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**Continuing Professional Development**
The Wake

People come and go all day.
Rosaries are said. Tea made. Chat about the weather. Nothing special.
One last chance to sit with you, with the absence of your presence.

There is a quiet hour in the late morning.
I lie on his bed, head to toe with you in your hospital bed.
Beneath the gold satin eiderdown my right palm rests on your still-warm shin.

I see you breathe.
The body is a creature of habit.
My eyes cannot stop seeing, certain as my own breath, your breath.

I force my eyes to notice the shine on the quilted satin, the way it does not move, the pattern of bright gold and dull gold over your chest, your breasts.
The way it does not alter.

I lie beside you for an hour.
Each time I think I see you breathe, I force my eyes to relinquish their illusion; to see the still, cold truth;
until the umbilical cord of my faith in your breath, unquestioned since the hour I formed in your womb, is severed.

M Corish
Diagnosis and treatment of sleep related breathing disorders in children: 2007 to 2011: Walsh et al highlight the issue of sleep related disorders in children. Obstructive sleep apnoea (OSA) occurs in 3% of children and is more common in conditions such as trisomy 21, and cranio-facial disorders. A survey revealed that paediatricians have little training in OSA. The authors report that the demand for sleep studies has increased, it is pointed out that the use of overnight oximetry can reduce the need for polysomnography by 70%.

A randomised controlled trial using the epidurium for labour epidurals: Deighan et al have assessed the efficacy of the epidurium compared with the standard technique. There was a higher failure rate in the epidurium group. In 9 cases in the epidurium cohort, a second anaesthetist was required to site the epidural.

Medical specialty choice: does personality matter? Lyndon et al have examined personality type of doctors in relation to gender, level of training, and medical specialty. There doesn’t appear to be a particular personality profile. The importance of conscientiousness is emphasised.

Improving surgical site infection prevention practices through a multifaceted educational intervention: Owens et al describe a quality improvement programme to improve pre and post surgery antibiotic use. After the intervention, antibiotic prophylaxis increased from 54% to 68% and postoperative prescribing rose from 71% to 92%.

A less invasive approach to screening for early onset neonatal GBS: Glackin et al reported on the more conservative approach to the management of asymptomatic infants with one risk factor for GBS. The new approach, as recommended by the RCOG and the CDC, has reduced the number of infants needing a septic evaluation/antibiotics from 19% to 6.5%.

An audit of prescribing practices for benzodiazepines and Z drugs: Cadogan and Ryder have audited the benzodiazepine prescribing practices. A total of 4,165 prescription records were examined. They found non-compliance with the benzodiazepine committee recommendations with just one fifth fulfilling all the assessment criteria. Over half had at least 2 discrepancies.

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Prediction of hospital mortality by changes in the estimated glomerular filtration rate (eGFR): Berzan et al found that among 61964 patients, the change in eGFR during a clinical episode strongly predicted the outcome.

Myocardial ischaemia following cocaine and adrenaline exposure in a child during an ophthalmological procedure: McGovern et al describe a child who developed cardiovascular complications following the topical administration of cocaine and adrenaline drops for an eye procedure. The child developed tachycardia and pulmonary oedema due to myocardial ischaemia.

Open access ultrasound referrals from general practice: Hughes et al address the issue of ultrasound access for GPs. The authors assessed 1,090 ultrasounds that were generated from general practice. The authors assessed 1,090 ultrasounds that were generated from general practice. The median waiting time was 56 days.
 Commentary

Community Acquired Pneumonia (CAP) in Children in the New Vaccination Era:

The introduction of H1N1 and Pneumococcal into the childhood immunisation programme has led to a significant reduction in the incidence of bacterial meningitis. The impact on childhood pneumonia is more difficult to quantify due to its multiple aetiology and diagnostic challenges. Causation of pneumonia in children has to rely on indirect methods including blood cultures, and analysis of respiratory tract secretions.

Prospective studies are required in order to quantify the relative roles played by bacteria and viruses. Jain et al. have mounted an important, large, detailed causation analysis among 2354 children with radiological evidence of pneumonia. The chest x-rays showed consolidation (58%), infiltrate (51%), or an effusion (13%). The pathogen detection rate (expressed as number of cases per 10,000 children per year) was respiratory syncytial virus 4.6, human rhinovirus 4.1, human metapneumovirus 1.9, adenovirus 1.6, mycoplasma pneumoniae 1.4, influenza A or B 1.1, parainfluenzae virus 0.9, coronavirus 0.8, streptococcus pneumoniae 0.5. The prominence of coronavirus was noted. It can act as a single pathogen or in combination with other organisms. The paper confirms that the vaccination programme has brought about a substantial reduction in cases of bacterial pneumonia. Viral causes of pneumonia have now increased in relative importance. The incidence of pneumonia was higher in younger children. Forty five per cent were under 2 years, 25% were 2-4 years, 18% were 5-9 years, and 12% were 10-17 years. Cough and fever were almost universal features while 75% had anorexia and 70% had dyspnea. Twenty one per cent needed PICU admission, 7% required ventilation, and 3 children (<1%) died. The Irish experience is that the pneumococcal vaccine has greatly reduced invasive pneumococcal disease (IPD) in children. There has been a 91% decline in infection due to PCV7 serotype, 44% decline due to PCV 13-17. The benefits were concentrated in the under two’s.

The World Health Organisation (WHO) states that tachypnea and retractions are the most accurate signs for the clinical diagnosis of pneumonia in children. It defines tachypnea as > 60 breaths/min in babies less than 2 months, >50 breaths/min in babies 2-12 months, >40 breaths/min in children 1-5 years, and >20 breaths/min in children over 5 years. Cough may not be an initial feature because the alveoli have few cough receptors. Coughing becomes more prominent when the infection starts to irritate the cough receptors in the airways. Pointers towards a bacterial pneumonia include WBC > 15x10^9/L and a CRP > 30-60mgs/L. Blood cultures are positive in only 10% of children with pneumonia. Bacteria isolated from the nasopharynx are difficult to interpret because they may simply reflect the normal upper respiratory flora. Obtaining suitable sputum samples is difficult because young children under 5 years swallow sputum. A suitable sputum sample is one with < 10 epithelial cells and >25 polymorphonuclear leucocytes.

Some children can present with atypical features particularly abdominal pain. Abdominal pain can be the presentation in children with basilar pneumonia and accounts for nearly 2% of cases. Grunting when present is a worrying sign, and is indicative of severe disease and impending respiratory failure. Oxygen saturation should always be measured in children with respiratory distress. An oxygen saturation <96% is 3 times more likely in children with pneumonia. An oxygen saturation <92% is an indication of severity and the need to administer oxygen. The indications for transfer to intensive care are- failure to keep oxygen saturation >92% with an inspired oxygen concentration >60%, rising respiratory and pulse rate, apnoea or slow, irregular breathing, and shock.

Influenza A and B have emerged as important causes of pneumonia in children of all age groups particularly in those over 5 years. ‘Flu vaccination is recommended for children with chronic disorders. The issue of flu vaccination for healthy children is a matter of debate. It is effective when there is a good match between the vaccine and the circulating influenza strains. When the match is good the protection can be over 70%, but when the match is poor the protection can be as low as 20%. A Cochrane review concluded that vaccination is effective in preventing influenza in children over 2 years but there is lack of evidence about its efficacy in the under twos. Thus there is a paucity of data on influenza vaccination efficacy in children. Canadian data suggests universal ‘flu vaccination reduced hospital admissions, ED attendances, and GP visits. The US recommends ‘flu vaccination for all children over 6 months old.

The UK experience regarding CAP has been similar to the US. Thompson and Harris point out that in the pre-pneumococcal vaccine era the incidence of CAP was 33/10,000 in children under 5 years. Pneumococcal vaccination was introduced in 2007 and by 2008 the admission rate for CAP had reduced by 20%. In clinical practice it is commonly assumed that chest x-rays showing alveolar infiltration indicate a bacterial cause, while diffuse interstitial infiltrates are suggestive of atypical bacterial or viral infections. The data would suggest that there is overlap and that it is difficult to assign infective causation from the chest x-ray in isolation. A persisting fever despite antibiotic administration should raise the suspicion of an empyema. When an effusion is present and the child has a persistent pyrexia, the child should be referred for drainage.

CAP remains a major cause of morbidity in children leading to large numbers of hospital admissions annually. The epidemiology is changing with an increased preponderance of viral causes.

JFA Murphy
Editor

Vaginal Breech Delivery at Term: The Doctors’ Dilemma

“When an operation is once performed, nobody can ever prove that it was unnecessary”. The Crazes for Operations from The Doctor’s Dilemma: Preface on Doctors by George Bernard Shaw, 1909.

Breech presentation complicates 3-4% of deliveries at term and it is associated with an increased risk of perinatal mortality and morbidity1,2,3. The increased fetal risks may be due to the hypoxia or trauma associated with a vaginal delivery, but this can be minimised if cases suitable for vaginal delivery are carefully selected and labour is supervised by experienced clinical staff4,5. The increased fetal risk may also be due to other causes, such as congenital malformations, which are independent of the mode of delivery. Before 2000, the elective caesarean section (CS) rate for breech presentation had been rising as obstetricians attempted to avoid the fetal risks associated with vaginal delivery.

The Term Breech Trial was an international randomised controlled trial from 121 hospitals in 26 countries which reported that a policy of planned vaginal delivery for selected breech presentations at term was associated with a higher rate of perinatal mortality and neonatal morbidity compared with a planned CS6. It found no differences in maternal mortality or morbidity between the two arms of the study. The publication of the Trial in the Lancet in 2000 led quickly to a series of professional guidelines advocating elective CS for breech presentation at term and to a further escalation of CS rates7,8. As a result, in many maternity units in developed countries only about one in ten babies presenting by the breech at term are now delivered vaginally. In some cases of vaginal breech delivery labour is so advanced there is not time to undertake a CS, although a CS had been planned.

The Term Breech Trial, however, was seriously flawed7,9,10. In particular, with regard to the adverse perinatal outcomes were in cases which should have been excluded from the study. Furthermore, the details published of the adverse fetal outcomes were limited and were not analysed by parity or previous CS. More detailed scrutiny shows that the risks of an adverse fetal outcome was remarkably low in multigravidas who were randomised to a planned vaginal delivery in a trial that included hospitals from both developed and developing countries11. Soon after new international guidelines were published, the long-term clinical outcomes of the Trial were reported which found no difference between the two arms of the trial in terms of morbidity or mortality “in contrast to our earlier report”7,8. A secondary analysis from the Trial showed that the risks were reduced if the CS was performed late in labour, and highest if the baby was delivered vaginally1. The intrapartum factors that were associated with higher fetal risk included augmentation of labour and/or prostaglandins (p<0.01), the duration of the second stage of labour (p<0.001) and birth weight (p=0.02). In the planned vaginal birth group, 49.8% had labour augmented, which is surprisingly high. This all suggests that the fetal risks of breech presentation are more strongly associated with labour than with the mode of delivery.

The lack of discernment in rushing to alter clinical practice in response to the Term Breech Trial has had consequences that received little consideration in 2000. The increase in CS for breech presentation in the index pregnancy has meant that there has been an increase in repeat CS, particularly as the number of women in developed countries undergoing a trial of labour after one prior CS has also plummed dramatically. The increase in CS rates in turn increases the number of catastrophic obstetric complications such as uterine rupture and peripartum hysterectomy1,12. Well-intended attempts to improve fetal outcomes with breech presentation may have come at a cost for the mother’s long-term reproductive health, as well as increasing the financial costs of providing maternity care due mainly to the increased length of stay associated with CS9.

Even if a CS is planned for all cases of breech presentation at term, some women deliver vaginally. In the Trial, only 90% of planned CSs had a CS. A downside of the changes in obstetric practice has been the loss of clinical skills and experience among obstetricians in performing a vaginal breech delivery at term, which also compromises their ability to deliver a breech presentation either in the setting of a preterm labour or after vaginal delivery of the first twin. This loss of clinical skills will be exacerbated as obstetricians who trained before 2000 retire from labour ward duties. As a priority we now need to introduce simulation training for obstetricians in Ireland to teach vaginal breech delivery techniques, as has been necessary in other developed countries7,12. Fourteen years on, an editorial in The Lancet recognises the unintended serious consequences of the Trial, particularly in low-resource settings13. The authors believe that the increase in CS for breech presentation at term is dangerous, unnecessary and needs to be reversed10. They urge the global health community to reconsider how we respond in general to the publication of clinical obstetric papers in high-impact general medical journals, and the influence they have had in changing the face of contemporary maternity care globally14,15. It highlights the risks of unquestioned international consensus, where individual errors of clinical judgement may be superseded by collective errors of judgement on a grand scale, potentially causing harm to large numbers of patients1.

*George Bernard Shaw was born at home on 26 July 1856 by vaginal breech delivery conducted by the Master of the Coombe Lying-In Hospital, Dr John Ringland. Shaw subsequently won the Nobel Prize for Literature in 1925 and an Academy Award (Best Screenplay) for the film Pygmalion in 1939. He died in England at the age of 94 in 1950.

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References
Take Home Naloxone for Ireland

In 2011 more people died in Ireland from opioid overdose (211) than in road accidents (186). Neither toll is acceptable and both figures conceal great sadness and loss. However, a key difference between them is that while road safety has rightly become a national and societal priority for action, virtually nothing is being done about deaths from opioid overdose.

Overdose prevention can be attempted in many ways including overdose education for users, their friends and families; sheltered drug use sites; better access to opioid substitution therapy or planned prison releases. ‘Take home naloxone’ is a further option and has reasonable evidence to suggest that it has value.

