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+ **TYPE 2 DIABETES IN MAORI**
a review

+ **METHADONE AND QT INTERVAL PROLONGATION**
how important is dose?

+ **CONFERENCE REPORTS**
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CONTENTS

EDITORIAL

Welcome to the sixth issue of the New Zealand Medical Student Journal (NZMSJ). The NZMSJ is one of the few student-based journals accepting original research articles with expert review for publication and to date we have received medical student submissions from Australia, the USA, the UK, Mexico, Brazil and Nepal. Although we are focussed on the education of New Zealand students, international submissions (and readership) are testament to the journal's growing success.

We are now in our fifth year of publication and are immensely proud that the journal has firmly established itself as a valuable means through which academic writing skills can be polished and professional development in the area of medical research enhanced amongst the New Zealand medical student community. This is demonstrated by this issue's inclusion of the first of a series of short critical review articles prepared by second year students from the Auckland School of Medicine, an initiative which we hope will give these students an introduction to the process involved in submitting an article to a peer-reviewed journal and equip them with confidence in academic writing which they can take with them in their future clinical careers. We also feature a conference report from one of our editorial team, Victoria Taylor on her attendance at Digestive Disease Week in Washington D.C. in May of this year, in which she outlines how a summer studentship in Barrett's oesophagus lead to the opportunity to travel and presentation of her findings at an international conference, exemplifying how undertaking research as a student can benefit one's future career as a clinician.

This issue also continues in our tradition of showcasing the proactive attitude characteristic of New Zealand medical students and their many and varied initiatives to address weighty current national and international health issues. The inaugural Clinician's Medical Education Convention of Aotearoa (MECA) was successfully convened last year and provided an opportunity for medical students from throughout Australasia to meet with current clinicians and inform themselves of many of the pressing issues facing our future health workforce. See page 11 for 2006 MECA Convener Jared Kilday's conference report. The 17th Global Congress of International Physicians for the Prevention of Nuclear War (IPPNW) was also held last year and its efforts in addressing an important global health issue are presented in Rosemary Wyber's page 20 report.

The NZMSJ executive is delighted to be in a position to nurture and promote these worthy student initiatives.

The NZMSJ executive extend our sincere gratitude to the Rt. Hon. Pete Hodgson for his generous grant in aid of our publication in December last year. We also express our thanks to Professor Peter Joyce, Dean of the Christchurch School of Medicine, for his generous sponsorship of this issue's Dean's Writing Prize. Brent Hyslop, a fifth year medical student at the Wellington School of Medicine was the recipient of this prize for his piece on prolongation of the QT interval during methadone use. Finally, we wish to thank all of our expert reviewers from each of the four schools of medicine throughout New Zealand, whose contribution to the journal allows us to provide our authors with a rigorous and informative peer review process and to our two academic advisors, Dr John Allison and Associate Professor David Perez for their continued contribution.

We congratulate all our contributors on their initiative and efforts and hope you feel deservedly proud on seeing your work in print. We look forward to receiving future quality submissions from our readers both in New Zealand and abroad.

The NZMSJ Executive

The NZMSJ editorial board maintains that the articles published under the heading "opinion" are the personal views of the author and the NZMSJ does not support or endorse these views in any way but respects the author's rights to voice his/her opinions.

Credits

LETTERS TO THE EDITOR

To the editors,

We read with interest the fifth issue of the NZMSJ. We are impressed with the excellent print quality and high production standards of the journal.

We read with particular interest the article by Alistair Escott on 'Learning clinical skills'. The broad definition of the term 'clinical skills' worked out by the author was comprehensive. In our institution, the Manipal College of Medical Sciences (MCOMS), Pokhara, Nepal we have an international student body with students from Nepal, India, Sri Lanka and a few students from other countries including New Zealand.

At the department of Pharmacology, the students are taught to communicate drug- and non-drug information to simulated patients. Pharmacology is taught during the first four semesters of the undergraduate medical (MBBS) course in an integrated manner with the other basic science subjects (Anatomy, Biochemistry, Physiology, Pathology, Microbiology and Community Medicine).

Common diseases and problems like Malaria, Bronchial asthma, Tuberculosis, Leprosy, Acute gastroenteritis, Epilepsy, Diabetes mellitus are discussed with the students. The non-pharmacological and lifestyle modifications are emphasized. The choice of the drug, dose, frequency, duration, adverse effects, drug interactions, contraindications is emphasized. The students carry out the exercise in small groups of 7 or 8 students each.

We teach communication skills using simulated patients. Students themselves also act as patients and role plays are used during the learning sessions. The students are assessed in this skill at an objective structured practical examination (OSPE) station during the practical examination in pharmacology. The students are assessed using a structured check list.

Communication skills are also taught to the pharmacists in the teaching hospital. The department of pharmacy runs a medication counseling center and in the center trained pharmacists educate patients regarding the use of specialized devices like the insulin pen, metered dose inhaler, rotahaler, suppositories and pessaries. The center is attached to the outpatient pharmacy.

However, formal courses on communication skills are lacking during the clinical years of training. Physical examination and clinical reasoning are taught during the clinical years. Sessions on practical ethics, multidisciplinary teamwork and reflective practice are lacking. The pharmacology department does teach critical analysis of pharmaceutical drug promotion and optimizing time spent with medical representatives. Further emphasis on clinical skills training is required in our institution and in Nepal.

Yours sincerely

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To the editors,

I congratulate you on the successful production of yet another fine issue of the New Zealand Medical Student Journal. I am aware that since its inception in 2004, the journal has successfully obtained support from a range of funding bodies and that this has helped a dedicated and committed group of volunteer students produce a journal they can truly be proud of. Everyone involved deserves to be congratulated for their achievement and I would like to enthusiastically express my support for this admirable project.

This journal provides an excellent opportunity for this country's medical students to demonstrate their academic capabilities and to publish their findings from research endeavours, as well as express themselves on a range of topical issues in medicine. I am pleased to see that the journal executive has expanded rapidly over the last two and a half years, and is now truly a nationwide initiative involving students from each of the four schools of medicine in New Zealand. It is also pleasing to see the journal is now being distributed on a biannual basis.

I am pleased to offer a Ministry of Health grant in aid of this promising venture to allow the journal to continue to expand into the future. I wish it every success.

Yours sincerely,

Hon Pete Hodgson,

Minister of Health

In Issue 5 we published a letter from the New Zealand Resident Doctor's Association (NZRDA) regarding the 2006 industrial action taken by the country's Resident Medical Officers (RMO's) in response to the proposal by the District Health Boards to replace their Multi-Employer Collective Agreement (MECA) with a Memorandum of Understanding (MOU).

As promised in that issue, we have endeavoured to bring you District Health Board New Zealand's (DHBNZ's) response to this letter, however they have declined to comment given the amount of time that has now passed since this action took place.

Prolongation of the QT interval during methadone use: how important is dose?

Brent Hyslop
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Brent is a fifth year medical student at the Wellington School of Medicine. This project was done as a summer studentship in conjunction with Wellington Community Alcohol and Drug Service. Working in this challenging environment stirred Brent's interest in the field of addiction medicine.

ABSTRACT

Recent studies have shown that methadone is one of many medications that prolong the QT interval, possibly in a dose-dependent fashion. This study was done to further assess this relationship, as well as to investigate practical issues with ECG monitoring in a local methadone treatment service.

Three staff members were interviewed and 12 staff questionnaires were collated. ECG analysis and data collection were performed retrospectively. Overall, 71 ECG printouts were interpreted from 60 clients. Detailed analyses of corrected QT (QTc), methadone dose, and other factors were carried out on 39 ECGs from 31 clients on prescribed methadone, with doses of 40mg - 360mg and QTc ranging from 360ms - 520ms. The study found a significant correlation ($r=0.57$, $p=0.0002$) between QTc and methadone dose.

32 ECGs done before the start of treatment were also available for analysis and comparison with the ECGs done during treatment, showing a significantly longer mean QTc for those on prescribed methadone ($p=0.0057$).

This study adds to existing evidence that methadone prolongs the QT interval in a dose-dependent fashion. It is the first New Zealand correlation study. It also highlights practical issues and uncertainties which still surround ECG monitoring for clients on methadone treatment.

INTRODUCTION

Methadone is a prominent drug in addiction medicine - being effectively used in opioid substitution therapy[1-3] and in chronic pain management. Recently, however, its use has been linked with arrhythmia and sudden cardiac deaths[1,4-6], which are thought to be mediated through prolongation of the electrocardiogram (ECG) variable, the QT interval. Studies have now shown that methadone causes lengthening of the QT interval and the associated ventricular arrhythmia, torsade de pointes (TdP)[2,7-11], as well as revealing a molecular mechanism[12]. QT interval prolongation (medication-induced in particular) and its associated risks have become a significant issue in contemporary medicine and pharmacology. Recommendations have now been published regarding risk management and monitoring in methadone treatment[4,9,13]. Of particular importance in the New Zealand setting are recommendations made from the New Zealand Government Medicines and Medical Devices Safety Authority, Medsafe, in late 2005[4]. The most significant recommendation was that all patients with a methadone dose greater than 150 milligrams (mg) should have ECG monitoring.

There are still, however, considerable uncertainties surrounding the issue of methadone and QT prolongation. The exact relationship between these two factors is yet to be defined clearly. Methadone, particularly in high doses, prolongs the QT interval[5,6,8,10], and recent evidence points to a moderate dose-dependent relationship[2,11,14]. Nevertheless, more work needs to be done in this area. There are many other factors which can contribute to QT interval lengthening[12,15,16]. It is likely that an interplay between various factors results in prolonged QT intervals, and the clinical presentations of arrhythmia and sudden death. Given this current level of understanding, there is uncertainty about the appropriateness of Medsafe's 'threshold' value of 150mg for ECG monitoring. Some practices have introduced ECG monitoring at lower doses[17].

Contributing to the uncertainty, staff are faced with situations where the clinical reality at times appears contradictory to the evidence. There are anecdotes about patients who have had their methadone doses reduced only for their QT intervals to increase, or vice versa, without any other obvious explanation[18,19]. There are also anecdotal accounts of sudden death when a previous ECG was normal, as well as patients with known prolonged QT intervals living without incident while taking methadone. Many staff have had clients on high doses for long periods without any cardiological problems. Furthermore, there is doubt about the precision of QT interval measurement. Intrinsic and extrinsic variability is well recognised[13,16], and there are cases showing significant fluctuation in the value even within minutes[18,19].

