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Editorial

Inland Waterways - the Cost of Messing About on the River.

Northern Ireland is blessed with some beautiful lakeland and coastal scenery so if it's a nice day, many of us enjoy visiting areas like the Fermanagh Lakelands or North Coast.

There is however a much darker side to our contact with water.

In 2014, a total of 338 people drowned in the UK from accidental or natural causes.

Only 14 of these deaths occurred in the open sea. 102 occurred close into the coast. 32 died in canals, 29 in lakes and 100 in rivers, streams and burns.

Many did not intend to be in the water at all – the most common activity before drowning was walking or running alongside water.

So far, I have only counted accidental and natural causes - suicidal intent accounted for a further 210 water-related UK deaths in 2014.[1]

The Coastguard (officially the Maritime and Coastguard Agency – MCA) and RNLI respond to emergencies at sea and close inshore, but who looks after emergencies above the tidal high water mark, i.e., in rivers and waterways?

A standard 999 call is the way to summon help, but the Police and other statutory emergency services can call on or "task" voluntary search and rescue groups when required - this includes Mountain and Cave rescue teams with specialist high altitude and subterranean skills and equipment. Everything below the mountains and above the sea (or caves) falls into the category of Lowland Search and Rescue (LSAR).[2]

In the Province, there are several voluntary Search and Rescue groups who support the emergency services. The Northern Ireland Fire and Rescue Association is a forum composed of the major groups and the statutory emergency services who regulate activities.

Community Rescue Service was formed in 2007 and as well as assisting with water rescue, members are trained in rural and urban search, for example, providing search teams to assist the Police if an elderly or vulnerable person goes missing. Often, rural searches include water-logged culverts, ponds and drainage ditches. They cover a wide area including the River Bann and adjacent North Coast, Antrim Glens, Newry Canal, Strabane and Craigavon.[3]

Lagan Search and Rescue supports operations in Belfast Harbour and the Lagan as far inland as Lisburn.[4]

Given the land-locked nature of Loughs Neagh and Erne, it is perhaps surprising to learn that the Coastguard is the statutory emergency service for any incidents on the water. RNLI maintains a lifeboat on Lough Erne (one of only two "inland" RNLI lifeboats) and Lough Neagh Rescue support the Coastguard Rescue Team upon request.[5]

Foyle Search and Rescue Service is the oldest group and was set up in 1993 in response to a large number of drownings in the Foyle around that time.[6]

The Foyle is one of the fastest flowing tidal rivers in Europe and can reach a flow of 8 knots (twice walking speed). This means that within a few minutes, someone entering the water at the level of the Peace bridge could be carried as far as the Craigavon bridge (or vice-versa). Its tidal nature means that the Foyle also maintains a reasonably constant low temperature of about 6 degrees throughout the year - hypothermia becomes an important issue after 10 minutes immersion. Spinal care is also important when handling and transferring patients.

I spoke to Mr. Colm O'Neill, Operations Officer at Foyle Search and Rescue Service about their setup.[7] Sixty-one volunteers provide a round-the-clock service. At "peak" hours – Thursday to Saturday nights between 9pm to 3am – a three-layered response of jet-boat patrols, walking teams and vehicles maintain vigilance. There is radio communication with a shore base and from there to the emergency services. At other times, a 12 strong pager team is available with a back-up 6 person team if required.

Three jet-boats (propellers could injure people in the water), jet-skis and dinghies have to be continuously serviced and ready for use (Figure 1).

Basic training as a foreshore volunteer takes 10 weeks and includes first aid, CPR and public access defibrillation. More

Fig 1. Foyle Search and Rescue jet-boat "Spirit of Adrian".

advanced training is required to work on the river. Within the group are swift water and flood response specialists who may be tasked to major incidents anywhere in the Province. Some have received additional first responder training.

In 2014, Foyle Search and Rescue responded to 191 incidents (125 at night):

94 Causes of concern – e.g., people in a state of distress or lost near the river.

74 People escorted away from dangerous areas such as the river edge or bridges.

18 People taken out of the water alive.

4 Bodies recovered

1 Animal rescue.

The majority of cases are male and mental health issues are common.

When most of us think of the emergency services, our thoughts turn to Police, Fire and Ambulance. A second's pause and we would include the Coastguard and RNLI but few would consider the inland waterways as a greater hazard than the sea.

Its sobering to think of the size and complexity of these volunteer organisations funded predominantly by charity who strive to keep us safe.

Here's to a peaceful and safe 2016 for us all.

John Purvis
Honorary Editor

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I am grateful to Mr. Colm O'Neill, Operations Officer of Foyle Search and Rescue Service for arranging my visit to the Headquarter buildings, answering my questions and a memorable jet-boat ride on the Foyle.

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Medicine outside the Comfort Zone

Medical Care in Palestine: Working in a Conflict Zone

Emma Keelan

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Provenance: Invited Article.

Considered one of the most intractable conflicts in history, hostilities between Palestine and Israel have been ongoing sporadically for 67 years and counting, since the formation of the Israeli state in 1948. The impact of a continuous state of war has left the Palestinian health system in a chronic state of disarray. Jimmy Carter, former American President declared,

> The health situation in the Occupied Palestinian Territories shows the urgency of finding a political solution, as restraints and insecurities continue to undermine the creation of a health infrastructure able to address the dire public-health needs of Palestinians.[1]

Fig 1. Picture of the "Separation Wall" as taken from Abu Dis in the West Bank.

One of the main constraints to the establishment of a functional healthcare system is a 708 kilometre long, 8 meters high wall, known as the "Separation Wall" (Figures 1 and 2).[2] Deemed by successive Israeli governments to be a necessary protective mechanism for Israelis, the wall has led to the separation of the West Bank from Israel.[3] Yet, despite suggestions to the contrary, the reality is that the barrier has had a devastating impact on 2.79 million people living in the West Bank and caused fragmentation of the region both physically and economically.[4] Amongst other issues, the wall has contributed to the disruption of Palestinian access to land, livelihoods, education, water resources and has significantly inhibited freedom of movement across the West Bank.[5] This in turn has generated deep seeded psychological and social harm to those living behind it.[2] From a medical sense, the barrier acts as an obstacle to health, inhibiting the fundamental right of Palestinians to healthcare by restricting the movement of

Fig 2. Graffiti on the "Separation Wall" in Bethlehem, Palestine - highlighting issues as a result of the barrier.

patients, doctors, ambulances and medications within the area.[6] Importantly, it should be highlighted that the so-called "Separation Wall" is considered illegal under International Law.[2&7]

Following the 1993 Oslo Peace Accords, the newly established Palestinian Authority (PA), functioning through the Ministry of Health (MOH), were given responsibility for the administration of health care in the region. Yet, the PA's stewardship over health care administration is by-in large symbolic. The health care system remains subservient to Israel, with the Israeli state retaining ultimate control over healthcare budgets, border crossings, building permits and pharmaceutical import/exports.[6] Consequently MOH hospitals are basic in comparison to hospitals within Israel and lacking many resources taken for granted in the UK, particularly those relating to imaging and specialist personnel. Doctors practising in the West Bank have limited opportunities for training and continued professional development due to imposed permit sanctions and accordingly, Palestine has 8 times fewer specialist doctors when compared with Israel.[6]

The physical implications of the path the wall has taken

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through the West Bank has resulted in the isolation of rural communities from health care amenities, leading to substandard local health care facilities, making "health" inaccessible to the most vulnerable in society.[5] Costly travel expenses and lengthy journeys to hospital as a result of the wall hinders access for the impoverished, elderly and disabled. Consequently, there exists a heavy reliance on humanitarian aid organisations for healthcare however, limited communication between such agencies and the MOH fragments an already ailing infrastructure.

Figure 3. Typical facilities in a PHR mobile clinic visiting Azzun, Palestine.

The impact of military occupation and the need for permits to pass through Israeli checkpoints generates additional access issues. At present there are more than 500 blockades, checkpoints and roadblocks affecting the freedom of movement within the West Bank.[8] Palestinian patients must apply for permits to enter Israel for medical services not provided in the West Bank, namely oncological treatments. It is commonplace to suffer protracted delays in receiving a permit or to have an application declined. A World Health Organisation report released in 2013 stated, patients referred to Israel from the West Bank had permits denied in 17% of cases with no reason cited in one third of applications.[9] Perhaps even more worryingly, statistics from the Palestinian Red Crescent Society (PRCS), the main ambulance supplier in the West Bank, reported 93% of its ambulance transfers with acutely unwell passengers experiencing "time consuming delays" of 10 minutes or longer at checkpoints due to Israeli security protocols.[9] When taken together, this presents a bleak picture of Palestinian access to healthcare.

In February 2015, my husband and I took the decision to move to Bethlehem where I took up positions with two NGOs providing health care in the West Bank through mobile clinics. I work with the Palestinian organisation, Palestinian Medical Relief Society, Bethlehem (PMRS) 2-3 days a week and the Israeli organisation, Physicians for Human Rights (PHR) on a Saturday (Figures 3 and 4). PMRS have many branches in the region, each working locally whilst PHR provides services throughout the West Bank. Mobile clinics are used as a means of delivering free of charge primary level health care within communities where such facilities do not exist. These clinics have target areas, specifically those areas with the greatest restrictions on mobility and rural communities. Correspondingly these areas tend to be those with the highest levels of poverty and are more likely to be surrounded by settlements.[10]

The two organisations function differently and, as a volunteer present distinct challenges. Attending a PHR clinic can have logistical difficulties. I must travel a mere 8km to the meeting point in Jerusalem, yet navigating the "Separation Wall" has obvious access issues. What would be a 10 minute bus journey in Belfast can take over 1 hour, allowing for security checks though the "Beit Jala" checkpoint. PHR provide a clinic conducted solely by volunteers of Palestinian, Israeli and international backgrounds comprising physicians, nurses, allied health professionals, translators, pharmacists and alternative therapists. The variety of specialist physicians alters weekly. This group differs greatly from my colleagues at PMRS, a small cohort of 7 Palestinians (3 doctors, a nurse, a lab technician, a pharmacist, a driver) and myself. Our PHR delegation meet and travel in a convoy of 2 buses to the clinics. The director of the mobile clinic coordinates with local villages in need of health care and prioritises where the clinic will travel, attending a different town each week. More often than not, the clinics are based in the Northern regions of the West Bank as many towns here are completely isolated due to the "Separation Wall".

Figure 4. The author at a PHR mobile clinic in Azzun, Palestine.

PHR clinics are held within school buildings thus there are no formal examination areas and issues with privacy and

confidentiality ensue. Patient numbers are large and space a premium. As a result two physicians may be required to practice within the same room, sometimes even sharing a translator. PMRS differs inasmuch as the clinics attend the same villages each week but the communities they serve experience extreme levels of poverty (Figure 5). The clinics are located in structures which lack windows, doors, heating and water and there remains little by way of examination areas or privacy. As expected, services at both clinics are basic and whilst an ultrasound machine is available for gynaecological exams from a medical perspective it is considered exceptional if a urine dipstix or ECG machine is available. It has thus become necessary to travel with my own equipment where possible, particularly a blood pressure cuff and glucometer.

My role in both organisations involves working as a general internal physician or "Batini" in Arabic. Despite this I tend to review patients from a variety of other specialities, from orthopaedics to paediatrics. The clinic lasts 4-5 hours or until all the patients are seen. PMRS clinics, for many of the reasons listed above, regrettably do not have the same level of specialist physicians. Their clinics are comprised of one gynaecologist and two "general practitioners". These doctors, like many Palestinian doctors have completed a 1 year internship, equivalent of the Foundation Programme in the UK, however many have been unable to enter into Residency Programmes given the restrictions on work permits by Israel and the lack of such programmes in the West Bank. The lack of training afforded to my colleagues in PMRS has on occasion become evident. This is not the case with highly trained Israeli physicians and frequently I have felt that teaching sessions between the two groups would achieve a greater long term benefit for the Palestinian health care system than just "bridging the health gap" on a weekly basis.

Lack of health insurance is a barrier to healthcare for many. Patients attend clinics for serious ailments only to ascertain if the required investigations are either inaccessible or impractical from a financial perspective. As a physician I have learnt to streamline my investigations, doing only what is absolutely necessary, be that the most basic investigation or that with the greatest diagnostic yield. Given the issues with access to health care, some patients present in the later stages of their illness or with florid clinical signs. Regrettably I have seen children with significant chronic kidney disease, adults with disseminated cancers and have diagnosed conditions including acromegaly, ankylosing spondylitis and Behcet's disease.

Moreover, there is a limited selection of medications available for Palestinian patients compared with those living in Israel. Despite the high prevalence of type 2 diabetes, patients may only be treated with metformin or gliclazide prior to commencement of insulin. This is in stark contrast to myriad medications available in the UK. Whilst insulin is available, it is not free, which in turn creates obstacles when attempting to adequately treat patients. As such I have had to make alterations to my prescribing practices, suggesting herbal remedies such as ginger or cinnamon that have been proven to reduce blood glucose levels in conjunction with health education.[11,12] Familiarising myself with brand names and learning to simply make do with the available medications has been an additional challenge. I have become adept at converting between drug subtypes, be that a beta blocker or a steroid, ensuring an equivalent dosage to allow for ongoing administration when the patient's "brand" has no longer been available. A situation I have never found myself in before.

"Inshallah" is a phrase heard commonly at clinics, translated it means "God willing". At times, patients place their health "in God's hands" accepting the outcome as predetermined. This ultimately contributes to a fatalistic acceptance of disease and death. Nevertheless, there remains a belief that there is a tablet for all ills and a doctor may be deemed incompetent if a prescription is not administered.[13] In my time spent working here I have noted that a spectrum of preference exists with injections favoured over liquids or tablets, coloured pills preferred over uncoloured, and larger pills over smaller ones.[13] Unquestionably this has led to patients on excessive volumes of medications, high levels of antibiotic use and patients prescribed treatments with no proven merit.

Behavioural risk factors such as tobacco and argila smoking, unhealthy diets and physical inactivity contribute greatly to ill-health.[14] Non communicable diseases have significant prevalence in Palestine and formed the majority of my clinical work. In spite of the high levels of smoking however, the prevalence of patients with chronic obstructive pulmonary disease at mobile clinics has been low. Unfortunately, the same cannot be said for lung cancer, particularly in male patients. Amongst many of the patients I have met, smoking is considered part of manhood and a symbol of generosity.[15] As a rite of passage, a father often gives their son their first cigarette, from age 11. Equally, I have been offered cigarettes as a gesture of thanks at clinics. Arab culture does not support the idea that many practices deemed 'risky' by the West have any bearing on health outcomes.[15] Consequently, such cultural views mean the concepts of preventative medicine, health education and health promotion are non-existent in Palestine.

Figure 5. A PMRS clinic facility in an impoverished town on the outskirts of Bethlehem.

In fact, the first campaign of its kind entitled POSIT has only been planned for 2015, comprising a "bottom up approach" aimed at education of patients through primary health care and reinforced by widespread media coverage, although I remain dubious about the impact this will have in Palestine.[16]

The ongoing conflict, high levels of violence and a continued threat to people's safety has, understandably, resulted in high levels of psychological stress.[17,18] That being said, when patients present at clinics they report their symptoms in terms of physical complaints rather than emotional or psychological symptoms. Adults frequently report generalised weakness, headache or palpitations whilst children have high rates of insomnia, bedwetting and night terrors. Moreover I have witnessed increased levels of disorders where one would identify "stress" as a risk factor, namely irritable bowel syndrome, migraine and gastritis. It has been suggested that in Arab culture, mental health problems are seen to be a punishment from God or an evil spirit from the devil.[15] Patients are reluctant to openly discuss symptoms deemed to be psychological in nature, to accept psychiatric medication or seek formal psychiatric help due to the stigma associated with such a diagnosis. Families tend to conceal the fact that a member has a psychiatric illness for fear, amongst other things, that their daughters' prospects for marriage will be jeopardised.[15] The social stigma of mental health was most evident to me when the PMRS provided a clinic in an elderly care facility. I was astounded to find that patients with mental health problems, specifically schizophrenia, and elderly patients were nursed alongside each other. Of great concern is the fact that staff receive no training in the care of psychiatric patients and were expected to tend to patients whose ages ranged from 28 to 103.

Practicing medicine in Palestine has provided an invaluable opportunity to learn about medicine and healthcare in another culture. I faced challenges relating to cultural matters I previously had no experience with, most notably during Ramadan. Aside from having to alter my prescribing to accommodate periods of fasting, the prolonged duration of fasts created a specific set of presenting complaints, namely duodenal ulcers, duodenitis and syncope. I have been fascinated by the impact culture has, not only on a patient's perception of health but in contributing towards ill health. Vitamin D deficiency is prominent in the female population, attributed to wearing of the hijab.[19] Moreover the prevalence of congenital heart disease is above the UK average, related to the sizeable prevalence of consanguinity in the region.[20] Poverty in Palestine is extreme, both in terms of the widespread nature of the problem and the levels of social deprivation people endure. I found this to be extremely upsetting. Many women and children present to the clinics thin and malnourished with deficiencies in B12, folate and iron due to their inadequate diets or conflictingly, present with obesity and nutrient deficiencies as food which is cheap is unfortunately higher in fat.

Working as an outsider, particularly as a female in a patriarchal culture, has been problematic on occasion. To work effectively in the rural communities required a level of trust to be established between myself and the patients. This required me to act as an observer to the local Palestinian doctors during my first PMRS clinics, allowing time for patients to become accustomed to my presence. Nonetheless occasionally men would not allow me to examine them physically due to their cultural beliefs; a challenging situation that necessitated alternatives to be carefully and sensitively negotiated so as to please all parties. I can think of one example when the patient was examined fully clothed whilst my male interpreter placed the stethoscope. On the other hand, some of my new habits generated as a result of my time here are more amusing, like my caffeine addiction. Coffee is used as a way to do business, to chat and as a sign of hospitality.[21] Coffee was provided frequently during clinics by grateful patients as a gesture of thanks and participating in these coffee drinking rituals helped generate rapport. Similarly the use of a little arabic, even if horribly mispronounced was helpful in creating trust, putting a patient at ease and bridging the inevitable gap created through a translator.

Working with the mobile clinics in Palestine has been a privilege and an insightful experience both culturally and emotionally. The process has at times been difficult and often I felt the clinics to be an emotional rollercoaster. Feelings of immense frustration at being unable to contribute enough are all too familiar. The resilience of the Palestinian doctors working in such challenging circumstances has been truly humbling, and it is clear that ultimately the main challenge to the sustainability and long term improvement of the Palestinian health system is the ongoing conflict.

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Clinical Paper

Radiographer Delivered Fluoroscopy Reduces Radiation Exposure During Endoscopic Urological Procedures

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ABSTRACT

Introduction: The 1999 Ionising Radiation Regulations recommend that medical professionals using ionising radiation should aim to keep exposure as 'low as reasonably practicable'. Urologists regularly use fluoroscopy during endoscopic surgical procedures. In some institutions, this is delivered by a radiographer whereas in others, it is delivered by the urological surgeon.

Objectives: To determine if radiographer-delivered fluoroscopy can reduce the exposure to ionising radiation during urological procedures.

Methods: An analysis of 395 consecutive patients, who underwent endoscopic urological procedures requiring fluoroscopy, was performed simultaneously across two institutions, over a 4 month period. 321 patients were matched and included in the analysis.

Results: Radiographer delivered fluoroscopy was associated with reduced ionising radiation exposure for retrograde pyelography procedures ED 0.09626 vs. 1.323 mSev, p= 0.0003, and endoscopic stone surgeries ED 0.3066 Vs. 0.5416 mSev, p=0.0039, but not for ureterorenoscopic stone surgeries 0.4880 vs. 0.2213 mSev, p=0.8292.

Conclusion: Radiographer delivered fluoroscopy could reduce the patient's exposure to ionising radiation for some urological procedures.

Keywords: Urology, endoscopic surgery, radiation exposure, ionising radiation

INTRODUCTION

Endourology is a branch of urology that specialises in the minimally invasive telescopic inspection of the urinary tract.[1] This is a subspecialty that has evolved thanks in part to fluoroscopy, which allows real-time imaging during procedures such as nephrostomy insertion, retrograde ureteropyelography, flexible ureterorenoscopy (FURS) and percutaneous nephrolithotomy (PCNL). Fluoroscopy is thought to deliver lower doses of radiation in comparison to conventional radiography, however the duration and complexity of the procedure all have an impact on the overall effective radiation dose.[2] Fluoroscopy utilises ionising radiation,[3] and it is believed that exposure to large quantities of ionising radiation can create DNA-damaging free radicals, making it a potent carcinogen.[4-7]

The use of fluoroscopy is essential to urological practice and as such, adherence to legislation and best practice guidelines is crucial to maintain staff and patient safety. UK legislation on radiation protection dictates that radiation exposure should be kept to the 'low as reasonably achievable' (ALARA) principle.[8] The International Committee for Radiation Protection (ICRP) believe that not enough is being done to minimise ionising radiation doses.[9-10] It is recommended to use pulsed rather than continuous fluoroscopy wherever possible, to keep a careful record of all exposure times and ensuring the field of view is minimised in order to reduce exposure time and effective dose.[2] Thus far, research has been concentrated on staff protection but more consideration must be given to the effective dose of radiation supplied to the patient.

Current practice in urology differs, with some institutions requiring a radiographer to administer fluoroscopy and others allowing the urological surgeon to use fluoroscopy as necessary. Radiographers have been found to deliver consistently low exposure times and effective radiation doses, equivalent to, and sometimes less than those of senior radiologists, perhaps due to a systematic approach more adherent to procedure and increased familiarity with the equipment.[11-12] The aim of this study was to determine if radiographer-delivered fluoroscopy could reduce ionising radiation exposure to the patient during urological procedures, by comparing the effective radiation dose with that of urologist delivered fluoroscopy.

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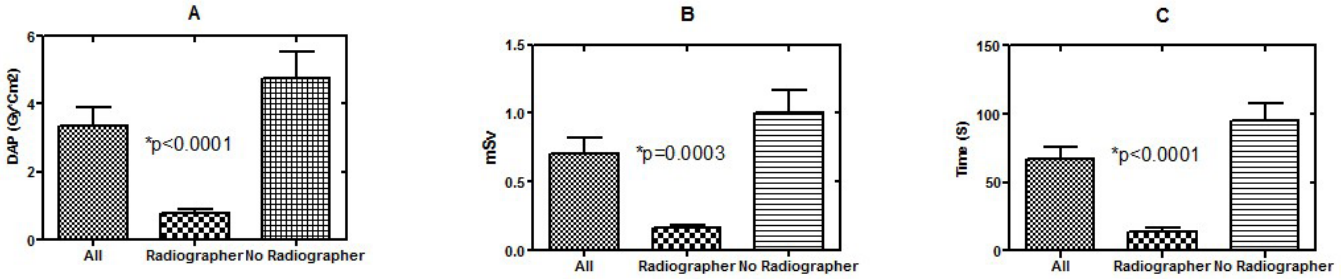

Fig 1. The use of a radiographer significantly reduced DAP (A), ED (B) and exposure time (C) for all retrograde pyelography procedures requiring fluoroscopy.

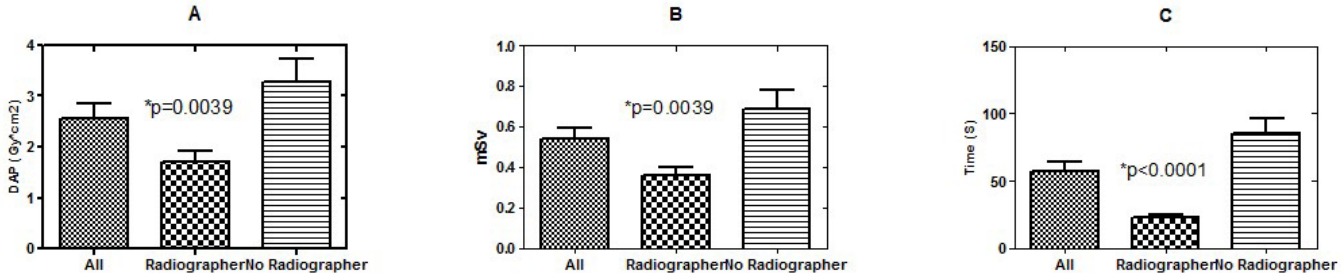

Fig 2. The use of a radiographer significantly reduced DAP (A), ED (B) and exposure time (C) for all ureteroscopic stone procedures requiring fluoroscopy.