Naloxone is an effective opiate antagonist with an excellent safety profile; it works rapidly to reverse the respiratory depression which generally is the immediate cause of death – but it must therefore be given within minutes of the overdose. Naloxone is widely used by health and emergency services in Ireland to good effect but is not currently available for use by lay people. Community based schemes to provide naloxone training and kits have been established throughout the US since the mid-90s and more recently in Wales, Scotland and elsewhere.

Naloxone is given by intravenous, intramuscular or subcutaneous routes by health care professionals; internationally, most community schemes have provided kits for intramuscular injection by drug users or other lay rescuers. The recent use of intranasal naloxone is increasingly recognised as an alternative to the parenteral route, with important advantages – it is needless, simple to use and has been shown to reduce deaths at a population level. In Ireland naloxone is given using the parenteral preparation administered through a nozzle-shaped Mucosal Atomiser Device. Legal (prescription-only medicine) and pharmaceutical (parenteral preparation used by intranasal route) concerns exist and have been addressed in 10 US states and several other countries to enable this medicine to be held and used by lay people. A customised nasal spray is reportedly in development by at least one pharmaceutical company.

What’s happening in Ireland to address the genuine crisis of almost two deaths from opioid overdose every three days? Very little, at least in official circles. A HSE working group reviewed opioid overdose issues in 2013; the report has been submitted but not published. The Department of Health says that it is examining the issue, consulting with stakeholders and was to publish its plans by the end of 2014. In the meantime, it indicates that its regulations are not compatible with ‘Take Home Naloxone’ schemes, whether they involve parenteral or intranasal naloxone. The Pre-Hospital Emergency Care Council has published a Clinical Practice Guideline enabling lay people qualified in basic life support to use intranasal naloxone, if trained – however this cannot be implemented until prescribing regulations are changed by the Department of Health.

The voluntary sector and individual clinicians and agencies are working hard to help those at highest risk; Safety net, the Merchant’s Quay Project and the Ana Liffey Drug Project are excellent examples. However in the absence of straightforward regulatory changes by the Department of Health, little can happen to enable trials of schemes to provide Take Home Naloxone to drug-users, their families or to the many lay people who provide support services.

Here is an excellent opportunity for focused, high-level action to save lives, at very little cost. Are the leaders of our health system sufficiently interested in a marginalised group to take action?

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References
Diagnosis and Treatment of Sleep Related Breathing Disorders in Children: 2007 to 2011

A Walsh¹, F Phelan¹, M Phelan¹, M Ryan¹, F Healy², DM Slattery², B Elnazer³, P Greally⁴, B Linnane⁴, M Ni Chroínín⁵, DM Mullane⁶, M Herzig⁶, DW Cox⁶, S Javadpour⁶, P McNally¹
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Abstract
Sleep related breathing disorders (SRBD) have historically been under-recognised and under-treated. Obstructive sleep apnoea (OSA) affects approximately 3% of children. In line with the increased recognition of SRBD there has been an increase in demand for diagnostic services. We determined the awareness of SRBD amongst Irish paediatricians, examined the provision of sleep services to children throughout the country between 2007 and 2011 and audited diagnostic sleep services in a tertiary centre in 2011. Amongst respondents there was an awareness of SRBD but a poor understanding of diagnostic evaluation with 31/46 (67%) referring to inappropriate services. There has been a sharp increase in both diagnostic sleep tests (433-1703 [414]) and in the use of non-invasive ventilation (NIV) (31-186 [627]) for treatment of SRBD between 2007 and 2011. Paediatric sleep services are organized in an ad-hoc manner nationally with significant service variation. The use of domiciliary overnight oximetry reduced the requirement for more formal polysomnography by 70%.

Introduction
Sleep related breathing disorders (SRBD) have a high prevalence in the paediatric population, and as awareness of SRBD has increased, demand has increased on existing sleep services. The commonest type of SRBD in children is obstructive sleep apnoea (OSA) which has a prevalence of approximately 3% and is more common in certain high risk groups such as those with trisomy 21 (50-70%), craniofacial disorders, sickle cell anaemia, mucopolysaccharidoses, and neuromuscular disorders. OSA in children is associated with impaired neurobehavioural functioning, long term cardiac morbidity, impaired academic performance and increased health care utilisation, all of which improve with treatment. The investigation and management of OSA can be very resource intensive and expensive. Nocturnal polysomnography (PSG) in a sleep laboratory represents the gold standard for the diagnosis of OSA but is costly and time-consuming. Pulse oximetry is an increasingly used abbreviated testing modality for the evaluation of children with suspected OSA. Overnight oximetry is cheap, easily performed at home and is a useful diagnostic test for OSA in some circumstances. A subset of children diagnosed with OSA will go on to require treatment with non-invasive ventilation (NIV), usually over the long term. The need for NIV is more commonly seen in children with pre-existing medical conditions. With increasing awareness of the high prevalence of SRBD and increasing demand for diagnostic testing, more children will be diagnosed with OSA and will require treatment. This will impact on paediatric ENT services and also lead to an increase in the number of children requiring ongoing NIV. In young children, treatment with NIV involves intensive follow up and support. In light of the increased demand on paediatric sleep services and variations in the approach to SRBD across the country, we sought to assess the awareness of the investigation and management of SRBD in children among paediatricians, and determine the level of service provision in the area over the last number of years. We further sought to examine in detail the provision of diagnostic sleep services in a single tertiary centre and formally assess the utility of domiciliary overnight oximetry to obviate more formal testing in our patient population.

Methods
A survey on awareness of SRBD in children and the referral pathways used was designed and emailed to consultant paediatricians registered with the Royal College of Physicians in Ireland. Data on the provision of paediatric sleep services between 2007 and 2011 was gathered directly from respiratory physicians in all centres that provide services. An audit of diagnostic sleep services at Our Lady’s Children’s Hospital Crumlin (OLCHC) during 2011 was performed with particular emphasis on the effectiveness of screening oximetry. Information was gathered from patients’ medical notes, sleep files and hospital databases. First line diagnostic tests were included in the audit providing full clinical information was available. Studies with incomplete datasets, follow up studies, NIV titration studies and monitoring studies were excluded. The data were analysed using Microsoft Excel.

Results
Awareness of SRBD and sleep services among paediatricians
The response rate to the survey was 20% (46/230). The majority (36/46 [78%]) had no training in SRBD. The majority (28/46 [61%]) correctly identified the prevalence of OSA in children, with 35/46 (76%) knowing the prevalence of OSA in children with trisomy 21. The majority (31/46 [67%]) said that they ‘always’ or ‘often’ ask about sleep as part of systems review. A third of respondents (15/46 [33%]) were working in hospitals where downloadable oximetry was available. Most respondents (31/46 [67%]) referred to ENT when a child presented with a history suggestive of OSA.

National Services
As of 2011 six centres in Ireland (OLCHC, Children’s University Hospital, Temple Street [TSH], National Children’s Hospital, Tallaght [NCH], Cork University Hospital [CUH], University Hospital Galway [UHG], University Hospital Limerick [UHL]) were providing some level of structured paediatric sleep service. All centres could provide overnight oximetry and/or oximetry/capnography combined (TCO2). Three of these centres also perform abbreviated polysomnography, two of which have the ability to perform full polysomnography. None of the centres provided multiple sleep latency testing (MSLT). The number of studies performed nationally has increased significantly in recent years; from 433 diagnostic sleep tests in 2007 to 1703 studies in 2011 (414% increase). There was also a 627% increase in the number of children on NIV nationally from 31 in 2007 to 185 in 2011 (Table 1). There were no funded posts in any of the centres for the delivery of paediatric sleep services. Clinicians in all centres reported a progressive increase in the proportion of their practice dedicated to paediatric sleep problems over the course of the four years. Marked differences in approach to diagnostic testing and service provision were seen across the country.
Diagnostic sleep service in OLCHC

We looked in detail at the provision of diagnostic sleep services in OLCHC, which carried out 1001 of the 1793 studies (56%) that were performed nationally in 2011. In OLCHC there was a 380% increase in the number of tests performed from 208 in 2007 to 1001 in 2011. Two hundred and forty five charts were reviewed. Two hundred and thirty four first line diagnostic studies had full clinical information available and were suitable for inclusion in the audit (127 oximetry, 53 TCO2 and 54 abbreviated polysomnography). The median wait time for an outpatient test was four months (range one day—sixteen months). The service was accessed by all subspecialty groups (Figure 1). The indication for the majority of the studies (206/234 [88%]) was to assess for OSA. Other indications included assessment of hypoventilation (19/234 [8%]), central apnoeas (4/234 [2%]), hypoaxia (1/234 [0.4%]) and a combination of these (4/234 [2%]). Of the total number of studies 123/234 (53%) were performed in the child’s home. Most oximetries (111/127 [87%]) were performed at home, with most abbreviated polysomnographies (42/54 [78%]) and all TCO2s (53/53 [100%]) being performed in hospital.

Discussion

We describe the provision of paediatric diagnostic sleep services internationally. As recognition of SRBD has increased in the number of tests performed from 208 in 2007 to 1001 in 2011. The proportion of children that are being referred for investigation and treatment is very low. The increasing awareness and recognition of SRBD in Ireland has resulted in an increased demand on services which mirrors the increased awareness and demand that is being seen internationally. As recognition of SRBD further increases it is likely that this will result in further increases in referrals to paediatric respiratory and ENT services. The survey response rate was poor, likely reflecting some degree of discomfort with the subject matter. Among respondents there was a good awareness of SRBD, again this is likely to be biased, however understanding of diagnostic evaluation and of available sleep services was poor with many referring to inappropriate services or locations. There was a significant increase in all types of diagnostic tests over the period of the study. This was most marked with TCO2, likely partly related to its increasing availability over the duration of the study. The lowest increase in numbers was seen with polysomnography. This likely reflects both the resource intensive nature of the test, thus the limited scope to increase numbers and the increasing use of screening tests with their relative ease of use and lower cost. In OLCHC there was a wide spectrum of disorders among the group of children with pre-existing medical conditions, underlining the need for awareness of, and concentrated expertise in, paediatric sleep medicine in tertiary centres looking after children with complex medical conditions.

The Royal College of Paediatrics and Child Health (RCPCH) published evidence-based recommendations for the diagnosis and management of disorders of sleep physiology and respiratory control in children, and the organisation of such services nationally in the UK in 20000. No similar recommendations exist in Ireland at present. Currently there is a good national network providing testing for SRBD in Ireland and this network has the potential to expand and consolidate. The majority (1469/1793 [82%]) of studies in Ireland in 2011 were carried out in Dublin. This distribution of caseload is incongruous with a situation where the disorder has a very high prevalence, with the large majority of children likely to have no underlying medical condition. For paediatric OSA, a more efficient system would ensure high

![Figure 1](image1.png)

**Figure 1** Referral source for first line diagnostic oximetry in OLCHC 2011

Most children (154/234 [66%]) had an underlying medical condition (Table 2). Of children without an underlying diagnosis 45/80 (56%) had OSA, and in children with an underlying medical condition 71/154 (46%) had OSA. Figure 2 details the clinical pathway of the 127 children who had oximetry performed. Most children (71/127 [56%]) were diagnosed with OSA following a first oximetry and required no further testing. Overall 80 of 127 children (63%) were diagnosed with OSA following testing with oximetry and this figure rose to 85/127 (67%) following a combination of oximetry and abbreviated polysomnography (Figure 2). By utilizing overnight oximetry as a screening tool for OSA the number of polysomnography studies required was reduced by 70%. In parallel to increased diagnostic testing we have no local prevalence data for OSA and are using international data which quotes a prevalence of 1-5%. This suggests that there are approximately 10-50,000 children in Ireland with OSA. The proportion of children that are being referred for investigation and treatment is very low. The increasing awareness and recognition of SRBD in Ireland has resulted in an increased demand on services which mirrors the increased awareness and demand that is being seen internationally. As recognition of SRBD further increases it is likely that this will result in further increases in referrals to paediatric respiratory and ENT services. The survey response rate was poor, likely reflecting some degree of discomfort with the subject matter. Among respondents there was a good awareness of SRBD, again this is likely to be biased, however understanding of diagnostic evaluation and of available sleep services was poor with many referring to inappropriate services or locations. There was a significant increase in all types of diagnostic tests over the period of the study. This was most marked with TCO2, likely partly related to its increasing availability over the duration of the study. The lowest increase in numbers was seen with polysomnography. This likely reflects both the resource intensive nature of the test, thus the limited scope to increase numbers and the increasing use of screening tests with their relative ease of use and lower cost. In OLCHC there was a wide spectrum of disorders among the group of children with pre-existing medical conditions, underlining the need for awareness of, and concentrated expertise in, paediatric sleep medicine in tertiary centres looking after children with complex medical conditions.