Staff face difficulties when dealing with patients with prolonged QT intervals. Some patients strongly oppose any decrease of their methadone dose, leaving clinicians with an ethical dilemma. Staff are unable to provide an accurate risk-benefit analysis, as the risks and benefits in such situations are currently unclear.

Some clients have been resistant to having an ECG recordings performed, as they have correctly perceived that it could lead to a recommendation for reduction of their methadone dose.

These issues led to the aims of this study: an assessment of the practical issues, and staff attitudes and views on the QT interval issue and ECG monitoring (reported elsewhere); an audit of a local clinic's current practice (partially reported here); and a retrospective, descriptive investigation to further examine the relationship between methadone dose and QT interval.

METHOD

Literature Review

Factors with probable or possible effect on the QT interval were identified. These factors were used to construct a data collection template to be employed in data retrieval.

Ethical approval was granted by the Central Regional Ethics Committee.

Search of Medical Records

A manual search was performed through the paper medical records at Wellington Opioid Treatment Service, guided by a complete client list (updated 12/11/2006). This search aimed to identify ECG printouts (original or copied) or ECG referral forms in the appropriate sections of the records. An attempt was made to identify further ECGs, using the online electronic clinical record and through the medical records department of Wellington Hospital.

When an ECG printout was found, it was measured and the remainder of the client record was searched to collect appropriate additional information as outlined in the data collection template.

QTc Measurement Procedure

An average of four individual QT intervals in any one ECG recording was taken to represent the QT interval[13]. Intervals were measured preferably using the limb leads that best showed the end of the T wave - typically the standard limb leads . Two leads were usually needed to get four individual QT intervals.

Individual QT interval lengths were measured manually, from the beginning of the QRS complex to the end of the T wave to the nearest millimetre (0.04 seconds at paper speed 25mm/s), by counting millimetre marks on the printout. As the QT interval is shortened by a faster heart rate and lengthened by a slower rate[13,16], QTc (QT corrected for heart rate) was calculated using the Bazett formula - QT interval divided by the square root of the RR interval. The RR interval needed for this calculation was measured by taking the average of four non-consecutive RR intervals (measured to the nearest millimetre by counting marks) from the rhythm-strip of the ECG printout. QTc values were rounded to the nearest hundredth of a second, as this represented the degree of accuracy possible from manual measurement.

If an ECG was unable to be measured due to poor technical quality or unclear T waves, any value recorded for QTc by the reporting doctor was used. Failing this, the automated electronic calculation of QTc was used.

For this study, QTc was deemed to be prolonged if greater than 450 milliseconds (ms) in males and 470ms in females[8,16] (although other values have been used elsewhere[4,13,20]). Heart rate (beats per minute) was calculated as 60 divided by the RR interval (seconds).

Analysis of Data

The statistical programme *EpiInfo* was used for analysis. Factors included in analysis were: QTc interval, methadone dose, age, heart rate, months on methadone treatment, gender, ethnicity, QT medication score (see appendix), presence of hepatitis C infection, and use of substances - alcohol (where over ten standard drinks per week), cannabis, BDZ (prescription or illicit), other opiates. Other factors were audited: serum methadone level, presence of heart disease, other liver disease, family history of arrhythmia, HIV infection, CYP medication score (see appendix), methamphetamine use, and laboratory blood values (potassium, magnesium, calcium, creatinine). These latter data sets, however, were too incomplete to be included in analysis.

RESULTS

Audit number overview

Records were viewed for 382 of the 387 clients on the Wellington Opioid Treatment Service client list. Of the remainder, three clients were not included because they were on an alternative opioid substitution substance, not methadone. Two records were unable to be located (of which one was a deceased client).

ECGs had largely been done at cardiology outpatients at the service's request, but a few others were performed in the emergency department (ED) or during an inpatient stay.

Of the 382 clients, 71 ECG printouts were analysed. 63 individuals were identified as having had ECGs (63/382, 16.5% of client population). ECG printouts were located for 60 clients (60/382, 15.7%). Of the three clients without their ECG printouts located, one was a baseline recording and the other two were from clients each on a dose of 160mg. Multiple ECG recordings were available for four clients.

7.6% of clients (29/382) had had baseline ECGs before starting prescribed methadone (32 baseline ECGs in total - One client had four ECG recordings in ED before starting prescribed methadone), and 8.1% of all current clients (31/382) had had ECG recordings taken while already on prescribed methadone (39 ECGs taken on prescribed methadone in total). No client in this audit had both a baseline ECG and one while on prescribed methadone. 55.2% (16/29) of clients with a baseline ECG are known to have been illicit methadone opiate users before starting methadone treatment.

Abnormal ECG group

Of the 60 clients for whom ECG printouts were available (71 printouts in total), 11.7% (7/60) had a prolonged QT interval on at least one ECG. 13 ECGs demonstrated prolonged QT intervals. QTc was consistently prolonged for only one of the four clients who had had multiple printouts. For one of these clients the abnormality had been noted on 2 baseline ECG recordings (performed during a quetiapine overdose), while for the remainder, prolonged QTc was present when the clients were already on prescribed methadone (6/31, 19.4%).

22 clients had a prescribed dose greater than 150mg at the time of an ECG and six of these people (6/22, 27.3%) had a prolonged QT interval. Four ECGs (from three clients) had a QTc value of 500 milliseconds (ms) or greater, the level viewed as a significant risk for TdP[9,15,16].

QTc correlation with dose

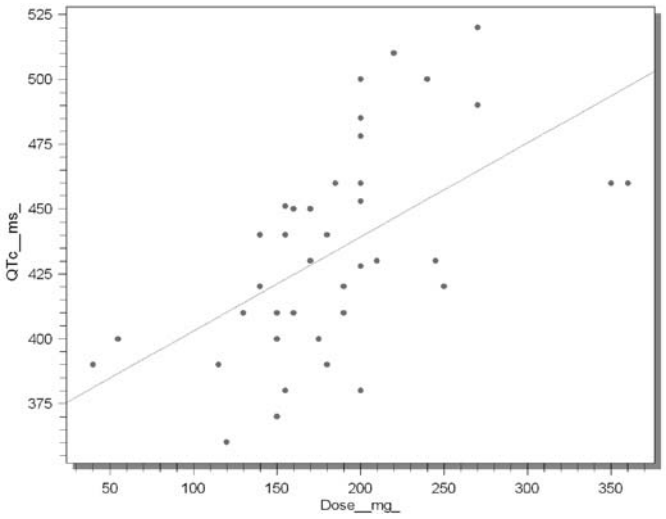
The 39 ECGs taken during prescribed methadone treatment covered a dose range of 40 - 360 milligrams (mg), median 180mg and mean 185.4mg. In this group the range of QTc was 360 - 520ms, median of 430ms and mean 434.0ms. For the 11 ECGs with prolonged QTc while on prescribed methadone, the dose range was 155 - 360mg, median 220mg and mean 242.3mg.

A moderate dose-dependent relationship between QTc and methadone dose was found on the linear regression analysis. Graph 1 shows this correlation for all available ECGs performed with clients on prescribed methadone (this included multiple ECGs for three individual patients). Methadone dose correlates significantly with QTc ($r=0.57$, $p=0.0002$); regression coefficient 0.36 (standard error = 0.087); 95% confidence interval (CI) (0.19, 0.56)Using an inverse t-test with 37 degrees of freedom. Extrapolating from this model, a 10mg methadone dose increase can be expected to increase QTc by 3.6ms (and a 100mg dose increase could increase QTc by 36ms).

This analysis was re-run using only one ECG for each client (the most recent). Eight ECGs (from the three clients with multiple ECGs) were removed in this second analysis. This still produced a significant result: $r=0.56$, $p=0.001$.

Regression analysis of the other factors showed only age to be significantly correlated to QTc ($r=0.37$, $p=0.021$). However, in a multivariate analysis including dose and age, age alone was not significant.

Graph 1. Methadone/QTc correlation for clients on prescribed methadone (39 ECGs, 31 individual clients)



High and low dose analysis

Mean QTc also proved significantly different in the methadone dose brackets used in analysis (p=0.0007) (ANOVA test for difference of means) (table 1).

Table 1. Mean QTc for methadone dose brackets

Dose bracket (mg)	Number of ECGs	Mean QTc (ms)	Std Dev
<101	2	395.0	7.1
101-150	8	400.0	26.2
151-200	20	435.8	33.8
>200	9	468.9	37.6

Baseline vs treatment ECG comparison

There was also a significant difference between mean QTc of the baseline ECGs (408.8ms) and mean QTc of all the ECGs taken on prescribed methadone (434.0ms) (p=0.0057) (ANOVA test).

Normal vs prolonged QTc comparison

Client factors from the group of ECGs with prolonged QT interval on prescribed methadone (11 ECGs in total, representing 6 clients) was compared with client factors the group of normal interval ECGs on prescribed methadone (28 ECGs), and both groups were analysed using the additional audit factors. The difference between the mean methadone dose was strongly significant between these two groups of ECGs: a mean dose of 242.3mg for prolonged QTc group, and a mean dose of 163.0mg for normal QTc group (p=0.0001) (ANOVA test) .

The only other factor showing a significant difference between these groups was alcohol use (greater than ten standard drinks) per week with RR-3.5, 95% CI (1.3, 8.9), which was still significant with one ECG per client - RR-5.1 (1.1, 24.9).

DISCUSSION

These results show a moderate dose-dependent relationship between QTc and methadone dose in this particular population (r=0.57, p=0.0002). This supports findings from several other studies. Krantz et al (2003)[11] found a significant correlation (r=0.51, p=0.03) in a series of 17 patients who developed TdP. Ehret et al (2006)[2] found a weak, but significant, dose-dependent relationship in hospitalised IV drug users receiving methadone treatment (r=0.20, p=<0.01). Cruciani et al (2005)[14] found no significant correlation overall, but a dose response for males on methadone for less than 12 months (r=0.60, p=0.02).