METHODS

A prospective analysis of consecutive patients requiring fluoroscopy during endoscopic urological procedures was undertaken in two institutions over a 4 month period. Procedures included in this study were retrograde pyelography and stent placement procedures, semi-rigid ureteroscopic stone surgery and flexible ureterorenoscopic (FURS) procedures, for both therapeutic and diagnostic purposes. All procedures were carried out by either a consultant urologist or a senior urology trainee under consultant supervision.

Data was collected on 395 consecutive patients from both institutions [208 patients from Craigavon Hospital (CAH), 187 from the Causeway Hospital (CWH)]. Recorded data included: procedure type, indication, radiation exposure (cGy*cm^2, and fluoroscopy time in seconds. Both institutions used similar fluoroscopy machines Ziehm Vision, (Ziehm Imaging GmbH). Fluoroscopy was delivered by a radiographer in CAH, whereas in CWH radiation was delivered by a surgeon.

In the data analysis, cGy*cm^2 was converted to Gy*cm^2 to determine the dose area product (DAP). The effective dose (ED), measured in *millisievert* (mSev) was determined from the DAP by the Monte Carlo conversion.[13] Unless otherwise stated, data is represented as median (interquartile range: IQR) and N represents the number of patients included in the analysis. Differences in distribution of clinical data and the development of a SSI were evaluated using non-parametric t test. All calculations were done using Prism version 5.0 (GraphPad Software, Inc., La Jolla, CA).

RESULTS

Procedure selection

A total of 395 consecutive patients from both institutions were analysed and matched according to procedure, difficulty and delivery of radiation (radiographer vs. no radiographer). 74 procedures were excluded from the study because there was no corresponding match, specifically nephrostomy insertion and PCNL procedures. 321 patients were matched and included in this analysis (119 from CAH and 184 from CWH). Procedures included 79 retrograde pyelography and stent placements (28 CAH, 51 CWH), 100 ureteroscopic stone surgeries (45 CAH, 55 CWH) and 142 FURS procedures (61 CAH, 81 CWH).

Retrograde pyelography procedures

The median DAP for all retrograde procedures was 1.276 (0.4400 - 4.669) Gy*cm^2, the ED was 0.9805 (0.0924 - 0.9805) mSev and the median exposure time was 24.00 (7.0 - 126.0) seconds. Radiographer-delivered fluoroscopy produced a median DAP of 0.4584 (0.3850 - 1.247) Gy*cm^2, the ED was 0.09626 (0.08085 - 0.2619) mSev and the exposure time was 8.5 (4.0 - 22.5) seconds. When fluoroscopy was used by the surgeon, the DAP was 3.320 (0.8100 - 6.299) Gy*cm^2, the ED was 1.323 (0.6972 - 1.323) mSev and the exposure time was 54.00 (14.00 - 149.0) seconds. Radiographers significantly reduced the DAP 0.4584 Vs. 3.320 Gy*cm^2, p< 0.0001, the ED 0.09626 vs. 1.323 mSev, p= 0.0003 and the exposure time 8.5 vs. 54 seconds, p < 0.0001. (Figure 1)

Ureteroscopic stone treatment procedures

The median DAP for all ureteroscopic procedures was 2.040 (0.8265 - 3.222) Gy*cm^2, the ED was 0.4284 (0.1736 - 0.6767) mSev and the median exposure time was 32.5 (17.0 - 62.5) seconds. Radiographer-delivered fluoroscopy produced a median DAP of 1.460 (0.3180 - 2.675) Gy*cm^2, the ED

was 0.3066 (0.06678- 0.5618) mSev and the exposure time was 19.00 (14.00 - 28.50) seconds. When fluoroscopy was delivered by the surgeon, the DAP was 2.579 (1.248 - 4.049) Gy*cm^2, the ED was 0.5416 (0.2621 - 0.8503) mSev and the exposure time was 52.0 (32.0 - 129.0) seconds. Radiographers significantly reduced the DAP 1.460 Vs. 2.579 Gy*cm^2, p= 0.0039, the ED 0.3066 Vs. 0.5416 mSev, p=0.0039 and the exposure time 19.0 vs. 52.00 seconds, p < 0.0001. (Figure 2)

FURS procedures

The median DAP for all FURS procedures was 2.385 (1.054 - 4.380) Gy*cm^2, the ED was 0.5171 (0.2213 - 0.9314) mSev and the median exposure time was 59.0 (31.75 - 98.25) seconds. The median DAP for diagnostic FURS procedures was 1.585 (0.5520 - 2.690) Gy*cm^2, the ED is 0.3330 (0.1159 - 0.5649) mSev and the median exposure time was 52.00 (28.50 - 105.0) seconds. (Figure 3)

Radiographer-delivered fluoroscopy for diagnostic FURS, produce a median DAP of 2.324 (0.9780 - 3.060) Gy*cm^2, the ED was 0.4880 (0.2054 - 0.6426) mSev and the exposure time was 32.00 (23.50 - 81.51) seconds. When fluoroscopy was delivered by the surgeon, the DAP was 1.054 (0.4862 - 2.099) Gy*cm^2, the ED was 0.2213 (0.1021 - 0.4408) mSev and the exposure time was 75.00 (36.00 - 123.0) seconds. Radiographers did not reduce the DAP 2.324 vs. 1.054 Gy*cm^2, p= 0.8292, the ED 0.4880 vs. 0.2213 mSev, p=0.8292. However the exposure time was reduced time 32.0 vs. 75.00 seconds, p=0.0297. (Figure 4)

Radiographer-delivered fluoroscopy for therapeutic FURS produced similar findings. The median DAP was 3.570 (1.778 - 5.658) Gy*cm^2, the ED was 0.7497 (0.3733-1.188) mSev and the exposure time was 56.50 (26.75 -75.50) seconds. When fluoroscopy was delivered by the surgeon, the DAP was 2.728 (1.616 - 6.245) Gy*cm^2, the ED was 0.5729 (0.3393-1.311) mSev and the exposure time was 64.00 (49.50 - 141.0) seconds. Radiographers did not significantly reduced the DAP 3.570 Vs. 2.728 Gy*cm^2, p=0.2156, the ED 0.7497 vs. 0.5729 mSev, p=0.2156 and the exposure time 56.50 vs. 64.0 seconds, p=0.0003. (Figure 5)

DISCUSSION

Endourological procedures, such as diagnostic retrograde pyelography, semi-rigid ureteroscopy, FURS and PCNL, are heavily reliant on the use of ionising radiation through fluoroscopy. The Society of Radiographers state, that "radiation protection principles and UK legislation is the responsibility of all professionals working with radiation".[13-14] We compared two departments utilising different methods of ionising radiation delivery, with the view that radiographer-delivered fluoroscopy could deliver a lower effective radiation dose to the patient.

Dose area product (DAP) and effective doses (ED) are variable depending on procedure type and difficulty, however the International Atomic Energy Agency, have compiled data recommending safe effective doses for a variety of procedures across specialties.[15] This has recommended mean doses of 1.3mSv for both semi-rigid and flexible ureterorenoscopic laser lithotripsy procedures and 4.7mSv for ureteric stent placement. Overall, our effective doses compare favourably, with doses far lower than the accepted averages across all procedure types irrelevant of fluoroscopy delivery method. This was particularly apparent in retrograde pyelography and ureteric stent procedures where the average effective radiation dose was only 0.9mSv. This difference could be explained by the use of modern digital fluoroscopic machines, as well as the

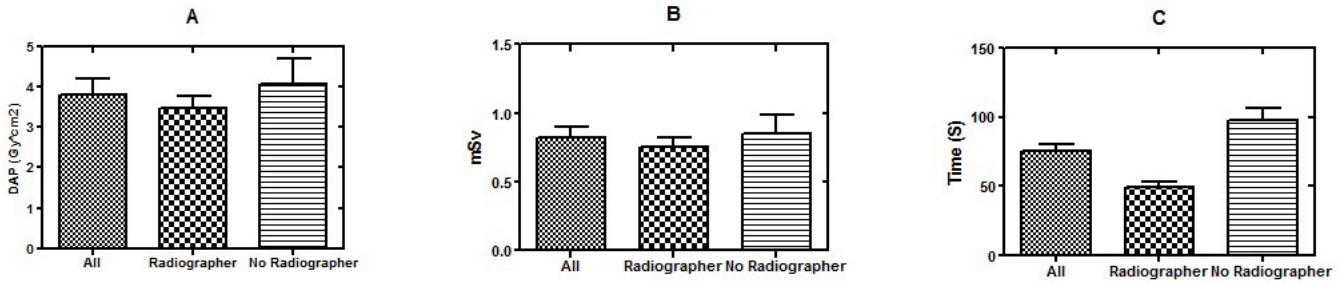

Fig 3. DAP (A), ED (B) and exposure time (C) for all FURS procedures.

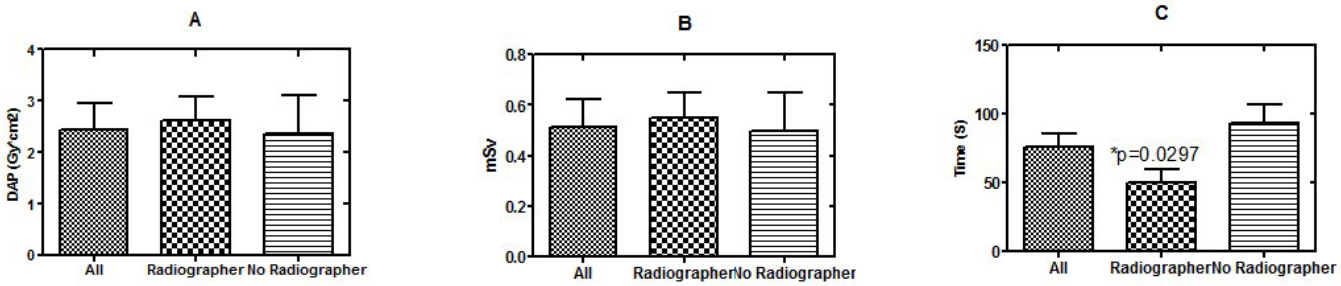

Fig 4. Radiographers did not reduce the DAP, the ED 0.4880 for FURS procedures. However the exposure time was reduced time, p=0.0297.

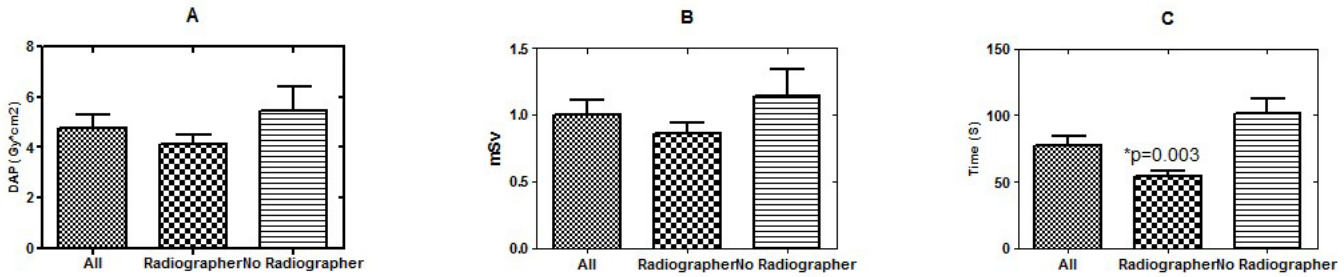

Fig 5. Radiographers did not reduce the DAP, the ED for FURS stones procedures. However the exposure time was reduced time, p=0.003.

use of a number of optimisation techniques designed to reduce ED, such as limiting radiation scatter with a scatter grid, beam collimation, using pulsed rather than continuous fluoroscopy and reducing the area of the radiation field [16]

Direct comparison of radiographer-delivered fluoroscopy (CAH) to urologist-delivered fluoroscopy (CWH) has produced variable results. Retrograde pyelography with ureteric stent and all semi-rigid ureteroscopy (URS) procedures demonstrated a significant difference between the two methods. Radiographer-delivered fluoroscopy has produced significantly lower DAP, ED and exposure time for both procedures. Very low effective radiation doses of 0.09mSv for retrograde pyelography and 0.3mSv for semi-rigid URS were recorded, which compared with 1.3mSv and 1.5mSv of urologist delivered radiation is a significant finding. There could be a number of possible reasons why radiographers are performing better. Radiographers receive formal qualifications in the delivery of ionising radiation, and may have a greater awareness of adherence to the 'ALARA' principle than doctors. Radiographers have been found to use less ionising radiation than some consultant radiologists, when performing complex procedures requiring fluoroscopy.[11,12] They use fluoroscopy routinely, providing a greater familiarity with and knowledge of the equipment.

The results for FURS (flexible ureterorenoscopy) did not demonstrate that radiographers significantly reduced the ED. There is no IAEA recommended mean ED for FURS, but it is expected that radiation dose would be higher. This is because FURS predominantly focuses on fluoroscopy in the vicinity of the kidneys, which have variable anatomical positions and move with respiration, making appropriate positioning more difficult for a radiographer less familiar with anatomy than a surgeon.

The urologist-delivered ED for both diagnostic and therapeutic FURS was lower, recording doses of 0.22mSv and 0.57mSv respectively. Overall exposure time, however were higher, measuring 75secs compared to 32secs for diagnostic, and 64secs compared to 56secs for therapeutic. This lack of correlation between ED and exposure time may be explained by Peach et al, who propose that doctors can better position the patient anatomically than radiographers, enabling short spells of continuous fluoroscopy, rather than repeated fluoroscopy from multiple incorrectly positioned attempts.[17]

Consideration must be given to the skill of the urologist delivering radiation. Interventional radiologist or 'operator controlled' fluoroscopy during complex vascular procedures, has been found to use a reduced effective dose in comparison to radiographers, concluding that the better quality imaging equipment and experience of the consultant interventional radiologist were the reason for this.[17] This concept of increased familiarity with fluoroscopy equipment may be relevant to reduce effective radiation doses further, one study in particular found that over a two year period, exposure time for semi-rigid ureteroscopy fell by 78% for one operating surgeon as they became more familiar with the procedure.[18]

CONCLUSION

This research has suggested that radiographer-delivered fluoroscopy could reduce the effective radiation dose delivered to patients undergoing certain endourological procedures. We believe this is due to greater knowledge and experience, increased familiarity with fluoroscopic equipment and better knowledge of optimisation techniques. Urologists delivering fluoroscopy should have a greater consideration of the radiation doses they are administering and take steps to reduce it, particularly for retrograde pyelography and semi-rigid URS. Everyone involved in the administration of ionising radiation should adhere to the 'ALARA' principle, even if operative radiation doses are already lower than IAEA recommended levels.

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Clinical Paper

A Novel Mental Health Crisis Service – Outcomes of Inpatient Data

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ABSTRACT

Introduction Northern Ireland has high mental health needs and a rising suicide rate. Our area has suffered a 32% reduction of inpatient beds consistent with the national drive towards community based treatment. Taking these factors into account, a new Mental Health Crisis Service was developed incorporating a high fidelity Crisis Response Home Treatment Team (CRHTT), Acute Day Care facility and two inpatient wards. The aim was to provide alternatives to inpatient admission. The new service would facilitate transition between inpatient and community care while decreasing bed occupancy and increasing treatment in the community.

Methods All services and processes were reviewed to assess deficiencies in current care. There was extensive consultation with internal and external stakeholders and process mapping using the COBRAs framework as a basis for the service improvement model. The project team set the service criteria and reviewed progress.

Results In the original service model, the average inpatient occupancy rate was 106.6%, admission rate was 48 patients per month and total length of stay was 23.4 days. After introducing the inpatient consultant hospital model, the average occupancy rate decreased to 90%, admissions to 43 per month and total length of stay to 22 days. The results further decreased to 83% occupancy, 32 admissions per month and total length of stay 12 days after CRHTT initiation.

Discussion The Crisis Service is still being evaluated but currently the model has provided safe alternatives to inpatient care. Involvement with patients, carers and all multidisciplinary teams is maximised to improve the quality and safety of care. Innovative ideas including structured weekly timetable and regular interface meetings have improved communication and allowed additional time for patient care.

INTRODUCTION

Background

Within mental health there have been radical shifts of service provision with a move of acute psychiatry away from inpatient care to the community. This links with the recommendations in the Bamford Review[1] and Transforming your Care – Compton Report[2].

Our team needed to introduce a new optimised service for people with mental health problems in our catchment area 24 hours a day, 7 days per week (24/7). Our aim was to provide alternatives to inpatient admission. There was over occupancy of acute psychiatric inpatient beds and this required change due to a move to a new unit with 30 beds compared to 44 (Figure 1). The NHS spends more on mental health than any other area of healthcare.[3] In comparison to the UK average, mental health needs in Northern Ireland are 25% higher.[4] At the time of establishing our new service, the suicide rate in Northern Ireland was increasing in contrast to England, Wales and Scotland.[5]

Our objectives were:

To establish a 24/7 Mental Health Crisis Service incorporating inpatient beds, a high fidelity model Crisis Response Home Treatment Team (CRHTT) and Acute Day Care (ADC) facilities.

To develop a single point of co-ordinated access to secondary mental health services and thirdly to enhance safe alternatives to hospital admission. The communication across all interfaces was improved by the introduction of a Hospital Consultant model, Hospital Team and structured weekly timetable.

Incorporating the three elements of crisis care in one team is novel. The purpose of this paper is to describe aspects of this new service. We used ongoing audit and Plan, Do, Study,

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Act (PDSA) cycles to monitor the service development. We describe our findings.

Our previous service model

The Western Health and Social Care Trust provides care across five council areas in Northern Ireland. The Trust is divided into Northern and Southern sectors due to the large geographical area with two inpatient facilities. The Northern Sector inpatient unit previously had 5 Consultant Psychiatrists and Community Mental Health teams interfacing with the hospital, leading to 22+ ward rounds per week. There was no dedicated "hospital team." Sector based teams were working independently, liaising and referring to other services when required.

The referral process to secondary care mental health services in a crisis was via General Practitioner (GP), Out of Hours General Practitioner (OOH GP) or Accident and Emergency Department. A psychiatrist or practitioner on call would assess the patient and determine the management plan, referring onto inpatient ward or other service as necessary. There was a Home Treatment Team 09.00-21.00 7 days per week and ADC service 09.00-17.00 5 days per week. Their main focus was providing additional resources and support to the community teams.

New service model

Fig 1. Grangewood Crisis Service Unit

The new service model was a 24/7 Mental Health Crisis Service incorporating inpatient beds, CRHTT and ADC facilities. The CRHTT underakes crisis assessments, "gate-keeps" the inpatient beds and collaboratively establishes management plans.

The Crisis Resolution aspect of the team aims to enhance patient's skills and improve future resilience. The functions of the CRHTT includes increasing support, short term prescribing of medications, frequent review until crisis abates and then timely discharge on completion. The Home Treatment aim is to replicate hospital care within the patient's own home. During assessment of history and mental state, priority is given to management of risk and level of containment required. Physical examination, investigations, medication initiation and review, therapeutic intervention, monitoring of progress and carer support is provided.

ADC facility supports the assessment and management of patients within the Crisis Service. Inpatients and outpatients can be observed in a wide variety of settings. The service combines close monitoring with a less restrictive environment. Interventions including structured activity, psychoeducation, skills training and sign posting to community services are offered.

There is flexibility and a smooth transition when moving within different aspects of the Crisis Service. Step down from hospital supporting discharge and additional support and respite for carers can be facilitated. The service is multi-modal and multidisciplinary. The medical staff is consistent during the crisis period; inpatient, CRHTT and ADC phases.

EVIDENCE BASE

There are a range of heterogeneous mental health crisis services described in the literature. The evidence base for successful models is relatively sparse. When reviewing the evidence, we could not find any service with the same structure as our integrated inpatient, CRHTT and ADC model. Most of the literature considers separate ADC, CRHTT and assertive outreach teams as alternatives to inpatient admission. This heterogeneity has made it difficult to make comparison with our own model. There was no evidence base related specifically to Northern Ireland.

Some studies found a decrease in the number of hospital admissions in the months following crisis interventions ranging from 8-51%.[6,7,8] Others found a reduction in admissions but increased bed occupancy or length of stay[7,9] In contrast, there is some evidence that CRHTT has no impact on admission rates or length of stay.[10,11] Several studies recommended combining crisis models to form integrated centres such as our model.[12]

METHODS

Review of current service and process to new Crisis Service

Inpatient services, community services and processes within were reviewed to identify any deficiencies in current care. The inconsistent approach towards admission and discharge of patients across five different mental health teams, was identified as a major issue.

Inpatient over-occupancy, multiple ward rounds and care planning meetings led to inefficiency. Nurses were unable to spend as much time engaging patients in therapeutic interventions as they wished. This led to development of a weekly timetable incorporating two ward round sessions.

Stake holders were identified including service users, carers, directorate, staff, specialist and non-specialist teams. There was an extensive consultation process with all teams. Other Trusts' systems in Northern Ireland and the UK were reviewed. We considered what changes could improve services along with weaknesses to be eradicated.

Process mapping was used to chart the patient's journey. The number of steps in the process, time frames and impact of bottle neck areas highlighted delays. Benefits and problems for patients and staff were outlined.

The COBRAs (Cost, Opportunity, Benefits, Risk, Analysis for satisfaction) framework was used as a basis for the service improvement model. This included situational analysis, assessing change required, scope of the service improvement, format and where it should start.

The Crisis Service operational policy set the service criteria. The standards for the new service were taken from the Royal College of Psychiatrists Occasional paper.[13] The bed occupancy rate should be 85% or less and the ward size a maximum of 18 beds. The service development was reassessed initially weekly then fortnightly. There were regular meetings with community services to develop the service.

Introduction of new systems

The Crisis Service introduced new management structures, a medical staffing model and a structured weekly timetable. A Crisis Service manager, CRHTT and ADC manager and Inpatient manager were appointed. There are currently 2 Consultant Psychiatrists each with a middle grade / senior trainee and junior trainee covering two geographical sectors each.

The Crisis Service has a weekly interface meeting which all community mental health teams attend. Each patient is discussed and this then informs the management plan. Attendance allows important patient and risk assessment information to be shared throughout all involved teams.

Patients are categorised into a traffic light system. Red indicates acute status, amber for ongoing care and green for discharge planning. Red and green inpatients are reviewed at the main ward round and amber inpatients at the review ward round. Each Consultant has two inpatient ward round sessions per week (one main and one review). A ward round timetable is provided to all hospital and community teams enabling the keyworker to attend for their patient. CRHTT and ADC staff attend the ward rounds to enhance communication and facilitate early discharge.

The traffic light system extends into CRHTT and ADC encouraging consistency. A weekly ward round for patients in CRHTT and ADC assesses progress, allows changes to management plans and timing of medical review. The weekly timetable facilitates the multidisciplinary approach and allows more time to be spent on therapeutic interventions and staff training.

RESULTS OF ASSESSMENT / MEASUREMENT

The data was collected on a monthly basis and evaluated from January 2012. Prior to the initial service change in May 2012, the average inpatient bed occupancy rate was 106.6% The average number of inpatient admissions was 48 per month. The average length of stay was 23.4 days. The number of occupied bed days taking into account number of beds available, number of available bed days and occupancy rate averaged 1298 per month during this period. (1/1/12-31/5/12)

After the deployment of dedicated Crisis Service Consultant Psychiatrists, the average occupancy rate decreased to 90%, number of admissions per month to 43.3, length of stay to 22 days and occupied bed days 1007. (1/6/12-30/9/12)

The introduction of a high fidelity CRHTT 9-5pm 5 days per week commenced on 1/10/2012. The bed occupancy rate average decreased to 82.7%, number of admissions to 32 per month, length of stay decreased to 12 days at this stage and occupied bed days to 779.3. (1/10/12-1/1/13)

The introduction of 24/7 CRHTT began on 07/01/2013. The averages for inpatient bed occupancy rate fell to 63%, admissions per month 35.6, length of stay at this time was 18 days and occupied bed days 563.3 (1/1/13-31/3/13).

