

## **Geoffrey & Joan Margaret Flavell Elective Scholarship Report**

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**Dates:** 8th April to 13th May 2014

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## Acknowledgements

It was an honour to have been awarded the Geoffrey & Joan Margaret Flavell Elective Scholarship. The support it offered allowed me to have such an educationally fulfilling elective. I would also like to thank Dr. Francois Stapelberg for his teaching, support and encouragement whilst I was under his supervision and the rest of the Counties Manukau Health Anaesthetic Department for being so welcoming to me.





***Compare & contrast population demographics of New Zealand and England. Additionally appraise the health determinants of a minority group from each country (the Māori of Counties Manukau & Bangledeshis of Tower Hamlets) and how this may impact upon their anaesthetic risk.***

### **Population comparison**

New Zealand, as of June 2012, has a population of 4,433,000 which has increased by 0.6% from the previous year (1). The median age is 37 years, an increase from 34.8 years a decade ago (1). The New Zealand Government attribute this average increase to an ageing population and sustained low fertility (1); indeed life expectancy is increasing, with females now expected to live to 82.8 years and males to 79.1 years (1) and the proportion of residents of retired age has increased 31% over the previous decade (1). However, a significant proportion of New Zealanders are of working age (66%) (1).

England on the other has a much larger population, estimated to be 53,493,700 (also in June 2012) (2) - around 11 times greater than New Zealand. Its population is increasing at around the same rate as New Zealand (0.7% a year) and the two countries share similar life expectancies (2). However it has, on average, an older population (median age of 40 years) and a smaller amount of this population is of working age (~52%) (2), therefore the burdens of an ageing population are greater in the UK. New Zealand is, however, not free of these; its healthcare system is becoming stretched and waiting lists have developed leading to 50% of New Zealanders obtaining private health insurance (3).

### **The Māori of Counties Manukau**

Counties Manukau has the 3rd highest population of all New Zealand's District Health Boards at around 464,000 (4) - 10.5% of the entire population, but it's population is growing rapidly compared to the rest of New Zealand (3.2% over the past decade vs. 1.6% nationally) (4).

The indigenous Māori population of New Zealand is estimated to be 682,200 (1) - 15.4% of the entire population. However Counties Manukau has the largest population of Māori of all the DHBs at 78,000 (16.8% of the national Māori population). Historically, the race has a health belief model with a very external locus of control, believing that there is no natural disease and that all afflictions are the result of transgression against an *atua* (god), breaking of *tapu* (law) or *makuta* (witchcraft) (7). In modern times the race's lack of engagement with healthcare services has been primarily

attributed to poor education and low income. This is of great concern because the Māori have been observed to have a higher burden of chronic disease than the non-Māori population (8). But what is has caused this?

The traditional Māori diet and way of life lent itself to a healthy lifestyle. The process of hunting for meat, cultivating and harvesting food involved great physical activity and the diet itself was high in protein & fibre and low in fat. The colonisation of New Zealand and subsequent westernisation of the Māori diet (8), which is high in fat and refined carbohydrates and involves low cardiovascular output, has led to an epidemic of hypertension, diabetes, stroke, cardiovascular disease and respiratory disease. The Alleviating the Burden of Chronic Conditions in New Zealand study highlighted that the Māori have higher rates of untreated hypertension, have worse risk profiles for cardiovascular disease, have three times the prevalence of type 2 diabetes than the non-Māori population with lower utilisation of screening services, tend to suffer from strokes at earlier ages and have a higher prevalence of COPD.

### **The Bangladeshis of Tower Hamlets**

There are around 500,000 Bangladeshis in the UK (5) with 53% having migrated to the UK (6). The Bangladeshi population therefore only makes up a less than 1% of the UK's population. However, due to a pocketing effect, within Tower Hamlets 33.5% of the population is Bangladeshi,\* thus it contains 22.8% of the national population (6). The healthcare problems afflicting this minority are in part due to a high background level of disease as a result of migration from a country with relatively poor healthcare provisions, explaining elevated incidence of TB etc. However, westernisation of their diet has led to increased rates of diabetes, hypertension and obesity.

### **The effects of diabetes, hypertension and obesity on anaesthetic risk**

Having diabetes increases a patient's risk for surgical complications (9) including dehydration, impaired wound healing, inhibition of white blood cell chemotaxis and function (associated with an increased risk of infection), worsened CNS and spinal cord injury under ischemic or hypoxic conditions and hyperosmolarity leading to hyperviscosity and thrombogenesis (10). Thus, achieving better glycaemic control in diabetic patients undergoing major surgery has been shown to improve perioperative mortality and morbidity (11). However, pre-operative hyperglycaemia is not the sole issue in diabetics; its macrovascular complications, like neuropathy, myocardial infarction and increased thromboembolic events, present additional anaesthetic problems (11).

Arterial hypertension is associated with increased cardiovascular complications post-anaesthesia and surgery (12) and therefore most hypertensive patients require optimisation prior to surgery.