Two other studies [Peles et al (2006)[20] and Leavitt (2001)[21]] showed correlation (r=0.13, p=0.1 and r=0.53 respectively). These results, however, were not statistically significant. Maremmani et al (2005)[22] failed to show any correlation.

Krantz's study had patients with a mean QTc of 615ms and a mean dose of 397mg[11], both significantly higher than this study, while Leavitt had 12 patients on doses of 500mg or greater[21]. Cruciani (104 patients; 63 for opioid substitution, 41 for pain management), Ehret (167 patients) and Peles (138 patients) had study populations with reasonably similar QTc and dose values to this study[2,14,20]. The Ehret study was retrospective, while Cruciani and Peles used a cross-sectional study design. Peles also investigated serum methadone levels, but showed no correlation of blood levels with QTc[20]. Although this present study is of smaller size (39 ECGs from 31 clients), it has shown a strongly significant result. This work appears to be the first of its kind in Australasia. Possible differences with other study populations include genetic susceptibility and methadone-consumption behaviour.

This study had several limitations largely due to its retrospective design. There was no control over client information recorded by the clinic, so relevant data was not always present. Serum methadone and electrolyte levels could not be analysed as very few clients had results in close proximity to an ECG. Ehret found that several factors other than methadone dose (CYP3A4 inhibitors, low potassium levels, hepatic dysfunction) contributed to methadone-induced QTc prolongation[2]. This supports the theory that, an interplay of several variables is most important in a QT prolongation. Due to lack of data, other factors (including these three mentioned) and their influence on QTc could not be satisfactorily investigated in this study.

ECGs were taken at various times of day, in different locations, and probably, using different ECG machines - none of which are ideal. An ideal cross-sectional study would perform ECGs in one location at a similar time of day, while concurrently measuring blood electrolyte and methadone levels.

For consistent handling, manual interpretation of ECGs was used in this study,. Manual interpretation is recommended[13], but was also necessary as not all ECGs had automated or doctor-reported values. It was sometimes necessary to use the doctor-reported or automated value, as interpretation was highly technically challenging, potentially introducing small measurement bias. The interpreter in this study was a medical student (a cardiologist is recommended by some[13]). QTc measurements, although generally consistent, were found to vary by up to five percent of reported or automated values in extreme instances. No formal comparison of measurement sources was done. There has been concern raised about the appropriateness of Bazett's formula (the accepted formula in this field) for heart rate correction[13,16]. The interpreter was not blinded to client dose.

In New Zealand, there is widespread illicit use of methadone by opioid dependent individuals. This could confound the results in several ways. Clients could have been taking extra methadone in addition to their prescribed dose, which could impact negatively on the QTc-dose correlation. As shown in this audit, a significant number of clients already use methadone before beginning methadone treatment (55% in this sample). This needs to be considered in interpreting the result for the difference between the mean QTc values for baseline ECGs and ECGs performed on a prescribed dose.

Non-compliance with the regular prescribed dose is a possible confounding factor of the QTc-dose correlation in this study. New Zealand clients are required to consume their methadone under supervision on at least three days per week, allowing up to four 'take-away' doses. This creates the possibility for clients to 'double-up' their dose, or to sell their methadone illegally. Prospective studies could better test urine and blood levels (showing methadone use at baseline and subsequent non-compliance), but it would be very difficult to prevent clients supplementing their prescribed dose, given its availability on the black market in NZ.

This analysis largely approached QTc and methadone dose as continuous

variables, which is appropriate. This avoided, for the most part, making judgements regarding the exact point where QTc should be deemed prolonged, or where dose is deemed too high. In comparing those with prolonged and normal QTc, cut-off points of 450ms for males and 470ms for females were used in this study. There is no clear consensus about what values constitute a prolonged QTc[20], and using different values could have altered this comparison.

There is evidence that QTc is intrinsically labile[13,16], and some cases show significant fluctuation even over short periods of time (Two local cases[18,19] showed QTc fluctuations of 364ms to 450ms, and 500ms to 444ms (automated values), with the repeat ECGs taken one minute later.); potentially, an individual could show a prolonged QTc one day and a normal one the next. Hence, placing rigid cut-off points for describing prolonged QTc could be quite inappropriate. There appears to be a tendency (quite understandably) among staff to categorise clients as having either a normal or prolonged QTc, without reference to the actual value. Management is vastly different for these two results, including a dose reduction that can be both distressing for clients and ethically challenging for clinicians, and given the uncertainty of describing defining values, any rigid cut-offs needs to be questioned.

This study provides an indication of prevalence of QT prolongation for clients on methadone treatment in NZ. Again, this prevalence and any comparisons are influenced by the cut-off values used, which vary between studies. Six of 31 clients on prescribed methadone showed a prolonged QTc in this study (19.4%). Ehret reported 50/ 167 as prolonged (29.9%)[2], Peles 22/ 138 (15.9%)[20], and Cruciani 33/ 104 (31.7%)[14].

This study has also shown a significant difference in proportions of alcohol use (>10 standard drinks per week) between the prolonged and normal QTc groups. Alcohol use is not currently reported as a risk factor for QTc prolongation. It is possible that this result is confounded, perhaps by effects on liver metabolism or other organs. More work needs to be done before any conclusions can be made.

The audit of this service has demonstrated difficulty in following ECG monitoring policy. Qualitative data reveals this is mainly due to clients' reluctance to attend cardiology appointments, but that there is also staff uncertainty around QT interval issues. These results further indicate that the practical implications of the QT interval issue, as well as the scientific understanding (especially concerning medications), are still developing. ECG monitoring policy for patients on methadone treatment will inevitably become more refined as further evidence becomes available.

CONCLUSION

A dose-dependent relationship is present between QTc and methadone in this NZ population of opioid dependent people on MMT. While giving further evidence about the role of methadone, much is still unknown about QT prolongation in this context. Other factors, as well as methadone, are clearly involved, but the contribution of each to QT prolongation, arrhythmia, and sudden cardiac death is uncertain. Further well-designed studies are needed to bring more clarity to this important issue.

APPENDIX

QT prolongation risk score: from a well-recognised database[23], medications with a known risk of QT prolongation were assigned 3 points, those with some association 2 points, and those with weak association 1 point. Points were added for each client's score.

CYP score: for medications affecting CYP3A4[24], an inhibitor was assigned +1, and inducer -1, and a total calculated.

ACKNOWLEDGEMENTS

Many thanks to the University of Otago Research Committee for their sponsorship of this project. Thanks also to the staff of Wellington Opioid Treatment Service for their assistance, and to Gordon Purdie (Wellington School of Medicine and Health Sciences, Department of Public Health) for his expertise and guidance with the statistical analysis.

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Maori Type 2 Diabetes:
A Critical Review of its Prevalence and Contemporary Disease Management Discourse

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ABSTRACT

Diabetes Mellitus presents a serious health challenge for New Zealand. It is a significant cause of ill health and premature death. Current research has shown that the prevalence of type 2 diabetes is increasing as well as it being disproportionate in some sectors of society. Maori in particular, have been highlighted in the literature as waging a losing war against diabetes. Type 2 diabetes rates in Maori have risen to levels where it is one of the leading causes of morbidity and mortality amongst whanau, hapu and iwi. In addition there are a high number of people who have diabetes but may not be aware of their condition. Robust screening and management strategies are required in order to tackle diabetes and its debilitating consequences. Appropriate targeted health promotion strategies and education will also assist in the prevention of diabetes or in the delay of onset.

INTRODUCTION

Diabetes mellitus is characterised by chronically elevated blood glucose levels, which is associated with long-term complications including diabetic peripheral neuropathy and diabetic nephropathy. These consequences are reflected in the high rates of limb amputation and chronic renal disease in New Zealand (Scott et al, 2006). Moreover, the prevalence of Type 2 diabetes is increasing in New Zealand and this increase is disproportionately higher for Maori than for other ethnic groups living in New Zealand (Joshy and Simmons, 2006).

A confounding factor of type 2 diabetes is the insidious nature with the onset of the disease in some patients going undetected for long periods of time. Type 2 diabetes is often referred to as being 'silent' with patients only presenting to their Health Professional with late-stage complications. Without a robust diabetes screening program a large number of patients may develop type 2 diabetes and remain unaware of their condition.

MAJOR RESEARCH FINDINGS

Prevalence of Type 2 Diabetes

In line with the fact that the prevalence of type 2 diabetes is increasing, the National Health Information Service (2003) estimate that the number of people with diagnosed diabetes is predicted to increase substantially in the next 20 years from 115,000 to over 160,000. These numbers are believed to only represent half of those who actually have diabetes. Simmons, Thompson and Engelgau (2005) stated that of all the prospective tools for identifying people with diabetes, most clinicians start with risk factor identification leading to fasting blood glucose screening. The drawback of this approach is that, there are a number of people with diabetes who are asymptomatic and may not have 'visible' risk factors. Subsequently, these people may remain unaware of their diabetic status for a significant period of time. The lag in detection may allow for the progression of what could have been preventable complications to the patient.

Maori and Pacific People appear to be disproportionately affected by type 2 diabetes. The New Zealand Health Information Service 2006 Diabetes Research showed that the prevalence was: European 2.9 %; Maori 8 %, Pacific 10.1 %, Asian 8.4 %. Moore and Lunt (2000) demonstrated that the incidence and prevalence of type 2 diabetes in Maori and Pacific People was disproportionately high with respect to the general population and that this health disparity was increasing. The study also found that there was an increasing prevalence of obesity amongst Maori and Pacific People. Similar findings were made more recently where the prevalence of diagnosed diabetes was found to be higher amongst Maori and Pacific People as well as diabetic complications being more common and more severe (Simmons et al, 2005). This study also suggested that Maori and Pacific People were more likely to have at least one major risk factor prevalent, namely a high body mass index.