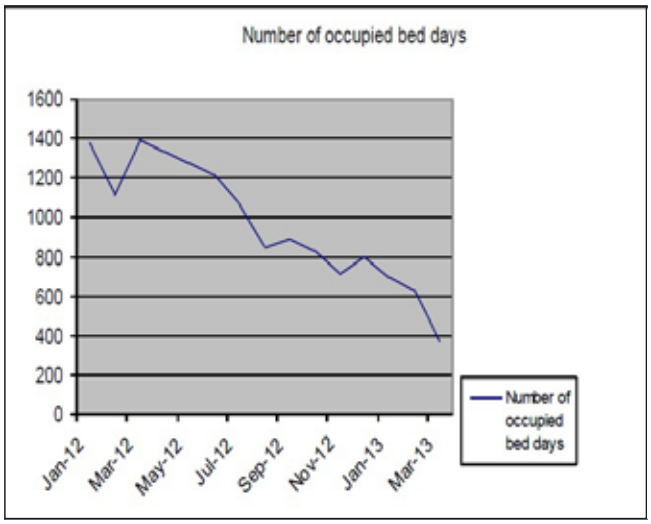

Fig 2. Graphical representation of the number of inpatient occupied bed days between January 2012 and March 2013.

481 assessments were performed by the new Crisis Service from 01/10/2012 to 31/03/2013. 177 assessments in first three months of CRHTT 9-5pm 5 days per week and 304 (63.2%) when performing assessments 24/7. This averaged 3.7 assessments per day since going 24/7. The outcomes of the assessments are shown in Table 1 below.

TABLE 1.
Outcome following Crisis Assessment by CRHTT

Lead role in care	CRHTT /ADC	Inpatient	CMHT	GP	Addictions	Other
Percentage (%)	55.1	15.8	11.4	12.5	4	1.2

Feedback from patients and staff

Seven experience questionnaires in the inpatient unit were obtained from patients. The feedback was positive in all seven submitted with one commenting on the *"huge advances.. made to the system as a whole"* and that the *"support received was tapered of (sic) very well and not ended abruptly."*

Staff focus groups were set up to encourage anonymised constructive critique. The feedback from these groups highlighted both positive and negative responses. A sample of the recorded quotes are as follows.

"All that has led to better patient centred care for the patients from their admission right through to discharge"
"There are so many good positive aspects of it - compared to old when you had 5 ward rounds and 5 consultants and things could be very chaotic. All those things have improved for the better for patient centred care."
"From a time factor point of view, with ward rounds going on every day, they had been going on until late afternoon. Now, they are focussed. They are time-scaled and there is time, extra time for nursing staff to prioritise their times with their own client groups."
"There has been a lot of change for us, there's been so much change in the past couple of years. There was a bit of resistance…But I think everybody has adapted really well and the change has been positive. You'd never want to go backwards now, this is far more productive."

DISCUSSION

Alternatives to inpatient care are the focus of government strategies with a shift from hospital to community care. Our objective was to establish a 24/7 Crisis Service which uniquely combined inpatient, CRHTT and ADC services. The results have shown improvement and an overall achievement of targets set. Presently, it is felt the achievements have justified this service transformation but the change hasn't been without criticism.

The large scale of the project required a transition period and phased approach. This led to frequent changes within the system which could have been difficult to manage.

Simplifying the process for referral to mental health services in a crisis to a single point of access can improve accessibility, safety and quality. The aim is to strengthen patient and staff autonomy and links with the community. However, there could be a perceived lack of autonomy around the crisis service gatekeeping and this may have led to some staff feeling undervalued and their skills unrecognised.

The combination of inpatient, CRHTT and ADC into one team was innovative and led to improved consistency for patients and faster transition to the community. Average bed occupancy, number of admissions, length of stay and number of bed days all decreased with the initial change.

Further improvements in all outcomes were found with the initiation and extension of the CRHTT. Our results suggest that the introduction of a CRHTT has a positive impact although, direct comparison is difficult as no other service has integrated inpatient, CRHTT and ADC facilities.

Many of the patients (55.1%), who may have been previously admitted to an inpatient ward, were managed in the community but within acute care services. The majority of patients were initially managed within the Crisis Service (70.9%) This could suggest appropriate referrals to the service, a high acceptance rate or both.

A 24/7 service meant there was always an experienced professional to assess patients and establish a management plan. Previously, assessment was by a junior trainee doctor, telephone consultation or direct admission. Concerns have been raised by the Royal College about trainees losing acute assessment experience. Trainees could attend assessments with CRHTT professionals to develop their skills in this area.

Of note, there is currently no dedicated psychologist or pharmacist. These could be viewed as major gaps in the multidisciplinary team.

At the interface meeting, all teams are present improving communication. The time required for staff to attend Crisis Service meetings and ward rounds is acknowledged and teleconferencing may be helpful in the future.

Patients referred and their families can make informed choices with staff about their options in a crisis when safe to do so. They may be discharged earlier from inpatient care providing more of a "recovery approach" to their care. This moves away from paternalistic management.

The most complex issue encountered is the culture change required. Changed processes, boundaries, relationships and interfaces have been encountered. Potential negatives have been considered, such as staff 'burn out' and deskilling due to subspecialisation. Ideas to counteract problems have included rotation within posts, additional training and increased supervision.

We will continue to review the objective outcome measures but also plan to evaluate subjective measures such as satisfaction surveys, patient questionnaires and data from focus groups. Longer term adverse outcomes such as serious adverse incidents, untoward incidents and patient suicides should be looked at to ensure patient safety. Staffing measures such as sickness levels, transfer requests and staff complaints could provide more information on the impact on staff.

Overall, since implementing the new Crisis Service the standards set by the Royal College of Psychiatrists have been met. There is an appropriate inpatient occupancy rate with a large proportion of care being provided in the community. The inpatient occupancy rate, total number of admissions and total length of stay have all decreased. Patients benefit from increased personal time with staff and consistent meetings with the multidisciplinary team. We recommend this model to those wishing to consider alternatives to inpatient management.

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Clinical Paper

High Risk Aortic Valve Replacement – The Challenges of Multiple Treatment Strategies with an Evolving Technology

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ABSTRACT

Objectives Deciding on the optimal treatment strategy for high risk aortic valve replacement is challenging. Transcatheter Aortic Valve implantation (TAVI) has been available in our centre as an alternative treatment modality for patients since 2008. We present our early experience of TAVI and SAVR (surgical Aortic Valve Replacement) in high risk patients who required SAVR because TAVI could not be performed.

Methods The database for Surgical aortic valve and Transcatheter aortic valve replacement referrals was interrogated to identify relevant patients.

Results Survival to hospital discharge was 95.5% in the forty five patients who had SAVR when TAVI was deemed technically unsuitable. One year survival was 86%.

Conclusion Defining who is appropriate for TAVI or high risk SAVR is challenging and multidisciplinary team discussion has never been more prudent in this field of evolving technology with ever decreasing risks of surgery. The introduction of TAVI at our institution has seen a rise in our surgical caseload by approximately by 25%. Overall, the option of aortic valve intervention is being offered to more patients in general which is a substantial benefit in the treatment of aortic valve disease.

Key Words: Transcatheter Aortic Valve Implantation (TAVI), Conventional Aortic Valve Replacement (AVR), High risk conventional Aortic Valve Replacement

INTRODUCTION

Transcatheter aortic valve replacement (TAVI) in humans was first described by Cribier et al.[1] Since then it has undergone a rapid technical evolution with promising results.[2-3] TAVI now offers an alternative to surgical aortic valve replacement (SAVR) when surgery is deemed high risk.[4] Considering aortic stenosis (AS) is more common in the elderly and those with cardiovascular risk factors and co-morbidities, surgical intervention is always going to be at a slightly higher risk of complication.[1,5] Despite the grave prognosis for patients with severe symptomatic AS not undergoing aortic valve replacement, the Euro Heart Survey found 33% of elderly patients did not have intervention due to this higher risk.[6,7] The Placement of Aortic Transcatheter Valves (PARTNER) trial demonstrated improved outcomes for patients with severe aortic stenosis randomised to TAVI or best medical care. This decreased mortality and increased functional capacity with good hemodynamic performance at 1- and 2-year clinical follow-up. 3 year results continue to show improved mortality with overall survival of 50% at three years.[8]

SAVR is still the gold standard in valve replacement in terms of haemodynamics. Post procedural complications such as aortic regurgitation, stroke, acute kidney injury, and vascular complications were seen in the PARTNER trial for TAVI. Residual para-valvular regurgitation after TAVI can lead to worsening left ventricular function and survival for patients. Cardiac causes were identified for 63% of all deaths at the three year follow up in the PARTNER trial. The optimal treatment strategy must be individualized when planning TAVI versus SAVR.

Crossover between the two interventions does occur and even in the PARTNER trial, crossover between medical treatment and TAVI was noted. D'Onofrio et al have shown that the development of TAVI caused an increase in the preoperative risk profile of patients scheduled for *all* aortic valve procedures without increasing hospital mortality.[9] Crossover between the two interventions occurs naturally as some patients decompensate and have their heart failure stabilised prior to intervention. Deciding which intervention is best can

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be challenging but the wider range of options allows for more discussion on the best treatment course.

Patients may be deemed unsuitable for SAVR mainly based on risk profiling. This can include technical reasons such as a redo procedure or multiple comorbidities. TAVI also can be technically unsuitable due to 1) coronary artery disease (which is best treated by surgery), 2) the dimensions of the aortic root or 3) the anatomy of their peripheral vasculature. Contraindications are device, approach and institution specific.[10] The number of patients unsuitable for TAVI is naturally low and decreases as experience increases. However, the ever decreasing risks of open heart surgery is often ignored.[11] Studying a patient population who was deemed unsuitable for TAVI during the introduction of this procedure allowed us an opportunity to study high risk patients having SAVR. Other institutions in the United Kingdom have also found that the impact of offering TAVI has had a positive effect on the volume of SAVR carried out. We have found that the main factor in offering intervention to these patients is for symptomatic control as many are acutely ill inpatients and are prepared to accept a high risk intervention over medical therapy alone.[12]

METHODS

Data on all referrals for TAVI was prospectively collected between February 2008 and November 2012. This was cross-referenced against the electronic cardiac surgical database to create a list of patients who had been considered for TAVI before undergoing SAVR. Hospital charts and the surgical database were searched for perioperative, critical care and inpatient data.

Table 1.

Rationale behind TAVI refusal in the 33 patients undergoing surgical AVR.

Reason for TAVI refusal	Number (%)
Coronary anatomy unsuitable for PCI and/ or TAVI	18 (45%)
Peripheral vasculature unsuitable	6 (13.1%)
Concomitant non-valvular procedure required	6 (13.1%)
Annulus/native valve unsuitable	6 (13.1%)
MDT/patient decision	5 (11.1%)
Lack of funding	3 (6.7%)
Emergency procedure	1 (2.2%)

The national death registry was used for survival data, with the date of the search equating to the date of last follow up. Forty five patients were identified who had been discussed through the local heart team. This consisted of one non-interventional cardiologist, two interventional cardiologists who perform TAVI, one surgical consultant who performs TAVI and one surgical consultant who performs SAVR only. This review spans the evolutionary process from its introduction and it must be recognised that the rationale for unsuitability of TAVI (table 1) is mostly technical, so that new techniques such as; peripheral TAVI under local anaesthetic, direct aortic and trans-apical aortic valve replacement have modified unsuitability criteria as they have become available in our unit.

RESULTS

Of the 45 patients identified, 31 (69%) were male with a median age of 79.1 years. The numbers of patients who were offered surgical intervention, medical therapy and TAVI are listed in table 2. Preoperative data is displayed in table 3. Aside from the more common co-morbidities, two patients had liver cirrhosis and varices, one patient had multiple sclerosis and was wheelchair-bound having had a previous sternotomy, and four patients required inotropic support preoperatively.

Table 2.

Characteristics of 45 patients undergoing surgical AVR having been deemed unsuitable for TAVI.

Total patients	**45**
Male	31 (69%)
Median age (± SD)	79.1 (± 9.8)
Previous cardiac surgery	3 (6.7%)
Chronic renal failure (creat>200)	11 (24.4%)
COPD	15 (33.3%)
NYHA III-IV	28 (62.2%)
Diabetes Mellitus	9 (20%)
Previous CVA/TIA	5 (11.1%)
Urgent Procedure	23 (51.1%)
Median ejection fraction	50.1 (±17.74)
Median valve area, cm2	0.67 (±0.16)
Median peak gradient, cm2	75.7 (± 24.9)
Median logistic EuroSCORE	19.5 (± 12.9)

Table 3.

Intraoperative details of conventional AVR patients

Concomitant Coronary artery bypass grafts	23 (51.1%)
Concomitant Mitral valve Surgery	4 (8.8%)
Concomitant Tricuspid Valve Surgery	2 (4.4)
Via ministernotomy	1 (2.2%)
Median cross clamp time (mins)	110.7 (± 34.7)
Median CPB time (mins)	152.6 (55.27)

Concomitant mitral valve surgery was required in four patients (8.8%) (2 repairs, 2 replacements) and twenty three patients (51.1%) underwent coronary artery bypass grafting. Mean cross clamp and bypass times were 110.7 and 152.6 minutes respectively. Mean time to extubation was 6.8 days.

Table 4.

Post operative course in 33 patients undergoing conventional AVR.

Post op	
Median blood loss (ml) (+ SD)	794 (+585)
Median Transfusion PRC units	1.6 (+ 1.7)
Median hours to extubation	6.8 (+9.4)
Requiring IABP	3 (6.7%)
LRTI	21 (46.7%)
New AF	11 (24.4%)
Dialysis	7 (15.5%)
PPM insertion	2 (4.4%)
Resternotomy for bleeding	7 (15.5%)
Prosthetic valve endocarditis	2 (4.4%)
Mean critical care stay (days)	8.3 (+5.0)
Mean LOS post operatively(days)	17.9 (+10.3)
30 day mortality	2 (4.4%)
1 year survival	86% (SE + 5.3)
Mean follow up in months	27.9 (+ 16.3)

Table 5.

Changes in referral patterns since the introduction of TAVI

	2006-2007 (2 years preceeding TAVI)	2009-2010 (2 years after TAVI)	p
Total number of AVRs	381	476	<0.01
Mean Age (sd)	65.9	67.8	0.03
Mean Euroscore	6.3	6.9	0.04

Mean blood loss in the initial 24 hours post operatively was 794 mls and seven patients (15.5%) required resternotomy for bleeding (see Tables 4&5).

One patient developed prosthetic valve endocarditis and underwent a successful redo procedure 2 months after the initial surgery. Two patients died before discharge, one from a Cerebrovascular Accident (CVA) on post-operative day 27 and the other died following unrecoverable cardiac arrest on post-operative day 2 from which post mortem examination revealed hypertensive heart disease. Forty-three (95.5%) patients survived to discharge. On follow up, 6 patients died within the first year, one from metastatic ovarian cancer, one from CVA, one from congestive cardiac failure, one from end stage renal failure, one from bronchopneumonia and one from peritonitis following bowel perforation and underlying ulcerative colitis. One year survival was 86% (see figure 1).

Since the introduction of TAVI we have seen an increase in SAVR caseload by 25%. Looking at 2006-2007 (2 years preceding the introduction of TAVI) we performed a total of 381 AVR's, in contrast from 2009-2010 we performed 476 operations.

DISCUSSION

The new joint ESC/EACTS guidelines on the management of valvular heart disease based mainly on the results of the PARTNER trials published in 2012, give a Class I B recommendation for the use of TAVI in patients with severe symptomatic AS who are not suitable for aortic valve replacement as assessed by the heart team, and a Class IIa for high-risk patients with severe symptomatic AS who may still be suitable for surgery but in whom TAVI is favoured by the heart team based on the individual risk profile and anatomic suitability.[13]

UK institutions such as the National Institute for Health and Clinical Excellence (NICE) recommend TAVI for patients with AS who are considered to be unsuitable for SAVR as the evidence on the efficacy of TAVI is adequate. For these patients, TAVI may be used with normal arrangements for clinical governance, consent and audit. Details of all patients should be entered into the UK Central Cardiac Audit Database.[14]

The National Health Service clinical commissioning policy recommend that patients should be considered by a multidisciplinary team (including 2 surgeons and 2 interventional cardiologists) with assessment of the balance of the risk/benefit ratio of open heart surgery versus TAVI. The usual "high risk" patient will have a logistic Euroscore of >20 or a Society of Thoracic Surgeons (STS) score of >10.[15] We accept that in this cohort our median logistic Euroscore was 19.5 and by definition 50% of this study group had a logistic Euroscore less than the accepted definition. This suggests that logistic Euroscore alone is not enough when deciding who is suitable for TAVI. For example, our cohort included a young patient with a life expectancy of less than 5 years from metastatic breast cancer. Another 2 patients had liver cirrhosis and varices. One patient had multiple sclerosis and was wheelchair-bound. Intervention may not have been considered in the past but with the advent of TAVI, patients' individual needs are now discussed at heart team meetings.

On reflection, this is a cohort in a centre performing 100 TAVI procedures and 300-400 aortic valve replacements annually. TAVI funding was an initial hurdle which we no longer face. Unfavourable anatomy is also seen less frequently. Anatomy requiring multi-vessel PCI is associated with referral for conventional surgery and it is noted that a high percentage of our high risk patients had concomitant coronary disease. Twenty-three patients in this cohort required CABG x3 for revascularisation with comorbidities such as diabetes. There is an acceptance that even if a patient is high risk, if the long term outlook is better with conventional surgery, then it is the treatment of choice. This demonstrates the need for better scoring systems for this group of patients.

As one of the largest series published on this patient population, our results concur with another UK centre - in

the series from Dimarakis et al, there was also high morbidity with 15% resternotomy rate, 25% new atrial fibrillation and median intensive care stay of 8 days. The survival data is also comparable with 81% at 359 days for Dimarakis' group and 86% at a similar interval for our own.[12] Our resternotomy rate is certainly higher in this SAVR cohort than our unit average of 4.6% for all comers (including CABG). This high morbidity confirms that despite a median logistic Euroscore of less than 20, discussion in a high risk forum was necessary.

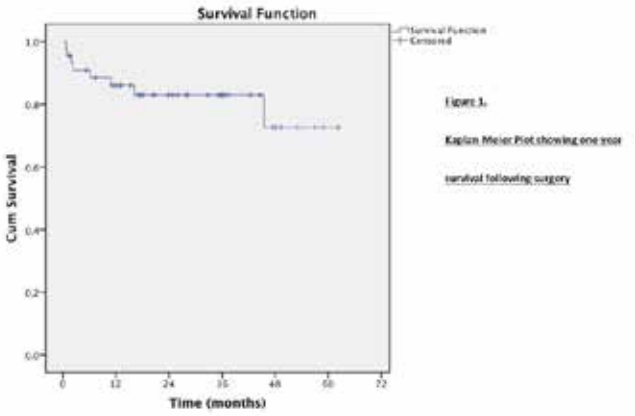

Figure 1.

Kaplan Meier Plot showing one year survival following surgery

The introduction and growth of TAVI has influenced the characteristics and outcomes of patients undergoing aortic valve procedures and in our own centre we have seen an increase SAVR caseload by 24.93%.

It is well established that symptomatic severe AS carries a grave prognosis if treatment is restricted to medical management only.[16] TAVI and SAVR confer better survival than medical management and with over 50% of our cohort being acute inpatients, it is reasonable to offer an intervention strategy for these patients despite the higher morbidity. The existing risk stratification models overestimate mortality and with the rapid evolution of TAVI, it has become pertinent to improve on these with some countries developing their own assessment tools.[17, 18, 19]

It is interesting to note cross over, mainly in one emergent patient. This patient initially was for TAVI procedure but due to an episode of pulmonary oedema and institution of heart failure supportive measures was reallocated to surgical treatment. This demonstrates that inpatients need daily reassessment and discussion with the heart team.

50% of this cohort underwent surgery on an urgent basis. This happened when the physicians at the MDM felt that overall, prompt intervention was appropriate but for various reasons, TAVI was unsuitable.

TAVI has been available in our unit for 5 years with differing valve systems and access routes. We have recently introduced a surgical arm to our TAVI programme to include more patients (although this does negate the benefit of a procedure under local anaesthetic). With the increase in our surgical case load and the availability of intervention to a wider patient population, multidisciplinary team discussion remains essential to ensure that the highest possible proportion of patients receive aortic valve intervention. New technology, such as the use of sutureless aortic valve replacement will add another valuable treatment modality.[20]

Our experience shows that with prudent MDM discussion involving surgeons and interventional cardiology, SAVR and TAVI can be offered to high risk patients with very acceptable mid-term morbidity and mortality. More importantly, it permits more patients to be considered for an increasing range of interventions.

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Medical History

Margaret Dunlevy (1909-2002) and the Conquest of Childhood Tuberculosis in Dublin

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Among the hereditary physicians, successors to the leeches caring for the Gaelic princes in olden times, the Dunlevys served the O'Donnells in Donegal. In the 20th century this old tradition was not lost. Two sons and two daughters of the five children born to Margaret and George Dunlevy (a grocer on Main Street, Mountcharles in county Donegal) entered the medical profession. In the saintly way that names were bestowed in profusion, the younger girl born on 13th August 1909 was burdened with Bridget Margaret Mary, softened to Pearl during her childhood (Figure 1).

Fig 1. Dr Margaret Dunlevy (1909-2002)

Pearl studied Medicine at the Royal College of Surgeons in Dublin, graduating with First Class Honours in 1932. Female graduates found it difficult, if not impossible, to get postgraduate training in Ireland, and Pearl became house surgeon in the Eye Hospital in Newcastle-upon-Tyne, house physician in the General Hospital in Nuneaton, resident house officer at the Children's Hospital at Birmingham and, later, at Sydenham in London and the Orthopaedic Hospital at Standon in Staffordshire.

In 1935 she returned to Ireland as Assistant County Medical Officer in her native county before appointment in 1937 as Assistant in the School Medical Service in Dublin. With the reorganisation of the health service in 1970 she became Deputy Chief Medical Officer of the Eastern Health Board, where she continued until her retirement in September/ October 1976.

For all its fresh air and bright sunshine, Dublin was not a healthy city in 1937. Its death rate from tuberculosis was twice that of major cities in the neighbouring isle, still suffering from economic depression after the Great War of 1914-1918. In 1935 the Dublin tuberculosis death rate was 1.3 per thousand population, and in Ireland it had risen to 1.63 per thousand by 1945. Very young children suffered disproportionately: of the 827 deaths in Dublin's population of 500,000, 123 were of children under 14 years of age, and two-thirds of this group were infants under 2 years suffering the invariably fatal tuberculous meningitis (Dunlevy, 1948).[1]

After a spell as resident medical officer in Crooksling Sanatorium in rural county Dublin, Dr Dunlevy moved to the city to work in the Collier Tuberculosis Dispensary, Charles Street West, Dublin 1. Parents were loath to bring children into this building, crowded as it was with cases of open tuberculosis. Dr Morgan Crowe (1907-1993), acting City Medical Officer of Health, inaugurated a Primary Tuberculosis Clinic. To begin, one session a week was held, though unwelcome, at the Carnegie Trust Child Welfare Centre, Lord Edward Street, Dublin 2. Numbers soared and, with Dr Crowe's assistance, a new location was found in 1949 at 6 Clarendon Row, now part of the Conservatory of Music and Drama, Dublin 2 (Figure 2).

Fig 2. The building provided from 1949 for Dr Dunlevy's Primary Tuberculosis Clinic for children, at 6 Clarendon Row in Dublin

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From the Clinic's inception, Dr Dunlevy kept records in her patients' charts that would have done credit to Laennec, and her assistants were trained to do the same. The records over the first three years of operation enabled her to review the results from 1945 to 1947 in 1,264 children infected with primary tuberculosis (Table 2).[1]

Table 1

Proportion (%) of 13-years-old Children found to be Tuberculin-Positive in 1959

Holland	3.5
London	7.5
Glasgow	16.9
Dublin	29.9

A tuberculin test, erythrocyte sedimentation rate, gastric lavage and chest radiograph were performed before supervision (or hospitalisation, if necessary and available) of the cases began. Nutritional supplementation was necessary in some cases: of the 1,264 children, 472 came from families with an income of less than 10 shillings per head per week. 182 of the children each came from a family existing in one room in a tenement house, the abode of 24% of the city's population at that time. The sources of infection were traced to 611 open cases, nearly all within the family, one in three being the mother.

Table 2

Ages of Children attending Clinic and Deaths in Dublin in the period 1945-1947

Age (years)	Number	Deaths Attending
< 2	129	18
2-5	340	4
5-10	526	9
10-14	269	5
TOTAL	1,264	36

Particular attention was paid to alerting signs. *Erythema nodosum* was seen in only 32 of the 1,264 children: in every case the patient or the parent was carefully questioned. This low frequency of 2.5% in children up to 14 years of age was consistent with the general experience that this allergic manifestation occurred more frequently in older age groups (e.g. in Scandinavia, contemporary records showed a sharp maximum at 20-25 years).[2] The 32 cases (only one of them was under 5 years of age) comprised 20 girls and 12 boys, an unusually high male ratio. On average, the nodes were seen one to three months before radiological evidence.