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![Figure 2](image2.png)

**Figure 2** The fate of children undergoing first line diagnostic oximetry in OLCHC in 2011

<table>
<thead>
<tr>
<th>Underlying Diagnosis</th>
<th>Number of children undergoing first line diagnostic oximetry in OLCHC in 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trisomy 21</td>
<td>24 (13%)</td>
</tr>
<tr>
<td>Other</td>
<td>22 (12%)</td>
</tr>
<tr>
<td>Congenital heart disease</td>
<td>21 (11%)</td>
</tr>
<tr>
<td>Asthma</td>
<td>17 (9%)</td>
</tr>
<tr>
<td>Scoliosis</td>
<td>17 (9%)</td>
</tr>
<tr>
<td>Sickle cell anaemia</td>
<td>13 (7%)</td>
</tr>
<tr>
<td>Ex prematurity</td>
<td>10 (5%)</td>
</tr>
<tr>
<td>CF</td>
<td>9 (5%)</td>
</tr>
<tr>
<td>ONS disorders</td>
<td>9 (5%)</td>
</tr>
<tr>
<td>Obesity</td>
<td>8 (4%)</td>
</tr>
<tr>
<td>Cerebral Palsy</td>
<td>7 (4%)</td>
</tr>
<tr>
<td>Neuromuscular diseases</td>
<td>7 (4%)</td>
</tr>
<tr>
<td>Pierre Robin Sequence</td>
<td>5 (3%)</td>
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<tr>
<td>Developmental delay</td>
<td>5 (3%)</td>
</tr>
<tr>
<td>Prader Will Syndrome</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>Craniofacial abnormalities</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>Airway malacia</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>Achondroplasia</td>
<td>2 (1%)</td>
</tr>
<tr>
<td>Spina bifida</td>
<td>2 (1%)</td>
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<tr>
<td>Hurler Syndrome</td>
<td>2 (1%)</td>
</tr>
</tbody>
</table>

### Table 1

<table>
<thead>
<tr>
<th>Test</th>
<th>2007</th>
<th>2011</th>
<th>% increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polysomnography</td>
<td>190</td>
<td>550</td>
<td>190%</td>
</tr>
<tr>
<td>Oximetry</td>
<td>238</td>
<td>789</td>
<td>330%</td>
</tr>
<tr>
<td>TCO2</td>
<td>5</td>
<td>789</td>
<td>15780%</td>
</tr>
<tr>
<td>Total tests</td>
<td>433</td>
<td>1793</td>
<td>414%</td>
</tr>
<tr>
<td>WTE funded sleep posts</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th>Test</th>
<th>2007</th>
<th>2011</th>
<th>% increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLCHC Crumlin</td>
<td>9</td>
<td>86</td>
<td>955%</td>
</tr>
<tr>
<td>CUH Temple Street</td>
<td>8</td>
<td>29</td>
<td>262%</td>
</tr>
<tr>
<td>NCH Tallaght</td>
<td>10</td>
<td>28</td>
<td>180%</td>
</tr>
<tr>
<td>Cork</td>
<td>3</td>
<td>15</td>
<td>500%</td>
</tr>
<tr>
<td>Limerick</td>
<td>2</td>
<td>15</td>
<td>750%</td>
</tr>
<tr>
<td>Galway</td>
<td>0</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>185</td>
<td>627%</td>
</tr>
<tr>
<td>WTE funded NIV posts</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
A Randomised Controlled Trial Using the Epidrum for Labour Epidurals

M Deighan, D O Briain, H Shakeban, D O Flaherty, H Abdulla, A Al-Jourany, S Ash, S Ahmed, R McMorrow
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Original Paper

Abstract
The aim of our study was to determine if using the Epidrum to site epidurals improves success and reduces morbidity. Three hundred parturients requesting epidural analgesia for labour were enrolled. 150 subjects had their epidural sited using Epidrum and 150 using standard technique. We recorded subject demographics, operator experience, number of attempts, Accidental Dural Puncture rate, rate of failure to site epidural catheter, rate of failure of analgesia, Post Dural Puncture Headache and Epidural Blood Patch rates. Failure rate in Epidrum group was 9/150 (6%) vs 0 (0%) in the Control group (P= 0.003). There were four (2.66%) accidental dural punctures in the Epidrum group and none in the Control group (P=0.080), and 2 epidurals out of 150 (1.33%) in Epidrum group were re-sited, versus 3/150 (2%) in the control group (P=1.000). The results of our study do not suggest that using Epidrum improves success or reduces morbidity.

Introduction
Neuraxial analgesia is widely recognised as the most effective form of pain relief during labour.1 Whilst generally safe, it has potential complications. After inadequate analgesia, the most common one is Accidental Dural Puncture (ADP) with a quoted incidence of 0.19% - 3.6% of obstetric epidurals.2 Following ADP, the incidence of Post Dural Puncture Headache (PDPH) is quoted as anything from 50% to 81%.3,4 It is often severe and
Resistance (LOR) to air or 0.9% Saline and the 'hanging drop' technique has become the technique of choice. A survey of epidural technique among obstetric anaesthetists in 2001 showed that up to 70% of respondents were using a LOR to Saline (LORS) technique. The Epidrum (Exmoor Innovations Ltd. Taunton, UK) is an optimal, constant, low pressure air operated LOR device developed to facilitate identification of the epidural space. It comprises of a plastic drum like cylinder with a thin silicone diaphragm. When placed between the Tuohy needle and syringe the user injects the Epidrum with 1ml of air to expand the diaphragm in a balloon like manner. This allows the operator to use two hands to control the epidural needle whilst providing continuous low pressure at the needle tip. After careful advancement of the needle, sudden collapse of the diaphragm signifies LOR and identification of the epidural space. It has been proposed that using the Epidrum may improve identification of the epidural space, reduce associated morbidity and provide teaching opportunities, as observers can also identify the moment of LOR. The aim of our pilot study was to determine if using the Epidrum improves success and reduces morbidity when compared to LORS technique.

Methods
After ethical approval and written informed consent, 300 parturients requesting epidural analgesia for labour, were enrolled in our study. Patients younger than 18 or those unable to give informed consent were excluded. The 300 subjects were randomised into two groups using computer generated numbers. One group (Epidrum group) received epidural analgesia using the Epidrum and the other group (Control group) received epidural analgesia using standardised LORS technique. All epidurals were performed by seven trainee anaesthetists rotating through the hospital during the period of the study. The experience of our operators in anaesthesia ranged from 1.5 to 8 years. All the trainee anaesthetists who participated in the study were trained in using the Epidrum device (via a simulated LOR device provided by Exmoor Innovations Ltd) prior to using it on patients. All epidurals were carried out with subjects in the sitting position, using an 18 gauge Tuohy needle with the bevel facing cephalad. After location of the epidural space, the epidural catheter was advanced 4 cm into the epidural space in all subjects. A standardised test dose and maintenance infusion was used in all subjects. If the trainee failed to site the epidural after three attempts, a second anaesthetist was called to carry out the procedure, using their technique of choice.

We recorded the following variables in the labour ward: subject demographics, anaesthetic experience of the operator in years, dural puncture, number of attempts taken to site epidural, failure (defined as being unable to site the epidural catheter after three attempts) to site epidural requiring a second operator, and failure of epidural analgesia (defined as failure to obtain a sensory block after initial local anaesthetic loading dose, resulting in the epidural catheter being re-sited). The subjects were followed up in the next 24-48 hours by an anaesthetist who was blinded as to group allocation in order to detect the occurrence of PDPH in the first 48 hours. The performance of epidural blood patches (EBP) on any of the subjects was also recorded. In addition the subjects were followed up with a telephone interview at 6 weeks to ensure we had not missed any atypical delayed onset PDPH. Data were compared using an independent samples t-test for continuous measures. For categorical measures Pearson’s chi-squared test was used. A Fisher’s exact test was used to compare the data in variables were the expected frequency was less than 5 in greater than 25% of the subjects; need for second operator, accidental dural puncture, failure of analgesia, PDPH and EBP. All comparisons were made with a level of significance of 0.05.

Results
There were no significant differences between the two groups for age, height, weight, BMI, parity or anaesthetic experience (Table 1). There were no significant differences between techniques except for failure to site the epidural requiring a second operator. In 9 out of 150 epidurals (6%) in the Epidrum group a second anaesthetist was required to site it, compared to none in the Control group (P=0.003) (Table 2). There were four accidental dural punctures in the Epidrum group and none in the Control group (P=0.060). Two of these subjects suffered from a PDPH as a result. One subject was managed conservatively and the other received an epidural blood patch. In the Epidrum group two out of 150 epidurals were re-sited, versus three out of 150 epidurals in the control group (P=1.000).

Discussion
Our pilot study showed that use of Epidrum to site epidurals was equivalent to LORS, except for failure to site the initial epidural where LORS was superior. It is the first study using the Epidrum to look specifically at morbidity as a primary outcome. It is also the largest study so far comparing Epidrum to standard LORS techniques. The principle aim of our pilot study was to estimate population rates of adverse events in each group. Therefore the number of participants (150 per group) was selected not to sufficiently power any hypothesis tests, but to attempt to observe sufficient numbers of events to adequately estimate the rates, given the time and resources available. We note that 150 individuals undergoing a procedure with a 3.6% adverse event rate (per ADP) would be expected to return 5.4 events on average, or 4 or more events with 80% probability, giving tight 95% confidence intervals for the rate of approximately +/- 2 to 2.5 percentage points. By adverse event we mean ADP, PDPH and EBP. The published adverse event ranges are broad (0.2% to 3.6% for ADP, 0.1% to 2.9% for PDPH), but centred around a 1-2% rate. Powering a study to detect even a 1 or 2 percentage point shift between groups would require a sample with at least twice as many participants as the present study, ranging up to several thousand participants per group. This was not feasible in the present study, nor justifiable given the uncertainty surrounding the rates of adverse events in this population, and with each of the devices. We hope to have addressed some of this uncertainty with the present study.

We additionally note that the actual power for a comparison of binary event rates is critically dependent on the actual observed rate, an unknown until the study is completed. In our case we
observed an unexpectedly low rate of ADP and PDPH (0%) in one group, which improved our power considerably, and is likely responsible for the "nearly significant" p-values reported. One confounding factor in our study is that the mean experience of our trainees was high, 5.54 years and 5.95 years in the Control and Epidrum groups respectively. There may also have been individual operator bias. Some of our investigators enthusiastically adopted the new device whilst others preferred their usual LOR technique. The small number of investigators in the study (n=7) may have provided an opportunity for individual bias to skew the results in favour of one technique over another. As such, it would seem prudent when designing a future randomised controlled trial to engage anaesthetic operators of a similar experience, preferably novice as in the pilot study we found experienced operators were less enamoured with the new device.

Our results differ somewhat from two previous studies carried out comparing the Epidrum to standard LOR techniques. Studying differences in time taken to carry out the procedure and ease of use, while our study looked primarily at morbidity and clinical endpoints. While our results did not show the Epidrum to offer any real advantage to LORS for siting epidurals, it may have a useful role to play in the teaching of the epidural procedure. It is often difficult for an anaesthetist teaching a trainee to determine whether there is a true loss of resistance simply by observing the procedure. If used correctly the Epidrum provides a very obvious visual signal that the epidural space has been reached, thus removing operator and observer subjectivity. In conclusion, the results of our pilot study do not suggest that using Epidrum compared to the standard LORS technique improves success or reduces morbidity associated with labour epidurals. All comparisons are from within our study.

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Acknowledgements
Thanks Exmoor Innovations Ltd, Taunton, and R Segurado and CSTAR School of Public Health, Physiotherapy and Population Science, University College Dublin, for their help with this study.

References

Medical Speciality Choice: Does Personality Matter?
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2Department of General Practice, National University of Ireland, Galway
3Galway University Hospital, Newcastle Rd, Galway
4Beaumont Hospital, Beaumont, Dublin 9

Abstract
There has been increasing interest in the personalities of doctors. This study examined whether personality differed based upon gender, level of training or medical speciality among 200 physicians and 134 medical students. Post-internship doctors scored significantly higher on conscientiousness (p<.001) than those pursuing basic medical training. Among those pursuing basic medical training, females scored significantly higher than males on agreeableness (p<.001) and conscientiousness (p<.001). Among post-internship respondents, females scored significantly higher on agreeableness (p=.004). There were no personality differences between post-internship doctors working in different specialties. However, among those pursuing basic medical training, those interested in person-focused medical specialities scored significantly higher on extraversion (p<.001), conscientiousness (p=.001), and lower on neuroticism (p=.01) than those who had no strong preference. These results suggest that there is no unique personality profile associated with medical practice, or medical speciality. Instead, it appears that medical school may shape personality.

Introduction
Interest in the "non-cognitive" traits of physicians, such as professionalism, personality, and empathy, has increased in recent years. Research has identified relationships between personality and acceptance into medical school, success in medical school, clinical performance, and physician wellbeing. Research has also examined whether personality may predict medical speciality choice. The identification of such an association would be relevant to career counselling, assignment of clinical placements, predicting future distribution of medical speciality choices, and medical selection. A recent review of the literature suggested that the relationship between personality and medical speciality is less clear than that between personality and academic and clinical performance. This literature is clouded by the use of a myriad of personality measures, many of which are now considered outdated or not useful. Borges and Savickas has synthesised this research using the five-factor model of personality and suggest some potential associations between certain medical specialities and personality traits. For example, general practitioners (GPs) appeared characterised by agreeableness and conscientiousness while surgeons were characterised by openness and extraversion. The current study sought to investigate personality among a
sample of Irish medical students and doctors, to examine whether personality differed according to gender, level of training or medical specialty.

Methods
The sample was composed of 334 physicians and medical students. The medical students attended a single Irish medical school while the physicians worked across eight different hospitals in Ireland. Of these participants, 134 (40%) were BMTR, 124 (37%) were basic medical training respondents, 64 (19%) were post-internship respondents, 43 (13%) were interns, 47 (14%) were senior house officers, 45 (13%) were registrars, 34 (10%) were consultants, 23 (6%) were trainee GPs, 5 (1.5%) were GPs, and 3 (0.9%) were medical researchers. A total of 165 females (49.3%) participated and 131 males (39.1%). Data on gender were not available for 39 participants (11.6%). The majority of participants were Irish (n=290; 87.7%) although 14 (4.2%) were from other European Union countries and 50 (14.9%) from non-European Union countries. Data on nationality were not available for 40 participants (11.9%). For analyses, participants were categorised by level of training and medical specialty choice or interest. For level of training, participants were divided into two groups: basic medical training respondents (BMTR) which comprised medical students and interns, or post-internship respondents (PIR) which included all physician grades senior to interns. Participants were also categorised on the basis of their specialty choice, in the case of BMTR, or their intended specialty choice, in the case of PIR. Data on the specialty interest of the physicians was obtained from the NEOFive Factor Index (NEO-FFI) which comprised a heterogeneous sample of doctors and medical students. While anumber of significant differences in the five personality factors were identified between BMTR and PIR, males and females, and BMTR intending to pursue person-focused medical specialities and BMTR reporting no strong preference (see Table 3). Further, PIR who were identified as outliers, scoring either very high or very low as per the NEO-FFI t-score interpretation guide, on any of the personality dimensions were further examined in order to determine whether any of these strong personality traits related to medical specialty. However, achi-square analysis revealed that those scoring very high or very low on any of the traits did not appear to cluster in any specialty type.