Potentiating Factors

There are several possible explanations for the severity of diabetes and the consequences in the Maori population. Maori and Pacific People tend to have a higher prevalence risk factors for diabetes, such as obesity, physical inactivity, insulin resistance and metabolic syndrome when compared with Europeans (Joshy and Simmons, 2006). Maori have a very high rate of diabetic nephropathy and develop renal failure at a more rapid rate than European patients with similar conditions (Moore and Lunt, 2000). The propensity for Maori patients with type 2 diabetes to develop diabetic renal failure and diabetic neuropathies may relate to a younger age at the onset of diabetes, a genetic susceptibility to nephropathy, and socio-economic or cultural factors leading to less adequate medical care (Scott et al, 2006). Jeffreys et al (2006) demonstrated that M•'5fori with diabetes

experienced excessive mortality, which was likely to be related to disease severity. The main recommendation from this study was that the association between diabetes in M•'5fori and excess mortality needs further investigation as the mortality may be 'amenable to intervention'.

Screening and Management Strategies

In the above studies, Maori have been identified as a sector within society that requires significant diabetic screening and management strategies. The link between type 2 diabetes and obesity in particular supports the current approach to diabetic screening, whereby overweight Maori and Pacific People are targeted (Lawrenson, 1993). This approach may be limiting as Maori and Pacific People who have diabetes may look 'thin' and remain undiagnosed for a long time, thus increasing the chance of developing preventable complications. Ellison, Elliott and Moyes (2004) published a research article that focused specifically on the identification of prospective screening tools for undiagnosed diabetes. Their findings showed that rates of elevated HbA1c levels in non-Europeans in New Zealand were very high, particularly in Maori, Pacific People and Indians. These findings reflected the possibility of undiagnosed diabetes as well as increased risk of vascular disease. The authors suggested that HbA1c levels could be used as an opportunistic screening test for diabetes and glucose intolerance but noted that diagnosis of diabetes can only be made on the basis of an oral glucose tolerance test. Thus, a potentially useful diabetes screening strategy for Maori could incorporate risk factor identification, HbA1c level analysis as well as an oral glucose tolerance testing.

A type 2 diabetes management study was recently carried out in a predominantly Maori community situated on the East Coast of New Zealand (Mann et al, 2005). The study identified that regular physical activity and a diet characterized by a high intake of dietary fibre reduced health risks such as progressive glucose intolerance and diabetic complications in newly diagnosed patients with type 2 diabetes. In the same study, one of the researchers by the name of Kirsten McAuley proposed a formula that identified high-risk individuals based on their fasting insulin rates, triglyceride levels and BMI. This study suggested that Maori who have been diagnosed with type 2 diabetes can improve their quality of life by changing their diet and increasing their physical activity levels. The authors suggested that the McAuley formula was helpful in predicting high risk individuals and may be a useful addition to any diabetes screening strategy.

The Ministry of Health (2003) published a booklet on type 2 diabetes management. The major recommendations in this booklet included the following:

- Lifestyle change is central to the management of all people with diabetes and this can be aided by providing advice on reducing energy intake, regulating dietary patterns, increasing physical activity and smoking cessation where appropriate;
- Involving families in diabetes management planning is of particular importance to Maori and Pacific People with diabetes; and
- Regular screening for renal, retinal and foot complications should occur from diagnosis of type 2 diabetes.

Mann et al (2005) supported the Ministry of Health's recommendations in regards to diet and exercise. However, the Ministry's suggestions of whanau involvement for disease management did not appear to be addressed. This point is pivotal as Poa et al (2003) state that there is evidence showing that diabetes has a strong genetic link. A change in lifestyle made at the whanau level would likely lead to the reduction in the incidence and severity of type 2 diabetes amongst Maori.

The prevalence and severity of type 2 diabetes amongst Maori reinforces the need for efficacious education and prevention strategies to be developed and implemented at the community level. Simmons and Voyle (2003) undertook research that proposed that diabetes educational strategies would be more effective if they were delivered by skilled Maori in a marae setting. They proposed that if people were aware of the risks they could then be encouraged to improve their health behaviours. The effectiveness of this community based approach is contingent to reflective policy being formulated at the Ministry of Health level. Although not conclusive, Governmental support of diabetes initiatives will increase the chance of reducing diabetes prevalence or delaying its onset. Overseas lifestyle intervention studies have successfully used a collaborative approach between schools, school nurses, clinicians, students and families to combat diabetes (Buchanan, 2007; Kaufman and Schantz). These studies demonstrated that targeting young people with high risk levels such as being overweight and under-exercising, could prevent diabetes or at least slow down disease progression. Similar strategies may have potential for combating Type 2 diabetes in Maori.

CONCLUSION

The prevalence of type 2 diabetes in New Zealand is increasing. Several studies have demonstrated that Maori are one of the most affected ethnic groups, which may be associated with disproportionately high rates of risk factors. Many diabetics remain undiagnosed, which highlights the need for a robust diabetes screening program in New Zealand. The studies presented in this critical review propose several strategies for screening, including the McAuley formula for the identification of high risk individuals, HbA1c level analysis and oral glucose tolerance testing. The combination of these strategies would need to be investigated to determine their effectiveness in improving the early identification of Maori with type 2 diabetes.

The disparity between Maori and Europeans suffering from diabetes is complex. Maori display an excess in severity of complications and mortality from diabetes, a proportion of which may have been prevented if the disease had been identified earlier. There are competing social, cultural, educational and medical factors that all need to be addressed in order for the individuals to effectively manage their disease with the support of their whanau and health professional. The Ministry of Health has given recommendations for targeted management of diabetes in Maori. Whanau should be involved at all stages of the disease process in order to facilitate positive changes in dietary habits and physical exercise and set-up robust follow-up programs to monitor diabetic complications. Diabetes is a debilitating disease that affects the lives of all whanau members and this has prompted Maori throughout New Zealand to become more proactive about preventing or at least delaying its onset. With continued support of the Government and health researchers, Maori are becoming more educated as to the risks and outcomes associated with diabetes. There still is, however, a long way to go before Maori start to win this war against diabetes.

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FEATURE : CONFERENCE REPORT

Clinicians Medical Education Convention Aotearoa

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Jared was the convenor of the 2006 Clinicians Medical Education Convention Aotearoa. James is currently studying in Christchurch.

Convention Report : The first annual CLINICIANS Medical Education Convention Aotearoa (MECA'06) was held in Dunedin over the weekend of 15th-17th September last year. I am pleased to announce that this inaugural medical students' convention was a huge success and the precedent has been set for this to continue on as an annual event in the years to come.

Over the course of the weekend more than 150 clinical and pre-clinical medical students from around Australasia attended lectures and special presentations, participated in a series of practical and ethical workshops and, celebrated together at two social events designed to encourage collegiality in medicine. This was just the third time that a full convention had been held for New Zealand medical students with the previous events being held in 1975 and 1991.

The special topic for last year's event was 'Baa Baa Black Sheep - Rural Health The Forgotten Realm'. As part of this special topic Drs Pat Farry and Stuart Gowland presented on the current poor state of rural health in New Zealand which included a live video link up to a rural general practitioner in southern New Zealand via technology provided by Mobile Surgical Services Ltd. Also as part of this event, the Matagouri Rural Health Club hosted rural secondary school students from around the greater Otago region to promote the benefits of pursuing careers as rural health professionals.

Other Highlights of the event included a presentation on the `Health Workforce Crisis' by Professor Des Gorman, Dean of the Auckland Medical School, an after dinner speech by surgeon scientist and author, the Emeritus Professor Graham Hill, and an entertaining semi-formal debate that featured the Honourable Pete Hodgson, Minister of Health.

Clinicians MECA
Medical Education Convention Aotearoa

The feedback I received both at and after the event has all been extremely positive and I sincerely hope that this groundswell of support will carry over to this year's event which has the potential to be even bigger and better.

Organising an event such as this was no small task, but what made the event such an outstanding success was the enthusiasm and commitment for medicine that was brought to the event by delegates, speakers, sponsors and other invited guests alike. The MECA'06 organising committee would like acknowledge the support of all those people that made this event possible and invite you all to make the journey to MECA in 2007.

MECA'07 will again be held in Dunedin at the Dunedin Town Hall over the weekend 28-30 September. The catch phrase is "Here's to the Future..." Distinguished key note speakers include: Professor Mike Ardagh (Emergency Medicine), Professor Des Gorman (Submarine and Diving Medicine) and, special guest, Shawn Riley from the Mayo clinic in America, who will be speaking on patient medication verification initiatives. Delegates will also be able to learn and master their suturing skills in one of the 4 clinical workshops offered. The Convention will include 2 social functions, a highlight being the Medical Challenge, featuring the Honourable David Benson-Pope.

For further information and registration go to or, any queries please contact Kerryn Harlow (Convenor MECA'07) harke742@student.otago.ac.nz

Digestive Disease Week:
Washington DC, May 20th-25th, 2007

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Tori is a fourth year medical student studying in Wellington, who especially enjoys public health. In this issue she shows us just how far a Summer Research Studentship can take you.

It's the winter of 2005 in Dunedin, New Zealand. A medical student stops before the notice-board of the medical library, prolonging the time till the slap of icy cold meets her at the exit. The notice-board is a hustled, vibrant market of notices calling out their wares. One inconspicuous advertisement speaks directly to the girl: "Do you need a summer job? Try a summer research studentship –a chance to earn money over summer whilst carrying out exciting research." Intrigued, or just procrastinating further, the girl leans closer, and ponders the small print. Cogs tick; neurons fire. . .then, thought bubble: "I need summer work. I'm sick to death of the supermarket! Research sounds like it could be interesting. But, I'm not sure, is it really going to get me anywhere. . . ?"

When I took on my first summer research studentship at the end of 2005, I never dreamed it could send me on international travel. However, in May 2007 it took me all the way to Washington DC, capital city of the United States of America. From May 20th-25th, this breeding ground of American patriotism was the home of Digestive Disease Week (DDW), where more than 16,000 researchers and physicians from around the world convene to share the latest exciting research on everything to do with the gut. I was to present a poster of my summer research, which looked at the outcomes of a surveillance programme for Barrett's Oesophagus.