Phlyctenular conjunctivitis was observed in 64 children, 38 girls and 26 boys, all of them tuberculin positive. In the vast majority (57 of the 64 cases) radiological signs indicated healing. The phlycten was present in only 5 cases before radiological evidence of disease, suggesting that phlyctens might be indicators of healing. Social conditions of the families were definitely poor, with substandard income or unemployment and dire living conditions – in 16 instances the family lived in one room. Yet, in spite of the penury, no deaths occurred in the 64 cases with phlyctens.

Over three years the number of progressions to adult phthisis was 29, but many of these were tertiary cases when they came under initial observation: tubercle bacilli were found in the sputum of 15, and after gastric lavage in another 8 children. Six of the sputum-positive cases died. One case became sputum-negative and calcification was noted in the primary focus.

Table 3

Deaths from Childhood (0-15 years) Tuberculosis in Dublin City

Year	Pulmonary Tuberculosis	Tuberculous Meningitis	Tuberculosis in other sites
1947	27	81	30
1952	6	17	2
1957	1	4	1
1962	-	2	-
1963	-	1	-
1964	-	-	2
1965	1	-	-
1966	-	-	1

The value of radiological examination of the lungs in primary infection lies in serial observation, even though early lesions may not be detectable: a lateral as well as an anteroposterior view is imperative. Of itself, primary infection is not the cause of death: miliary tuberculosis and meningitis (indicative of blood-borne infection) are the death-dealers. Progression and spread of disease can be monitored by the erythrocyte sedimentation rate (ESR), but caution is advisable for an increased ESR may indicate the presence of a septic focus or a tuberculous lesion elsewhere (in bone, a joint, or abdominal or cervical lymph nodes). Rest, for a year at least, was the keynote of treatment, at home or in hospital. Theo Dillon (1898-1946) calculated that one hospital bed should be provided for every four cases of primary disease.[3]

In 1947 Dorothy Price (1890-1954), author of 'Tuberculosis in Childhood'[4], advised Dunlevy to visit Scandinavia. There she came under the spell of Johannes Holm (1902-1990), Chief of the Tuberculosis Division of the State Institute in Copenhagen. Holm had advised the United Nations International Children's Emergency Fund (UNICEF), and Pearl accepted that an ounce of prevention was better than a ton of therapy. And so Dublin became the first city in these islands to have a BCG service. That was a programme of immunisation using the Bacille Calmette-Guérin, supplied weekly (by air) from Copenhagen. Schools were visited for tuberculin testing of 10-14-year-olds (Table 1), and 72 hours later BCG was administered to tuberculin-negative children. On account of the prevalence of tuberculosis in the city, the

Masters of the Coombe and Rotunda Hospitals permitted immunisation of neonates. Younger children were more vulnerable than older (Table 2), but over the first ten years (1947-1957) the death rate from tuberculosis fell rapidly (Table 3).

When tuberculosis faded as a major problem, Dr Dunlevy broadened the scope of her preventive programme. She promoted diphtheria immunisation and again led the way when a vaccine was found for acute anterior poliomyelitis. When some birth defects were recognised to be consequences of infection by rubella during pregnancy she turned her attention to the epidemiology and control of that fever. Her ability to understand infectious diseases and to organise suitable programmes of intervention was outstanding, but she was not above learning – she set off on a postgraduate course on tuberculosis in the International Children's Centre in Paris in 1954.

She died on the 3rd of June in 2002. Donegal's loss was Dublin's gain.

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Medical History

Under the Mountain

A 30 year old sculpture at the Belfast City Hospital postgraduate centre.

Patrick J Morrison, Deirdre E Donnelly

Accepted 22 September 2015.
Provenance: internally peer-reviewed

BACKGROUND

'Under the mountain' is one of the few external art pieces commissioned for a hospital grounds in the 1980's. It was created by the renowned artist Eilis O' Connell. Eilis was born in Northern Ireland in 1953, and studied at Cork and Boston with distinction, later moving to New York and London for fellowships and residencies.

From her London base she exhibited widely and won many public art commissions, She received the Art and Work prize for her sculptures at 99 Bishopsgate from the Wapping Arts Trust, and in 1998 won a Royal Society of Arts Award. She represented Ireland at the Paris Biennale in 1982 and the Sao Paolo Biennale in 1985. The majority of her commissions are in the United Kingdom. The most significant three are 'Secret Station' in 1992 (figure 1 - bronze, fibre optic light, and steam medium), for the Cardiff Bay Arts Trust at the Gateway, Cardiff; 'Vowel of Earth Dreaming its Root', a 12 metre high Kilkenny limestone sculpture for the London Docklands Development Corporation at Marsh Wall, The Isle of Dogs, London 1994 (figure 2); and 'Pero footbridge', a rolling bascule bridge 54 meters long, Bristol, 1999 (figure 3). She currently works from both London and her studio in a renovated creamery in the hills north west of Cork city.

Fig 1. 'Secret Station'

UNDER THE MOUNTAIN.

"Under the Mountain" with dimensions of 4 x 4.3 x 3 metres is made of welded and hand painted steel and was commissioned in 1985 by Brian Ferran, director of the Arts Council of Northern Ireland. It was the artist's second commission and she noted that "it was wonderful to work with Brian who gave me complete freedom to do as I wished, unlike todays bureaucratic commissioning processes that drive artists to despair".

Fig 2. 'Vowel of Earth Dreaming its Root'

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Fig 3. 'Pero footbridge'

It is now 30 years old. It was made with a small shipbuilding firm in Arklow, Co. Wexford. Eilis worked on the factory floor and did a lot of the welding and grinding herself and learnt how to fabricate steel on a large scale. The title refers to the postgraduate centre building behind it with the lecture theatre section jutting out into space as 'the mountain'. The postgraduate centre is part of the Belfast City Hospital which opened in the same year and the large Tower block of the main hospital sits below the Belfast hills and in itself dwarfs the postgraduate centre so the title is appropriate on several levels.

Fig 4. 'Under the mountain' just after installation in 1985.

Figure 4 shows the sculpture at its installation. The moon-like segment rests gently on the back of the main form and this is to look casual as though it just rolled back to lean on it. The metal tracks are particularly interesting. Her original intention was very ambitious. She wanted a sculpture that moved and planned to motorise the small triangular form so that it would run slowly on the curved tracks and run through the triangular cut out in the main part of the sculpture.

Fig 5. Blue and silver painted version 2005.

Fig 6. Front of 'Under the mountain' August 2015 after repainting.

Eilis notes that she "wanted the sculpture to be a living, moving thing. The planners objected to that but I kept the idea of the steel track in the ground to suggest movement. It conveys the concept of movement inherent or suggested in something static".

Fig 7. Rear view showing the smaller triangular form and the steel tracks under the larger form.

Fig 8. Lateral view

It has gone through a repainting roughly once a decade. For the last decade it was blue with silver stars (figure 5) and it has just been repainted in August 2015 (figures 6-8) and the artist is thrilled with the current result. Despite planning permission not being granted to allow the small triangular form to move on the tracks, rumours constantly abounded about the power switch location for the alleged 'motor unit'. Clearly two of the allegations - that a former chief executive personally chiselled off the wheels late one night to save electricity costs, and that the senior paediatric emergency room consultant crept stealthily under the cover of darkness with a screwdriver to disable the power switch to prevent injuries to children's fingers - are totally unfounded.

Fig 9. 'Conetwirl' recently commissioned by the Cass foundation.

The artists' most recent piece is Conetwirl, a painted epoxy resin and woven glass medium of 3 x 5.3 x 2.5 metre dimensions, commissioned by the Cass Foundation (figure 9), a piece that has come to reprise the movement theme that exemplifies many of her works.

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Medical History

Ulster's Fulton Physicians

David Robinson

Accepted: 3rd August 2015
Provenance: Internally peer-reviewed

PREFACE

A series of books under the same title, "Always Turn the Page" was designed to bring family stories to life by including the history of the times that they lived through. The Fulton Story traces the family from their roots in Scotland, their arrival in 17th century Ulster and their journey through 18th & 19th century life in South Antrim. The books are not published but printed hard copies of the Fulton Story are available at the Linenhall Library, N.I., Family History Society, Presbyterian Historical Society and Fleming Fulton School. Individual chapters and other details in the book can be obtained directly from the author, Dr David Robinson who presents some extracts here:

INTRODUCTION

Dennis Biggart, in his 2011 book about his father 'John Henry Biggart', wrote that: "Throughout N. Ireland, but perhaps more particularly in County Antrim, there were certain traditions in the farming community. One son inherited the farm, one entered the church, whilst another frequently studied medicine".

This was most certainly true of the 'Ballyhartfield Fultons', who had arrived in Carnmoney Parish from Ayrshire, Scotland, in the mid 17th century.[1,2,3]

Samuel Fulton, (1813-1872), was the fourth generation of his family to tenant farm in south Antrim. With his wife, Elizabeth Speers (1821-1905), they raised eight children on their 52 acre Ballyhartfield farm, which bordered on the Six-Mile-Water River, between Ballyclare and Templepatrick.[1]

Of their six sons, the three eldest inherited the farm, the fourth, Thomas Cosby Fulton entered the church, while the two youngest, James and Joseph Fulton, studied medicine.

JAMES FULTON

James Fulton(1861-1935) was born on the 3rd December 1861 in Ballyhartfield. He qualified from the Royal College of Surgeons of Ireland in 1889 and practiced as a family physician on the Woodvale Road, Belfast.[1]

"A much loved physician, in a practice where his patients came from all walks of life and were treated with love and compassion. In the early days he made all his visits to patients by bicycle. At all hours he never refused a call to anyone in need. When he himself was ill, his patients spread straw on the road outside his house so that the carriages and trolley buses would not disturb him".

Fig 1. Dr. James Fulton with wife Minnie (Campbell) and daughters Maisie & Dorothea, at the family home at Woodbank, Ballygomartin Road, Belfast.

James Fulton's life is commemorated by a plaque in the Woodvale Presbyterian Church, where the Fulton family worshipped. The other lasting memorial to James Fulton is at Fulton Park on the Woodvale Road, now the home of the Forth River Bowling and Tennis Club. It was opened in his honour in a lavish ceremony on the 4th October 1930. An article in the 'Ireland Saturday Night' newspaper described in detail Dr Fulton's 40 year association with cricket, football and bowls, both as member and patron. It was reported that the ceremony concluded with the unveiling of a portrait of Dr. Fulton "amid the cheers of the crowded audience".

Dr. James Fulton died on the 10th July 1935 at the age of 74. His passing was noted:

"As a family physician he will be missed by a large community and especially by the sick and poor in this district, to whom he was always a friend. One had no difficulty in discerning that his genial presence and the consideration which he displayed,

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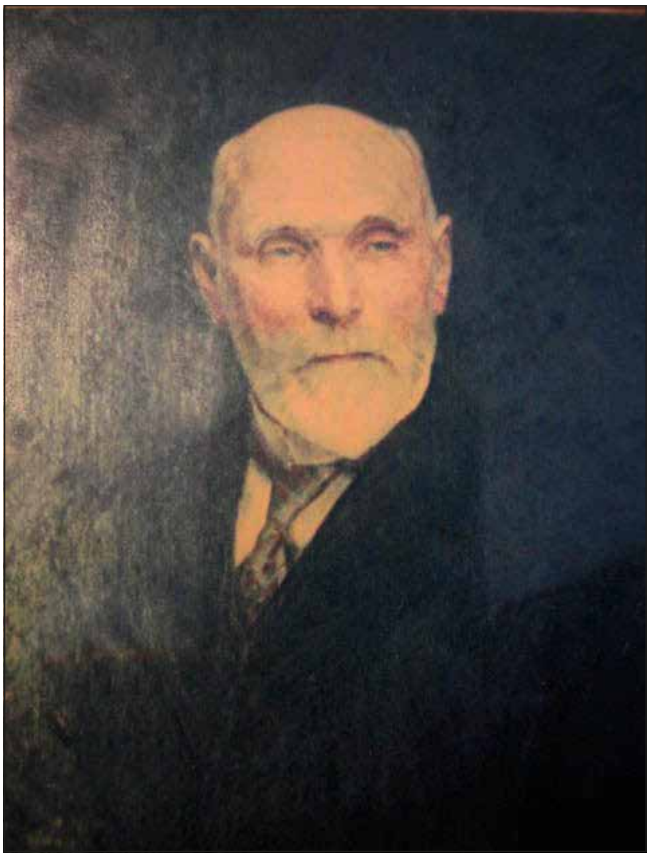

Fig 2. Portrait of Dr. James Fulton presented in 1930 at the opening of Fulton Park, Woodvale Road, which was named in his memory.

came from a life characterised by nobility of conduct and a heart that was generous to all men".

James's daughter, Elizabeth Dorothea (1900-1956), followed her father into family practice in County Down.[1] James Fulton would be delighted in the knowledge that his great-great grandson, Kieran Taylor, is carrying on the family tradition in Melbourne Australia.[1]

JOSEPH FULTON

Joseph Fulton (1864-1940) was born on the 11th February 1864 in Ballyhartfield and studied medicine at the Royal College of Surgeons of Edinburgh. By 1901 he was working as a resident surgeon at the Belfast City Hospital.[1] Belfast City Hospital began life as the 'Workhouse' on the Lisburn Road in Belfast and from its beginnings in 1841 provided sick beds for the poor. It was so difficult to separate the sick from the destitute that the 'Workhouse' soon developed into a 'Workhouse Infirmary' with over 600 beds.

Belfast City Hospital recorded its first official surgery in 1850, created a dedicated operating room in 1877, and appointed its first trained surgeon, Dr. Lynass, in 1900. In that year Dr. Lynass performed '51 chloroform induced surgeries'.

As we can see from the below text, Dr. Joseph Fulton became head of surgery in 1905, at the age of 39, and continued in that post until he died in 1940.[4]

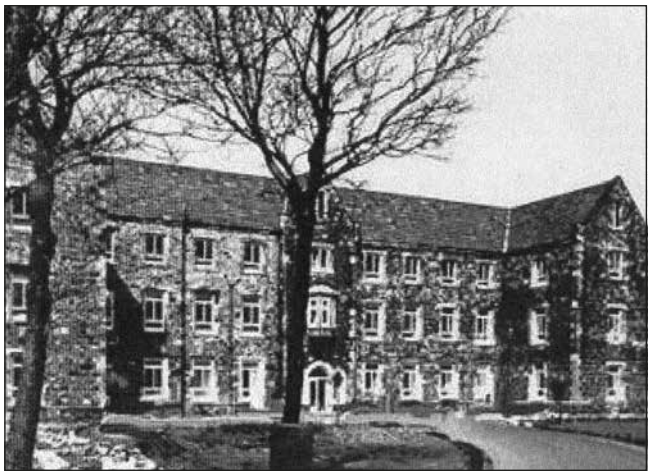

Fig 3. Belfast City Hospital began as the 'Belfast Workhouse' in 1841. It then became the 'Belfast Union Infirmary', which by 1869 had over 4,000 inmates. By WWI it was called the 'Belfast Union Hospital' and by WWII it had been renamed 'Belfast City Hospital'.

"Dr. Lynass died very suddenly in 1905, at the age of 40, and was replaced by Dr. Joseph Fulton, who had worked for several years as his assistant. 'Old Joe', as we called him behind his back, worked on until 1940. He too I think was largely self taught, and though this may seem extraordinary to the young men of today's jet set, this was a long time ago and was not surprising or uncommon about that time. He worked in isolation all his life and had few contacts with any of his surgical colleagues. This again was quite common in those days. Even the surgeons in the Royal corridor had relatively little contact with each other. Joseph Fulton's results were as good as many better known surgeons. He was a remarkable personality".

Dr. Joseph Fulton passed away on the 19th March 1940 at the age of 75. Joseph Fulton's son, Jay (1903-1985), carried on the medical tradition, practicing family medicine in England.[1] It was however James and Joseph Fulton's nephew, Thomas Stevenson Fleming Fulton, who next left an indelible mark on Ulster medicine.

FLEMING FULTON

Fleming Fulton (1887-1974) was born in Newchwang, Manchuria, on the 26th February 1887, the oldest child of Rev. Thomas Cosby and Barbara Fulton. He was given his middle names in memory of Rev. Dr. Fleming Stevenson (1832-1886), who had been Convener of the Irish Presbyterian Foreign Mission.[1] Fleming's father had come to Manchuria from Ballyhartfield in 1884 as a missionary and was to become the longest ever serving Presbyterian missionary, staying for 57 years.[5,6]

During their time in Manchuria Fleming's family lived through several major Chinese wars, numerous droughts, floods and a plague. In 1888, still in his first year of life, Fleming nearly died of small pox. He made his first visit to Ulster at the age of seven on one of his parents 'ten yearly furloughs home'. He returned to England to attend the 'School

of Sons of Missionaries' in London.

He remained there until entering Queens College Medical School, Belfast in 1906. Fleming was at Queens College Belfast, when it received its charter in 1908 as Queens University Belfast Medical School, and graduated with an MB in 1912 and a DPH (Diploma in Public Health) in 1913.

Fig 4. Dr. Fleming Fulton (centre) during his houseman year in Belfast, having graduated from Queens University Medical School in 1912.

Fleming initially practiced in Rochdale but on the 3rd August 1915 he joined the Royal Army Medical Corp (RAMC) as a Lieutenant and was stationed in France for the next four years. At the outbreak of WW1 in 1914 the RAMC had a total of only 200 medical officers but by July 1916 there were 10,000, by which time Fleming had been promoted to Captain.

After the war Fleming continued his medical work back in Rochdale but in 1920 returned to the land of his birth, working as a Medical Officer of Health in Shanghai, which by then had a population of nearly 2 million.

Health concerns caused Fleming to return to the UK in 1921, with posts in Whitehead, Nottingham and Pembroke, before finally settling in Belfast in 1923. For the next thirty years Fleming became a pioneer of the school medical services, ending up as Senior Officer of Health for Schools and developing a special interest in handicapped children.

Fig 5. Dr. Fleming Fulton, about 1937, in the garden at Pasadena, Knock & Kensington Roads, Belfast. This was the Fulton family home from 1926 until 1962. Also in the photo from the left are his son, Thomas Terence Fulton (1921-2009), wife May Elizabeth Lyons (1888-1985) and daughter Elizabeth Sherrard Fulton (1923-2010), who married John Walker Sinclair Irwin.

In his position as chairman of the N.I. Orthopaedic Services he was closely involved with the development of a multidisciplinary school to teach children with cerebral palsy. The Belfast Education Authority opened Mount Collyer House in 1957 but soon renamed it 'Fleming Fulton School' in his honour.[7]

Fig 6. The original Fleming Fulton School Building on the Upper Malone Road was called 'Mount Collyer House & Demesne'. It was built in the 1840s by Andrew Mulholland Esq., a successful Belfast Flax Merchant. It was later lived in by the Donaldson (1875) and Thomson (1892) families, before being converted into the school by the Belfast Education Authority and renamed 'Fleming Fulton School' in 1957.

The official motto was 'Faith, Friendship, Service' (F.F.S.) and the prevailing philosophy 'One Step at a Time'.

Fig 7. Fleming Fulton School, crest & motto, 'Faith, Friendship, & Service'.

Thomas Fleming Stevenson Fulton passed away on the 9th January 1974, at the age of 87 and his obituary described his 'devotion to handicapped children.'

The next Fulton physician to make his mark on Belfast medicine was Fleming's son, Terence.[1]

Fig 8. Dr. Fleming Fulton, in retirement about 1970, in his garden at Lennoxvale, Belfast, with his wife May.

TERENCE FULTON

Thomas Terence Fulton (1921-2009) was born in Belfast on the 14th February 1921 and grew up in the Shandon Park area, attending Campbell College. He studied medicine at Queens but because of the war and through the Rockefeller Foundation program, he finished part of his studies in Cincinnati, Ohio. Returning from America, Terence served in the RAF in Palestine in the years following the war.

His first medical practice was in Banbridge, where he was a consultant physician with the Dromore and South Armagh Hospital Group from 1951 until 1954.

Fig 9. Dr. Terence Fulton, in the R.A.F. in Palestine in 1945.

Terence came to the Royal Victoria Hospital in 1954, where he served as a consultant physician until his retirement in 1986. He was a brilliant diagnostician and a walking encyclopedia of medical knowledge, combined with compassion and common sense.

He was widely respected and admired and would supplement his clinical obligations with service on committees and administrative work. He maintained connections with medical fellowships in the North and the South of Ireland and offered medical care and assistance to all the missionaries of the Presbyterian Church, whenever they were home in Ulster. Terence served as the Head of Postgraduate Teaching at the Queens University Department of Medicine. His OBE for services to medicine in 1986 was richly deserved.

Dr. Terence Fulton passed away on the 4th November 2009 at the age of 88.

CURRENT GENERATIONS

The Fulton medical tradition continued into the next generation, with two of Terence's daughters, Lorna and Jill practicing, along with his nephew Terry Irwin and niece Barbara (Irwin) Marshall.

Fig 10. Dr. Thomas Terence Fulton (1921-2009), with his wife Denise Ingham (Corkey) Fulton (1920-2003) receiving the O.B.E. at Buckingham Palace in 1986.

The present generation is continuing the Fulton tradition with three Fulton descendants in the profession: Jill's son, David Finlay, Barbara's daughter, Louise Marshall and Terry's daughter Charlotte Irwin.[1]

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Annual Oration

Delivering Safer Care: Endless Quest or Jewel within Reach?

Royal Victoria Hospital, Friday 26th September 2014.

Gavin Lavery

Accepted: 1st December 2015

INTRODUCTION

The first challenge in preparing for an address such as this is a title. Something that generates curiosity yet gives a sense of the nature of the subject. The key word in my title is DELIVERING, a concept which should be more central to our thinking as healthcare professionals. The time and effort we spend designing, discussing and refining the system of care for our population, or planning the care for individual patients, is a demonstration of our intention. However, patients can only judge us on the reality of what they experience, on the care that we DELIVER. Too often there is a significant gap between what was intended and what was delivered and therefore experienced. Improving Quality in healthcare and patient safety will be progressed when we find ways of reducing that gap.

'THE BEST THE WORLD HAS EVER SEEN'

My 35 years as a doctor have seen amazing changes. New knowledge and new technology has improved our ability to care for our patients and successfully manage their illnesses. Today we have expensive and complex therapies that successfully treat acute myocardial infarction, stroke, and many cancers where before we merely treated symptoms with little ability to reverse the condition itself. We can also make great advances in ways that are not expensive or dramatic.

In 2007, the then Royal Hospitals Trust was one of 20 UK Trusts participating in the Safer Patient Initiative, a national programme supported by the Boston-based Institute of Healthcare Improvement and funded by the Health Foundation, a UK-based charity. As part of that work, the Regional Intensive Care Unit (RICU) was tasked with reducing the rate of ventilator associated pneumonia (VAP). At the time our VAP rate was not high, relative to national norms and we viewed those cases we did see as unavoidable. Nevertheless, over 18 months, we reduced our VAP rate by about 75%. This occurred without new equipment, more powerful antibiotics or cleaning agents. It cost nothing - yet saved a number of lives, reduced morbidity and also saved resources by reducing (i) the extra days of ICU care required to treat pneumonia and (ii) the cost of antimicrobial agents.

The doctors, nurses and support staff achieved this by delivering patient care as they intended, by delivering a group of interventions known to reduce VAP (the ventilator care bundle) to every patient - and not to only 60-70% of patients some of the time which had previously been the case. This came about as a result of examining, and then improving, how we interacted as a team and narrowing the gap between our intentions and the reality of what we were delivering.

This huge effect on outcome, using what I came to know as Quality Improvement (QI) methodology, made me realise that focusing on how we deliver care and removing the obstacles to improvement would dramatically improve outcomes for our patients. In 2011, I became the Clinical Director of the Health and Social Care Safety Forum, a small unit within the Public Health Agency with a regional remit to provide support and leadership in patient safety and quality improvement.

Last year I completed a 4 month Advanced Training Programme at Intermountain Healthcare in Salt Lake City. Intermountain provides healthcare for more than 2 million people. It's a highly regarded, not-for-profit system which has a world-wide reputation for safe, reliable care. I went to Intermountain in large part to work with Dr Brent James, a surgical oncologist and world leader in Quality Improvement (QI). Dr James leads the Institute of Healthcare Delivery Research at Intermountain. Note the focus of the Institute is researching how we DELIVER healthcare. QI does not generate new knowledge but explores ways of optimising how we use existing knowledge to benefit patients.