Discussion
While research has consistently demonstrated a link between personality and academic and clinical performance, the relationship between personality and medical specialty choice has been less clear. The current study examined whether personality differed according to medical specialty, level of training, or gender, among a sample of doctors and medical students. While a number of the analyses were limited by the small number of participants in some of the subgroups (e.g., BMTR intending to pursue technique-focused specialities), and the high proportion of BMTR expressing no strong preference with regards medical specialty, a number of significant findings were nonetheless observed. It is perhaps surprising to find that the sample was so heterogeneous in personality. A comparison of PIR and British norms for the NEO-FFI revealed few notable differences although PIR did score several points higher on extraversion, openness and agreeableness. Given the years of training required to qualify, and the responsibilities of a senior doctor; the similarity in conscientiousness levels between PIR and British norms is perhaps unexpected. However, previous research has also suggested that medical students or doctors do not have particularly different personality profiles from other professions.

Table 1 Means and Standard Deviations For Each Trait Among The Whole Sample, Basic Medical Training Respondents, Post-internship Respondents, and British Norms Reported By Egan And Colleagues (2000).

<table>
<thead>
<tr>
<th>Trait</th>
<th>BMTR (M, SD)</th>
<th>Basic Medical Training Respondents (M, SD)</th>
<th>Post-internship Respondents (M, SD)</th>
<th>British Norms (M, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>20.6 (7.8)</td>
<td>21.1 (8.1)</td>
<td>19.9 (7.5)</td>
<td>19.5 (8.6)</td>
</tr>
<tr>
<td>Extraversion</td>
<td>31.2 (6.7)</td>
<td>31.1 (6.6)</td>
<td>31.3 (6.9)</td>
<td>27.1 (5.9)</td>
</tr>
<tr>
<td>Openness</td>
<td>32.3 (7.0)</td>
<td>32.4 (6.6)</td>
<td>22.2 (7.7)</td>
<td>26.5 (6.5)</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>32.8 (6.1)</td>
<td>33.1 (5.6)</td>
<td>22.6 (6.4)</td>
<td>29.7 (5.9)</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>32.5 (6.7)</td>
<td>31.4 (6.7)</td>
<td>33.8 (6.6)</td>
<td>32.1 (6.6)</td>
</tr>
</tbody>
</table>
Table 3 Summary Of Comparisons Conducted via Independent t-test and Statistical Outcomes

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Trait</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic medical training respondents and post-internship respondents</td>
<td>Neuroticism</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Extraversion</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Openness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Conscientiousness</td>
<td>Pre-registration doctors: M= 31.4, SD= 6.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Registered doctors: M= 33.8, SD= 5.3</td>
</tr>
<tr>
<td>Females with basic medical training and males with basic medical training</td>
<td>Neuroticism</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Extraversion</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Openness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Conscientiousness</td>
<td>Female pre-registration doctor: M=35.7, SD= 5.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male pre-registration doctor: M=33.6, SD= 5.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female pre-registration doctor: M=32.8, SD= 6.9</td>
</tr>
<tr>
<td>Post-internship females and post-internship males</td>
<td>Neuroticism</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Extraversion</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Openness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Conscientiousness</td>
<td>Female registered doctor: M=33.8, SD= 6.7</td>
</tr>
<tr>
<td>Post-internship respondents working in person-focused specialties and post-internship respondents working in technique-focused specialties</td>
<td>Neuroticism</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Extraversion</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Openness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
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</tr>
<tr>
<td></td>
<td>Conscientiousness</td>
<td>ns</td>
</tr>
<tr>
<td>Post-internship respondents working in person-focused specialties and basic medical training respondents intending to pursue person-focused specialties</td>
<td>Neuroticism</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Extraversion</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Openness</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
<td>ns</td>
</tr>
<tr>
<td>Basic medical training respondents intending to pursue person-focused specialties and basic medical training respondents with no strong preference</td>
<td>Neuroticism</td>
<td>Person-focused: M=17.8, SD= 5.4</td>
</tr>
<tr>
<td></td>
<td>Extraversion</td>
<td>No strong preference: M=22.1, SD= 7.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(174)= -2.85, p=.005, d= .58</td>
</tr>
<tr>
<td></td>
<td>Openness</td>
<td>No strong preference: M=30.4, SD= 6.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(85.22)=3.85, p&lt;.001, d=.51</td>
</tr>
<tr>
<td></td>
<td>Agreeableness</td>
<td>No strong preference: M=30.5, SD= 6.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(174)=3.7, p&lt;.001, d=.73</td>
</tr>
</tbody>
</table>

Note: "ns"= non-significant, alpha set at .01

The findings of higher agreeableness and conscientiousness among female BMTR, and higher agreeableness among female PIR are also of interest. Previous research has also identified higher agreeableness and conscientiousness among female medical students than among their male counterparts. While the NEO-FFI also indicate higher scores on agreeableness for females than males which suggests that the findings of the current study are not unique to our sample. The findings of a significant gender differences in conscientiousness for BMTR but not PIR further supports the suggestion that conscientiousness develops over the course of medical training. Our data, which suggest little correspondence between personality and medical speciality choice, contribute to the body of evidence suggestive of little association between these variables. While Borges and Savickas’ review suggested some potential associations between specific medical specialities and personality, the authors emphasised that there appeared to be greater in-trai-speciality variation than inter-speciality differences. Findings of significant personality differences between BMTR intending to pursue person-focused specialties and those reporting no preference with regards medical speciality are difficult to explain. Given the lack of differences between PIR working in the different types of specialities, it is likely that there are factors unrelated to personality which mediate the relationship observed. Previous research has identified a myriad of factors which impact upon medical speciality choice. Further, the BMTR category included individuals studying at a variety of levels. In this way, it may be that those who report an intention to pursue person-focused specialties, as opposed to those who had no strong preference, were at a later stage of training, possibly involving greater degrees of patient care which may impact on personality; and that this may account for personality differences.

Overall, the results of the current study suggest that there is not a personality profile which is common to all doctors, or to particular medical specialities. The results suggest that the use of personality measures to "select" medical students or interns may be misguided. Instead, it is perhaps more appropriate to seek the skills which are requirements for the job. For example, those seeking to pursue surgical careers should have leadership skills and perform optimally under pressure. The current study also revealed that conscientiousness, a key predictor of academic and clinical performance and professionalism, appears to develop throughout medical training. Interventions targeting conscientiousness may thus be a potential means of improving academic performance and clinical practice.
Improving Surgical Site Infection Prevention Practices Through a Multifaceted Educational Intervention

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Abstract
As part of the National Clinical Programme on healthcare-associated infection prevention, a Royal College of Surgeons in Ireland (RCSI) and Royal College of Physicians of Ireland (RCPI) working group developed a quality improvement tool for prevention of surgical site infection (SSI). We aimed to validate the effectiveness of an educational campaign, which utilises this quality improvement tool to prevent SSI in a tertiary hospital. Prior to the SSI educational campaign, surgical patients were prospectively audited and details of antibiotic administration recorded. Prophylactic antibiotic administration recommendations were delivered via poster and educational presentations. Post-intervention, the audit was repeated. 50 patients were audited pre-intervention, 45 post-intervention. Post-intervention, prophylaxis within 60 minutes prior to incision increased from 54% to 68% (p=0.075). Appropriate postoperative prescribing improved from 71% to 92% (p=0.015). A multifaceted educational program may be effective in changing SSI prevention practices.

Introduction
Healthcare associated infection (HCAI) causes considerable morbidity and mortality. The total number of patients acquiring HCAI in Europe each year is estimated at 4.1 million, equating to an average prevalence of 7.1%1. A 2012 study reported prevalence of HCAI in Ireland of 5.2%, with SSI being the most common infection reported, accounting for 18.2%2. Numerous studies have documented independent risk factors associated with increased SSI incidence. These include increasing age, presence of co-morbid disease, obesity, smoking and increased National Academy of Sciences (NAS) wound classification index3,4. Patients who develop SSI have a 60% increased risk of requiring intensive care, are five times more likely to be readmitted to hospital, and are twice as likely to die compared to patients without a SSI. Furthermore, overall costs are substantially increased for patients with SSI5-8. It is estimated that up to 30% of HCAI are preventable through improved infection prevention practices9,10. Educational interventions have previously been multifaceted, utilising educational posters, feedback of audit data, lectures and provision of online information11-15. These varied

CPD available online at www.imj.ie and questions on page 95.
initiatives have been successful in improving adherence to guidelines. However, although the benefits of surgeon-led SSI prevention educational interventions have been previously demonstrated, there exists a paucity of infection prevention programmes aimed directly at surgeons. We aimed to utilise a multifaceted educational intervention targeting surgical teams to improve SSI prevention processes. As part of the National Clinical Programme for HCAI prevention, the Royal College of Surgeons in Ireland (RCSI) and the Royal College of Physicians of Ireland (RCPI) established a working group in 2012 to develop a quality improvement tool for SSI prevention.

Results

Patient and procedure characteristics are outlined in Table 1. Of the 50 patients assessed pre-intervention, 24 (48%) received antibiotic prophylaxis, while 25 out of 45 patients (56%) in the post-intervention group received antibiotic prophylaxis. There were no significant differences between pre and post-intervention patient or procedural demographics with regard to age, gender, urgency of the procedure or National Academy of Sciences wound classification index (clean, clean-contaminated, contaminated or dirty) (p=0.177, p=0.193, p=0.418, p=0.162 respectively). Pre-intervention, 13 (54%) of patients received antibiotics within 60 minutes prior to incision, with seven (29%) receiving prophylaxis at incision and the remaining four (17%) post-incision. Of those who didn’t receive antibiotic prophylaxis, it was not indicated in two patients (4%) and 24 had been previously commenced on intravenous antibiotic therapy. Following the educational initiative, 17 (68%) received antibiotics within 60 minutes prior to incision, seven (28%) at incision, with one patient (4%) receiving prophylaxis post-incision. This represents a 14% improvement in the appropriate timing of antibiotic administration (54% pre-intervention, 68% post-intervention) (p=0.026).

In terms of appropriate antibiotic duration, 14 patients (58%) in the pre-intervention group received single dose prophylaxis, seven (29%) received antibiotics for up to 24 hours post-operatively, and the remainder (n=3, 13%) for more than 24 hours. 17 patients (71%) received the recommended duration of antibiotic prophylaxis. This compares to 22 patients (88%) in the post-intervention group, who received single dose antibiotic prophylaxis, two patients (8%) who received antibiotics for up to 24 hours post-surgery and one remaining patient (4%) who received greater than 24 hours of antibiotics. 23 out of 25 patients (92%) in the post-intervention group were prescribed antibiotic prophylaxis for the appropriate duration, representing an overall improvement of 21% (p=0.075). In the pre-intervention cohort, 43 of 50 (86%) patient’s wound dressings were left in-situ for greater than 48 hours as compared with 39 of 45 (87%) patients in the post-intervention group.

Discussion

This is the first trial of the RCSI/RCPI national quality improvement tool for SSI prevention in Ireland. Though not statistically significant, we report encouraging trends over a short period of time with respect to improvements in appropriateness.

Table 1 Selected Breakdown of Patient and Procedure Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Pre Intervention</th>
<th>Post Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>(60%)</td>
<td>(40%)</td>
</tr>
<tr>
<td><strong>Breakdown</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean Age in Years (Range):</strong></td>
<td>44.2 (3 years - 84 years)</td>
<td>51.18 (7 - 88 years)</td>
</tr>
<tr>
<td><strong>Urgency</strong></td>
<td>Elective Procedures</td>
<td>Emergency Procedures</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>(46%)</td>
<td>(74%)</td>
</tr>
<tr>
<td><strong>Classification</strong></td>
<td>Breast Vascular Colorectal Other General</td>
<td>Clean Contaminated</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>(16%)</td>
<td>(24%)</td>
</tr>
<tr>
<td><strong>Surgical Specialty</strong></td>
<td>Clean-contaminated</td>
<td>Contaminated</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>(10%)</td>
<td>(48%)</td>
</tr>
<tr>
<td><strong>NAS Wound Classification</strong></td>
<td>Registrar Consultant</td>
<td>Suture Interrupted Suture Subcuticular</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>(12%)</td>
<td>(88%)</td>
</tr>
<tr>
<td><strong>Operating Surgeon</strong></td>
<td>No Closure</td>
<td>Stapes No Closure</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>(2%)</td>
<td>(28%)</td>
</tr>
<tr>
<td><strong>Closures</strong></td>
<td>Minimal</td>
<td>Infra- operative Blood Loss</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>&lt; 100 mls 100 mls - 1500 mls &gt; 1500 mls</td>
</tr>
<tr>
<td></td>
<td>(42%)</td>
<td>(4%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No recorded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(26%)</td>
</tr>
</tbody>
</table>
Irish Medical Journal March 2015 Volume 108 Number 3 www.imj.ie

Irish hospitals. Traditionally, Ireland has utilised national SSI guidelines from the RCSI/RCPI working group on prevention, a group appropriate for the care setting. Our poster design was taken from this data on a population basis, implying a cost to the Irish Healthcare System of approximately €73,000,000 per annum. Multiple previous education programmes have been reported in peer-reviewed literature. Educational posters have also previously been used as an effective part of educational interventions. A study by Lange et al combined posters with teaching sessions in an intensive care unit (ICU) in an effort to decrease catheter-related bloodstream infection (CRBSI).