Obesity presents anaesthesia with a myriad of problems. Obese patients tend to have short, larger necks making both mask ventilation and direct laryngoscopy technically more challenging. A BMI of 46 is associated with a 13% risk of difficult intubation. Additionally, metabolically active adipose tissue leads to increased oxygen consumption & carbon dioxide production and can make the volumes of distribution, binding and elimination of anaesthetic agents unpredictable. There is reduced chest wall compliance (of up to 30%) due to the heavy chest wall, increased pulmonary blood volume and splinted diaphragm. This reduction in compliance, together with increased respiratory demand results in an increased work of breathing. In addition, the functional residual capacity (FRC) declines exponentially with increasing BMI. The closing capacity in these patients can encroach on the FRC even when conscious; therefore the onset of anaesthesia, a supine position and the abnormally high elevation of the diaphragm (due to increased visceral and abdominal wall fat) all combine to cause ventilation-perfusion mismatch, right-to-left shunting and arterial hypoxaemia. It increases cardiovascular risk and so increases DVT/PE risk twofold (13).

## **Conclusions**

The Māori of Counties Manukau and Bangladeshis of Tower Hamlets are minority groups, albeit that one is indigenous and the other migratory, that are epidemically afflicted by illnesses as a result of their westernisation. Unfortunately both groups concurrently suffer from educational, financial and health deprivation. This combination means that they have elevated prevalence of diabetes, hypertension and obesity which in turn gives them greater anaesthetic risk.

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***Compare & contrast the Private/Public health system in New Zealand with that of the UK currently with its predominant NHS model and how each might learn from the other.***

New Zealand is a world leader in public health services having been the first to introduce a welfare state. It was also one of the first democracies to nationalise its health service provision, in 1938 – eight years before Aneurin Bevan helped pass the National Health Service Act in the UK. However, due to rising costs of maintaining its health service, the development of waiting lists and contraction of its economy in the 1970s, the New Zealand government instituted reforms over a 20 year period to create the public-private mixed service that exists today. Indeed around 50% of New Zealanders have private health insurance. The UK, by comparison, uses the National Health Service, a system whereby the state provides nearly all healthcare needs for everybody, although patients have to pay a small charge for some services like prescriptions. However the Health and Social Care Act 2012 has paved way for great reforms of the NHS and a model like that of New Zealand is expected to develop as health services are competitively tended for by private companies, in addition to nationalised services.

In New Zealand patients must pay for a visit to a GP albeit that those of low income have this subsidised. In the UK, patients are not charged for primary care, however access to same day GP appointments has been widely acknowledged as a problem, resulting in a greater tendency to seek help via the Emergency Department for primary care. New Zealand shares this problem as patients can access the ED for free as it is funded as a secondary care service. The cost of an ED consultation, as an average, is far greater than seeing a GP (in the UK it has been estimated that a GP visit costs the NHS around £25, whereas a visit to the ED can cost up to four times this). In both New Zealand and the UK, expenditure on emergency services represents a significant proportion of the healthcare budget. There are speculations and suggestions in the UK of patients having to pay to access ED services – the only function of this can be to deter patients with non-urgent issues from attending.

New Zealand and the UK share the same burden of overuse of the Emergency Department, resulting in a costly bill nationally for these services. This problem has arisen through difficulty (true or perceived) accessing primary care services. What both countries can learn from this shared problem is that improving access to primary care, which is financially cheaper, may result in decreased expenditure on secondary care services.



***Anaesthetics is a very strong career option for me. I will utilise my elective period to undergo further career exploration. I hope to improve my understanding of anaesthetics, the pre-operative assessment and peri-operative care.***

This placement has provided me with a great opportunity to examine the potential of a career in anaesthetics. I feel that I've had good exposure to the main aspects of the specialty and from this can draw some key learning points. The benefit of this extended attachment has primarily been to improve my knowledge and skills within anaesthetics – I feel that my ability to manage a patient's airway and secure the airway for an operation has greatly improved. These skills transfer well to managing a patient in the acute setting and will therefore stand me in good stead for when I am a House Officer come August.

The placement allowed me to compare and contrast my experiences of anaesthetics in both the UK and New Zealand. My main observation was that certainly in South Auckland, where my elective was conducted, patient's compromised by poor control of chronic disease were being anaesthetised without a great deal of pre-operative optimisation, something that I had not really experienced in the UK. During my year 5 placement in the UK, my impression was that patients certainly would not undergo elective operations until their chronic disease was optimally controlled. Several anaesthetists I spoke to about my observation remarked that if they didn't operate on these patients, then they wouldn't do many operations at all. I suppose this provided me with a pivotal point of reflection in that your patient population really does dictate how we practice as doctors.

In addition to my clinical experience, I have had the chance to see how a career in anaesthetics will allow me to continue an academic commitment. Several of the consultants within the department I was placed had academic components to their working week – be that teaching or clinical or lab based research. This is very encouraging for me, especially as I am undertaking an Academic Foundation Post in Medical Education and my academic involvement in this is certainly something I want to maintain throughout my clinical career.