Before I continue, it is important to acknowledge and celebrate the standard of care we CAN and DO deliver most of the time. Dr James describes healthcare today, when delivered as intended, as "the best the world has ever seen". Furthermore, data from the USA-based Commonwealth Fund show the United Kingdom's National Health Service ranks number 1 in the world on quality of care when compared to healthcare systems across the globe. It is also less expensive than all its rivals with the exception of New Zealand.

In N. Ireland, and within our own organisation, we have

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evidence of high standards of care across many disciplines producing excellent outcomes. The RVH fracture unit admits more fractured femur cases than any other UK unit and has the joint lowest 30-day mortality. Data for RICU, compiled by the national audit body show we admit more patients than all but 1 of our UK peers and have a standardised mortality ratio consistently lower than the UK-average. Some patients in our care who survive critical illness would not have survived in an "average" ICU in the UK. Patients receiving renal dialysis across the 4 countries of the UK have high survival rates, with figures for Northern Ireland at least as good as those in England and better than Scotland or Wales. In maternity care, excessively high C/section rates are often a marker of poor quality care. Figures from Royal Jubilee Maternity Hospital show an impressive reduction in C/section rates over the last 5 years (Fig 1).

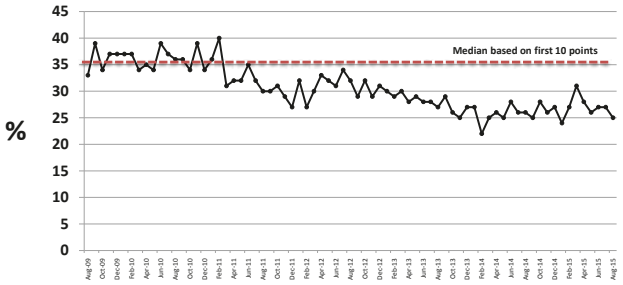

Fig 1. C/section rate by month

In 2007, during the Safer Patient Initiative, the rates of MRSA bacteraemia in critical care were reduced, but still occurred at least once every 2 months. We have improved further since then, our last MRSA bacteraemia was in October 2012, almost 2 years ago.

WHY WE NEED TO CHANGE?

If outcomes are so good, why do we need to change? We need to change not because of our best but because of our average or worst performances. There is a large variation in the standard of our care. Delivering acceptable or better care most of the time, lets say 90% of the time, is not good enough. When there are millions of patient interactions every year, this means tens of thousands of patients receive less than acceptable care.

The reports by Francis, Berwick and Keogh documented failures in providing care that is safe and person-centred in NHS England. We know that similar events happen within our own system and that the care of the frail and elderly, in particular, is sometimes less than we would wish. We also need to plan for a future in which there is increased demand for healthcare - but reduced funding.

During my medical career, life expectancy in NI has increased by 6-8 yrs, a cause for celebration. Our challenge is to ensure those extra years of life are predominately healthy life years. We have rapidly increasing rates of obesity, diabetes, alcohol-related illness and dementia. These will all increase demand for healthcare at a rate that will outstrip any increase in resource. So we have to learn to use our time and resources better, reduce duplication and wasted effort. To do this will require a change in how we deliver care to individual patients and across the system. Sometimes this will involve being more honest and transparent. Thirty years ago, many patients were judged too old or too chronically ill to be admitted to ICU. In some cases this judgement was wrong. However, today the expectations of what we can achieve have grown exponentially and sometimes surpass what we can realistically achieve. We are still making many poor decisions - but for different reasons. Today we are more likely to over-treat at the end-of-life than under-treat.

Despite the new buildings, advancing technology and specialisation, changed workforce, reduced working hours and multiple handovers of care, our approach to delivering care has not changed sufficiently. Many of our current ways of working belong to an age when care was delivered under the leadership of a senior doctor and a ward sister/manager with a stable (and relatively large) team of medical and nursing staff. In that system it was very clear who was in charge.

As we care for increasingly complex patients with multiple co-morbidities, requiring the input of many services, there has been a fragmentation of care. Many patients do not know who is in charge of their care and sometimes that care seems short on compassion. We assume our patients are treated seamlessly, getting the best care available from all the services we provide. However, each service tends to focus on how it works internally – rather than how it links with other services. So many patients, whose needs cross several services, sometimes have a journey subject to obstruction and delay. The elderly are most prone to this problem and will be compromised most by it.

Cyril Chantler, a former chair of the Academy of Royal Colleges summed this up when he said "medicine used to be simple, ineffective and relatively safe, now it is complex, effective and potentially dangerous."

Sometimes our system of care reminds me of the recent football World Cup Final. We, unfortunately, often work like the Brazilian team, individually very skilled but with no cohesion, no overall plan and no sense of the bigger picture. We should model our approach on that of the Germans who, on that day, harnessed their individual skills to progress an overall plan and reach their full potential.

We must acknowledge that some of our staff feel increasingly pressurised, undervalued and in some cases disengaged. In January 2014 NHS Trust finance directors, rated staff morale their greatest concern - ahead of A&E targets, cancer waiting times, performance issues, HCAIs and others.

HOW CAN WE IMPROVE CARE? WHAT SHOULD WE AIM FOR?

Patient Safety is defined as avoiding harm from care that is supposed to help – hardly a lofty ideal. Safety is one of 6

domains of quality. To aim for safety alone is akin to aiming for the minimum pass mark in an examination – unambitious and often destined to end in disappointment. We would all want care that is not just safe but care that was also effective and person-centred.

Quality2020, our regional strategy to improve care, marks a change from the usual NHS methodology based on regulation, policies and targets. Such approaches don't engage staff and without engagement, culture, behaviour, and patient care, usually remain unchanged. The importance of culture was highlighted by Robert Francis in his report of the Mid-Staffordshire NHS Trust and by Don Berwick. In his report *A promise to learn – a commitment to act*, Berwick stated *"Culture will trump rules, standards and control strategies. A safer NHS will depend far more on major cultural change than on a new regulatory regime*.

Figure 2 summarises factors that many believe support safe, high-quality healthcare. A workplace culture that truly puts the patient at the centre; uses information to learn; values staff, engages them and uses their knowledge and talents; a culture that identifies and develops leaders early.

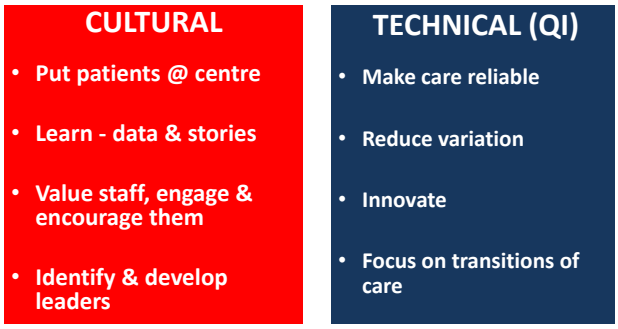

Fig 2. Factors supporting high quality healthcare.

Changing culture is a slow process and even after several years, evidence of progress may be less than convincing. So alongside changing culture, we need to focus on changing the processes we use to deliver care using a structured approach. We need to make care more reliable. We need to reduce the variations in care. We need to give staff the opportunity to innovate and we should focus our efforts on the transitions of care where we know many failures occur. Improvement science gives us a structure within which we can achieve these goals.

To demonstrate what is meant by the term "reliable care" let us consider the early management of severe sepsis. There are 6 elements of care to be delivered, ideally within one hour of making the diagnosis. Imagine a ward where staff, relying on their professionalism but with no agreed approach to managing sepsis, deliver each of the six elements on time to 9 out of every 10 patients. While this seems quite good at first glance, it means only 53% of patients would receive care as intended. In practice, many clinical areas would not manage to perform to the level of "9 out of 10". Reliability will require us to develop ways of working which make it easy to do the correct thing; which ensure that care is delivered as intended 99.9% of the time, at least.

Variation in care occurs when there is no agreed plan between (or within) teams on what care to deliver or how to deliver it. Today we often have different clinical teams or wards using a different series of processes (pathway) for patients with the same condition. Each stage of the patient journey takes variable amounts of time and resource and each step is micro-managed, requiring more work. It is difficult to recognise if anything is missed, if we strayed from our clinical pathway, because there is no recognisable pathway. The end product (the therapy/treatment delivered to the patient) is dependent on arbitrary factors such as the make-up of the team, unstructured interactions, personal preference/habit and perceived wishes/beliefs of the clinical leaders.

In a system with little variation, patients with the same diagnoses/symptomatology receive care that follows the same pre-planned, semi-automated steps which have been pre-designed by clinical teams. The time (and mental capacity) liberated by reducing the need to micro-manage every step of the patients' journey is then available to (i) make specific modifications to the pathway due to individual patient factors (co-morbidities) or patient preference (ii) have meaningful communication with patient/family (iii) train or mentor junior members of the team. This approach leads to hospital stays that are shorter, more beneficial and consume less resource.

Some may believe that I am advocating a reduction in clinical autonomy. I would reply that automating the basic steps in good patient care frees clinicians to exercise real autonomy; to do what Brent James calls mass-customisation – let the system follow basic steps in care and (having looked at the patient as an individual) personalise their care if required – something we don't do well at present as we rush around micromanaging the mundane and re-inventing the wheel.

The concept of clinical autonomy assumes we accurately convert all forms of evidence (research, audit, observations and experience) into conclusions, which in turn determine our actions. As doctors we say "just give us the evidence and leave us to figure out what to do". We then give ourselves lots of latitude citing "clinical judgment". However, there are now many confounding factors preventing us reaching the appropriate conclusions and therefore actions. The greatest is that we can no longer memorize, analyze and apply all the relevant information due to the explosion in published research and its complexity. Centres admired for their clinical effectiveness such as Intermountain Healthcare and Virginia Mason focus on reducing variation - "It is more important that you do it the same than that you do it right (you will always choose something reasonable)". Such an approach reduces rates of error and teams use the scientific approach to gradually and systematically improve.

You may believe that such standardisation stifles innovation. I would suggest the opposite. At present, to treat the same condition, we have teams using different processes of care

and sometimes not delivering the care they intended. This unnecessary variation and lack of reliability might be viewed as care which is chaotic. The "noise" in such a system makes identifying a beneficial innovation very difficult. Even if a beneficial innovation were identified, such a system would be unlikely to be good at adoption and spread of the innovation. Alternatively, in a world of standardisation, there is a strong baseline against which new ideas can, and should, be tested in a planned way.

HOW DO WE LEARN FROM ERROR?

In Dr James Reason's "Swiss Cheese" model, adverse events are rarely the result of a single factor or error but the outworking of a combination of factors. Luckily all of these rarely occur together and so there is no adverse event but instead (with a subset of the factors present) there is a near miss. Near misses could give us an insight into the defects and dangers that lurk in the system.

Major harm events must be reported though we could debate whether we recognise all major harm. Minor harm events sometimes go unreported and near misses are rarely reported – or even noticed. Thus, often we do not give ourselves the opportunity to learn unless, and until, a patient is harmed - often significantly harmed. This is the failure to learn that Sir Liam Donaldson called inexcusable.

The "Fair and Just Culture" model espoused by The Mayo Clinic system is an important part of their approach to patient safety. Following an adverse event or near miss, they pose a number of questions - Was it a system problem (as most are) or was it a problem of behaviour? In reviewing behaviour, the key issue is the actions of individuals, and not the outcome of the action, since the result of an action might be catastrophic or nil depending on luck/chance. In situations where behaviour is the cause of a adverse event, Mayo also distinguish between *genuine error*, where the response is console and learn; *risky behaviour* which requires coaching and possible redesign to prevent repetition; and *reckless behaviour* which requires a disciplinary response.

STRUCTURES AND SKILLS FOR IMPROVEMENT

What should a QI team look like? As we might expect, the team needs managers and/or senior clinicians who have content knowledge, can influence others to change and help remove some barriers. A significant portion of the team should be drawn from front-line staff who know "why things work or don't work". As well as contributing their own knowledge, front-line staff bring information and ideas from colleagues to the QI team and bring potential changes/solutions back to the front line to test and to gain buy-in. Thus, before a new approach gets to the point of implementation, it can become collectively owned by all who will use it. The QI team should be led by one or more individuals with quality improvement skills, high credibility with the group and skills in facilitation. At Intermountain, to help unblock the bigger obstacles across the organisation, senior organisational leaders interact with QI teams on a weekly basis.

The methodologies most commonly used in healthcare for QI are the Model for Improvement and Lean. Both have their origins in industrial engineering and have similar principles. The model for improvement is simpler to teach and is founded on the work of Walter Shewhart and Edwards Deming. It is based on 3 fundamental questions (Figure 3) and builds from starting small - with 1 patient, or on 1 day, or 1 ward using Plan-Do-Study-Act cycles, testing and measuring new approaches or processes. If these new ways of working are advantageous then they are further tested at ever-increasing scale across the system. Front-line staff do this testing and contribute their detailed knowledge to help shape the changes. In this way, the changes become a new collective process owned by those who will use it – rather than one imposed from above. This helps build the will for change, get the best ideas and ensure implementation.

- Build will
- Get ideas
- Ensure execution

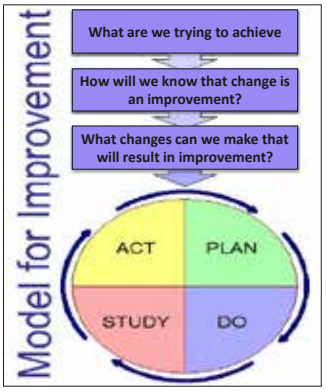

Fig 3. The model for improvement.

Using this approach we worked with our Emergency Departments (ED) across Northern Ireland to improve the early management of patients with severe sepsis. In 2011, data from a national audit suggested that the UK performance in applying the Sepsis6 approach in ED was poor with NI among the worst performing regions. Within one year, using a QI approach to change, our Sepsis6 compliance fulfilled most College of Emergency Medicine standards and by 2014 NI was one of the UK highest performing regions in terms of compliance with the Sepsis6 (figure 4).

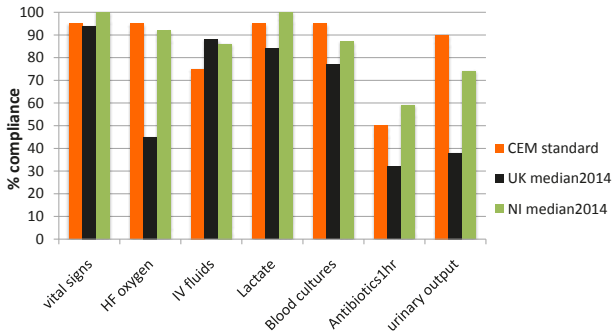

Fig 4. Severe sepsis in ED - 2014

Figure 5 shows data from a clinical team improving the out of hours process for CT scanning patients with stroke within

45 minutes of arrival - crucial to delivering thrombolysis, to those who need it, within 60 minutes. Using the model for improvement the team developed a new process that substantially reduced the variation and average time needed to CT scan these patients. The team realised that they had a major obstacle in that the CT radiographer was not resident after midnight. However, having improved their process dramatically, they were able to make a persuasive case for the small extra resource needed and were able to reach their goal. Often when we had the resources our answer to a problem was to buy more staff, more equipment or more capacity. Of course, as in this case, the real answer was to improve the process and then provide resource if it was still needed.

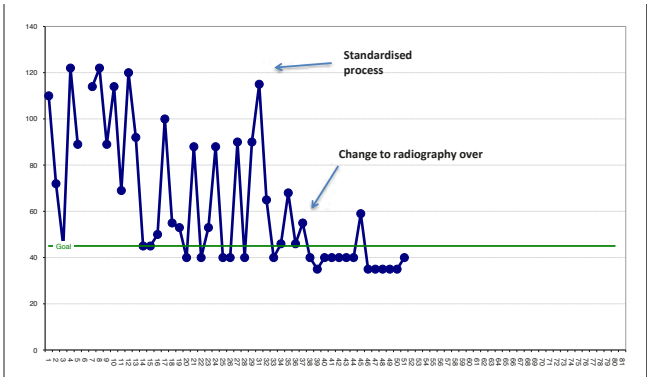

Fig 5. Time to complete CT scan for stroke thrombolysis (out of hours)

Another way to improve the reliability of a process is to map it out and re-design to remove steps that are unnecessary or unproductive. Every extra step is an additional opportunity for error and/or delay. When a team mapped the process of discharging a child from a paediatric ward with the correct medication they found 25 steps. With redesign, they reduced this to 10 steps.

The majority of staff within our system have knowledge or expertise which can help improve how we deliver care, if we can unlock it. Over the last 4 yrs we have invested in staff who wish to equip themselves with skills related to QI. One such group are those who have undertaken the Scottish Patient Safety Fellowship, a multiprofessional, 10 month training programme involving development of knowledge, skills and the completion of a QI project. Currently we have 18 of these individuals which we call our Safety Forum Scottish Fellows. This represents an investment of over £250,000 to date, but we need even more individuals with these skills.

Within Quality 2020 there is an intention to develop QI experts across HSC who will support a workforce who have knowledge of QI relevant for their roles – from top to bottom of the organisation. An Attributes Framework has been developed and tested with frontline-staff and undergraduates. In the future, we intend that all undergraduates develop the attributes in level 1 of the framework during their training and that developing/recognising level 1 skills will be part of the induction process for other staff. QI must become a more explicit component of the activities discussed at annual appraisal.

MEASURING CHANGE AND CHANGING BEHAVIOUR

Change is common in healthcare and the public sector. Improvement comes through change, though change is not always an improvement. If we want to know if change is an improvement, we need to measure. Measurement can also reassure us during change that we are making progress. However, measurement alone is not enough. If we wish to engage and motivate staff to change, we need to display relevant, recent, easily-understood measurement data openly and widely.

Histogram A in Figure 6 is typical of reports produced by many NHS trusts. It suggests no change in the annual frequency of reported adverse events in two successive years. Graph B in Figure 6 is a run chart of the raw monthly data from which histogram A was constructed. This tells a different story – of a change that was reversed. Drilling down to discover what caused the change and its reversal would yield useful information. Simplifying data by averaging it over time often results in lost information - the story behind the data is buried. Analysing data as collected, and not after aggregation is often very revealing.

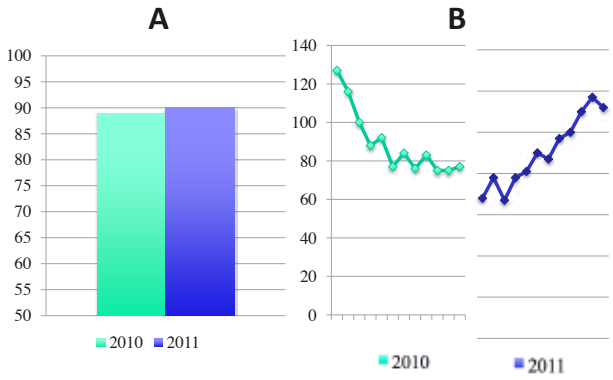

Fig 6. Aggregated v original data

The ultimate aim in measurement and the collection of data is to influence behaviour. This requires an emotional connection with those with whom the information is shared. A CEO of a world famous children's hospital wanted to use their annual adverse event rate, which was comparatively low at 0.54/1000 admissions, to build the will to change. He chose to reframe the information by stating "Next year [without change] we will seriously harm 500 children". His intention was to galvanise his team to change and improve. He chose a way of making the data more personal, painful and urgent. He appealed to the hearts of his staff. In the following 3 years there was a 70% reduction in serious adverse events in that hospital.

LEADERSHIP FOR IMPROVEMENT

To improve across our system, we need QI experts with leadership skills and/or leaders with QI skills. A hundred years ago next month, the Imperial Trans-Antarctic expedition set off for the South Pole under the leadership of our fellow-

countryman, Ernest Shackleton. The expedition ended in failure but is celebrated as one of the greatest examples of leadership through adversity. In his book, Frank Worsley, the captain of the expedition's ship, Endurance, recounts Shackleton's many leadership skills. Significantly, he dwells on Shackelton's relationship with, and protective attitude towards, his men. Was this how he inspired their loyalty and kept them motivated? Was it the men's perception of Shackleton as a resourceful leader and protector that kept them alive and gave them the belief that they could reach safety?

Staff in healthcare also face adversity and need to be protected by leaders at all levels. They are often so busy and/or stressed that they feel unable to engage in anything outside core work activities. Sometimes they are unfairly dismissed by those promoting change and improvement as "people who just don't get it". We need to give staff space and opportunity to re-engineer how they do their jobs – making their roles more rewarding and better for patients.

We should grow and nurture a culture where staff feel safe to contribute their knowledge, ideas and expertise. We should protect them from wasted effort, from situations that are impossible to resolve, from expectations that can't be met, from a culture that may be potentially threatening. If the workplace has psychological safety, staff will ask questions, ask for feedback, express their doubts, offer ideas. In short, they will become workers who are committed, motivated and loyal.

As I near the end of this oration, I ask for your assistance. QI has a growing but still peripheral presence in our health and social care system. It is the province of a small number of doctors, nurses and allied health professionals – who are viewed by some of their colleagues as possibly a little deranged! QI needs to be main-streamed, it needs to be part of everyone's agenda. That requires all junior and senior members of medical teams to show interest and give support. It requires a number of doctors to become expert improvers and role models.

PATIENTS AS PARTNERS

We must learn from, and with, our patients. Only they are present at every step of their journey through our healthcare system. The Public Health Agency's 10,000 voices initiative allows us to get both qualitative individualised feedback from patients and a quantitative assessment of our strength and weaknesses. The importance of person-centredness has been shown by the huge spread of the #hellomynameis campaign led by Dr Kate Granger, a doctor with a terminal illness who realised how poor our culture is around introducing ourselves to our patients.

These are common elements in the "patients as partners" movement. I believe, however, that we need to go much further. We need to make it clear that healthcare can reduce the burden of illness and disease but it cannot make citizens healthy. The big determinants of health are factors such as housing, education, social isolation, public health, economics and the behavioural choices of the public. While many of these factors are outside the control of an individual, the latter is not. Choices on diet, exercise, smoking, alcohol and drugs will dwarf the efforts of healthcare to improve health. We need a partnership with patients in which patients should (i) expect the highest standard of care we can deliver and (ii) accept the responsibility of making appropriate decisions which effect their health. This new partnership should include honest discussion about what is appropriate in end-of-life care as I mentioned earlier.

CONCLUSION

In my title, I asked a question about Delivering Safer Care. Was it "an *endless quest or jewel within reach"?*. I think I have shown we are on our way. We have unearthed our native gem. It has been cleaned and roughly cut. If we can mobilise the legions of undergraduates and trainees, frontline staff, managers and healthcare leaders to refine and polish our rough cut then a dazzling jewel is within reach.

I believe Delivering Safer Care is also an endless quest. As changes to our world and society result in new diseases and risks, we will respond with new knowledge, treatments and therapies - which will in turn bring new risks and dangers. We can make care safer but we cannot make it absolutely safe. Thus we will always be on the a quest for 'safer".

I will end with the words of Dr Francis Peabody who, in 1926, delivered a series of lectures about clinical care to medical students at Harvard. "*Time, sympathy and understanding must be lavishly dispensed, but the reward is to be found in that personal bond which forms the greatest satisfaction of the practice of medicine. One of the essential qualities of the clinician is interest in humanity ….for the secret of the care of the patient is in caring for the patient"*

FURTHER READING

The slide presentation complementing the Oration can be viewed at the HSC Knowledge Exchange http://www.knowledge.hscni.net/Resources/ContentDetail/417

Letters

LATE COMPLICATION OF GASTRIC BANDING CARRIED OUT ABROAD

Editor,

A 68 year old lady was referred to gastroenterology by the respiratory physicians after originally presenting with cough and dyspnoea, worsened by lying down and eating. She had undergone laparoscopic gastric band insertion in France nine years before and was experiencing symptoms of postprandial reflux and dysphagia for the past two years. Computed tomography of the chest showed the gastric band in situ and marked oesophageal dilatation with appearances 'consistent with marked achalasia'.

Urgent upper GI endoscopy confirmed a grossly dilated oesophagus with a large quantity of fluid residue leading to procedure abandonment. Water-soluble contrast imaging revealed gross oesophageal dilatation with beaked tapering at the level of the gastric band.(Figure)

Fig 1. Still from water-soluble contrast swallow, showing gastric band (white arrow) causing incomplete obstruction of the oesophagus, leading to marked dilation and tortuosity of the structure (black arrow).