As a result, CRBSI rates among infants on surgical services decreased from 15.46 to 6.67 BSI per 1000 catheter days. Similarly, an educational initiative to decrease ventilator-associated pneumonia (VAP) utilised educational posters to effect a decrease in VAP rate in a surgical ICU by 50%.

A study by McHugh et al reported on the impact of a poster campaign with an online educational platform specific to SSI prevention. In this study, authors noted a significant improvement in the administration of prophylactic antibiotics administered prior to incision and a significant decrease in inappropriate dressing changes during the initial 48 hours following surgery. Our educational intervention utilised similar methods employing both a high visibility poster campaign with face to face educational sessions. There are many modifiable parameters to consider when assessing best practice in relation to SSI prevention. A systematic review of meta-analyses published between 1990 and 2006 concluded that compliance with antibiotic prophylaxis policies was an accurate surrogate marker for SSI prevention, while being reasonably independent of the type of surgery. As a result, we focused particularly on antibiotic prophylaxis in our educational initiative, with repeated emphasis on giving the “right drug, at the right time, for the right duration”, Improvements in key areas of practice were demonstrated in the post-intervention audit. The percentage of patients receiving prophylaxis in the 60 minutes prior to incision increased from 54% to 66%. Furthermore there was an improvement from 71% to 92% in prescribing antibiotics for the appropriate post-operative duration. Our poster design was taken from the RCSI/RCPI working group on SSI prevention, a group developing national SSI guidelines for those working in Irish hospitals. Traditionally, Ireland has utilised international SSI prevention guidelines; however, there is a requirement for the production and implementation of guidelines specific to the needs of our own healthcare system.

The authors acknowledge a number of limitations associated with this work. Notably, this study was undertaken in a single centre, is prospective in nature and all observations were recorded by a single observer. We report relatively smaller numbers to those being reported in international literature. While we accept that our results were not statistically significant, the recorded improvement in practice is promising. However, this is a novel pilot study providing preliminary reports on the use of a planned national quality improvement tool designed to reduce rates of SSI in Ireland. Further audit, with an increased sample size, in collaboration with other Irish sites, is required to contribute conclusive evidence towards the efficacy of this multifaceted educational intervention. To conclude, national guidelines are necessary for prevention of SSI in an Irish hospital setting. A multifaceted educational intervention, comprising educational posters and face to face educational sessions may be effective in improving SSI prevention practices.

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References


A Less Invasive Approach to Screening for Early Onset Neonatal GBS

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Abstract
Recent recommendations for the management of an asymptomatic term infant with one septic risk factor for Group B Streptococcal (GBS) invasive disease have advised a clinical approach.1 Following a previous audit in our unit which showed that high numbers of asymptomatic infants were receiving antibiotics, a new protocol was introduced which emphasised the importance of clinical examination. This study assessed the safety and efficacy of this new protocol through chart review of 1865 eligible infants. We found a statistically significant decrease (P<0.0001) from 444 (19%) to 121 (6.5%) in the total number of term infants who underwent septic evaluations and received antibiotics. 241 asymptomatic infants with one septic risk factor were managed conservatively. No eligible infants had GBS invasive disease during the three month study period. The new protocol is a safe and effective tool for evaluating infants at risk of GBS invasive disease.

Introduction
Neonatal sepsis is a devastating condition associated with significant morbidity and mortality most commonly caused by GBS. The incidence for early onset GBS (EOGBS) invasive disease varies from 0.35/1000 live births in the US to 0.5/1000 live births in the UK and Ireland.1,2 15-40% of pregnant women are colonised with GBS.3 Case fatality rate is approximately 2-3% for EOGBS disease in term infants.1 The risk of sepsis in an asymptomatic infant with risk factors for sepsis is low but clinically significant (0.5-1.0%).4 However, most infants (approx. 90%) who develop EOGBS invasive disease will be symptomatic within 24 hours after birth. Only 65% of these infants will have had at least one perinatal septic risk factor.5 In 2012 a survey of the different guidelines used in the UK showed little consensus on this issue with 125 different guidelines identified for 157 neonatal units.6 The RCOG guidelines recommend that infants with one GBS septic risk factor and no clinical signs should be carefully observed for the first 24 hours.6 In 2010 the Centre for Disease Control and prevention (CDC) changed their guidelines to improve the management of asymptomatic infants at risk for invasive EOGBS disease and thereby decrease unnecessary evaluation, antibiotic exposure and separation of mother and infant.1

Many units use broad-spectrum intravenous (IV) antibiotics such as Penicillin to cover GBS and Gentamicin to cover E-coli. The toxic effects of Gentamicin are well known including ototoxicity and nephrotoxicity. A single dose of a Gentamicin can cause permanent hearing loss in genetically predisposed individuals.12 Broad-spectrum antibiotics can also increase the risk of resistant bacteria at a later stage. Early infant antibiotic exposures have also been linked to increased risk of wheezing in children,13,14 and can affect the developing intestinal microbiome, increasing the risk of gastrointestinal disease,15,16 as well as intussusception and autoimmune diseases. However in the case of suspected neonatal invasive disease, these antibiotics are the most effective. In 2011 a retrospective audit on septic evaluations was performed in our neonatal unit. Following this, a new protocol, Figure 1, was introduced for the management of term infants with septic risk factors. This emphasised the importance of clinical examination and highlighted that for suspected maternal chorioamnionitis or in a symptomatic infant, a septic evaluation and antibiotics are always indicated. However, in infants with one septic risk factor who are asymptomatic, the new protocol recommended that four hourly clinical observations be performed by the nursing staff and that four and twelve hourly medical reviews be performed for 48 hours by the senior house officer (SHO).

The primary outcome of this study was the number of septic evaluations performed and antibiotic exposure in asymptomatic term infants with one septic risk factor following introduction of the new protocol. We hypothesised that we had performed less unnecessary blood tests and given fewer unnecessary antibiotics.
Our secondary outcomes included identifying any symptomatic infants on the postnatal ward with a septic risk factor from observations and medical review, comparing these with the number of symptomatic infants identified on the postnatal ward without a septic risk factor, and analysing the economic cost implications of our new protocol.

**Methods**

Two independent reviewers performed a retrospective chart review of the babies born at term (≥37 + 0 weeks of gestation) from 1st July to 30th September 2012 in our tertiary maternity centre (Coombe Women and Infants University Hospital). We excluded infants with significant congenital defects such as congenital heart disease, spina bifida, and surgical gastrointestinal conditions which would increase their risk of sepsis. Details of birth gestation, mode of delivery, presence or absence of septic risk factors, maternal antibiotics, Apgar scores, clinical symptoms, blood tests performed, blood results and duration of any antibiotics were recorded. The clinical symptoms observed and identified as symptoms of suspected sepsis are listed in Table 1. Neither written informed consent nor research ethic committee approval was sought as this was an audit of the changed clinical practice in our centre. The data was analysed using a PC-based statistics package (StatsDirect version 3.0.97). The data was analysed using a PC-based statistics package (StatsDirect version 3.0.97). Descriptive statistics and Fisher exact test were used for the outcomes as appropriate.

**Results**

The results of the primary audit showed that 444 (19%) out of 2375 term infants born in the Coombe Hospital in the three month audit period in 2011 had septic evaluations which included an FBC, a serum CRP and a blood culture performed and received IV antibiotics. This was similar to international data (approx. 15%). Of these 444 septic evaluations, 242 (54.5%) were asymptomatic infants with one septic risk factor such as prolonged rupture of membranes (PROM) or maternal GBS positive high vaginal swab (HVS). The other 202 (45.5%) were performed on symptomatic infants with suspected invasive disease or those with multiple septic risk factors. Of the total septic evaluations performed, 2.5% (11) had positive blood cultures, 1.2% (5) of which were GBS positive and only one of whom had a septic risk factor. All of these GBS positive infants were clinically symptomatic. They concluded that the 4 (80%) of GBS positive infants had no known septic risk factors and that the 0% (0 of 242) asymptomatic infants who had septic evaluations and antibiotics for one septic risk factor had a positive blood culture or raised CRP. The annual incidence of EOGBS in our hospital ranged from 0.45/1000 live births to 0.68/1000 live births between 2000 and 2011. Following the introduction of the new protocol, Figure 1, a re-audit was performed. 1855 charts of infants who were eligible for inclusion were reviewed from the time period.

We found that 344 infants had septic risk factors and of these infants, 83 (4.5%) had septic evaluations and received IV antibiotics immediately after delivery. See Figure 2. Of the initial septic evaluations, two had a raised CRP while none had a positive blood culture. Of these infants, five were clinically unwell and received antibiotics for >48 hours despite their negative blood cultures. 261 infants with one septic risk factor were allocated as per the new protocol to four hourly observations for 48 hours if the mother had received adequate intrapartum antibiotics (IAP) (ie >2 doses or 1 dose > 4 hours before delivery) or four hourly observations and a four and twelve hourly medical review for 48 hours if the mother had received inadequate IAP. 241 infants

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Total number of infants with septic risk factors at birth=1511</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Infants</td>
<td>Infants with septic risk factors who had an immediate septic evaluation</td>
</tr>
<tr>
<td>83 (4.5% cohort)</td>
<td>261</td>
</tr>
<tr>
<td>Blood C/S positive (sepsis)</td>
<td>0</td>
</tr>
<tr>
<td>Blood C/S positive (contaminant)</td>
<td>0</td>
</tr>
<tr>
<td>Raised CRP</td>
<td>2</td>
</tr>
<tr>
<td>Antibiotics &gt;48 hours</td>
<td>5</td>
</tr>
<tr>
<td>GBS positive</td>
<td>0</td>
</tr>
</tbody>
</table>

*For e.g multiple septic risk factors/ suspected maternal chorioamnionitis/clinical symptoms at birth.**For clinical signs/symptoms observed during medical review/observations.***For clinical signs/symptoms at birth or during their stay on the postnatal ward.****Without any unnecessary septic evaluations or IV antibiotics
remained asymptomatic, 20 infants were identified as symptomatic on the postnatal ward. These infants all had septic evaluations performed on identification and received IV antibiotics. None of these infants were blood culture positive however 6 had raised CRPs and received >48 hours IV antibiotics. See Table 2. 151 infants in this time period had no septic risk factors. 18 infants were identified as having clinical symptoms of sepsis either at birth or during routine observations/ checks on the postnatal ward. None had a blood culture positive sepsis, however one had a blood culture positive suspected as contamination. Two other infants with raised CRPs had >48 hours IV antibiotics. We calculated that at least eleven thousand five hundred euro was saved by the unit in this three month audit period due to less on call blood tests being performed and analysed, which equates to annual savings of nearly fifty thousand euro.

**Discussion**

As previously mentioned, the RCOG and the CDC have recently changed their guidelines encouraging a more clinical and less invasive approach to infants with one septic risk factor. We confirmed our hypothesis that we are performing less septic evaluations and giving fewer courses of antibiotics. We reduced the numbers of septic evaluations performed and antibiotics given from 19% to 6.5% (p<0.001), of the total number of term babies born in those three months. In 2011, 242 (10%) of all term infants had septic evaluations and received antibiotics immediately after birth for one septic risk factor despite being asymptomatic, while in 2012, 241 (13%) asymptomatic infants with one septic risk factor were safely managed conservatively. We also showed that four hourly clinical observations and four and twelve hourly medical reviews of infants with one septic risk factor successfully identified symptomatic infants. There was no difference between the numbers of infants with and without septic risk factors that were identified as symptomatic on the postnatal ward. No infants became significantly unwell and there were no known morbidity and no mortalities. We cannot calculate a sensitivity or specificity of our screening tool as we do not have any blood culture confirmed sepsis during this period. It could be argued that we could not definitively state that no unwell infants had been missed, however as all infants get a postnatal check before discharge, a symptomatic infant would have been identified. In the US and in many European countries, all mothers are screened for GBS antenatally, with a positivity rate of 15-40%. The policy is that these mothers should be covered with IAP, usually in the form of a Penicillin. However, it has been found that even with adequate IAP, EGBS infection in term infants in these countries is still a significant burden. In Ireland and in the UK, screening is not performed routinely. IAP are recommended in certain situations in our hospital such as intrapartum pyrexia >38°C, previous baby with GBS disease or delivery at <37 weeks with PROM >18 hours. However, the evidence for this is inconsistent. Some centres perform 18 hour CRP measurement as an indication of sepsis in infants. This has a 64% sensitivity and 56% specificity with a negative predictive value (NPV) of 93% and a positive predictive value (PPV) of 14%. However, many diagnostic tests for neonatal sepsis have a poor PPV. The use of procalcitonin can also be used in the evaluation of sepsis.

We did not evaluate late onset GBS (LOGBS) invasive disease, which has an incidence of 0.24 per 1000 live births for term infants. Most mothers in these cases are GBS carriers and IAP have been associated with delayed presentation of symptoms and mild late onset sepsis. However, neither septic evaluations nor early antibiotics have been shown to prevent infants from developing LOGBS invasive disease. Our study shows that we were able to perform less septic evaluations and give fewer antibiotics to asymptomatic term infants with 1 septic risk factor without compromising the safety of infants who became symptomatic or unwell. We calculated that nearly fifty thousand euro per year were saved with this new protocol. We interviewed the SHOs who performed the frequent medical reviews. Subjectively they advised that the collective time performing the medical reviews was less than the collective time and stress it would take to perform septic evaluations on these infants. We suggest that this new protocol, Figure 1, of observational and medical review could be introduced in other hospitals who are performing septic evaluations and giving antibiotics unnecessarily to well term infants with one septic risk factor. We emphasise the importance of clinical exam in all cases whether or not septic risk factors are known.