Me, bike and the Golden Gate Bridge, San Francisco

My research

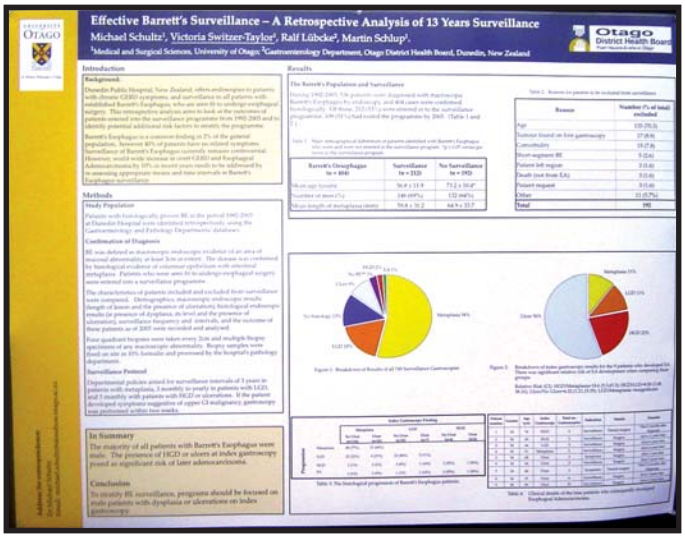
Barrett's oesophagus is when the squamous cells of the oesophagus are replaced by columnar epithelium with intestinal metaplasia[1], and is believed to be a result of GORD (gastro-oesophageal reflux disease), a very common disorder[2]. It is observable on upper endoscopy, which is when a tube is inserted down the patient's oesophagus and a camera used to look around. Barrett's is found in approximately two percent of the population[3], so is quite common, but its significance lies in its potential to progress to adenocarcinoma. The risk of progression is very low, approximately 0.5-1.0% per year of having the lesion[1]. However, the incidence of this cancer is increasing rapidly, and it carries a very poor prognosis, with a 5 year survival of 13%[4]. A ray of sunshine appears in this gloomy outlook however, when you consider that this survival is improved, the earlier the cancer is detected[5]. As Barrett's is a detectable lesion at the start of a cascade towards cancer, finding patients with Barrett's and surveying them regularly seems intuitive. This intuitive response has been shared by the rest of the world, with surveillance of Barrett's oesophagus patients being the international status quo.

However, Barrett's surveillance is very controversial at the moment. As there are a lot of people with Barrett's, and very few of these cases progress to malignancy, it has been described as "searching for a needle in a haystack"[6]. My research project analysed thirteen years of Barrett's Surveillance at Dunedin hospital and assessed its outcomes, including identifying risk factors in Barrett's patients that made them more likely to progress to cancer, to try and "cut down the haystack". These factors included being male or showing ulceration or high grade dysplasia on the very first endoscopy.

Digestive Disease Week

I presented these results in a poster on the first day of DDW. The poster was on show throughout the day and I had to be present at it for two hours to answer questions. What was it like? My sweaty palms and palpitations prior to this experience were uncalled for; in fact it was really valuable. Many people with expertise in the field looked at the work and gave me extensive feedback. I met other researchers who had done similar studies elsewhere in the world, and we compared results.

Aside from learning more about my own research project, the conference as a whole was a fantastic learning experience. The sheer size was overwhelming, and even if I cloned myself ten times over I couldn't have seen everything the DDW had to offer. It ran from 6.30am to 5.00pm for four consecutive days, and during that time attendees could view posters, go to a presentation on anything and everything gastrointestinal, encompassing both basic and clinical sciences, go to a learning centre where you could get some 'hands on' endoscopy practice with models, or visit the exhibition floor.



Some interesting facts I found out:

- The number of microbes in our gut number ten times that of our own human cells. These microbes may play more of an important role than we previously anticipated. One trial gave lean, microbe-free mice either microbes from obese mice, or microbes from lean mice. They were then fed the same things and treated identically in all ways other than the microbes in their gut. The mice with the microbes originating from obese mice gained double the amount of weight![6]
- In 1993, the National Polyp Study found that colorectal polyp removal decreased the incidence of colorectal cancer significantly. At DDW 2007 they released data showing this procedure also decreased colorectal cancer mortality by up to 92%![7]
- In the future, Barrett's surveillance may be replaced by an aspirin therapy![8]

Beyond the excitements of digestive disease, the conference was an eye-opening experience with regards to medical research and education. There was a real sense of drive and edge about the research, with considerable competition and extensive analysis. It was both exciting and intimidating. The evenings and lunchtimes were a stark contrast however, where people from all over the world could relax together and try not to talk about guts over dinner!

One aspect of the conference which really surprised my naive eyes was the involvement of the pharmaceutical industry. They and their loud brand names sponsored backpacks, free soft drinks, internet kiosks and buses. On the ground floor, an entire exhibition floor was filled with drug and equipment companies promoting their products via freebies. These ranged from Metamusal smoothies, memory sticks and blankets, to somebody sitting you in a lazy boy and telling you about their product while you had your feet massaged! The pervasive nature of this advertising shocked me and I struggled to resist the giveaways. Although I could understand the drug companies have a massive investment in their product, with some $1.4 billion being invested in a drug before it gets to the market, I couldn't help but notice the absence of both evidence and the patients from this bribery. Everybody who did accept freebies seemed to think they were immune to the drug companies' message, but if everybody was immune, why were these clever multi-million dollar companies marketing at all?

Leaving the colour, vibration and laxative smoothies of the exhibition floor, I was reassured: the research presented upstairs was very well critiqued and all speakers had to disclose any commercial biases they had before their talk commenced.

By the end of the week, I felt overwhelmed and inspired, and very grateful for the experience. I would like to thank my supervisor, Dr Michael Schultz, who supported me both in getting to the conference and throughtout the week. I must also extend my gratitude to both the Faculty and School of Medicine, in Dunedin, who funded my trip.

Finally, to all med students out there, standing in front of that noticeboard, contemplating a summer research studentship... Research is a massive, exciting, exploring ship, and you never know what new world you'll discover or where you'll pass along the way. A summer studentship is a great way to get on board!

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Pharmaceutical advertising was varied and creative! Diseases outside the convention centre

The Washington Monument

PRIDoC: Pacific Region Indigenous Doctors Congress

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John is from Te Atiawa descent. He has an interest in indigenous health in particular in health care of the elderly.

What is PRIDoC?

PRIDoC is the Pacific Region Indigenous Doctors Congress, a conference held every two years, with the previous two meetings being held in Hawaii and Cairns (Australia). In 2006 the conference was hosted by Te Ohu Rata o Aotearoa (Te ORA - the Maori medical practitioners association) and held in Rotorua.

The attending doctors and medical students came from a number of countries, including New Zealand, Australia and the Torres Straight, Taiwan, mainland America and Hawaii, and Canada. As well as Te ORA, the doctors associations involved in PRIDoC include the Australian Indigenous Doctors association (AIDA), the Association of American Indian Physicians (AAIP), Ahahui o na Kauka (the association of Native Hawaiian Physicians), the Pacific Basin Medical Association (PBMA) and the Native Physicians Association of Canada.

The notion behind PRIDoC is that indigenous populations throughout the world, which have undergone colonisation, have similar health problems and needs. When we come together there is the opportunity to focus our attention on those needs. However, PRIDoC is more than just a medical conference; it also provides opportunities for the associations involved to learn from and support each other.

Students outside Tunohopu Marae

Wednesday/Day 1

We arrived in Rotorua at different times and from different directions, with many students driving in and others flying. For those that had never been to Rotorua before, the hot springs, geysers and mud pools were all on the must see list. With all this geothermal activity, Rotorua has a thriving tourism industry, much of which is run by Te Arawa, the local iwi (tribe) and our hosts for the week.

The conference started with a Powhiri (formal welcome) at Tamatekapua marae. Te ORA organised for small groups of Maori students to wait at the hotels and answer any questions congress delegates may have had about marae protocol. We taught delegates to hongi (to press noses, a traditional Maori greeting), with some occasional, accidental lipstick exchange. This was the first of many opportunities to meet international delegates and learn about their home countries from an indigenous perspective.

The marae was overflowing during the Powhiri, a testament to the enthusiasm and spirit of the people attending. Although it got very hot inside, most delegates were glad to have attended as experiencing the culture of the host nation is an important part of the conference.

Hangi (a type of traditional meal) was provided for dinner, with more than enough for everyone - another Maori tradition for our delegates. The hangi in Rotorua was different to most hangi as the natural hot water and steam eliminated the need to bury the food with hot rocks. This meant that it didn't have the smoky flavour many of us are used to, though no one was complaining.

After this, the students went down the road to Tunohopu marae, where we were all staying for the week. For those who have never stayed at a marae before, it is most similar to a giant sleep over, with everyone bringing their own sleeping bags or bedding and the marae providing the mattresses and kai (food). We had around 50 people staying on the marae for the conference, mainly Maori students, though there were also a few people from other countries. A special feature of this marae was under floor heating in the bathroom, presumably via a redirected natural hot water spring.

Thursday/Day 2 - Indigenous Medical Workforce

Thursday saw the start of the presentations, and the first presentation for the day was from Professor Mason Durie about indigenous resilience. This was an alternative perspective on indigenous peoples, presenting them not as weak races that have suffered from colonisation, but resilient races that have survived colonisation and are now growing stronger. For those of

AIDA at Cultural Events Night - Photos used with kind permission form AIDA

us that had not heard this perspective before, this was an eye opening and inspiring presentation.

Throughout the rest of the day, there were presentations from several different countries discussing how to increase the numbers of indigenous medical students, one of the many health issues we share. Most indicated a need to target students before they start university and a need to ensure indigenous students can retain their cultural connections while training. The idea of creating a dedicated indigenous medical school was raised. This is likely to become an increasingly attractive idea as existing medical schools are stretched to their limits. It would reduce, perhaps eliminate, the accusations indigenous students face that they have taken a non-indigenous students place, and it would allow a culturally safe and supportive environment, particularly for indigenous students with English as a second language.

The Cultural Events Night was held in the evening, one of the highlights of the conference. There were outstanding performances from everyone (particularly AIDA), a prayer giving thanks for everything, and many successful protests at the suggestion we leave without having seen a performance from Hawaii. The only complaint was that the night wasn't long enough!

