane Cardiovascular Service, Auckland City Hospital, who will work in the Echo Laboratory, at the University of Queensland

Dr Bo Remenyi

A Research Fellowship (for 2 years) was awarded to Dr Bo Remenyi, who will work in the Department of Paediatric and Congenital Services, Starship Hospital, Auckland.

Ms Lotte Thomsen

A Postgraduate Scholarship (for 3 years) was awarded to Ms Lotte Thomsen, Department of Medicine, University of Otago, Christchurch.

SMALL PROJECT GRANTS

Professor Janet Hoek

Marketing Department, University of Otago, Dunedin

How would plain packaging effect young adult smokers?

$8,528 for 5 months.

Associate Professor James Paxton

Department of Pharmacology & Clinical Pharmacology, University of Auckland

Dietary phytochemicals and the ABC transporters.

$14,817 for 1 year.

GRANT-IN-AID

Associate Professor Lisette Burrows

School of Physical Education, University of Otago, Dunedin

Research Symposium – The Big Fat Truth: What are we 'weighting' for?

$11,078.

TRAVEL GRANTS

Dr Emmanuelle Cognard

Department of Molecular Medicine & Pathology, University of Auckland

45th European Association for the Study of Diabetes (EASD) Annual Meeting, Vienna, Austria.

Mr Paul Drury

Department of Physiology, University of Auckland

Fetal and Neonatal Physiological Society Annual Meeting, California, USA.

Ms Katrina Ellis

Department of Medicine, University of Otago, Christchurch

European Society of Cardiology Congress 2009, Barcelona, Spain.

Mr Thusitha Mabotuwana

Department of Computer Science, University of Auckland

Medical Informatics Europe Conference, Sarajevo, Bosnia & Herzegovinia.

Mr Andrew Waa

Department of Public Health, University of Otago, Wellington

Oceania Tobacco Control 09: Reducing inequality through tobacco control, Darwin, Australia.

Dr Bridget Leonard

Auckland Bioengineering Institute, University of Auckland

CSANZ Annual Scientific Meeting, Sydney, Australia.

Ms Nicola Scott

Department of Medicine, University of Otago, Christchurch

American Heart Association Scientific Sessions 2009, Florida, USA.