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**References**

An Audit of Prescribing Practices for Benzodiazepines and Z-Drugs

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2School of Pharmacy, Queen’s University, Belfast, Northern Ireland

Abstract
Concerns persist over the use of benzodiazepines and Z-drugs in Ireland. A prospective prescription audit was conducted in 81 community pharmacies across Ireland over a four week period. The study sought to assess the level of prescription compliance with key components of benzodiazepine and Z-drug prescribing guidelines. 28% of audit booklets issued were returned, yielding data on 4,418 prescriptions. The findings suggest that little progress has been made in improving the prescribing of benzodiazepines and Z-drugs in Ireland in the decade since publication of the Benzodiazepine Committee’s report. Fewer than one fifth of prescriptions (18.8%) were fully compliant with the assessment criteria and the majority (53.7%) had multiple discrepancies. This study highlights the importance of monitoring and auditing benzodiazepine and Z-drug prescribing practices. Interventions involving patients, prescribers and pharmacists are required to improve the prescribing and use of these medications in Ireland.

Introduction
Despite publication of the Benzodiazepine Committee’s report1 and good practice guidelines2 in 2002, there is evidence that inappropriate benzodiazepine prescribing (i.e. prescribing for durations in excess of 2-4 weeks) persists in Ireland in both general practice3 and residential care settings4. There are also ongoing concerns over the extent to which benzodiazepines are implicated nationally in cases of problem drug use5 and deliberate self-harm6. The use of Z-drugs (e.g. zopiclone, zolpidem) has reportedly increased over time in Ireland1 and other European countries7. Any trend towards increased use of Z-drugs over benzodiazepines would not constitute a favourable development as there is no compelling evidence of a clinically useful difference between benzodiazepines and Z-drugs in terms of their effectiveness or potential for adverse effects, dependence or abuse8. The Benzodiazepine Committee stated that its recommendations applied equally to benzodiazepines and Z-drugs owing to similarities in the two drug classes’ pharmacology1. The lack of any distinct difference in clinical benefit between the two classes is further reflected by the addition in 2012 of Z-drugs to the Beers criteria, some of the most widely used criteria for assessing potentially inappropriate prescribing in older patients9.

The Benzodiazepine Committee recommended the introduction of a system for auditing benzodiazepine prescribing in Ireland1. It was intended that prescribing practices would be reviewed regularly and that appropriate support and advice would be provided to prescribers where required. However, it took almost a decade for this recommendation to be acted upon10. This study was conducted prior to implementation of the national auditing system. The aim of the study was to assess benzodiazepine and Z-drug prescribing practices in terms of the level of prescription compliance with key components of the relevant prescribing guidelines2 relating to prescribed dose, duration and patients’ age profile. Previous evaluations11,12 have focused on estimating general parameters such as prevalence of use from prescription claims data as opposed to assessing the quality of individual prescriptions. As amendments to the existing Misuse of Drugs Regulations are currently being considered by government13 which, if passed into law, will have significant implications for the prescribing of benzodiazepines and Z-drugs in Ireland, it is timely to report the results of this assessment.

Methods
An audit of benzodiazepine and Z-drug prescriptions was conducted prospectively by a convenience sample of community pharmacists over a four week period in 2011. Pharmacists were recruited using a randomised and geographically stratified quota sampling method. A total of 290 pharmacists across the Republic of Ireland agreed to receive an audit booklet with a view to possible participation. The study was entirely anonymous. Pharmacists were issued a booklet in which they could evaluate up to 120 prescriptions using a questionnaire-styled system with Yes/No response options. Evaluation was based on prescription compliance with key guideline recommendations2 relating to prescribed dose, patient age and treatment duration (see Table 1). The audit questions were designed to assess prescribing practices while simultaneously being quick and easy to complete. No distinctions were made between health schemes. It was intended that all benzodiazepine and Z-drug prescriptions would be evaluated prospectively by participating pharmacists as they were presented in the pharmacy over a continuous four week period. Data validation and analysis were undertaken using SPSS v.18 (SPSS Inc, Chicago, IL, USA).

Results
Response rate
81 booklets with usable data were returned, yielding a response rate of 28%. Data were received from at least one pharmacy in each county in the Republic of Ireland with the exception of counties Clare and Westmeath. A further 7 booklets were returned that did not specify the county in which they were completed.

General analysis
Data were collected on a combined total of 4,418 prescriptions. Following validation of the dataset, 253 (5.7%) prescriptions were either incompletely assessed (n=28) or deemed to have at least one conflicting response (n=225), such as stating that the dose was both unlicensed and the lowest recommended. These prescriptions were excluded from detailed analysis, yielding 4,165 valid prescription records. Summary statistics of the number of prescriptions per evaluation booklet are shown in Table 2. Excluding the small number of invalid records had no significant impact on the

<table>
<thead>
<tr>
<th>Table 2: Number of prescriptions per evaluation booklet</th>
</tr>
</thead>
<tbody>
<tr>
<td>All prescriptions</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>IQR</td>
</tr>
<tr>
<td>Mode</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
</tbody>
</table>

*6 booklets were received with data recorded for the maximum number of prescriptions.

Table 1: Prescription evaluation questions

1. Does the prescribed dose comply with the licensed dose? 
2. Is the prescribed dose the lowest recommended dose? 
3. Does the prescribed dose match the patient’s age profile? (i.e. in the case of elderly patients the recommended dose for the majority of these drugs is half the adult dose) 
4. Is the duration of treatment compliant with the recommended period of not longer than two to four weeks? 
5. Does the prescription specify that the prescription can be repeated?

Ethical approval was granted by the Faculty of Health Sciences Research Ethics Committee, Trinity College Dublin.
overall results. Analysis of the 4,165 valid records is presented in Figure 1.

The compliant prescription
Figure 2 shows that fewer than one fifth (18.8%) of prescriptions complied with all the assessment criteria. The majority of prescriptions (53.7%) had at least two discrepancies and more than a quarter (27.3%) had three or more discrepancies.

Discussion
The results indicate that benzodiazepines and Z-drugs continue to be widely and frequently prescribed in Ireland, as data were collected on a large volume of prescriptions over a relatively short period. If prescriptions were assessed over the intended four week timeframe, and taking the average number of prescriptions evaluated (n = 54.5) across the 81 participating pharmacies, this would yield an average of approximately two prescriptions presented in each pharmacy daily. This is consistent with the findings of our previous research 14, as well as annual reports of national reimbursement claims data published by the Primary Care Reimbursement Service which have repeatedly shown that benzodiazepines and Z-drugs feature among the most commonly dispensed medications on both public and private health schemes in Ireland 15. The findings also indicate that there is not uniform adherence to the recommendations and prescribing guidelines published by the Benzodiazepine Committee more than a decade ago. For example, fewer than one in five prescriptions (18.8%) complied with all the key guideline criteria 2 and the majority of prescriptions (53.7%) had at least two discrepancies. The most commonly identified problems were that the lowest recommended dose was not prescribed (58.5% of cases) and the duration of treatment was non-compliant with the recommended period (54.1% of cases). These findings are consistent with previous related research 11,12,16. For example, the percentage of prescriptions that were non-compliant in terms of treatment duration (54.1%) closely mirrors the findings of Hennman et al. 11 who reported that in 2002 almost half (48.9%) of General Medical Services (GMS) patients in the former North Eastern Health Board region receiving benzodiazepines or Z-drugs were obtaining them for extended periods (i.e. longer than 3 months). While there may have been cases where prescribers were justified in deviating from guideline recommendations for reasons not immediately apparent to participating pharmacists, it is unlikely that such cases could have accounted for the high level of discrepancies identified in the current study. Overall, the findings suggest that little progress has been made in improving the prescribing of these medications in Ireland since publication of the Benzodiazepine Committee’s report.

The interim National Drugs Strategy 17 noted that implementation of the Benzodiazepine Committee’s recommendations had been slow and among the issues relating to the Committee’s report needing to be addressed were the monitoring of prescribing practices, inappropriate use/supply and guideline implementation. Subsequent to this study there have been a number of important developments with direct implications for the prescribing of benzodiazepines and Z-drugs in Ireland. An auditing system of prescribing practices has been implemented nationally 18 and self-auditing has been endorsed by the Irish College of General Practitioners, with guidance available to GPs on completing the various stages of a benzodiazepine prescribing audit cycle 19. In addition, amendments to the existing Misuse of Drugs Regulations are currently being considered by government 18. However, these measures alone are unlikely to be sufficient in effecting the changes necessary to improve benzodiazepine and Z-drug prescribing practices. Audit coupled with feedback can be effective in improving professional practice but the effects are generally small to moderate 19. Furthermore, experience from implementing additional legislative measures has found that some degree of reduction in benzodiazepine use can be achieved but with the potential for unintended consequences, such as benzodiazepines being replaced with less favourable drug alternatives 20.

The current study has a number of strengths. Firstly, participation was entirely voluntary and no form of incentive was offered. This supports the findings as an objective and unbiased assessment of benzodiazepine and Z-drug prescribing practices in Ireland. The relatively low proportion (59%) of overall prescriptions that had conflicting responses indicates that participating pharmacists were both capable and reliable in carrying out the assessment correctly and consistently. Owing to the sampling method employed and the 28% response rate, the possibility of response bias cannot be excluded. However, the participation rate was comparable to or greater than that in other benzodiazepine prescribing evaluations 19,23 which relied on voluntary GP participation. A high volume of prescription data was obtained from a wide geographical spread which strengthens the findings as an assessment of prescribing practices on a national scale. In designing the evaluation questions, it was felt that it would be more practical to have one set of assessment questions with relatively universal applicability to all prescription types, rather than making distinctions based on individual health schemes. Based on the volume of prescriptions on which data were collected, as well as informal feedback, it would appear that this held true in practice. However, this carried an inherent limitation for the study insofar as the assessments made relating to duration of treatment and repeat prescribing were curtailed by the health scheme set-up in Ireland and are likely to represent an underestimate. This is because GMS prescriptions are typically issued for a maximum duration of four weeks. Despite the existence of specific repeat
GMS prescription forms, it is not uncommon for repeat supplies to be issued on identical single prescription forms that have been forward dated. This means that single GMS prescriptions, when assessed on an individual basis, could appear to comply with the recommended duration. However, without actually specifying repeat supply, post dated GMS prescriptions could effectively facilitate it. Thus the actual proportion of prescriptions that were non-compliant in terms of treatment duration and repeat supply is likely to be higher than reported.

As was acknowledged by the Benzodiazepine Committee³, any single initiative is limited in the extent of the contribution it can make to address the problems associated with the use of drugs such as benzodiazepines and Z-drugs. However, evaluations of prescribing can provide valuable insights which are important in the process of changing prescribing practices²⁴. As already noted, the use of community pharmacists for this study meant prescriptions were reviewed in the absence of information from prescriber-patient consultations that might have influenced prescribing decisions, hence the factors underlying deviations from guidelines could not be explored. However, the detected frequency of extended duration and repeat prescriptions, in particular, reveals the potential scope for other forms of the process of changing prescribing practices²⁴. As shown in the findings, interventions involving patients, prescribers and pharmacists should be pursued to improve the prescribing and use of benzodiazepines and Z-drugs in Ireland.

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Acknowledgements
The researchers are grateful to all of the community pharmacists who participated in this study.

Funding
C Cadogan was supported in undertaking this research by an Ussher Fellowship awarded by TCD.

References
Prediction of Hospital Mortality by Changes in the Estimated Glomerular Filtration Rate (eGFR)

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Abstract
Deterioration of physiological or laboratory variables may provide important prognostic information. We have studied whether a change in estimated glomerular filtration rate (eGFR) value calculated using the (Modification of Diet in Renal Disease (MDRD) formula) over the hospital admission, would have predictive value. An analysis was performed on all emergency medical hospital episodes (N= 61964) admitted between 1 January 2002 and 31 December 2011. A stepwise logistic regression model examined the relationship between mortality and change in renal function from admission to discharge. The fully adjusted Odds Ratios (OR) for 5 classes of GFR deterioration showed a stepwise increased risk of 30-day death with ORs of 1.42 (95% CI: 1.20, 1.68), 1.59 (1.27, 1.99), 2.71 (2.24, 3.27), 5.56 (4.54, 6.81) and 11.9 (9.0, 15.6) respectively. The change in eGFR during a clinical episode, following an emergency medical admission, powerfully predicts the outcome.

Introduction
St James’ Hospital (SJH) is a tertiary referral centre for various specialties, but is on continuous call for emergency medical admissions. In 2002 there was a major reorganisation of acute care with the establishment of an Acute Medical Admissions Unit (AMAU). Following this system change, key quality markers including hospital length of stay; hospital emergency department ‘wait-times’1, in-hospital mortality and readmissions were improved2,3. Further improvement in the outcomes for unselected emergency medical admissions may be achieved by closer monitoring and early detection of deteriorating patient. Previous studies have shown that deterioration in the clinical status of patients can be anticipated by changes in physiological parameters4 and laboratory variables5,6. Much work had been completed in this field, focusing on both physiological- and laboratory-derived variables, alone or in combination7,8. This has led to the development of Early Warning Systems tools for ward based patients to identify patients at risk and prevent further deterioration1,4,6.