Friday/Day 3 - Indigenous Health Research

The most memorable part of Friday's presentations was during Moana Jackson's presentation, when a member of the audience suggested that we follow-up the "Warrior gene" research by looking for the "Ignorant racist gene". Moana's presentation also talked about knowing where the thought began, such as the use of "us" and "them" to accuse Maori. He noted that "needs usually arise because rights have been breached".

Other presentations included research on health inequalities and how these are presented in the media. There was also a discussion of what the Women's Health Initiative means for Native American women, and a description of Ho'oponopono, a traditional Hawaiian way of dealing with family issues.

On our only free night the students decided to retreat to the Waiotapu Bridge pool, a natural hot spring. We had a few waiata (songs), a few ales and very few injuries (pretty good considering how much boiling mud was in the area). Everyone that attended had a great night. While there, bathing under the stars, a few creative folk decided to compose a waiata (box 1) complete with actions. We decided to make it a PRIDoC tradition for the students to try and write a new song in the language of the hosts.

Box 1 **Waiata**

E piata ana nga whetu i te rangi
He tohu arahi e
I hoea mai ra o tatou tipuna e

Koira te timatanga he iwi rangatira
I whakapuawai e
Kia mataara, whai whakaaro
Whakamarama e

Translation

Our ancestors great migration was guided by the stars in the sky. From this, a beautiful people blossomed. Stay focussed and always follow the thoughts back/know where we originated. Enlightenment will prevail

Written by: Diana Rangihuna (Ngati Porou), Lily Fraser (Kai Tahu) and Marama Wepa (Ngati Kahungungu).

Saturday/Day 4 - Indigenous Health Services

The final day of presentations started with a talk about traditional healing by aboriginal Australians. This presentation stood out from the many others on traditional healing because the healers spoke in their native language. The two men spoke through a translator about how they became healers, the importance of traditional healing, and what they are doing to continue the tradition. It was a privilege to witness a culture so untouched by western society.

As the day went on, there were more presentations about traditional healing, as well as indigenous health care, cancer treatment, and inequalities. Mental health was also clearly on the agenda, with a summary of the Maori data from the New Zealand Mental Health Survey and a talk about cultural identity issues among Maori children and adolescents.

In the evening we had the Congress Dinner. It was decided that we would unveil our new waiata here, in front of all our mentors! We had a fantastic number of students get up, many from overseas who may have never done waiata before. The performance went well, with only one hitch (when there was some disagreement about what the words were), not bad given that it was only written the day before.

Sunday/Day 5

The final day saw everyone gather poolside at the Millennium Hotel for Poroporoaki (farewell). Here the various nations attending exchanged gifts and awards were given out to various organisers and presenters. All of the students received numerous small gifts from bags of salt to diaries.

Conclusion

The week of PRIDoC was a fantastic time, which we will all cherish for years to come. The most valuable part was meeting new people and knowing that, half way round the world, there are other indigenous doctors/medical students struggling with so many of the same issues that we struggle with as Maori. The whole event was a time of bonding, a spiritual gathering to keep the fire burning with passion and commitment. This was an essential reminder that we are not alone, something we need at least once every two years.

For more information about the 2006 PRIDoC go to www.conference.co.nz/pridoc2006

Acknowledgements:

The authors would like to thank Te ORA, especially Lily Fraser for all the support she has given us - from organising our transport to PRIDoC through to helping edit this article. Thank you to Diana Rangihuna for providing the information about the waiata. Thank you also to Jaclyn Aramoana, Arihia Waaka, Jed Hocart-saunders and Sara McOscar for providing pictures and details used in this article, and AIDA for allowing us to use photos of their performance.

Hyperemesis Gravidarum: the clinical relevance and current use of anti-emetic medications

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Sarah is a fourth year medical student at Auckland University with a prior BSc and outside interests in practically everything including: music, art, humanitarian issues, philosophy and cultures/languages. I've also been involved with medical research, with hyperekplexia being the main research interest. The hyperemesis gravidarum article was written for a General Practice learning needs paper.

ABSTRACT

Hyperemesis Gravidarum is best defined as intractable nausea and vomiting during pregnancy, and is characterised by dehydration, ketonuria, electrolyte disturbance and weight loss[1,2]. Affected women experience significantly reduced quality of life and there remains no evidence of adequate pharmacological treatment. The pathophysiology of HG is also indistinct with human chorionic gonadotropin and estrogen believed to contribute. Management of nausea and vomiting during pregnancy typically falls within the domain of the General Practitioner. Anti-emetics which may be considered in this scenario include dopamine and histamine antagonists, serotonin receptor antagonists and

corticosteroids. Here, a pyridoxine-metoclopramide combination is suggested to be the first-line therapy for HG.

INTRODUCTION

For centuries, physicians have searched for a treatment to counteract Hyperemesis Gravidarum, best defined as intractable nausea and vomiting during pregnancy and characterised by dehydration, ketonuria, electrolyte disturbance and weight loss. At best, hyperemesis gravidarum not only severely reduces quality of life for women during pregnancy, but also contributes an extreme financial burden and loss of paid hours of work to society. At its most severe, the condition is a leading cause for hospitalization during pregnancy. It poses a significant threat to both mother and fetus and was once considered an important cause of maternal mortality. Despite medical evidence that 70-85% of women experience nausea and vomiting during pregnancy and up to 3% of these women experience hyperemesis gravidarum, there remains no proven evidence of adequate pharmacological treatment.

Early treatments for hyperemesis gravidarum which proved unsuccessful include anti-psychotics, vitamins and tranquilisers. More recent therapies have included pyridoxine (vitamin B6) and doxylamine combinations, H1 receptor antagonists, dopamine receptor blockers and serotonin antagonists. Based on evidence that they may reduce emesis resulting from cancer chemotherapy, corticosteroids have also recently been trialled as a treatment for hyperemesis gravidarum (HG). However, Bsat et al. commented that corticosteroids and serotonin receptor antagonists such as ondansetron, are more commonly used following failure of first-line therapy. Importance however, must be placed in assessing the relevance of the available anti-emetic medications in relation to the physiological cause of HG.

PHYSIOLOGY OF HG

Despite much speculation, the pathophysiology of HG remains largely elusive. There is general agreement amongst the scientific community that the condition arises from a placental source, most often considered to be human chorionic gonadotropin (hCG). However, estrogen has also been noted to be a recognised potential hormonal contributor.

Because all pregnant women exhibit increases in serum hCG and estrogen, the physiological response to these hormones in women who develop HG is believed to be dictated by genotypic and psychological factors, in addition to response of the gastrointestinal, vestibular and olfactory systems. Sullivan et al. postulate that the vomiting reflex arc forms a component of HG, suggesting therefore the importance of the serotonin receptors which are central to this reflex. The use of histamine receptor antagonists and dopamine receptor blockers suggests that these receptors may also mediate HG. Yost et al. propose that the chemoreceptor trigger zone in the brainstem which is responsible for nausea and vomiting may be modified by corticosteroid administration, a possibility echoed by Safari et al., who remark however, that the involvement of this centre in HG is unclear. The fact that the physiological processes involved in HG have never been adequately proven is postulated to be a large contributor to the perplexity surrounding management of the condition within the field of General Practice.

EVIDENCE FOR USE OF ANTI-EMETICS

Dopamine and Histamine Receptor Antagonists

A recent study conducted by Bsat et al., considered the use of three commonly administered medications for nausea and emesis associated with pregnancy. Pyridoxine-metoclopramide (a dopamine receptor antagonist), prochlorperazine (a dopamine and histamine receptor antagonist) and promethazine (a histamine receptor antagonist) were administered to three groups of study participants in the first trimester of a singleton pregnancy over a three day period. Despite the fact that

the pyridoxine-metoclopramide required an intramuscular injection, this was not perceived as being problematic to the patient. This combination was also reportedly the most effective, reducing emetic episodes from an average of 2.3 to 0.6 over the three days of treatment. Promethazine demonstrated a similar efficacy, reducing emetic episodes from 2.4 to 0.8, whereas prochlorperazine reduced such episodes from 2.3 to 1.1. Additional to central antagonism of the dopamine receptor, Bsat et al. also described the gastro-intestinal effects of metoclopramide which may be relevant in reducing HG. Although promethazine also demonstrated efficacy in reducing symptoms of nausea and vomiting, the sedating effect of promethazine is significantly more persistent than compared to metoclopramide. This finding, in conjunction with the symptomatic results of the three therapies indicates that the pyridoxine-metoclopramide combination has a place as one of the first line treatments for HG.

Serotonin Receptor Antagonists

The serotonin receptor antagonist featured most prominently in literature for treating nausea and emesis is ondansetron. Sullivan et al. conducted a study extending over 17 months comparing this treatment with promethazine, postulating that the anti-emetic effects of this medication may extend to the intractable hyperemesis experienced in HG. As noted by Bsat et al., promethazine was mentioned as a popular first-line anti-emetic medication, and was for this reason selected by Sullivan et al. as comparison for efficacy of ondansetron. Response to treatment between the two groups was investigated using both subjective assessment by study participants and objective assessment using measurable clinical parameters. At all levels of investigation, ondansetron proved no more effective than promethazine in treatment patients with HG. Interestingly however, sedation was elicited in more than 50% of the study population assigned to promethazine compared with only 13% of the study population assigned to ondansetron. Similar to results demonstrated by Bsat et al., this finding suggests that non-sedating treatments with similar efficacy profiles to the current first-line treatment, promethazine are available and should be considered for use in HG.

Corticosteroids

Despite over-riding similarities in study design, recent studies by Yost et al. and Safari et al. offer diverse conclusions regarding the use of corticosteroids (predominantly methyl-prednisolone) in HG[3,5]. Whilst Safari et al. report improvements in symptom profile and reduction in hospitalization following treatment of participants[5], Yost et al. demonstrate no reduction in hospitalizations between treatment and control groups[3]. Interestingly, promethazine was the control treatment used for research by Safari et al., whilst all participants in the study by Yost et al. received promethazine and metoclopramide[3,5]. Whilst Safari et al. provided evidence of shortened duration of HG with methyl-prednisolone therapy; Yost et al. stated that their findings supported those of a recent evidence-based review, with methyl-prednisolone not reducing number of hospital admissions for symptomatic HG[3,5].