She was referred to the upper gastrointestinal surgical team for review, at which point the band was deflated percutaneously. Her symptoms improved markedly and after lengthy discussion around the benefits and hazards of keeping the gastric band she elected to undergo laparoscopic removal. This was performed without complication. The operative finding of anterior band slippage explained the symptoms on presentation. Contrast swallow imaging performed one day following band removal showed a marked improvement in her oesophageal emptying although the oesophagus remained dilated. On review two weeks later she reported eating a near normal diet and was almost symptom free.

In a series of 126 patients having laparoscopically inserted gastric bands, anterior slippage was detected in ten (7.9%) individuals.[1] There is no bariatric surgery service in Northern Ireland and the number of individuals who have undergone surgical intervention in United Kingdom or abroad is unquantified. This case highlights that a lack of such a service can delay diagnosis and treatment of associated complications. The proportion of obese adults in Northern Ireland is comparable with nationwide rates at 24%.[2] In a retrospective review in 2009, Arias et al[3] identified five out of 257 patients (1.9%) presenting with megaoesophagus following gastric band insertion. The mean postoperative time to complication was significantly shorter than in our patient at 32 months (range 24-36) and in all cases the band was removed. With this unusual delay it was important that we excluded oesophageal cancer with careful endoscopy.

Given the lower complication rates and proven superiority of gastric reduction surgery such as Roux-en-Y bypass and sleeve gastrectomy to gastric band insertion in sustaining weight loss, type 2 diabetes control and hypertension remission, the incidence of band insertion continues to reduce with time.[4,5] Despite this, as the risk of complications of gastric band insertion remains a possibility we urge all healthcare practitioners to be vigilant and preferably to refer to an upper gastrointestinal service with a specialist interest in bariatric intervention.

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IMAGING FOR SUSPECTED RENAL COLIC IN A DISTRICT GENERAL HOSPITAL; IS AN X-RAY OF THE RENAL TRACT AN OUT-DATED INVESTIGATION?

Editor,

Acute renal colic is a common, often recurrent condition with an annual incidence of 1-2 cases per 1000 and a lifetime risk of 10-20% for men and 3-5% for women [1-3]. Whilst historically, a plain radiography of the renal tract (XR KUB) was routinely performed, a non-contrast computed tomography scan of the urinary tract (CT KUB) within 24 hours of presentation is currently the investigation of choice for suspected renal calculi [4,5]. We assessed the investigation pathways followed for patients presenting to the emergency department in a large district general hospital with suspected renal calculi to determine the utilisation and role of XR KUB and CT KUB.

The hospital's radiology database was utilised to identify all patients undergoing CT KUB for suspected renal calculi during a 12-month period (September 2012-2013). All CT KUBs were requested at the time of presentation. Patient demographics (age, gender) were recorded. The performance of XR KUB prior to CT KUB was documented, as were CT KUB results and time interval between presentation and scanning. Patients were grouped according to their gender and ages range (<30, 30-60, and >60 years).

154 patients were identified (88 males and 66 females). 72 patients (46.7%) were diagnosed with a renal calculus by CT KUB being present in 49 (55.7%) males with a mean age of 47.2 years and 23 (34.85) females with a mean age of 38.2 years. 110 patients (71.4%) out of 154 had an XR KUB prior to CT KUB. Compared to CT KUB, XR KUB had a sensitivity of 62.3% and specificity of 92.6%, positive predicative value 90% and negative predicative value 71.4%. XR KUB had a true positive rate of only 32.7% (36/110) for renal calculi.

Table 1:

Comparison of performance of XR KUB and CT KUB for detection of renal calculi.

	CT KUB +ve	CT KUB -ve
XR KUB +ve	36	4
XR KUB -ve	20	50

For patients aged <30 only 8 of 28 (28.6%) had calculi identified while no females over 60 had calculi identified with an overall positive rate for this age group of 27.6% (8/29). 117 patients (75.9%) had CT KUB performed <24 hours of presentation and 58 (49.6%) had calculi identified. Of the 37 patients who waited >24 hours for CT KUB, only 14 (37.8%) had calculi identified.

XR KUB has a low sensitivity compared to CT KUB, providing no additional value, and so in accordance with published guidelines should be avoided. Efforts are required

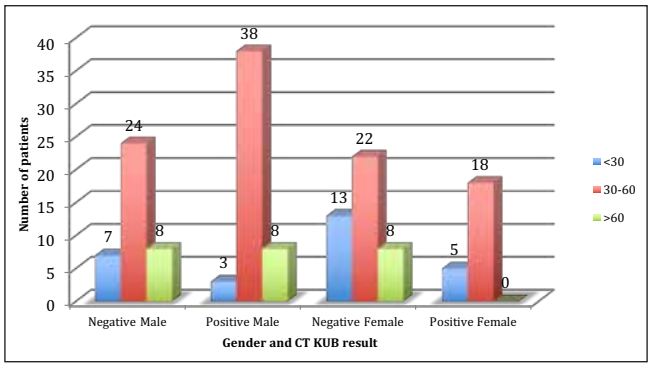

Fig 1. Number of positive and negative CT KUB results for patients grouped into gender and ages ranged less than <30, 30-60, and >60 years.

to reduce negative CT KUB numbers and to insure that scans are performed <24 hours, preferably sooner, as this is associated with a higher pick-up rate for calculi. Females present a particular diagnostic challenge and the indiscriminate use of CT KUB should be re-evaluated.

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A SIMPLE TECHNIQUE TO IMPROVE BOWEL DECOMPRESSION AT LAPAROTOMY

Editor,

Decompression of small or large bowel is often necessary during laparotomy. During a bowel resection, intra-luminal decompression may be performed using a hypodermic needle or alternatively a standard plastic or reusable metallic sucker [1,2]. This approach leads to repeated obstruction of the device due to the semi-solid nature of the effluent and risks spillage of enteric contents, with potential intra-peritoneal contamination. Milking small bowel effluent proximally into the stomach and aspirating via nasogastric tube increases the risk of intestinal trauma and potential respiratory sepsis.

Fig 1. Remove proximal guide from a 32 FG chest drain.

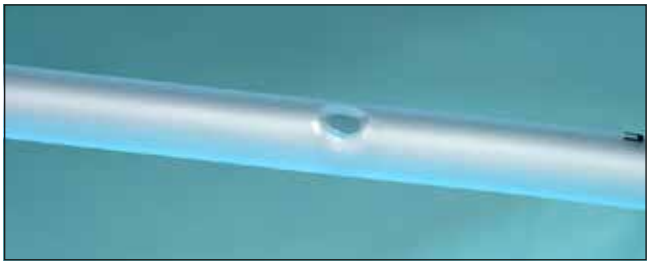

Fig 2 & 3. Fold over drain approximately 4cm from proximal end and cut out a small triangle. The resulting circular venting hole can be occluded to control the level of suction.

Fig 4. Insert drain connector into proximal drain lumen and connect to standard suction tubing.

We have modified existing techniques to facilitate wide bore decompression of obstructed small or large bowel, whilst simultaneously minimising contamination, utilising a standard 32FG chest drain.

There are currently many available devices for intra-operative bowel decompression. Commonly encountered problems with these devices include blockage by intra-luminal content, as well as repeated suction damage to bowel mucosa. Using a 32FG chest drain provides a bigger lumen with multiple drainage holes, enabling larger volumes and particles to be suctioned efficiently. It is more flexible, thus limiting damage to bowel mucosa; however, caution must still be taken as the plastic is firm. Tightening of the purse-string suture on enterotomy closure minimises contamination. Although there is not one decompressive strategy that can be implemented in all cases, with a move towards intra-operative colonic lavage and primary anastomosis, this simple technique is an inexpensive, beneficial addition to the surgeon's armamentarium [2,3].

Fig 5. Fashion a 2cm purse string suture in the anti-mesenteric border of the bowel, leaving suture ends untied. Create a controlled enterotomy within the confines of the purse string. Carefully insert the chest drain without suction and pull the suture tightly around the drain.

Fig 6. Place thumb over venting hole formed earlier to create suction and evacuate enteric contents. When evacuation is complete remove the drain from enterotomy, pulling tightly on suture to prevent spillage of bowel contents and tie suture to close.

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INTESTINAL CRYPTOSPORIDIOSIS MIMICKING ACUTE APPENDICITIS

Editor,

Surgery for acute appendicitis (AP) is one of the commonest emergency surgical procedures performed on the acute take. The differential diagnoses for AP are well known to those involved in acute general surgical practice. Unusually, other causes may mimic this common acute surgical condition, one of which is Cryptosporidial enteritis.

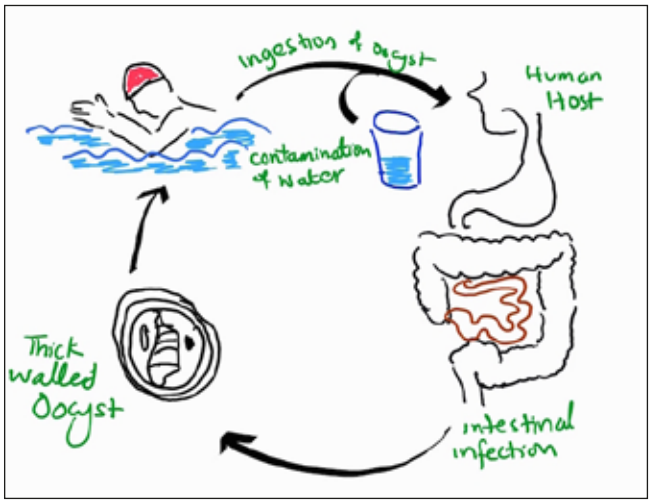

Fig 1. Cryptosporidium life cycle in a human host.

We report a case of a patient presenting with right iliac fossa pain (RIF) and diarrhoea who had a histologically normal appendix and whose stools were positive for Cryptosporidia oocysts.

A 19-year-old female presented with a short history of RIF pain and diarrhoea. Whilst inflammatory markers and an ultrasound scan were essentially normal, acute appendicitis could not be excluded and she proceeded to appendicectomy. At operation there was a grossly normal appendix with a small amount of fluid in the RIF and associated mesenteric lymphadenopathy. Appendicectomy was completed and histopathology reported a normal appendix. Post operatively the patient had ongoing diarrhoea and microbiology of stools samples reported Cryptosporidia oocysts. Otherwise, the patient was systemically well. At outpatient review, her symptoms had settled and she was discharged.

Cryptosporidium infection (also known as cryptosporidiosis) is an important cause of gastroenteritis. It may affect any age group, however is more classically symptomatic in children and immunocompromised individuals. There were in the region of 143 reported cases of cryptosporidium infection in Northern Ireland in 2014[1].

Cryptosporidium in humans is caused by two main species - Cryptosporidium hominis and parvus with an incubation period of between 3 and 12 days. It is usually a self-limiting diarrhoeal illness, although in some cases, it can be more severe. Infection is commonly transmitted via the faeco-oral route (Figure 1). Sporadic cases can also be transmitted via animal contact or drinking contaminated water. Many reported disease outbreaks are linked to contaminated water as the organism is resistant to disinfectants and chlorine [2].

Once inside the gastrointestinal tract (GIT), the organism reproduces within the epithelial lining, commonly the jejunum and ileum [3]. Confirmation of the diagnosis requires stool microscopy to identify cryptosporidium oocysts, which is considered the gold standard [4]. In cases where microscopy is negative and the diagnosis is considered, colonoscopy with biopsy may aid diagnosis.

In this case, a diagnosis of Cryptosporidial enteritis was not considered. The history of diarrhoea and the positive stool samples retrospectively made the diagnosis and also explained the operative findings.

The Authors have no conflict of interest

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PRESCRIPTION OF SECONDARY PREVENTION MEDICATIONS TWO YEARS POST CORONARY ARTERY BYPASS GRAFTING: AN AUDIT OF REGIONAL PRACTICE

Editor,

Coronary artery bypass graft surgery (CABG) is among

the most commonly performed cardiac operations, with over 20,000 procedures conducted annually in the United Kingdom.[1] The efficacy of CABG has been well established, as demonstrated in numerous studies. Nevertheless, the progression of native coronary artery atherosclerosis, as well as the occlusion of bypass grafts, continue to predispose patients undergoing CABG to an increased risk of myocardial infarction and death. To reduce the occurrence of major adverse cardiovascular events, secondary prevention is of paramount importance and includes appropriate medical therapy and lifestyle modifications.[2]

Table 1.

Secondary prevention prescriptions 2 years post-CABG (n=50)

Medication	% Prescriptions
Aspirin (or alternative if aspirin contraindicated)	100
Statins	100
β-blockers	91.7

The use of secondary prevention medications (antiplatelet agents, β-blockers, renin-angiotensin-aldosterone system blockers and lipid-lowering agents) has been associated with a lower rate of adverse cardiac events in patients after CABG and is therefore a Class I recommendation in national and international guidelines. However, despite evidence supporting the use of these medications, implementation has been inconsistent.[3] Whilst our own internal audits have found excellent secondary prevention prescription on discharge, we sought to investigate medium to long-term adherence to guidelines.

An audit of regional practice regarding prescription of secondary prevention medication was conducted against the relevant guidelines published by American Heart Association / American College of Cardiology Foundation (AHA/ACCF) and National Institute for Health and Care Excellence (NICE).[4,5] Patients who underwent isolated CABG in the Royal Victoria Hospital were identified from our database (n = 50) and assessed for prescription of aspirin, β-blockers and statins at a mean time of two years and one month post discharge. The audit was performed in May 2014. Current medications and most recent cholesterol levels were obtained using the Northern Ireland Electronic Care Record (NIECR).

The results are summarised in Table 1. NICE guidelines, in effect during the period in which the audit was conducted, recommended total cholesterol (TC) concentration < 4 mmol/l, with low density lipoprotein (LDL) < 2 mmol/l. However, it is accepted that a substantial proportion of patients fail to achieve this, thus group audit target with respect to TC should be < 5 mmol/l.[5] Our audit identified 91.7% of patients achieving TC concentration < 5 mmol/l, and of these, a total of 43.8% achieved the lower target. Drug allergy was not a reason for patients to be excluded from β-blocker therapy. We found three patients initially prescribed β-blockers on discharge, whose treatment was subsequently stopped. Additionally, in one particular patient, no β-blocker was prescribed on discharge and no corresponding reason documented.

In conclusion, adherence to prescription of secondary prevention medication in the medium to long-term post-CABG is excellent. However, as we all strive for perfection, it was noted that 42% of patients remain on the same dose of β-blocker issued at discharge, which may indicate a missed opportunity for up-titration.

Our study may also be influenced by the limitations of NIECR as not all prescriptions are routinely updated on the database. Another limitation is that patient compliance was not measured. It remains the responsibility of surgeons, cardiologists, general practitioners and community pharmacists to educate patients on the importance of continued adherence to secondary prevention medications.

The authors have no conflict of interest.

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IMPROVING STANDARDS IN RADIOLOGY REQUEST FORMS: A SCORING TOOL FOR CLINICAL AUDIT

Editor,

Adequately completed radiology request forms play an essential role in communication between practitioners, the patients they treat and radiologists responsible for minimising radiation exposure.[1,2] Incomplete radiology request forms are commonly encountered by radiologists, hampering their ability to triage requests and assess appropriateness.[3] Clinicians often compound the problem by delegating responsibility for completing requests to the most junior member of the medical team during a busy ward round, where time pressures ensure that the clinical information is scantly recorded.[1] Given that few audit tools are available to assess standards of radiology requests we aimed to develop an audit proforma to assist in identifying current standards and measure improvement of emergency CT request forms for patients admitted to our surgical unit.

Figure 1: Evaluation of Clinical Information on Emergency CT Request Forms

Patient Demographics		
Name: *	Y/N	
Hospital Number: *	Y/N	
Age/Date of Birth:	Y/N	
Sex:	Y/N	
Patient Ward/Location: *	Y/N	
Clinical Information		
Clinical History:	Y/N	
Clinical Signs:	Y/N	
Previous Surgery:	Y/N	If so what_____
Inflammatory Markers:	Y/N	
Reference to previous imaging:	Y/N	
Differential Diagnosis:	Y/N	If so what_____
Documented eGFR:	Y/N	If so what_____
Referring Clinician Details		
Name of referring practitioner: *	Y/N	
Contact details of referring practitioner:	Y/N	
Grade of referring practitioner: *	Y/N	If so what_____
Name of responsible consultant for patient: *	Y/N	
TOTAL SCORE: /16		

* Mandatory fields on the Sectra electronic radiology request system (used predominantly in Northern Ireland) that prevent the referrer sending a form without completion. Such fields will yield a 100% completion rate and as such may be removed yielding a 10 point scoring tool in the case of those utilizing Sectra.

A 16 point universal scoring tool incorporating patient demographics, clinical information and requesting physician details was developed by members of the surgical and radiology departments in Craigavon Area Hospital. The format of this tool is applicable for use when dealing with hand written or electronic requests but in centres using electronic request systems, containing mandatory fields, the audit tool may be adapted. In Northern Ireland, where the Sectra system predominates, the universal tool may be collapsed to 10 points when the mandatory fields, such as referring clinician name and grade, are removed (Figure 1). A retrospective review of 200 consecutive inpatient CT requests was carried out. A point was allocated to each completed parameter and an overall score calculated. Results were then presented to the surgical team and a prospective audit of 100 consecutive requests performed.

The overall mean score for CT request form completion improved from 13.3 (83.1%) to 15.3 (95.6%). Documentation of previous surgery (35% to 71%), reference to previous imaging (37.5% to 75%), documentation of clinical signs (67% to 97%) and contact details of requesting practitioner (79.5% to 98%) all showed improvement. Of the 16 parameters assessed, 12 had greater than 90% completion after the audit loop was completed. Of the 300 request forms sampled, 212 (71%) were requested by Foundation Year One doctors emphasising the delegation of such tasks to junior members of the team. The cumulative effect of improvement in standards has been to reduce the number of final CT reports asking for additional clinical information from 13.5% to 1%.

In summary, inadequately completed radiology requests represent a safety concern as patients are potentially exposed to ionising radiation unnecessarily. As referring clinicians, we are responsible for ensuring adequate information is available for our radiology colleagues.[2] This scoring tool offers a method of appraisal for radiology requests and, as demonstrated by audit, may be used to assess current practice standards and measure improvement. It also provides opportunity to educate junior trainees on how to summarise pertinent clinical information and formalise this in a radiology request. Whilst this tool was developed for the assessment of emergency CT requests we believe its methodology is applicable to all forms of radiology request.

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James Logan Essay

The Importance of Patient Dignity in Care at the End of Life

Grace Kennedy

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PREFACE

James Alexander Logan, a second-year medical student at the Barts and The London School of Medicine and Dentistry, died in February 2001 after a painful illness. A Trust was set up in his name in 2003 to promote education in the recognition and treatment of cancer pain and it provided funds for an annual essay prize, open to those undergraduate medical students of Queen's University, Belfast, who had completed their fourth year palliative care teaching. The first competition took place in 2010 and the winning entry appeared in the Ulster Medical Journal in 2011.

The Trust itself was dissolved in 2014 but the essay prize continues and the Trust's website can still be accessed at http://www.jameslogantrust.org.uk/

INTRODUCTION

When one hears the words 'patient dignity', one tends to think of showing the patient that they are, in a sense, worthy of honour and respect. While no-one is likely to dispute that patient dignity is an important concept, it is much more difficult to translate this abstract concept into the clinical setting. Maintaining patient dignity is something we often hear mentioned when discussing the principles of palliative care; however it is possible that this almost becomes a phrase of vain repetition with little relevance to the quality of care the patient actually receives.

The purpose of this essay is to consider why dignity is important in palliative care and how the concept of dignity can affect one's day-to-day practice.

DEFINITION

Firstly, one may ask the question 'What is dignity'? The word dignity originates from two Latin words, *dignitus* (merit) and *dignus* (worth). The International Council for Nurses Code of Ethics 2012 instructs that the observance of dignity should not be limited by the individual's age, colour, creed, culture, gender, sex, nationality, race, social status, or health status. However, while dignity is accepted as a universal need which is fundamental to the well-being of every individual in all societies, the actual 'practical' meaning of dignity remains complex and unclear because it is a multidimensional concept[1].

The concepts of *respect*, *autonomy*, *empowerment* and *communication* have been identified within the literature as being key defining attributes of dignity. In turn, each of these attributes is multidimensional, further contributing to the complex, ambiguous nature of the concept. For example, *respect* may involve self-respect, respect for others, and respect for people's privacy; *autonomy* may involve having choice, giving choice, making decisions, competence and independence; *empowerment* may involve self-esteem, self-worth, modesty and pride; and *communication* may involve explaining and understanding information using verbal and non-verbal modalities[2].

NEEDS OF THE PATIENT

Secondly, one may ask 'What practical implications will this abstract, multidimensional concept have for patients requiring end-of-life care?' Two key factors which influence the preservation of dignity at the end of life are promoting self-respect and treating the patient with respect[3]; but how are these translated in practice into palliative care? Most end-of-life interventions focus predominantly on symptom control, rather than holistic care[4]. Therefore it may be helpful to consider the *physical*, *emotional* and *spiritual* needs of patients in palliative care settings.

Regarding *physical* needs, when trying to enhance and preserve dignity, a systematic review found that symptom control and being placed in the correct environment are important in delivering dignified end-of-life care[5]. Good management of physical symptoms such as pain, dyspnoea, constipation, nausea, and respiratory secretions may allow for opportunities to work through unfinished emotional, psychological and spiritual issues, and promote a sense of closure towards the end of life[6]. However, invasive and inappropriate investigations should be avoided[7].

Regarding *emotional* needs, a review found that important actions for healthcare professionals providing end-of-life care include communicating, listening, conveying empathy, and involving patients in decision-making[8]. Furthermore, good communication between the patient and their partner about their feelings should be promoted[9].

Spiritual needs should also be addressed[7]. An observational study evaluated the spiritual needs of patients with terminal

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cancer. The two most relevant needs were the need to be recognised as a person until the end of life without losing their identity, and the need to know the truth about their illness. Less importance was placed on concerns for the past and future, and for religious matters [10]. It would appear that, as spiritual care goes beyond the scope of religion, it involves more than facilitating access to the relevant chaplains. Any healthcare professional can be involved in spiritual care by being present, understanding the patient's perspective, and creating with the patient a holistic care plan which considers dignity issues[11].

Other measures found to promote dignity include enabling of the management of finances, facilitating activities such as reading or watching television, allowing the patient to spend time with their family, providing choices regarding the place of death, remembering the dignity of the family after the death of the individual, and offering emotional support [7]. In addition, life storytelling has been shown to help individuals with dementia maintain their dignity of identity. This may be helpful in end-of-life care also, and may help carers better understand the patient's needs [12].

The age of the patient may influence how one thinks of dignity in end-of-life care. For example, a study to explore the characteristics of a 'good death' for children with cancer highlighted the importance of maintaining 'normality' as far as possible. Thus the child should be offered sufficient opportunities to play freely, access to their usual activities and relationships, a sense that others acknowledge and respect the patient's childhood, and symptomatic care. There should also be less emphasis on the prospect of impending death [13].

Religious and cultural factors may also influence how one thinks of dignity in end-of-life care. As dignity is a value- and culture-laden concept that encompasses a wide spectrum of physical, psychosocial, spiritual, familial and cultural issues, an awareness of ethnic diversity is required for all healthcare professionals [4]. For example, Muslims may view a 'dignified death' as one where the individual dies facing Makkah and has someone present to recite the Qur'an [14]. A Hindu may accept or reject certain treatments based on their interpretation of suffering in relation to beliefs about Karma [15].

LOSS OF DIGNITY

Thirdly, let us consider 'What is loss of dignity?' I would propose that there is no clear distinction between dignity being present or lost in end-of-life care; rather loss of dignity is a spectrum and is subjectively experienced. A case report highlighted aspects of losing one's dignity as 'insults'; in this example the lady was most bothered by junior members of staff addressing her by her forename and having to wear poorly-fitting hospital gowns [16]. A longitudinal study found that a downward trend in the sense of dignity following admission to a nursing home was associated with the feeling of a loss of control and a loss of self-worth [17].

Considerations of patient dignity may also be set aside unintentionally due to time constraints and heavy workloads, for example in the Emergency Department [2]. Lack of feeling empathy or the inability to emotionally engage with patients may indicate healthcare provider burnout[18]. Spiritual care has been shown to be hindered by a lack of privacy and discontinuity in care [11]. Furthermore, the concept of dignity may be forsaken due to the pressures of modern medicine, where the emphasis is on providing *care* (i.e. evidence-based practices) rather than actually *caring* (i.e. developing a relationship with the patient and understanding what matters to them) – two concepts which ought to be inseparable [18].