Emergency medical patients have frequent blood and biochemistry analyses; on our electronic patient record, there is an automated calculation of the GFR value following each creatinine determination. A more robust estimate of the glomerular function can be made using the Modification of Diet in Renal Disease (MDRD) formula, which was devised in 1999.9 It uses six variables—age, race, gender, serum creatinine, urea and albumin levels. The MDRD formula to estimate GFR has not been validated in acute kidney injury9; however, standing alone; some of the variables used in these equations have been independently shown to predict mortality in an acute setting10,11. We have previously demonstrated that admission eGFR can predict the in-hospital mortality in emergency medical admissions1,2. Used in the latter context, the eGFR represents an aggregate predictive score with significant evidence for these1,2,13,14. The aim of this study therefore, was to explore how the eGFR value might change during an acute hospital admission, and whether it could be used to predict in-hospital mortality. The setting was a study of all unselected acute medical emergencies admitted to a large university teaching hospital over a 10-year period between January 2002 and December 2011.

Methods
An anonymous dedicated patient database was created in 2002 to characterise emergency admitted patients, using components from the administration system (PAS), the emergency department database, and the hospital biochemical, haematology and microbiological databases; some discharge and procedural codes were derived from the hospital in-patient enquiry (HYPE) scheme (Table 1). The admission and discharge eGFR values were used to calculate the delta GFR value, the change during the hospital episode. The extended MDRD equation (MDRD Value = 170 x Sr. Creatinine-0.993 x Age-0.176 x [0.742 if Female] x [1.210 if Black] x BUN-0.176 x Albumin+0.318) was utilized. We categorised patients by any improvement in delta GFR (Group I) or of this variable over the clinical episode: deteriorations were of <= 5 (Group II), > 5 <=10 (Group III), 10 < <=20 (Group IV), 20 < <=40 (Group V) and > 40 ml/min-1/m² (Group VI). Mortality was any in-hospital death at a designated cut-offs; we examined the association of change in eGFR from admission, at designated cut-offs of 24 hr, 72 hr, 7 day, 14 and 30 days on mortality by that point. Descriptive statistics for baseline demographic data included, as appropriate, means / standard deviations (SD), medians / inter-quartile ranges (IQR) or percentages. Comparisons between categorical variables and mortality were with Chi-square tests. We examined the association between mortality at cut-offs (24 hr, 72 hr, 7 day, 14 day and 30 day) and the following predictor variables: age, change in eGFR over the hospital episode, the O2 saturation and troponin status (all at time of presentation in the Emergency Department).

Results
Renal function over time
The median GFR at admission was 75.3 ml/min/1.73m² (IQR: 53.8, 97.7); the grouped data suggested an increase following admission being at 24 hr – 87.4 ml/min/1.73m² (IQR: 67.2, 107.6), at 72 hr – 85.7 ml/min/1.73m² (IQR: 64.7, 106.8), at 7 day – 80.8 ml/min/1.73m² (IQR: 59.9, 101.8) and at 30 days – 72.5 ml/min/1.73m² (IQR: 52.9, 93.2). However, as patients had different lengths of hospital stay; direct comparisons must be done to establish whether on a paired basis patients dropped their MDRD value over time. Most patients showed small improvements in MDRD value; the change from baseline to discharge or death value were respectively +1.3, +2.6, +2.8 and +2.2 ml/min/1.73m² at the sample points of 24, 72 hr, 7 day and 30 days. Patients who died had a much lower GFR at admission 48.9 ml/min/1.73m² (IQR: 30.4, 69.7) but showed a crucial difference with a substantial fall by day 2 – 33.5 ml/min/1.73m² (IQR: 19.9, 59.4) with little further change thereafter – 3 day 36.3.

Table 1 Details of emergency medical admissions 2002 – 2011

<table>
<thead>
<tr>
<th>Variable</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>30998 (48.9%)</td>
<td>31666 (51.1%)</td>
<td>61664 (100%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Median (IQR range)</td>
<td>63.8 (43.2 – 78.0)</td>
<td></td>
</tr>
<tr>
<td>Length stay (days)</td>
<td>Median (IQR range)</td>
<td>5.9 (2.4 – 12.9)</td>
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<tr>
<td>Charlson Co-morbidity Index</td>
<td>0</td>
<td>30957 (50.0%)</td>
<td>18030 (29.1%)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>12977 (20.9%)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Change in renal function and Odds Ratio for an in-hospital death by day 30

| Group | Delta MDRD (ml/min) | n  | Mortality (%) | OR (95% CI) | P <  
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Improved</td>
<td>32112</td>
<td>4.4</td>
<td>9.06 (0.87, 1.06)</td>
<td>0.40</td>
</tr>
<tr>
<td>1</td>
<td>0 to -4.9</td>
<td>14712</td>
<td>4.2</td>
<td>6.66 (1.36, 17.4)</td>
<td>0.0001</td>
</tr>
<tr>
<td>2</td>
<td>-5 to -9.9</td>
<td>4738</td>
<td>6.6</td>
<td>2.74 (2.01, 2.52)</td>
<td>0.0001</td>
</tr>
<tr>
<td>3</td>
<td>-10 to -19.9</td>
<td>5094</td>
<td>9.4</td>
<td>4.06 (3.64, 43.4)</td>
<td>0.0001</td>
</tr>
<tr>
<td>4</td>
<td>-20 to -39.9</td>
<td>3088</td>
<td>15.7</td>
<td>7.08 (6.12, 8.19)</td>
<td>0.0001</td>
</tr>
<tr>
<td>5</td>
<td>-49 to -100</td>
<td>1120</td>
<td>24.5</td>
<td>15.71 (12.7, 18.9)</td>
<td>0.0001</td>
</tr>
</tbody>
</table>
admitted with congestive heart failure irrespective of left ventricular systolic function of stay with even very small increases in creatinine in patients mortality and morbidity in patients hospitalized for CHF, et al and Smith et al demonstrated increase in mortality and length of stay with even very small increases in creatinine in patients admitted with congestive heart failure. The difficulty is that these studies could require specific knowledge of different scoring system, complex calculation or additional adjustments for age of clinical variables in order to predict the outcome.

Others agree that there are major ramifications for changes in renal function in specific contexts and that even small alteration can have important consequences. Grigorian Shamagian et al demonstrated that renal dysfunction was a powerful predictor of mortality and morbidity in patients hospitalized for CHF, irrespective of left ventricular systolic function. Similarly, Gottlieb et al and Smith et al demonstrated increase in mortality and length of stay with even very small increases in creatinine in patients admitted with congestive heart failure.

Risk prediction based on lab data and change in GFR (Figure 2)

We identified an efficient model using only four predictors of 30-day outcome; these were age, change in GFR between admission and end of the hospital episode, troponin status (negative or positive) and O2 saturation level at time of admission. The fully adjusted Odds Ratios for each of the classes of GFR deterioration showed a stepwise increase in risk of 30-day death, compared with those showing no change or an improvement. The prediction was of a high order at each of the time points assessed of 24 hr, 72 hr, 7 days, 14 days and 30 days. The Area under the Receiver Operator Curve at each of these prediction time points were 0.94 (0.92, 0.96), 72 hr 0.93 (0.91, 0.94), 7 days 0.91 (0.90, 0.92), 14 days 0.89 (0.89, 0.90) and 30 days 0.88 (0.87, 0.89).

The fully adjusted for each deteriorating group vs. improvers at 30 days were 0.94 (0.92, 0.96), 72 h 0.93 (0.91, 0.94), 7 days 0.91 (0.90, 0.92), 14 days 0.89 (0.89, 0.90) and 30 days 0.88 (0.87, 0.89). The adjusted OR for a 30-day death for the five groups with declines of <5, >5<10, >10<20, >20<40 and >40 ml/min/1.73m2 were 0.89 (1.06, 1.06), 1.54 (1.35, 1.74), 2.74 (2.0, 3.52), 4.06 (3.64, 4.54) and 4.06 (3.64, 4.54) respectively.

Discussion

Acute kidney injury is not uncommon in emergency medical admission; what our data emphasises is that, for emergency medical admissions, homeostasis of the internal environment is the norm. Blood tests are routinely collected (often daily) in emergency hospitalised medical patients; therefore there is an opportunity to deploy these as a monitoring and an early warning system. A combination of markers, when formalized, then constitute an aggregate score system. Hucke et al suggested that a combination of clinical and biochemical measurements in the accident and emergency department proved the best predictors of hospital mortality based on the logistic regression analyses rather than each of them taken individually. These results were supported by Prytherch et al and Asadollahi et al, both confirming the relationship between admission abnormal laboratory data and a predicted worse outcome in general medical patients. The difficulty is that these studies could require specific knowledge of different scoring system, complex calculation or additional adjustments for age of clinical variables in order to predict the outcome.

Others agree that there are major ramifications for changes in renal function in specific contexts and that even small alteration can have important consequences. Grigorian Shamagian et al demonstrated that renal dysfunction was a powerful predictor of mortality and morbidity in patients hospitalized for CHF, irrespective of left ventricular systolic function. Similarly, Gottlieb et al and Smith et al demonstrated increase in mortality and length of stay with even very small increases in creatinine in patients admitted with congestive heart failure. The limitation of these studies is that they were performed on selected groups rather than with unselected medical emergencies. In contrast, this study was performed on an unselected group of patients, representing all emergency medical admissions over a 10 year period. Therefore the findings can be applied to all medical patient groups. Nearly 80% of patients, the eGFR will either show no change or improve over the course of the admission. For the remaining 20% of patients, the drop in renal function is exponentially related to the risk of an in-hospital death. It is important to note that we are not considering patients with advanced or deteriorating renal function; as the average eGFR value on admission was 74 ml/min/1.73m2 (IQR 54 – 98), a threshold cut-off of 5 ml/min/1.73m2 (Group I) represents a change of 67% from baseline. This variation would be at the level that might be considered important in a clinical context. There has been debate about whether absolute decline in renal function or relative decrease (for example 25%) would provide a better discriminator. In this view would be a high threshold as only 5.8% of our patients encountered such a deficit, but with a mortality of 50.7% and an OR of 15.5 (95% CI: 13.9 – 17.3) for a 30-day in-hospital death. Thus any significant deterioration in GFR, following an emergency medical hospital admission, must be considered a high-risk event and mandate closer monitoring.

We have previously shown that admission eGFR is a reliable tool to predict mortality following acute medical admission. This study expands on this work by demonstrating any deterioration in the
admission eGFR value is an indicator of increased risk of death during that admission. The hope is that a move to standardise of National Early Warning Systems will provide a basis to detect early deterioration in perturbed physiology, initiate corrective action and further improve clinical outcomes. As patients frequently have biochemistry determinations during such an admission, algorithms could be devised to ‘track and trigger’ with such deterioration. The impact of an automatic laboratory based alerting system, providing feedback to the clinical care process, would be of great interest.

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Acknowledgements
Our consultant medical colleagues and the non-consultant members of the ‘on-call’ teams without which the AMAU initiative could not have been progressed; and the contribution of S Donnelly, her Clinical Nurse Managers and the ancillary professions related to medicine (SCOPE).

References

Myocardial Ischaemia Following Cocaine and Adrenaline Exposure in a Child during an Ophthalmological Procedure

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Abstract
We report a 23-month old girl who presented with bilateral epiphora who underwent bilateral lacrimal probing and syringing, during which a cocaine adrenaline solution was used. Two hours after the procedure she developed acute pulmonary oedema secondary to myocardial ischaemia. The patient was treated with intravenous glyceryl trinitrate and milrinone infusions; cardiac enzymes and left ventricular function normalised over the subsequent 72 hours. Topical administration of cocaine and adrenaline solution may have caused systemic cardiac effects and should always be used judiciously.

Introduction
For over a century, cocaine has been used as a topical anaesthetic and vasoconstrictor in otorhinolaryngological procedures. It thereby reduces local bleeding and mucosal swelling making it a useful agent for procedures in confined mucosal spaces. However, systemic absorption of cocaine does occur via the nasal mucosa, at rates which vary considerably between individuals. Adverse reactions are rare but occasional reports of iatrogenic cocaine induced acute coronary syndrome have been documented in the adult literature. Adrenaline is frequently used in conjunction with cocaine to reduce the absorption of cocaine.

Case Report
An otherwise healthy 23-month old girl presented to her local hospital with bilateral epiphora secondary to congenital nasolacrimal duct obstruction. Under general anaesthetic she...
underwent bilateral lacrimal probing and syringing, during which cotton dental roll dampened with an 4% cocaine and 1 in 1000 adrenaline solution was placed in the nose under the inferior turbinate for approximately twenty minutes. This allowed good endoscopic visibility of the lacrimal probe in the nose. She also had a small volume of the cocaine adrenaline solution injected into the lacrimal sac to anaesthetise the lacrimal sac mucosa. Approximately two hours following the procedure she became agitated, tachycardic and developed acute pulmonary oedema requiring intensive care admission. She demonstrated acute myocardial ischaemia with subtle anterolateral ST segment changes on her electrocardiogram and a markedly elevated troponin T of 161 ng/L. Left ventricular (LV) ejection fraction was reduced at 35%. At 23 hours following development of symptoms, she was urgently transferred to a paediatric cardiology unit given the risk for development of fatal tachyarrhythmias. She was treated with intravenous glyceryl trinitrate and milrinone infusions, diuretics, aspirin and an ACE inhibitor. Her electrocardiogram at this time demonstrated a return to baseline of her ST segments. Her LV fractional shortening on echocardiogram measured 28% with markedly jerky relaxation. Cardiac enzymes and LV function normalised over the subsequent 72 hours. There were no arrhythmias detected. Following thorough local investigation into this adverse clinical incident at the regional hospital, no medication or procedural error was identified. Independent laboratory analysis of the cocaine solution was confirmed at 4%. This child appeared to suffer toxicity from a standard cocaine adrenaline solution that was used in a manner that is widely recognised.