CONCLUSION

Recent evidence examined indicates the frequent use of promethazine as a first-line therapy in the treatment of HG[2-5]. Studies have provided evidence that this medication remains superior to other trialled treatments including methyl-prednisolone and ondansetron (a serotonin receptor antagonist)[2-5]. However, evidence also identifies the potential for replacement of promethazine as a first-line anti-emetic treatment with a pyridoxine-metoclopramide combination which not only proved more effective in reducing anti-emetic episodes, but also demonstrated a significantly diminished sedative effect[4]. This review suggests that pyridoxine-metoclopramide is considered a standard first-line therapy for HG, with secondary measures including promethazine and ondansetron. Administration of methyl-prednisolone alongside first- and second-line therapies should be considered, especially in severe cases of HG where rapid improvement is essential to avoid serious metabolic consequences leading to hospitalization.

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These titles are available from Elsevier Australia (www.elsevier.com.au) or your favourite university or medical bookshop

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Clinical Examination: A Systematic Guide to Physical Diagnosis, 5th edition Nicholas J Talley and Simon O'Connor
Publisher: Churchill Livingstone, 2006. RRP: $117.00

Preclinical years at medical school are by definition very theoretical. We learn about the mechanisms behind health and disease, and in what symptoms and signs disease will manifest itself in the patient. In tutorials and exams, patients' signs and symptoms are right there on paper, ready for us to apply our theoretical knowledge. One of the major challenges of clinical years is learning to elicit these signs and symptoms ourselves, via history taking and physical examination.

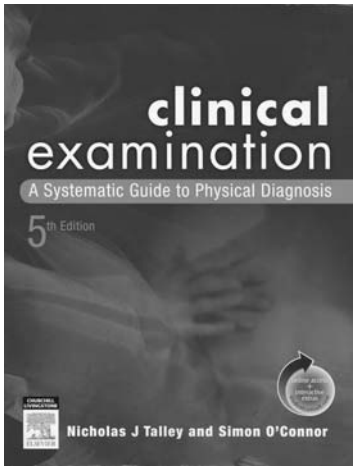
Talley and O'Connor's Clinical Examination: A Systematic Guide to Physical Diagnosis provides the map for this transition. It is a 2cm thick reference book with two chapters covering the general principles of history taking and examination, followed by eleven chapters going through the applications of this for each system.

The structure of the book is clear and it is easy to navigate: each chapter begins with history taking for the system concerned, then the physical examination, with photos and diagrams of many of the signs, followed by a section on the major diseases for that system and how they would present, a guide on X-ray review, if relevant for that system, and finally, a concise summary of the physical examination for that system, which is also represented in a one-page figure. These figures are useful to photocopy and take on the wards, as the whole book is too cumbersome. Unfortunately, four chapters are without this final one-page summary.

Besides this, there was little to criticize in Talley's. I really appreciated its evidence-based approach. Tables of "Good signs guides" illustrate the evidence-based weight to put on various signs for a given diagnosis. This evidence-base was reviewed and updated for this latest fifth edition. Compared to the fourth, the fifth edition has more colour and is more spaced out, making it fresher and more inviting. Also new to this edition is access to a website which contains numerous features, including heart and lung sounds, self assessment MCQs and excerpts of the book you can download to a handheld device.

An accompanying DVD is yet another complementary electronic feature. The ten examination video clips on this help provide a way of observing a physical exam as many times as you want, without having to pester your consultants or registrars!

It is useful for all levels of medical student, from the preclinical student wanting earlier integration of their theory with clinical knowledge, to the clinical student first learning examination technique, all the way to the registered doctor wanting to review or fine-tune their technique. Previous editions of this book are internationally renowned and translated in to seven languages. The fifth edition is like having a friendly, knowledgeable consultant in your bookshelf, and it will no doubt follow the success of its predecessors.



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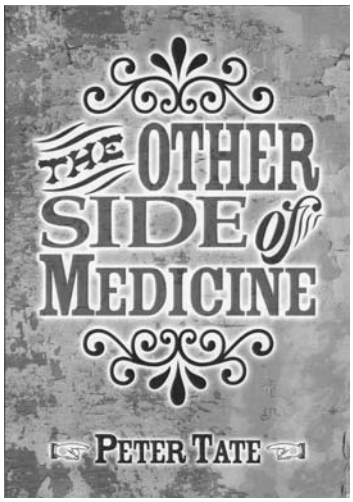

The Other Side of Medicine
Dr Peter Tate
Publisher: Radcliffe Publishing, 2007. RRP: $79.00

"So you're a Med Student huh? Wow, people must have said some pretty good things about you, I bet you're really smart." Then you actually geot through a couple of years of Med school . . . Isn't it funny how it swiftly cuts you back down to size?

It is ideas like this from the satirical, sometimes pessimistic and above all honest Dr Peter Tate that makes one feel relieved. Relieved that all those feelings of total inadequacy, frustration and fear of blunt consultants one might meet are totally normal. Relieved that even experienced, well-respected clinicians experience the same thing. In this compilation of short stories from his life as a General Practitioner in the UK and a trainer/assessor for the MRCGP training scheme, Dr. Tate describes humorous, sad and interesting events that reveal the often unspoken but unmistakeably true side of medicine. Ironically enough, it's like a text about all the parts of medicine that cannot be learned from a book.

Comprising 26 chapters in just 120 pages, the book is in convenient bite sized pieces that make it an easy read. Although this book is written in from a UK perspective and therefore the systems, training and protocols are different to ours, the concepts are universal. Sadly there are no illustrations, but vivid descriptions of situations and patients easily make up for it. For example: ". . . the bags under her eyes were spectacular, her jowls hung like a bloodhound and her chin folded like a well-used fan...giving her a doggy look that was both sad and a little macabre. By 70 she was heroically ugly . . . I focussed on the ulcers. They were huge, at least 6" by 6", they were covered in yellow foul-smelling pus and, no surely not, there was movement. There were maggots . . . I gagged and fought desperately against vomiting over her urine and pus enriched carpet." The silver lining of these cloudy stories about the dreaded patient is the illustration that with a little perseverance, one can learn a great deal from such a case. This particular lady had not left her house in five years and was totally bedridden. Within a matter of months she ventured outside and up the road.

Dr Tate manages to boldly and humorously acknowledge medicine's discrepancies, fallacies and unexpectedly complex patients. However, best of all, he moves you past this, leaving you with the message that medicine is still able to achieve a remarkable amount of success, and the daily frustrations are no reason to give up altogether.

Suitable for any medical professional, this book can serve as an eye-opener for the situations you may encounter, or as a jovial yet knowledgeable reflection of those you might may have already met.

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Crash Course Pharmacology Second edition. Dawson, Taylor, Reide. Faculty advisor: Clive Page. Publisher: Mosby, October 2002

Medical science is in the midst of a knowledge explosion. Being a medical student in these changing and challenging times is difficult. Medical schools the world over are switching to an integrated, problem-based system of teaching and learning.

The crash course series consists of both Basic science and Clinical titles. The series is written by medical students under the supervision of a faculty member. The second edition of the Crash course in Pharmacology was published in 2002. The book is divided into three parts: Principles of Pharmacology, Clinical Pharmacology and Self-assessment.

The book is primarily intended to serve as a quick and reliable reference and as a supplement to text books. The various topics are covered in a concise and interesting manner. The main section is Part II. This is divided into eleven chapters. These are cancer, infectious diseases, inflammation, pain and immunosuppression, peripheral nervous system, central nervous system, respiratory system, kidney and urinary system, gastrointestinal system, endocrine system and eyes and skin.

The system-wise coverage is primarily intended to facilitate system-wise integration across the various subjects. The chapters are covered in a concise fashion and care has been taken to include the latest developments. The tropical diseases section excepting malaria is not well covered. However, the book was primarily written for British students. The dose and regimens are not covered and will have to be obtained from text books.

Comprehension check boxes test understanding of the topics which have been read. Hints and Tips boxes draw attention to key content and helps to remember important points. These boxes are very effective. Simple diagrams and tables help to comprehend information easily. Each chapter ends with a list of short answer questions.

The book's predominant colour scheme is blue. The visual of a helmeted, white coated student riding a scooter is quite appropriate. The self-assessment section contains multiple choice questions (MCQs), Short Answer Questions (SAQs) and essay questions. The MCQs are in true-false format and the answers to the MCQs and SAQs are given.

The index is comprehensive and helps to access information easily. The book is well produced and its compact size makes it portable. The book also advertises an online resource, www.fleshandbones.com which will be useful to students and preceptors. The book is manufactured using paper obtained from sustainable forests. This book will be a useful addition to a students' bookshelf. Cost may be a problem however for students from developing countries.

17th Global Congress International Physicians for the Prevention of Nuclear War (IPPNW)

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Need blurbs (short) for 3 authors and where and what year they all are

Over the past two decades, IPPNW physicians from many countries have worked together on the unified cause for nuclear disarmament and peace. Finland has been a European powerhouse of ideas and practical policies supporting IPPNW causes from the beginning; and the last World Congress held there was over twelve years ago, just prior to the awarding of the Nobel Peace Prize in 1985. It was hence entirely appropriate that the 17th global congress of IPPNW was held in Helsinki in September of this year.

Background

International Physicians for the Prevention of Nuclear War (IPPNW) grew from the professional correspondence of two cardiologists in the late nineteen seventies. Dr Bernard Lown from the United States and Dr Evgueni Chazov from the Soviet Union identified a common passion for medicine and humanity that transcended the political climate of the Cold War. In 1980 they co-founded IPPNW to unite doctors around the world in condemning the threat, development and use of nuclear weapons. In 1985 IPPNW won the Nobel Peace Prize for this work. Since the end of the Cold War IPPNW has continued to campaign against the 27,000 nuclear weapons which continue to threaten the lives of millions[1,11]. IPPNW has also become involved in campaigns against landmines, small arms and for the health of refugees. Medical students have played an increasingly significant role in the organization and now run a number of global anti-nuclear campaigns which are some of the most effective and inspiring projects supported by IPPNW.