IMPORTANCE OF DIGNITY

Fourthly, 'Why is dignity in end-of-life care important?' Unsurprisingly, no-one appears to have studied whether or not patients and/or healthcare professionals believe dignity in end-of-life care is important, nor have they tried to quantify 'how much' dignity is required. "The secret of the care of the patient is in caring for the patient" are words which were delivered by Dr. Francis Peabody in his famous address to Harvard medical students in 1925 [18]. Why? It is no surprise that patients and families are less satisfied with medical encounters when the 'caring' aspect of care is lacking. A lack of caring may result in the patient being less forthcoming with concerns – leading to missed treatment opportunities, medical errors, and ultimately compromised patient safety. Furthermore, studies consistently show that most complaints against healthcare professionals derive, not from medical errors, but from a failure to communicate and the absence of caring – in other words, compromised patient dignity [18].

PROMOTION OF DIGNITY

Fifthly, 'how can dignity be promoted?' As touched on previously, dignity can be upheld by measures such as symptom control [5]; promoting independence, privacy, social support and a positive tone of care [8]; listening, giving appropriate information, having a caring bedside manner [19]; and showing respect, empathy and companionship [16]. Spiritual care has been shown to be facilitated by having sufficient time, employing effective communication, and reflecting on one's personal experiences [11].

It is clear that involvement of the palliative care team encourages a sense of dignity as the emphasis is less on the disease and more on the person [16]. Measures such as getting acquainted with new living structures or involvement with staff and other residents have been shown to encourage a sense of dignity among nursing home residents – measures which may be transferred to palliative care units [17].

A sense of depersonalisation reduces the perception of patient dignity [10]; thus getting to know the patient as a person is likely to help promote dignity. The Patient Dignity Question (PDQ) *'What do I need to know about you as a person to take the best care of you that I can?'* was devised for patients with palliative care needs by Chochinov to combat this depersonalisation associated with modern medicine [20].

The PDQ was found to be acceptable to patients with

palliative care needs [21]. Asking this question was found to make improvements to a person-centred environment and levels of empathy perceived by patients, and also supported disclosure of information previously unknown to healthcare professionals [22].

In one study, 93% of patients felt that the information they disclosed was important for healthcare professionals to know, whilst 99% said they would recommend the PDQ for others. Furthermore, 64% of healthcare professionals studied claimed to be emotionally affected by the response they received, and 59% said it influenced their sense of empathy [20].

Encouraging life review can also promote patient dignity [16]. In a formal sense, this may involve dignity therapy, a psychotherapeutic intervention proposed by Chochinov. Dignity therapy focuses on dignity conservation tasks such as settling relationships, sharing words of love, and preparing a legacy document for loved ones. Patients have reported high satisfaction and benefits for themselves and their families including an increased sense of meaning and purpose [23]. Compared with standard palliative care, patients undergoing dignity therapy reported that it improved their quality of life, increased their sense of dignity, changed how their family saw and appreciated them, was helpful to their family, and was superior to standard care in lessening sadness or depression [24]. Hospice staff also rated dignity therapy as worthwhile, felt it reduced pain and suffering, and felt it enabled a greater connection with patients. They also reported increased job satisfaction [25]. Commonly discussed topics during dignity therapy were autobiographical information, love, lessons learned in life, defining roles in vocations or hobbies, accomplishments, character traits, unfinished business, hopes and dreams, and guidance for others [26].

HEALTH CARE PROFESSIONAL

Sixthly, 'can healthcare professionals be taught how to promote patient dignity or does it come with experience?' This is difficult to say. It has been suggested that there is actually a decline in the level of empathy shown by medical students as they progress through medical school, perhaps driven by the greater emphasis placed upon technology and innovation than on individual patient's needs [27]. There appears to be nothing in the literature relating to dignity in the Objective Structured Clinical Examinations; however it has been suggested that the subject of dignity should be incorporated in its own right within the curriculum for those studying to become healthcare professionals, perhaps in an inter-professional education setting [28]. In developing a 'culture of caring', caregivers are recommended to look at what shapes their 'tone of care', including their own attitudes, vulnerabilities, and fears [18].

CONCLUSION

In conclusion, despite being viewed as an abstract concept, the importance of patient dignity in end-of life-care cannot be denied. I propose that the concept of dignity may be likened to that of love – important, widely understood, difficult to define, and cannot be taught in a black-or-white manner. As dignity is subjectively experienced and each patient is unique in their requirements, it is important that healthcare professionals use an open approach to assess each patient's needs and aim to meet these accordingly, using discretion as to what is appropriate when providing care for patients of different ages, cultures and religions. Simple measures such as the PDQ and life storytelling can help healthcare professionals view the patient receiving end-of-life care as a person; thereby helping them to promote patient dignity and address needs which would otherwise not be known.

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Book Reviews

THE MATER – THE STORY OF A BELFAST TEACHING HOSPITAL AND ITS COMMUNITY

Dr Mark Gormley, Mary Hinds, 160 pages. Publisher: Dr Claude Costecalde 2015. ISBN 978-1-906886-67-7. RRP £15.00

This elegantly produced book outlines the history of the Mater since it opened as a 28 bedded hospital on 1 November 1883.

In 1899 it expanded to 150 beds. Funding was provided by charitable donations, including a Grand 6 day Bazaar in the Ulster Hall. Later the Working Men's Maintenance Committee contributed generously. In 1948 the 'Young Philanthropists' had the brilliant idea of setting up a football pools company, and this raised many millions over the succeeding years.

At the inception of the NHS in 1948 the Unionist Government failed to offer guarantees similar to those given to voluntary hospitals in the rest of the UK, and the Mater had to survive independently until 1972.

The book reflects the Mater as part of its society. In 1886 it treated hundreds of casualties from the Home Rule riots in which over 50 were killed (la plus ca change!). In 1922 government forces fired at the hospital using a machine gun from Crumlin Road Prison. During the blitz there was bomb damage to the Nurses' Home. In 1976 Sinn Fein's Vice-President Maire Drumm was murdered in her hospital bed.

Staff were not immune from the violence. In 1972 consultant ophthalmologist Peter Gormley's car was ambushed. He was shot and his son Rory was killed. The son of consultant surgeon Paddy Lane was also murdered in 1972.

Astonishingly, consultants were not paid until the 1950s! (They were expected to survive on private practice). After this they received an 'honorarium', but this was much less than the salary of NHS Consultants.

First recognised for medical student and nurse training in 1899 the Mater has a long and proud tradition of teaching which continues to this day. Of note, in the 1920s nurses had to be 5' 2" in height and 8 stones in weight!

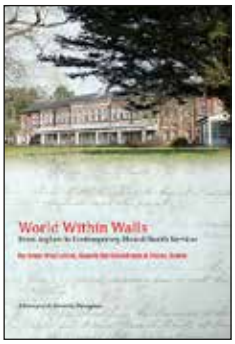
The first Mater doctor was (later Sir) Alex Dempsey. The hospital appointed the first full time anaesthetist in Ireland, Dr Claire McGucken, in 1923. In 1952 Dr Pearse O'Malley opened the first inpatient psychiatric unit in a general hospital in Ireland. In 1985 the Mater became the first hospital to offer day surgery for cataracts.

Throughout the 'Troubles' the Mater, which has long been the hospital of choice for the people of the Shankill Road as well as North Belfast and further afield, treated a remarkable number of patients and saved very many lives. The Emergency Department, despite several incidents when riot police had to be called, was a true oasis of healing, situated in an area which witnessed dreadful violence for over three decades.

This book, which is well laid out and generously illustrated with a range of photographs old and new is a fitting tribute to one of Northern Ireland's finest public institutions.

Dr Philip McGarry
Consultant Psychiatrist

WORLD WITHIN WALLS: FROM ASYLUM TO CONTEMPORARY MENTAL HEALTH SERVICES. A HISTORY OF ST. DAVNETS, MONAGHAN.



Anne McClelland, Niamh Nic Ghabhann, and Fiona Byrne. ISBN: 9781782804581 Available from local Monaghan bookshops at €25.

The story of Ireland's psychiatric asylums is a remarkable one. From the opening of the Cork Lunatic Asylum in 1791, and with changes to public attitudes and legislation throughout the 1800s, a series of asylums was established throughout Ireland. The numbers hospitalised were astonishing (increasing from 3,234 to 11,265 in the 40 years to 1891 - this at a time of a falling population), persistent and slow to decline. Ireland led the world in this: by 1961 one in every 70 Irish people over the age of 24 was in a psychiatric hospital bed. Several arguments have been advanced to account for this: the medicalisation of destitution; therapeutic zeal; philanthropic enthusiasm; and increased prevalence (rather than incidence) of illness because of the improvement in life expectancy. An important perpetuating factor was the centrality of the asylum to the life of the community, not least as a significant employer.

World Within Walls is an account of one such asylum that served Cavan and Monaghan, from its beginnings in 1869 as the Monaghan District Lunatic Asylum, until the closure of the St Davnet's Psychiatric Hospital acute inpatient unit in 2012. It is topped and tailed by two excellent essays: a short summary of Ireland's asylum system by Professor Brendan Kelly, and a personal perspective by the first chair of Ireland's Mental Health Commission Dr John Owens, credited with the remodelling of the Cavan/Monaghan mental health service – which became the model for psychiatric services in the Republic of Ireland and further afield.

The essential core of this book, however, is the history told in the personal experiences of patients and staff. Although it is impossible to summarise here this account of 150 years of experience, the impression is of a largely enlightened and compassionate workforce, delivering care in difficult

circumstances, and when resources from public funds were often limited. They juggled with many of the difficulties the modern practitioner will recognise: overcrowding; the risks of institutionalisation; staff concerns about working conditions and pay; and the physical health of the patients. There are detailed records of the contribution of St Davnet's Hospital to the local community, such as the hospital's football team and the St Davnet's Players, reflecting its importance in the life of Monaghan. The amount of detail is rich, sometimes excessively so, with accounts of ancient conflicts among staff that the casual reader might consider had been deservedly forgotten.

Frequently in such histories the voice of patients is less audible, unsurprisingly, and often via third parties alone – staff, for example. The World Within Walls project uses oral testimony to supplement its history gathering, to good effect. Through this, a sense emerges of a patient experience that could be dreary, regimented and boring, with little privacy.

The dramatic transformation of the local psychiatric service in the last twenty years, which became a template for the rest of Ireland, was perhaps the greatest legacy of the institution. With a declining inpatient population, and the increasing recognition of the importance of community care, the days of the asylum were numbered. The asylum system of Ireland, examined through a modern lens, has often been pilloried and seen as a flawed system that outlived its time and in which far too many were hospitalised. Nevertheless, it was staffed in the main by compassionate and dedicated individuals, who strove with diligence to provide care. This book is an important account of the experience of staff and patients alike, and will provide an enduring legacy.

Dr Nial Quigley, Consultant Psychiatrist.

Ulster Med J 2016;**85(1):**51-54

Abstracts

ULSTER SOCIETY OF INTERNAL MEDICINE 94th (Autumn) MEETING, Friday 30th October 2015

Ulster Hospital Dundonald

PROGRAMME:

2.00 pm **Evaluating 7-day re-admission rates in Antrim Area Hospital.**
Collins P, Trouton T, Riddell J.
Cardiology Department Antrim Area Hospital.

2.15 pm **Faecal Calprotectin in the Diagnosis and Monitoring of Inflammatory Bowel Disease**
Boyle S, McGoran J, Loughery C, Rafferty G
Department of Gastroenterology, Belfast City Hospital

2.30 pm **A Uterine presentation of Giant Cell Arteritis**
Stewart RGA, O'Neill AB, Benson CE.
Department of Rheumatology, Musgrave Park Hospital. Belfast.

2.45 pm **Guest Lecture: "The changing face of Meningococcal Meningitis in Northern Ireland."**
Prof. John Moore,
Consultant Microbiologist, Belfast HSC Trust.

3.15 pm **Afternoon Tea** and **Poster Viewing**
Refreshments sponsored by **Actavis.**

Poster 1 **The Final Duty of Care.**
MP Toal, KM Cullen, Department of Respiratory Medicine,
Royal Victoria Hospital, Belfast, UK

Poster 2 **Difficult thyroid function tests**
McNabb B,Trinick T, Duly E,McHenry CM
Depts of Endocrinology and Clinical Biochemistry, Ulster Hospital, Dundonald, Belfast

Poster 3 **Prescribing and Monitoring of Electrolyte Supplements**
F McCann, A Deeny, T McNeilly
Craigavon Area Hospital, Southern Health Trust

3.40 pm **Grand Rounds: Cases from Ulster Hospital Dundonald.**
Facilitators: Dr Iain Gleadhill, Dr Tony Tham.
Presenters: Paul Brennan, Sarah Gordon and Philip Hall.

4.10 pm **Identical twins with atypical Muscular Dystrophy.**
P Devlin, C McQuillan, CM Wilson, A Muir.
Department of Cardiology, Belfast HSC Trust, Belfast, UK.

4.25 pm **Co-existing non-alcoholic fatty liver disease and type two diabetes**
A Kearney, J McGoran, AG Nugent,
Depts of Endocrinology and Gastroenterology, Belfast City Hospital, Belfast UK.

4.40 pm **Guest Lecture: "Atrial fibrillation for Physicians."**
Dr Nick Cromie, Consultant Cardiologist,
Royal Victoria Hospital, Belfast HSC Trust.

5.10 pm Presentation of prize for the best abstract.

2PM ORAL

Return to Sender: Evaluating 7-day re-admission rates in Antrim Area Hospital.

Collins P, Trouton T, Riddell J.

Cardiology Department, Antrim Area Hospital.

Between January 2014 and December 2014 the Cardiology Department in Antrim experienced a large number of 7-day readmissions, i.e., the number of patients who were discharged from the department and then readmitted from A&E within 7 days of their discharge.

Cardiology had the second highest figures within the hospital with 144 of 2780 patients. This number was also high in comparison with national rates, with the readmission percentage close to double the national lower quartile (4.2% vs. 2.2%).

In an attempt to identify reasons for potentially avoidable readmissions and suggestions for future improvements a retrospective audit of a sample (86 patients) was undertaken. The audit examined patient demographics, presenting complaints, length of stay, co-morbidities and eventual outcomes.

The audit showed that, of the original sample figure of 86

readmissions, only 43 were true readmissions for the same clinical problem (see table). The audit also identified a small cohort of 5 patients accounting for 26% of the readmissions. Patients who had a recent cardiac event were more likely to represent with benign symptoms e.g. troponin-negative chest pain or palpitations.

A re-audit is proposed following interventions which include Consultant coding on discharge and patient education on post-discharge symptoms and management.

215PM ORAL

Faecal Calprotectin in the Diagnosis and Monitoring of Inflammatory Bowel Disease

Boyle S, McGoran J, Loughery C, Turner G, Rafferty G

Department of Gastroenterology, Belfast City Hospital

Faecal calprotectin (FC) is a novel method for measuring gut inflammation which was conceived originally to distinguish between inflammatory bowel disease (IBD) and irritable bowel syndrome.[1] Its use has expanded as a surveillance tool in established IBD. Prudent requesting for this novel test is vital to ensure its sustainability.

We collected data on the first 150 FC results of 2014. Paediatric and private cases were excluded from the analysis.

108 patients were identified after exclusions were applied, 55 of which had known IBD. Three cut-off points were used in analysing the FC- <50µg/g, 50-199µg/g and >200µg/g. Of those not known to have IBD, 6/12 of patients who had calprotectin >200µg/g and 0/15 who had levels 50-199µg/g had evidence of inflammation on colonoscopy.(See Table) Among those with known IBD reviewed in clinic, 51.4%(18/35) of patients in the FC >200µg/g underwent a step-up in therapy compared to 23%(3/13) in the 50-199µg/g group. Twenty-five out of the 54 patients without known IBD had FC <50µg/g, with all such patients declared as not having IBD, only two of which actually undergoing colonoscopy to support this.

Our data corresponds with the literature in that that a FC level below 50µg/g can adequately exclude IBD. When applied as part of the entire approach to the care of those with a suspected or established diagnosis of IBD, FC can be a useful and cost-effective tool. FC levels exceeding 200µg/g when used appropriately can carry high positive predictive value for IBD and steer treatment in established disease.

FC Level (µg/g)	>200	50-199
Not known IBD	12	15
Proceed to Colonoscopy	8(66.7%)	6(40.0%)
New IBD Diagnosis Made	6(50.0%)	0(0%)

1. Dabritz J Musci J, Foell D. Diagnostic utility of faecal biomarkers in patients with irritable bowel syndrome. *World Journal of Gastroenterology*. 2014;**20(2)**:363-75.

230PM ORAL

A Uterine presentation of Giant Cell Arteritis

Stewart RGA, O'Neill AB, Benson CE.

Department of Rheumatology, Musgrave Park Hospital. Belfast.

An 85 year old lady was referred to Rheumatology following a hysterectomy for Stage 1A endometrial adenocarcinoma having presented with post-menopausal bleeding. Uterine section also showed 'a prominent giant cell reaction in the media reminiscent of giant cell arteritis.'

At clinic the patient was well with no constitutional symptoms and no symptoms suggestive of vasculitis, in particular giant cell arteritis, or polymyalgia rheumatica.

Investigations showed anaemia of chronic disease, chronic kidney disease and ESR 78mmol/L. There was no proteinuria and urine microscopy was negative for red blood cells and casts.

A CTPET showed FDG uptake along the length of both vertebral arteries including intracranial segments.

A temporal artery biopsy was subsequently performed showing changes in keeping with temporal arteritis although giant cells were not seen.

This lady was started on a tapering dose of prednisolone with rapid normalisation of ESR. Repeat CTPET after 3months on steroids shows resolution of vascular changes with no convincing evidence of increased vertebral artery uptake.

Vasculitis of the genital tract is unusual although has been reported in the literature. 8.3% cases of gynaecological vasculitis were associated with endometrial cancer in one series1. In systemic genital tract vasculitis giant cell arteritis appears to be the most common pathological finding[1]. CTPET is a well-regarded tool in the evaluation of large vessel vasculitis and has also been reported in the evaluation of uterine giant cell arteritis[2]. Use of CTPET should be strongly considered for the investigation of patients with an incidental finding of giant cells in pathology.

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410PM ORAL

Identical twins with atypical Muscular Dystrophy.

P Devlin, C McQuillan, CM Wilson, A Muir.

Department of Cardiology, Belfast HSC Trust, Belfast, UK.

Emery-Dreifuss muscular dystrophy (EDMD) primarily

affects skeletal and cardiac muscle.[1] Clinical features are usually evident from childhood but progress relatively slowly in comparison to other muscular dystrophies.[1,3] Involvement of the myocardium most commonly manifests with conduction disease and supraventricular arrhythmias. Atrial paralysis is a pathognomonic feature of EDMD.[4] EDMD is one of the most common subtypes of muscular dystrophy. It has a genetic basis.[6] In contrast to other muscular dystrophies, left ventricular systolic function is usually preserved in EDMD.[10] Atrial dilatation and right heart impairment dominate.[1] There is loss of atrial myocardium and progressive replacement of the normal myocardium by adipose and fibrous tissue.11 The resultant clinical and individual significance is an increased risk of sudden cardiac death.[12, 13]

In this case report, we describe a pair of identical male twins with the condition Emery Dreifuss Muscular Dystrophy, and their unusual clinical course. Conduction disease was apparent from their twenty's and managed with pacemaker devices. Tachyarrhythmia later necessitated device upgrade. But atypically, progressively severe LV impairment ensued. Genetic analysis was subsequently repeated and confirmed the original isolated diagnosis.

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1 Cardiac involvement in Emery Dreifuss muscular dystrophy: a case series. Buckley AE; Dean J; Mahy IR. *Heart*. **82(1)**:105-8, 1999 Jul.

2 Emery-Dreifuss muscular dystrophy and other related disorders. Emery AE. *British Medical Bulletin*. **45(3)**:772-87, 1989 Jul.

425PM ORAL

Co-existing nonalcoholic fatty liver disease and type two diabetes: A Retrospective review of management and outcomes

A Kearney, J McGoran, AG Nugent.

Depts of Endocrinology and Gastroenterology, Belfast City Hospital, Belfast UK.

Introduction: Nonalcoholic fatty liver disease (NAFLD) is the commonest cause of chronic liver disease worldwide.[1] It is strongly associated with type two diabetes and obesity. Treatment strategies include weight loss and managing insulin resistance. The effects of metformin on NAFLD are mixed but better results have been observed with thiazolidinediones and glucagon-like peptide-1 agonists (glp-1 agonists).[2] Cardiovascular disease and NAFLD are strongly associated. Rosuvastatin improves the biochemical and histological scores in NAFLD. We analysed the management of patients with type two diabetes and NAFLD,

Methods: A retrospective analysis of 46 patients with type two diabetes diagnosed with NAFLD between 2008 and 2013 in the Belfast Trust was performed. Data recorded included body mass index (BMI), glycated haemoglobin (HbA1c) and diabetic therapy. Outcomes measured included progression to cirrhosis, cardiovascular events and mortality.

Results: The average length of follow up was 44 months. At diagnosis of NAFLD the average BMI and HbA1c was 33.8kg/m2 and 67.9mmol/mol respectively. BMI averaged 34.5kg/m2 and HbA1c 61.5mmol/mol at the end of our follow up period. Statins were prescribed in 54.3%. Metformin, thiazolidinediones and glp-1 agonists were prescribed in 33, 3 and 1 case respectively. 22 patients (47.8%) progressed to cirrhosis, of these 12 (54.5%) within one year of presentation with NAFLD. Cardiovascular events occurred in 13% and mortality in 19.6%.

Conclusion: Co-existing type two diabetes and NAFLD carries a high risk of morbidity and mortality with high rates of progression to cirrhosis observed. Aggressive management strategies including weight loss and addressing cardiovascular risk profile appears essential.

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2. Federico A, Zulli C, de Sio I, Del Prete A, Dallio M, Masarone M, et al. Focus on emerging drugs for the treatment of patients with non-alcoholic fatty liver disease. *World J Gastroenterol*. 2014;**20(45)**:16841-57.

POSTER 1

The Final Duty of Care.

MP Toal, KM Cullen,

Department of Respiratory Medicine, Royal Victoria Hospital, Belfast, UK

Objectives: The importance of accurate and thorough documentation is frequently cited as a crucial factor in improving the quality of healthcare delivery. Documentation after the death of patients is equally important for several reasons: this allows timely release of the body to the family, clarity of the cause of death between healthcare professionals and acts as evidence in the event of legal proceedings.

Methods: The notes of 15 patients who died in the RVH Respiratory unit under the care of a Respiratory medicine consultant over a period of one month were analysed. We designed and implemented a simple one-page checklist based upon NI Coroner's service and Belfast Trust guidance. Following this intervention, the notes of a further 15 patients with the same inclusion criteria were measured against this standard. Included in this checklist was a complete list of indications for discussing a case with the Coroner, for ease of reference.

Results: Following the implementation of a checklist, improvement was noted in several parameters. Documentation of time of death and clinical signs of death improved by 1 (7.1%) and 2 patients (16.7%) respectively. Documentation of cause of death on certificate improved from 6 to 10 patients (66.7%). Documentation of updating of the Morbidity and Mortality register improved from 3 to 10 patients (233%). Documentation of discussion with responsible Primary Care team improved from 2 to 10 patients (400%).

Conclusions: A simple checklist was able to yield a notable improvement in several aspects of documentation after death over a two-month period

POSTER 2

Difficult thyroid function tests (TFT)

McNabb B,[1] Trinick T,[2] Duly E,[2] McHenry CM[1]

Department of Endocrinology and Diabetes[1] and Clinical Biochemistry[2], Ulster Hospital, South Eastern Health and Social Care Trust, Dundonald, Belfast

Thyroid function tests (TFT) are amongst the most commonly requested laboratory investigations. Interpretation is usually straightforward, confirming clinician's impressions regarding thyroid status. However, results may be discordant; either not in keeping with the clinical picture or incongruent with each other. It is important to consider confounding factors. Once excluded, laboratory artefact in commonly used TSH or thyroid hormone immunoassays should be screened for, avoiding unnecessary investigation. In the remainder, consideration should be given to rare disorders of the hypothalamic-pituitary-thyroid axis.

We studied clinical records of patients in whom TFT showed incongruent results (normal or elevated TSH with elevated Free T4 (FT4)) and whose samples were sent to Edinburgh Royal Infirmary (ERI) for analysis on a different immunoassay over 18 months.