## ***Appraise the literature on workplace based assessments in anaesthetics training***

### **Workplace based assessments: *assessing their educational impact and acceptability amongst anaesthetic trainees***

#### **A shift in postgraduate training**

Historically postgraduate training was seen as traditional apprenticeship relying on time-related experiential training and subjective observation of clinical skills (1). However this form of training is no longer feasible (2) for a myriad of reasons. Firstly there have been significant reductions in the total number of working hours for trainees through legislative changes like the European Time Working Directive in the United Kingdom, which restricts trainees to working a 48 hour week. This is coupled with a reduction in time spent in training/accelerated time to obtain a Certificate of Completion of Speciality Training. Thus trainees exposure to the clinical environment has faced significant reduction, with one paper estimating that time spent in training has reduced from 30,000 to 6,000 hours in some surgical specialities (3). Secondly, the past 15 years has seen the medical profession be placed under greater scrutiny from both the public and politicians (1) and as such doctors need to be able to demonstrate with evidence their competencies, training and progress. The combination of the above drove a need to develop more objective, rigorous and scheduled assessment of trainees and the result was the development of workplace based assessments (WPBA).

#### **The theory behind WPBA**

WPBA occur during normal clinical activities and requires the observation of a trainee performing a task with the provision of feedback immediately after by the observing trainer. This feedback is normally provided both verbally and on written proformas/checklists for the task.

WPBA assess the highest levels of Miller's pyramid for assessment: does (in that performance is integrated in the workplace) and shows how (as the learner demonstrates their learning) (4). Miller states that "it is only in the 'does' triangle that the doctor truly performs" (4), the implication of this is that WPBA focuses predominantly on the skills and behaviours of the trainee, more so than knowledge and aims to assess their working practices within the workplace (5).

Considering the role of WPBA in the assessment of trainees, the integration of feedback within the assessment itself provides a formative opportunity, 'assessment for learning'. The collection of evidence from the feedback of multiple WPBA demonstrates the progression of a trainee and can be therefore used to summatively assess them.



## **Integrating WPBA in training programmes**

The Australian and New Zealand College of Anaesthetists (ANZCA) introduced WPBA to their training programmes in 2013 formally. The four WPBA methodologies the programme utilises are Mini-clinical evaluation exercises (mini-CEX), Direct Observation of Procedural Skills (DOPS), Case Based Discussions (CBD) and Multi-Source Feedback (MSF).

Mini-CEX involves a consultant reviewing a trainee as they manage an acute case and provides a structured assessment of relevant knowledge including reasoning, understanding, skills and behaviours. Following the case the consultant should provide feedback. A study on anaesthetic trainees in New Zealand found this methodology good for feedback as the process itself facilitates feedback provision and recommendations for trainee improvement (6).

DOPS involves a consultant reviewing trainee as they perform a practical skill. A systematic review of WPBA showed that this method provides trainees with focused feedback for development (7).

CBD involves a consultant discussing a case with a trainee, it occurs after the event and has to be case the trainee actually managed. Knowledge, reasoning and decision skills should be explored.

MSF involves the trainee seeking feedback from a variety of colleagues (including fellow doctors, surgeons, nurses, anaesthetic technicians, etc). The feedback should be a combination of specific, free text comments and Likert scale ratings, the former is preferred by trainees as it is more specific to their performance (7). It has been shown that MSF can increase motivation, leading to positive behaviour changes and therefore increased productivity & self-awareness amongst trainees (7). However, the unregulated self-selection of colleagues providing the feedback may lead to a leniency bias and it has been shown that feedback providers are more critical of senior trainees than juniors (7).

The approach of trainees to WPBA has been assessed by research. It has been shown that if a minimum number of assessments is set, trainees will tend to do the minimum (5). Trainees also view WPBA as an examination and therefore they tend to practice informally and allow themselves to be assessed only when they deem themselves competent (5). This approach negates the educational benefit of WPBA in that if utilized correctly it can identify issues earlier in training, thus allowing time for remediation and to map progress; performing WPBA only when competent will not allow for this.

## **The Utility of WPBA**

van der Vleuten developed the Utility Index of Assessment in 1996 and it has 5 components (8):

- Reliability - how consistent/reproducible is the assessment?

- Validity - does the assessment measure what it supposed to in that is it matched to the curriculum (content), differentiates a novice and an expert (construct), predicts future performance (predictive) and produces the desired education outcome (consequential)?
- Cost Efficiency
- Educational Impact
- Acceptability

Studies have shown that WPBA increases the reliability of training as it creates a structure for defining competence; however it is difficult to replicate clinical cases and standardize assessors (10). In terms of validity, careful mapping to the curriculums of postgraduate training mean that it has good content validity but low predictive validity (1).

Systematic reviews of WPBA has shown that inter-rater reliability and construct validity are the most commonly reviewed factors of the utility of WPBA and that acceptability and educational impact have been studied less (9, 10). MSF has been studied the most of all WPBA methods (7).

A further systematic review recommended that acceptability and educational impact needs to be assessed further and should include whether trainees have perceived a change in behaviour as a result of WPBA and whether they take in to account the credibility of the person giving them feedback when deciding on a change (11).

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