The New Zealand Chapter of IPPNW was founded in 1982 and at its peak 1100 New Zealand doctors were members. However, as nuclear weapons have disappeared from public consciousness, membership of IPPNW(NZ) has declined and long serving members have continued their work with little contribution from next generation. Facilitating the development of a medical student chapter of IPPNW (NZ) became a priority and three students were funded to attend the 17th Global Congress of IPPNW in Helsinki from September 8th - 10th 2006. Andrew Winnington, Catherine Yang, Mohammed Alawami (Saudi funded student) and Rosemary Wyber were honored to attend. We have returned inspired and passionate about the role New Zealand medical students have in creating a nuclear free world and a Pacific free of gun violence.

The Student Meeting

Over one hundred and forty medical students from around the world attended the student meeting, which was held prior to the main Congress on September the 6th and 7th. This was opened by Ayako Okumura, a survivor of the Nagasaki atomic bombing. Her tearful, translated description of the immediate aftermath of the bombings was bleak confirmation of our medical mandate and moral imperative to prevent further atrocities.

This poignant introduction was followed by two days of workshop sessions which outlined IPPNW student projects around the world. One highlight was the Nuclear Weapons Inheritance Project (NWIP): an initiative devised by students who visit nuclear weapon states and meet with other students for dialogue about nuclear issues[2,12]. Another programme is Refugee Camp Project (ReCap) for international medical students to spend one month in Palestinian refugee camps working with children and providing medical and social support[3]. IPPNW students also run the One Bullet Stories which presents the experiences of victims of small arms violence[4]. Each of these activities, and the many others, were inspirational and exciting in their own right. It was humbling to realise that they were founded, developed and organised by our peers; with similar demands on their time for study and family commitments.

Prior to the student meeting, twenty students from all over the world gathered in Tallinn to cycle the 880km expedition to Helsinki via St Petersburg, raising awareness of the importance of nuclear disarmament. This received a lot of media coverage and provided a unique bonding experience for the participants. They were able to consolidate within themselves the reasons for supporting IPPNW causes and encourage each other. The group also met with politicians along the way and explained why the nuclear disarmament issue was important to medical students.

Main Congress Proceedings

A vast array of committed humanitarians addressed the main congress. Dr Kgosi Letlape, President of the World Medical Association described war as the longest running health epidemic. He called on doctors to make working towards peace part of our core business, not a task maginalised to a few. Dr Ronald McCoy, Co-President of IPPNW, spoke passionately about developments towards disarmament, including the recent Blix

Report on Weapons of Mass Destruction, the role of the Non Proliferation Treaty, and the growth of military spending under the guise of increased security. The following twenty five workshops were diverse and, at times, overwhelming; peace strategies in the Middle East, health consequences of production and testing of nuclear weapons, medical effects of nuclear weapons, peace in South Asia and a multitude of other topics. Presenters and contributors were doctors who believe that abolishing nuclear weapons - like slavery and small-pox - is possible. The discussions and plenary sessions reflected opinions and experiences from all over the world; and provided considerable insight into medicine outside the narrow confines of our curriculum.

One of the most exciting outcomes from the Congress was the adoption of a reinvigorated[14] [w6]push for a global nuclear weapons convention; International Campaign for the Abolition of Nuclear Weapons (ICAN). ICAN has a number of technical components including a second submission to the International Court of Justice, change in NATO policy and nuclear weapons free zones. However, its core component is a global groundswell of information and indignation about the continued threat of nuclear weapons. Public opinion is an essential driver for change in government policy and ICAN provides a vehicle for this to happen. The funding and development of ICAN has been spearheaded by Australian members of IPPNW and it is exciting to think that we are so close to the action[5,6]. The timeline for ICAN is abolition by 2027 and its vision is feasible within our practicing lifetimes.

The IPPNW Global Congress brought together some of the finest medical minds and peace activists in the world today. Talking to them over coffee and at official functions was incredible and surreal as students from a tiny country on "the other side of the world". We were welcomed, encouraged and included at every event, in part due to New Zealand's unique leadership in nuclear disarmament. We gave a presentation at a workshop about New Zealand's nuclear free status which was exceptionally well received. New Zealand continues to inspire other nations; we are the only country with a Minister for Disarmament and Arms Control and legislation that criminalizes any involvement in nuclear activities. It was refreshing to be surrounded by so many people working for the global good without political or financial incentive.

Since our return from Helsinki we have developed Medical Students for Global Awareness (MSGA). Although MSGA has a strong connection with the nuclear weapons abolition movement our primary interest is in socially responsible medicine. Local groups will be free to explore health issues with implications for peace, equity, population health and development. Nationally, MSGA will provide a supportive environment for students who choose to pursue research interests in related fields, undertake peace campaigns, or participate in global IPPNW projects. We hope that you will be inspired to find out more and become involved and perhaps to join us at the next IPPNW World Congress, which will be held in New Delhi, India from 7 to 12 March 2008[7].

Catherine Yang, Rosemary Wyber, Andrew Winnington and Mohammed Al Awami

More information from medstudentsforglobalawareness@gmail.com

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Poor Souls: Alcoholics Anonymous Experience

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Kate needs a blurb

'Poor souls'. The general practitioner that I have been attached to calls them this. She deals with 'poor souls' on a daily basis and from what I have observed so far, experience has taught her well.

They drift into the room, she closes the door behind them and, for the most part, they play the sobre act well. They recite their stories of honest hardship with the hope it will earn them their next fix or a signature on their benefit forms. To the casual observer they may appear much in control of their situation, yet it is often only a transient mask the drug gives them; the desperate hold of their eyes gives them away and tells me the world they see is a different one to mine.

It is just past nine in the morning and they sip meths from a water bottle already half empty. The room quickly fills with an acrid stench – yesterday it was paint, the day before glue. As the senses settle a new odour, that of one who has not washed in days comes in waves that compliment the poor souls' every move. On the desk, next to the sphygamometer, stands two air fresheners but their use will have to wait until the end of the consult – one would not want to appear rude.

Now I am not as naï'efve to think that every alcoholic presents to a clinic as such. In an AA meeting the members take turns to share something about their life. This might be their story of alcoholism or rather their 'alcoholic career' as many of them like to redefine it. Or it simply may be an account of their day, their trials, their successes – whatever may be plaguing their thoughts at that moment. A lot of them talk of bottoming out; the lowest of lows. Alcohol ends up drinking them dry of life: it drinks their money, their relationships, their careers, but most viciously, it drinks their spirit. One could argue everyone's bottom is different and that it is all relative to their situation, but when I see these 'poor souls' at the clinic they seem to hold the definition fairly.

I have been to quite a lot of meetings in the past with friends playing a support role and once as a second year medical student so was reasonably aware of what to expect. I felt welcome as a student by most, but there were a few who seemed hesitant to have me there. However this did notshake me up too much as I knew how much the therapy of these meetings is based on the idea of comradeship: the ability to confide in one another, an understanding that cements an instant friendship. Anyone who attends these meetings is offered the gift of a sponser. These sponsers are long time AA members who have achieved a lasting sobriety and who nominate themselves to be an on-call support man for any particular member. There is no monetary payment for this job even though the task of acting as a counsellor to a broken man is surely a grueling one. Yet there is no lack of volunteers. Such has been the effectiveness of the AA programme for these volunteers that they feel honoured to offer their time to those who shoes they once filled.

The use of spirituality could be seen as a short cut to encompass a feeling of well being – a wet hand to offer someone who is so lost in themselves. The common stone of these people is that they have searched themselves and their lives and have found both lacking. They identify their lack of control over alcohol and turn the responsibility over to a 'greater power,' whether that means their God, Allah or any other religious nomination. It could also be anything else they identify as being a power greater then themselves; their own AA group could even fill this role. They use this same philosophy to encompass all aspects of their life. They come to realise they can not control everything or everyone, and by releasing such stressors to their greater power in turn releases them from such responsibility. I think this is a fantastic concept for those who have difficulty coping with the stressors of life and struggle with addiction, though this could result in forfeiting too much responsibility when they should in fact own it as their own burden.

On the whole this programme is clearly effective to a huge number of alcoholics in achieving sobriety. The founders of this group have uncanningly encoporated George Valiant's four factors to address addictions. Such a programme has shown to be effective in treating other addictions with the formation of Narcotics Anonymous (NA) and even a Food Addictions Anonymous (FA). It would be a rare occasion to sight one of those 'poor souls' from the clinic at an AA meeting. The fact that a fair handful of this group rolled into their first meeting in such a state is surely testament to the success of AA.

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- Letters (<500 words)

Criteria for Submission

- Submissions are of interest to medical students
- Written approval from supervisors are required
- Author's email address for correspondence is necessary
- Short blurbs about authors should be included

Style

- The British Medical Journal house style is to be followed.
- This is available at:
  http://bmj.bmjjournals.com/advice/stylebook/start.shtml
- Use the Vancouver referencing style
- Abstracts are required for research articles

Delivery

Email articles and authors' blurb to:
nzmsj@otago.ac.nz
with "article submission" in the subject header

Download an article cover sheet from:
www.otago.ac.nz/nzmsj

complete and post it to:
New Zealand Medical Student Journal
c/- Medical Teaching Support Unit
Dunedin School of Medicine
PO Box 913
Dunedin
New Zealand

Process

All submissions will be subedited for spelling, grammar and clarity. They will then be sent for expert reviews. Authors will be required to revise their articles during this process.

Final article selection for publication will be made in conjunction with our academic advisors and editorial board once the review and revision process is completed to a professional publishing standard.

Acceptance of an article into the review process does not constitute a guarantee of publication. It is the intention of the NZMSJ to provide authors with the benefit of external review and revision processes that are standard internationally for published journals. This is in keeping with our educational aim to assist medical students in making the transition from writing for medical school to writing as a graduate

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Submissions
received before November 12
will be considered
for issue 7

In keeping with the NZMSJ's ethos of encouraging students to submit articles, we are proud to offer prizes to acknowledge excellent work. Under the category of academic submissions, **a first prize of $350 and a second prize of $150** will be awarded.

The best feature article and letter to the editor will receive **medical book prizes.**

Submissions for the next issue are due **12st November 2007.**

FACT #1

of the 11,000 doctors practising in New Zealand around 50% will require some medico-legal advice!

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MEDICAL PROTECTION SOCIETY

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www.otago.ac.nz/nzmsj