Records of 16 patients were reviewed. The presenting incongruent TFT showed mean FT4 of 27.9±7.3pmol/L and TSH 2.7±2.8mU/L and were referred to ERI. Twelve of 16 (75%) patients had normal TFT (FT4 16.8±7.3pmol/L; TSH 1.8±1.9mU/L) when checked on their assay. Eleven were asymptomatic, one had classical thyrotoxic symptoms. Incongruent TFT were confirmed in the remaining four (thyroid hormone resistance, renal impairment with normalisation of TFT post-transplant, variable compliance of thyroxine replacement, declined investigation).

Where most TFT results fit with clinical assessment of thyroid status, a small subset of patients exhibit results that are discordant with the clinical picture or incongruent with each other. This study highlights when confounders are excluded, close liaison with clinical biochemists to exclude thyroid hormone and TSH assay interference is essential. Only then should further investigation be performed.

POSTER 3

Prescribing and Monitoring of Electrolyte Supplements

F McCann, A Deeny, T McNeilly

Craigavon Area Hospital, Southern Health Trust

Kardexes were reviewed over one month, on 1 medical and 1 surgical ward, identifying 33 patients who had been prescribed electrolyte supplements. The laboratory system was used to assess the initial deficiency and subsequent monitoring while on replacement. Kardex prescriptions were reviewed to assess start/stop date and duration of supplementation. Current trust guidelines were used as the standard to assess appropriate use of electrolyte replacement.

Prescription of supplements in the 33 patients was as follows - Potassium (58%), magnesium (15%), Phosphate (27%). 6 % of start dates and 55% of stop dates were not recorded on prescriptions. Duration of replacement ranged from 3-9 days. 55% of patients had supplements stopped by day 5. There was considerable variation in monitoring - 21 % received daily monitoring while 24% had no record of monitoring. When compared to trust guidelines initial prescription was deemed unnecessary in 56% receiving phosphate supplements and 80% receiving magnesium where mild deficiency doesn't require replacement.

The audit highlights that current prescription of oral supplements in hospital is not in keeping with trust guidelines. It showed that there is room for education regarding prescription, duration of treatment and especially regarding monitoring of electrolytes in this group of patients.

This audit was presented to the surgical department with plans to present to the medical department in the near future. Implementation is in the form of education for staff working in the Southern Trust.

Impact to Patient/Client Care

1. Avoid unnecessary prescriptions for patients reducing risk of harm.
2. Appropriate blood monitoring to avoid over replacement.

Curiositas

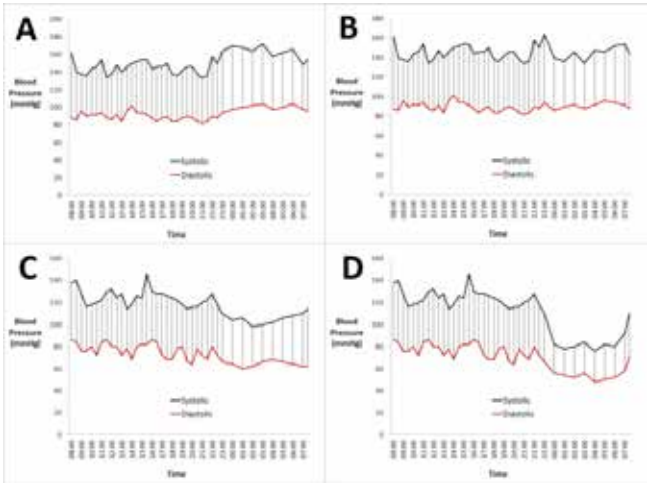
CRITICAL CARE

Look at the values of $\%SpO_2$ on the Pulse Oximeter below. Surprisingly the individual was functioning normally at the time of the photo.

The device is working properly and the individual did not have cool peripheries. Can you work out why the reading is so low?

MEDICAL STUDENT QUIZ

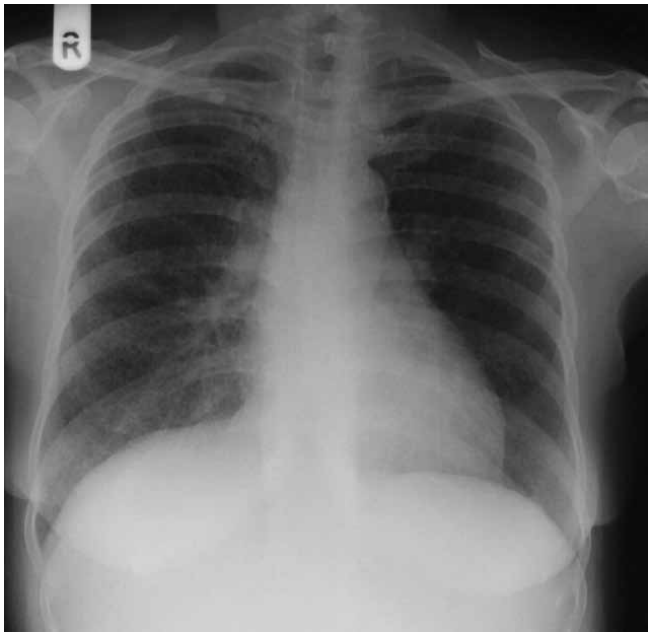
A 52 year old man is noted to have high blood pressure and undergoes ambulatory blood pressure monitoring. Four possible sets of results are shown graphically below.

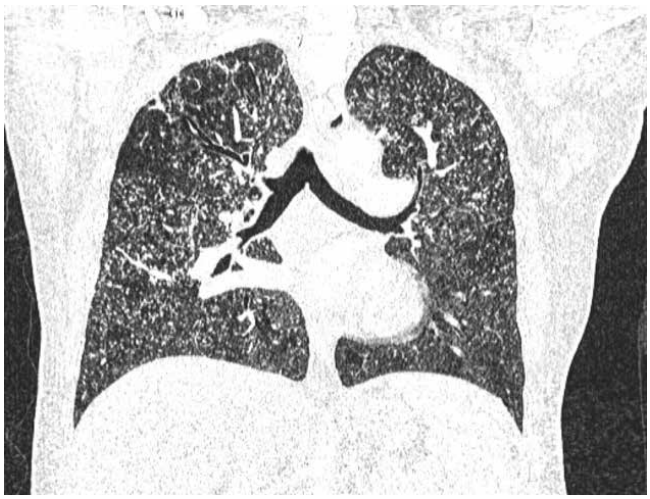


1. Which of these patterns would be classified as normal?
2. What do the other 3 patterns shown demonstrate and what is the significance of such findings?

POSTGRADUATE QUIZ

A 20 year old man presented with increasing lethargy and shortness of breath over the past 6 months after visiting parts of Africa. Recently he has lost weight, developed a fever and headache. His chest x-ray and CT scan of chest are as follows:





1. What is the diagnosis and why is this specific term used?
2. List three differentials, for such an appearance on chest CT/ chest x-ray
3. How is this condition treated?
4. Beyond the respiratory system, which other systems are most commonly involved with this condition?

ANSWERS See overleaf

CONSIDER CONTRIBUTING TO CURIOSITAS?
Please refer to '*Curiositas: Guidelines for contributors*' http://www.ums.ac.uk/curiositas.html and email *umj@qub.ac.uk* with your ideas and submissions.

CRITICAL CARE

Under normal circumstances clinical observations such as these would lead the diligent physician to conduct a full clinical assessment and seek to rapidly reverse the cause. At the time of this picture the individual concerned was comfortable, at rest and far from being in extremis. On the morning of May 23, 2007, after having spent 60 days at an elevation higher than 2500m, and having just summited Mount Everest (8848m), four climbers on the Caudwell Xtreme Everest Expedition[1] had arterial blood sampling on their descent.

The mean values for the climbers of PaO2 and PaCO2 were respectively 24.6mmHg/3.28kPa (Normal ref. 75-100mmHg/10-13.3kPa) and 13.3mmHg/1.77kPa (Normal ref. 35-45mmHg/4.67-6.0kPa); the lowest ever documented in humans. These measurements provide a picture of the pattern of and limits to changes in human blood gases in response to hypobaric hypoxia on the earth's highest mountain. In conjunction with initiating factors and the presence of coexisting conditions, hypoxia triggers numerous adaptive and maladaptive systemic responses that remain poorly understood. The authors suggested that an understanding of the limits of adaptation to hypoxia would be relevant to physicians who care for critically ill patients since many of the interventions aimed at restoring or maintaining cellular oxygenation often prove ineffective and may at times be detrimental.[2]

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Dr Nigel Hart (Senior Lecturer, Queen's University Belfast). Dr Hart kindly gave consent for these images to be published.

MEDICAL STUDENT QUIZ

1. Panel C. Blood pressure is within 'normal' limits, and the pressure overnight is around 15% lower than that during the day (normal nocturnal dipping).

2. In Panel B, there is no clear diurnal variation in blood pressure meaning that there is absent noctural dipping. Non-dipping can have innocent or pathologic explanations. Perhaps the patient works night shifts, and is asleep during the day, or perhaps the inflation/deflation of the sphygmomanometer cuff caused discomfort and resulted in a very poor night's sleep. Non-dipping has been also associated with obstructive sleep apnoea, diabetes mellitus, obesity, renal failure and other secondary causes of hypertension. In Panel A, the blood pressure is higher overnight than during the day - the so-called 'reverse dipping' pattern, which is again abnormal and in need of investigation. Panel D shows excessive dipping which has been linked with worsening of cardiovascular risk, perhaps due to under-perfusion of vital organs.

Dr Paul Hamilton (Specialty Registrar, Chemical Pathology, Belfast Health and Social Care Trust) and Michael Corr (Medical Student, Queen's University Belfast)

POSTGRADUATE QUESTION

1. Miliary Tuberculosis. The chest x-ray appearances of multiple pulmonary nodules (1-3 mm) is so called due to its similar appearance to 'millet seed'.

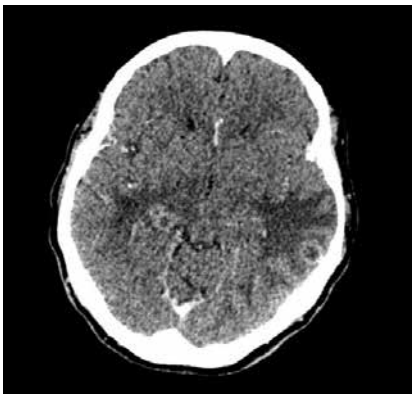
2. Infection (e.g. TB, fungal), metastases (e.g. thyroid, renal, breast, melanoma, pancreatic), and sarcoidosis.

3. NICE suggests 2 months of treatment with Isoniazid, Rifampicin, Pyrazinamide and Ethambutol, followed by 4 months with Isoniazid and Rifampicin.

4. Extra-pulmonary sites of infection commonly observed in TB include: lymph nodes, pleura, osteoarticular, skin and liver, although any organs can be involved. There are various central nervous system manifestations, one of which is tuberculomas which could explain this patient's headache.

Tuberculosis (TB), caused by Mycobacterium tuberculosis, remains a significant global disease, with protean manifestations, albeit a disease most commonly associated with the respiratory system. One of the more uncommon forms of pulmonary TB is miliary TB, in which tiny deposits form innumerable nodules between 1-3 mms in the lungs. These are typically uniform in size and diffusely distributed in both lungs. This form of the disease often presents in the sickest patients and represents haematogeneous dissemination for which the prognosis is poor. The name miliary arises from the similarity of the appearances in the lungs to that of millet seed. Millet seed is grown for use in feed for the animal industry as well as a health food for humans.

Millet Seed



Axial CT Head with contrast showing tuberculomas

TB is a truly multi-system disease and can manifest in any organ system, including various central nervous system manifestations, one of which is tuberculomas. Cold abscesses of the neck and chest wall are also a recognised presentation.

Dr Ian Bickle (Consultant Radiologist, Raja Isteri Penigran Anak Saleha Hospital, Bandar seri Begawan, Brunei Darussalam) and Glenn Ritchie (Medical Student, Queen's University Belfast)

Book Case

Prof Peter Maxwell, 6 favourites from my bookcase.

BLINDNESS

Jose Saramago (Vintage, 2005)

A contagion of blindness spreads through an unnamed city. The authorities attempt to contain the epidemic but very rapidly normal social conventions start to break down. Human spirit prevails in this surreal allegory which illustrates the fragility of civil society. A wise and ingenious novel by Portuguese Nobel laureate Jose Saramago.

THE YEAR OF THE HARE

Arto Paasalinna (Peter Owen, 2006)

A journalist, Vatanen, rescues an injured hare that his car hits in the outback of Finland. This seemingly random act of kindness triggers a life-changing experience and Vatanen sets out on an increasingly farcical adventure leaving behind his job, his wife and worldly possessions. A liberating and popular European novella confirming Finns have a well-developed sense of humour.

NINETEEN EIGHTY-FOUR

George Orwell (Penguin Classics, 2004)

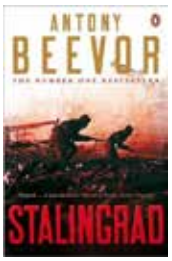
Written in 1949, this satirical novel portrays a dystopian nightmare vision of the future. The world is divided into three great powers permanently at war. "Oceania" is controlled by "The Party" a repressive and totalitarian regime. Constant surveillance of citizens is "justified" by the remote threat of "terrorism" but the Big Brother state itself is truly terrible. This is the story of Winston Smith and his revolt against the Party's rule. George Orwell's novel reflects his own experiences of the Spanish Civil War and Second World War and the extremes of fascism and communism.

THE MEMORY CHALET

Tony Judt (Vintage, 2011)

This book is a beautiful and remarkable series of dictated essays. They form historian Tony Judt's humane, amusing and moving memoir of times past as his body lies trapped and immobilised by progressive motor neurone disease. The first two chapters alone are eloquent insights into living with an incurable disorder. This posthumously published book is a testament to the human spirit.

STALINGRAD



Anthony Beevor (Penguin, 1999)

The German siege of Russian forces at Stalingrad lasted almost 2 years and is seen as a major turning point in the Second World War. Anthony Beevor's book depicts the almost unbelievable savagery of this war of attrition between ill-prepared German forces and a Red army which is also harassed in turn by Soviet intelligence. Meticulous research of the evolution of the siege is coupled with first-hand accounts from soldiers. This is military history at its finest.

THE HUMANS

Matt Haig (Canongate Books, 2013)

A thought provoking, hilarious and touching satire of what it means to be human. One night a naked man is found walking through the streets of Cambridge. Mathematical genius Professor Andrew Martin is not quite himself. Clothes confuse him, food sickens him, and even his wife and son are abhorrent to him. Love, marriage, logic, mercy, immortality, teenagers, mathematics and much more are all in the mix that makes this novel unique.

Gamechangers

ON THE CUSP OF A DIGITAL PATHOLOGY REVOLUTION

Mr MJ Dolaghan; Dr JP Houghton; Dr CP Wilson

Centre for Medical Education, Queen's University Belfast

Histopathologists play a key role in clinical medicine providing tissue diagnoses to guide patient management. For many decades this has involved microscopy using a traditional microscope. Internationally this practice is slowly being replaced with high resolution digital images, similar to modern digital radiology.

Potential benefits of digital pathology include workflow improvement and quality improvements for patients. Digital images are readily available to review in routine practice and at multidisciplinary team meetings.[1]

In 2006, a review of pathology provision in Northern Ireland[2] recommended a radical reduction in the number of histopathology laboratories allowing for subspecialist reporting. This was never implemented due, in part, to local opposition. The adoption of digital pathology within a clinical network of small laboratories permits subspecialisation regardless of the size of the laboratory allowing histopathologists to remain *in situ*.

There are a number of perceived disadvantages including image quality and cost of image storage.[3] There are also training issues as most histopathologists find digital images slower to examine than traditional microscopic images, making some resistant to change. Possible ethical issues surrounding digital photography, such as fraudulent image manipulation, could require the development of protective measures.[3]

The transition in histopathology will be smoother if lessons are learnt from our colleagues in radiology. Digitisation of pathology is inevitable.

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MEPOLIZUMAB AND ITS ROLE IN THE TREATMENT OF EOSINOPHILIC ASTHMA

Dr M O'Neill; Dr C Butler Respiratory

Belfast Trust

Recent studies have increasingly focused on the heterogeneity of asthma, promoting the concept that asthma consists of multiple phenotypes, thus leading to phenotype specific clinical trials and the development of targeted therapies.[1]

Eosinophilic asthma is now recognized as an important phenotype associated with increased asthma severity, atopy, late-onset disease, and poor response to steroid treatment[2].

Current guidelines for management of asthma recommend that treatment start at the step most appropriate to the severity of symptoms. In cases of severe asthma this can result in daily oral glucocorticoid therapy.

Mepolizumab is a monoclonal antibody which targets Interleukin-5- a key regulator of eosinophil maturation and activation. It is indicated for the add-on maintenance treatment of patients with severe eosinophilic asthma who remain uncontrolled despite treatment at Step 4/5 of the BTS/SIGN guidelines for management of asthma[3]. However, it is important that demonstration of adherence to standard therapy is confirmed.

When investigating the steroid sparing effect of Mepolizumab, a 50% reduction from baseline glucocorticoid dose has been reported, compared to placebo, which showed no reduction. Mepolizumab demonstrated an annual reduction in asthma exacerbations by 32%.[1]

With EMA approval granted in early December 2015, Mepolizumab can be expected to improve outcomes in patients with eosinophilic asthma due to its significant glucocorticoid-sparing effect and proven reduction in exacerbations.

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HEART RHYTHM SOCIETY UPDATE ON MANAGEMENT OF POSTURAL TACHYCARDIA SYNDROME AND INAPPROPRIATE SINUS TACHYCARDIA

Dr C McQuillan, Dr N McAleavy, Dr J Purvis.

Cardiac Unit, Altnagelvin Hospital

The latest guidance on managing two conditions not infrequently seen in young people referred to cardiology clinic.

Postural Tachycardia Syndrome (POTS)

POTS is characterised by (1) symptoms occurring with standing including light-headedness, palpitations and fatigue; (2) increased heart rate >30 beats per minute (bpm) when moving from recumbent to standing position; and (3) absence of orthostatic hypotension. Prevalence is approximately 0.2%. Most patients are female (75%) aged between 15 and 25 years. Contributory mechanisms include peripheral autonomic denervation, hypovolaemia and hyperadrenergic stimulation. Diagnosis is clinical supported by orthostatic vital signs. Symptoms are exacerbated by dehydration, heat, alcohol and exercise. Treatment is difficult with no uniformly successful approach. Nonpharmacologic methods include increased salt and fluid intake, compression garments and graduated exercise. Pharmacological therapies include fludrocortisone which can boost fluid retention, midodrine which augments peripheral vasoconstriction and reduced dose propranolol (10-20mg) which reduces palpitations. Ivabradine slows sinus rates without affecting blood pressure. Radiofrequency sinus node ablation is not recommended as it often worsens symptoms and occasionally necessitates pacemaker implantation.

Inappropriate Sinus Tachycardia (IST)

IST is defined as resting sinus heart rate >100 bpm (mean 24-hour > 90 bpm) associated with palpitations. Prevalence is estimated at 1.2% including symptomatic and asymptomatic patients. Underlying pathophysiological mechanisms include increased sinus node automaticity, beta-adrenergic hypersensitivity and decreased parasympathetic activity. Diagnosis is confirmed by excluding exogenous causes of tachycardia while documenting sinus tachycardia using electrocardiogram and 24-hour Holter. Lifestyle changes are advocated early in treatment. Beta-adrenergic blockers are not usually effective and can worsen symptoms. Ivabradine has a modest evidence base for reducing symptoms and heart rate. Radiofrequency ablation has limited success and is associated with numerous complications.

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So you want to be an **Erasmus Medical Student?**

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INTRODUCTION

"I'm in Craigavon for Paediatrics, where are you placed?" "Spain." This unique response always raises eyebrows. Whilst the idea of taking medical electives across the world is engrained in every UK medical student's mind, the concept of completing part of your medical degree on mainland Europe is often met with questions about your sanity. Whether it is the fear of assessment, the perceived difficulty of a language barrier or just the rarity of exchange programmes for medical students this international opportunity is often poorly understood and hence rarely sought by medical undergraduates.

WHAT IS ERASMUS?

ERASMUS or the ***E**uropean Community **A**ction **S**cheme for the **M**obility of **U**niversity **S**tudents* is a programme established by the European Union since 1987. Since its conception it has given 6 million students from across Europe the opportunity to spend part of their university career in another country whilst achieving credit for their degree at home. The ideals of the programme are to give students the chance to internationalise their degree, improve linguistic skills and form personal and professional networks across Europe. ERASMUS exchanges are usually considerably longer than medical electives (the shortest period being 3 months). Furthermore rather than paying your host institution (as with electives) you receive a generous grant from the E.U. to complete your ERASMUS exchange and live in your chosen country. These universal grants are organised by dedicated ERASMUS departments at your own university, making them incredibly more accessible than those available for electives.

WHAT ARE THE ERASMUS OPPORTUNITIES FOR A MEDICAL STUDENT?

With over 4000 institutions registered as ERASMUS hosts across Europe the opportunities are endless. However, your institution must have a formal agreement with the university you wish to visit. With medical courses this can be a tricky process and hence it is perhaps easier to work within the formal partnerships already set-up by your university. Thankfully, medical schools who do have ERASMUS programmes seem to be expanding the range of options for their students; my own university, Queen's University Belfast, has recently added two new locations.

LANGUAGE BARRIERS

Medicine is all about the art of communication. So what if your foreign linguistic skill does not expand beyond ordering a beverage? Fear not; as increasingly medical schools across Europe, particularly in Scandinavia, are conducting their full medical courses in English. This gives UK medical students the opportunity to participate in ERASMUS without a strong knowledge of the local language, though the benefits of even learning a basic level cannot be overemphasized.

If, like the author, you decide to blow the dust off the language textbooks the challenge is not as insurmountable as it may first appear. Firstly most universities offer night courses in main European languages, which can be useful preparation. Moreover it is truly remarkable when you are totally immersed in a language by working, socializing and just living in a foreign country how rapidly you can attain a level of fluency.

CHALLENGES OF AN ERASMUS PLACEMENT

As anyone who has ever worked in another country can confirm it can be a disorientating experience, not only are you dealing with a new system you are also dealing with very different cultural attitudes towards health and doctors. In Spain, for example, medical students have a very observational role whilst in Belgium students help run outpatient clinics. It takes a level of negotiation to ensure you get the clinical experience mandated by your university without going beyond your own limits and competencies. With varying techniques and clinical practice across the continent it can be difficult to know if what you are learning on your placement abroad completely corresponds to clinical practice in the UK. Furthermore returning home to sit exams and be compared to your peers who have received training in the UK can be a daunting and stressful experience.

BENEFITS OF AN ERASMUS PLACEMENT

The benefits of an ERASMUS placement can be split into three broad categories; cultural, professional and personal. Culturally there is always a benefit to living in a different country, it broadens your world view and ERASMUS in particular gives you the opportunity to build networks across the European continent. As technology makes our world smaller this ability to work with international partners is an increasingly needed skill. Professionally, like any opportunity to work in another healthcare system, the experience provides huge lessons to be learnt and brought home. From experiencing a paperless notes system in Germany to seeing a more insurance based health care system in the Netherlands it can give an insight into future opportunities and challenges for the NHS. Finally the experience drives personal development, allowing you to challenge yourself to become more independent, adaptable and confident.

CONCLUSION

An ERASMUS placement is a unique opportunity within medical school to internationalise your degree. Whilst there are many challenges they are very much outweighed by the benefits of the experience, including the newly made friends and memories. If you are a medical student, currently debating whether to seek out an ERASMUS opportunity, I personally couldn't recommend it enough. You won't regret it.

THE ULSTER MEDICAL JOURNAL

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Manuscripts should be accompanied by a covering letter **signed** by all the authors agreeing to publication and stating that the work has not been published elsewhere; and stating that they have been actively involved in the preparation of the paper and outlining their contribution to the paper. Any conflict of interest should be declared.

A **PDF** copy of the printed and signed covering letter is ideal for electronic submission.

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    5. volume number and issue number (in brackets) **in bold**.
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- *Example:* Devlin LA, Price JH, Morrison PJ. Hereditary non-polyposis colon cancer. *Ulster Med J* 2005;**74(1)**: 14-21.
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Front cover: Ulster's Fulton Physicians. Dr. Fleming Fulton during his houseman year in Belfast, having graduated from Queens University Medical School in 1912.