Discussion
This case highlights a serious side effect of topical cocaine administration not previously reported in a child. The systemic absorption of cocaine in this child had a dramatic effect on coronary perfusion and myocardial integrity as evidenced by acute pulmonary oedema, elevated troponin T, abnormal electrocardiogram and reduced left ventricular function on echocardiogram. Although the child recovered fully, such an event may have resulted in a poor outcome, particularly with the risk of reperfusion arrhythmia.

The etiology of cocaine induced cardiovascular ischaemia is complex and likely multifactorial. Cocaine increases myocardial oxygen demand, but simultaneously decreases supply by inducing coronary arterial vasoconstriction from stimulation of alpha adrenergic receptors and promoting intra-coronary thrombus formation from enhanced platelet aggregation. Epinephrine is often used with cocaine in the context of topical anaesthesia, as its vasoconstrictive qualities further promote haemostasis and it is believed to reduce systemic absorption of cocaine. However, overall results showing decreased absorption of cocaine are inconsistent. There is a potential risk that epinephrine could act synergistically to strengthen its sympathomimetic effects. A healthy 18-year-old male who underwent nasal surgery with prior nasal packing of a cocaine/epinephrine solution, where no drug administration error was later identified, suffered myocardial ischaemia and post operatively. To date, there have been no reported cases to our knowledge, of iatrogenic cocaine induced myocardial ischaemia in a child. Care should be taken with topical administration of cocaine due to its sometimes unpredictable absorption rate and potential for cardiac toxicity.

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References
appropriate. A 2011 HIQA report recommended that the HSE should carry out a review of the benefits of a direct access referral system. To our knowledge no such review has been carried out to date. There is significant data supporting the benefits of direct access referral for ultrasound, though little in the recent literature and none in Ireland. It has previously been demonstrated that referrals from GPs have a comparable rate of positive findings when placed alongside referrals from hospital consultants. It has also been shown to reduce the number of outpatient and emergency department referrals made by general practitioners. Robinson et al. demonstrated that direct access to ultrasound is the preferred arrangement for the majority of general practitioners, rather than transferring services to primary care. This study aimed to review all direct GP referrals for ultrasound investigations to a tertiary referral teaching hospital and to assess the waiting times and diagnostic outcomes.

Methods
All GP referrals were vetted by a consultant radiologist and triaged according to urgency, as per the HIQA patient referral pathway. Our department is staffed by one Consultant Radiologist, one Specialist Registrar and two to three Sonographers, including one Clinical Specialist. Ultrasound is generally reported on the same day as they are performed and the results made available to the referring GP either by post or via Healthlink. Urgent or unexpected results are communicated directly to the referring physician by phone at the time of reporting. All patients who underwent diagnostic ultrasound between January 1st and July 31st 2012 were identified using the hospital Radiology Information System. Patients who had an ultrasound requested by a GP were included in the study, patients were excluded if the referral was from a Hospital Consultant. Breast and axillary ultrasound are carried out in the breast imaging department and were also excluded. The radiology reports from the included studies were reviewed by a Specialist Registrar in radiology. Patients were divided into two possible groups: those with positive findings and those with normal findings. A positive finding was classed as any finding which could explain the patient’s symptoms or a significant incidental finding. Studies which were normal or those that demonstrated benign entities such as simple renal cysts or simple liver cysts were included in the normal category. The number of patients who had a recommendation for subsequent specialty referral or who underwent follow up imaging investigations was also noted.

Results
Over the 7 month period, there were a total of 7,624 ultrasound investigations carried out in our department. Of these, 1,090 referrals (14.3%) originated from general practice. A total of 327 different referring physicians were identified. The majority of these (304) referred less than 10 patients each. 21 GPs made between 10-20 referrals and 2 physicians sent in excess of 20 referrals in the 7 month period. The average age of patients was 43.7 years (range 16-91 years). The male to female ratio was 1.3:4. The median turnaround time was 56 days from the time of referral to the time of scan. Of the 1,090 studies, there were positive findings in 332 (30.5%) patients (Table 1). 71 patients (6.5%) had further imaging investigations either to further characterise a lesion seen on ultrasound or to ensure resolution or stability of a detected lesion. 35 patients (3.2%) had a recommendation for subsequent referral to a hospital based specialist based on the result of their ultrasound. Within the category of positive findings, there were 9 patients who required urgent specialist referral including: 2 large abdominal aortic aneurysms both of which underwent endovascular repair within 2 days; 2 patients with newly diagnosed metastatic disease to the liver; 1 suspicious thyroid mass later confirmed as papillary thyroid cancer; 1 patient with extensive lymphadenopathy later confirmed as Hodgkin’s lymphoma; 1 patient with hydronephrosis secondary to an obstructing calculus; 1 patient with a neck abscess requiring surgical drainage. Renal ultrasound demonstrates the highest rate of negative findings with 121 of 131 (92.36%) studies classed as normal (Table 1). Further review of the indications for these studies demonstrates that urinary tract infection was the most common reason for referral, accounting for 47 of 131 cases (44 of which were normal) while flank pain accounted for 32 cases (28 of which were normal).

Discussion
Direct access ultrasound for general practitioners has been consistently shown to yield a similar rate of positive diagnostic outcomes to referrals generated from the hospital outpatient department which demonstrates that general practitioners make good use of the resource when it is made available to them. Robinson et al. demonstrated that direct access to ultrasound is the preferred arrangement for the majority of general practitioners, rather than transferring services to primary care. This study aimed to review all direct GP referrals for ultrasound investigations to a tertiary referral teaching hospital and to assess the waiting times and diagnostic outcomes.

Table 1 The number of “positive” and “normal” studies by subtype according to body area

<table>
<thead>
<tr>
<th>Body Region</th>
<th>Normal</th>
<th>Positive</th>
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<tbody>
<tr>
<td>Abdomen (N=275)</td>
<td>188 (68.12%)</td>
<td>88 (31.88%)</td>
</tr>
<tr>
<td>Pelvis (N=247)</td>
<td>189 (75.56%)</td>
<td>58 (23.44%)</td>
</tr>
<tr>
<td>Renal (N=131)</td>
<td>121 (92.37%)</td>
<td>10 (7.63%)</td>
</tr>
<tr>
<td>Transvaginal (N=112)</td>
<td>84 (75%)</td>
<td>28 (25%)</td>
</tr>
<tr>
<td>Testes(N=87)</td>
<td>37 (42.53%)</td>
<td>50 (57.47%)</td>
</tr>
<tr>
<td>Neck/ Thyroid (N=77)</td>
<td>38 (49.35%)</td>
<td>39 (50.65%)</td>
</tr>
<tr>
<td>Liver(N=51)</td>
<td>30 (51.88%)</td>
<td>21 (41.18%)</td>
</tr>
<tr>
<td>Soft Tissue / MSK (N=47)</td>
<td>23 (48.94%)</td>
<td>24 (51.06%)</td>
</tr>
<tr>
<td>Gallbladder (N=38)</td>
<td>27 (71.05%)</td>
<td>11 (28.95%)</td>
</tr>
<tr>
<td>Aorta(N=15)</td>
<td>13 (86.66%)</td>
<td>2 (13.34%)</td>
</tr>
<tr>
<td>Salivary Glands (N=6)</td>
<td>6 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Genit (N=3)</td>
<td>2 (66.67%)</td>
<td>1 (33.33%)</td>
</tr>
<tr>
<td>Totals (N=1090)</td>
<td>758 (69.54%)</td>
<td>332 (30.46%)</td>
</tr>
</tbody>
</table>

While this study provides evidence to support a direct referral system, we acknowledge a number of limitations. There are other options for imaging in the community, such as private healthcare providers. This study only captures those patients referred from GPs to our hospital and may not reflect the absolute need in the catchment area. The number of patients in our study referred for follow up was relatively low, however this only includes those who were followed up in our institution and some patients may have been further investigated elsewhere. We do not account for those who may have been referred for further investigation but were lost to follow up. Finally, the division into either “normal” of “abnormal” is potentially too simplistic as the designation of incidental findings may be quite subjective. This study provides further evidence to support the provision of a nationwide direct access referral system for general practitioners. The Irish Faculty of Radiologists supports the provision of “walk-in access” to services for patients provided it is supported by an adequate number of specialised staff and is properly resourced. At a time where outpatient departments are stretched to capacity and there is a politico-economic movement...
A Rare Case of Cryptogenic Stroke with an Incidental Finding of Patent Foramen Ovale

Sir

Patent foramen ovale (PFO) occurs in 25–30% of the general population. Stroke in the puerperium is a rare phenomenon, 34 per 100,000 women. A 32 year old lady, Para3+2 presented eight days postnatally with symptoms of a transient episode of left sided facial and limb paraesthesia and dysphasia. She had a CT brain which was normal, however a subsequent MRI brain showed a small right parietal lobe infarct. An echocardiogram was performed which showed a small PFO, with an ejection fraction of 60-65%. A bubble study was performed which was positive with valsalva. She was started on aspirin 300mg once daily for 2 weeks, and shall remain on life-long aspirin 75mg. She has been seen at 2 and 6 weeks postnatally and is asymptomatic.

Introduction

Patent foramen ovale (PFO) occurs in 25–30% of the general population. Stroke in the puerperium is a rare phenomenon (34 per 100,000 women)\(^1\). Paradoxical embolism may be more frequent in pregnancy due to the hypercoagulable state. Cases of stroke\(^2,3\) and myocardial infarction\(^4,5\) in conjunction with a patent foramen ovale in pregnancy and the puerperium have been reported.

Case Report

A 32 year old lady, Para3+2 presented eight days postnatally with symptoms of a transient episode of left sided facial and limb paraesthesia and dysphasia. Her antenatal course was complicated by a new diagnosis of hepatitis C at her booking visit. She was induced at 39 weeks gestation due to oligohydramnios and had a vaginal delivery. She had a CT brain which was normal, however a subsequent MRI brain showed a small right parietal lobe infarct. Carotid Doppler and lower limb Doppler studies were normal. An echocardiogram was performed which showed a small PFO, with an ejection fraction of 60-65%. A bubble study was performed which was positive with valsalsva. She was started on aspirin 300mg once daily for 2 weeks, and shall remain on life-long aspirin 75mg. She has been seen at 2 and 6 weeks postnatally and is asymptomatic.

Discussion

This case represents transient symptoms of a parietal infarct in the postpartum period. Detection of PFO can be augmented by releasing a sustained Valsalva manoeuvre while performing a Bubble study\(^6\). The Valsalva manoeuvre occurs during the second stage of labour causing the same right-to-left shunt to occur, allowing a paradoxical embolus to travel to the brain. A study by Komar et al, comparing symptomatic to asymptomatic patients with PFOs, showed that those who are symptomatic have larger diameter PFO (3.9mm +/- 1.4mm), longer tunnel length (overlap of septum primum and secundum) and a greater frequency of atrial septal aneurysm (65% vs 15%)\(^7\). The 2012 ACCP guidelines advise antplatelet therapy in patients with cryptogenic stroke and PFO. Anticoagulation is indicated only in those with other risk factors such as a hypercoagulable state, or in the case of recurrent ischaemic events despite treatment with aspirin. Fortunately for this lady she suffered no residual neurological deficit and her prognosis is excellent.

References

Children with Life-Limiting Conditions: Establishing Accurate Prevalence Figures

Sir

Children’s palliative care is a new and evolving specialty. In order to ascertain accurate data on the number of children requiring services, a number of countries, including Ireland, have undertaken children’s palliative care needs assessments. Regardless of the country of origin, the findings of these needs assessments are very similar. Irish child (0-17 years) population figures indicate that there are approximately 1.2 million children in Ireland.1. Harmered by ambiguity surrounding definitions and the lack of a national database, currently there are no definitive data on the number of these children living with a life-limiting condition.

In the absence of a national database on children with life-limiting conditions, data from a needs assessment published in 2005 continues to be utilised. In this needs assessment, the number of children living with a life-limiting condition in Ireland was extrapolated from UK data which at the time, reported a prevalence rate of 12:10,000 child population.2. This was utilised although known to be an underestimate. Applying this ratio to Irish census data the researchers estimated 1,369 children were living with a life-limiting condition in Ireland. Cultural factors that may impact on the accuracy of these estimates for example, the legislation governing termination of pregnancy in Ireland were not considered despite the high likelihood of an increase on the number of children born and surviving with complex care needs and conditions that may result in premature death.3. A more recently published Irish report examined prevalence figures further and after considering international evidence a higher median prevalence figure of 14.5:10,000 per child population was used to plan for the development of respite services for children with life-limiting conditions.

Researchers in England, in order to gather more robust data on prevalence utilised the English Hospital Episode Statistics Dataset and International Classification of Disease Data. Analysis in this study suggests that the true prevalence of children living with a life-limiting condition is at least 32:10,000 child population and may be as high as 44:10,000. Historically Irish prevalence rates are based on the UK data therefore, application of the 32:10,000 figure to recent child population data suggests that there are 3840 children in Ireland living with a life-limiting condition. It is clear from both national and international data that the original figure of 1369 children living with a life-limiting condition is an underestimate. Findings from England indicate an approximate three-fold increase on original estimates. This has significant implications for service provision and workforce planning. The national children’s palliative care policy is widely viewed as the blueprint for the future development of children’s palliative care in Ireland, in light of these findings this document needs to be reviewed and the implications of this significantly increased prevalence of children with life-limiting conditions needs to be considered by service planners, care providers and policy makers alike.

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Acknowledgements

Written on behalf of the HSE National Development Committee for Children’s Palliative Care

References


Thyroid Disorders in Girls with Turner Syndrome and the Influence of the Underlying Karyotype

Sir

The risk of developing thyroid dysfunction is higher in Turner syndrome (TS) than the general population. In previous studies, the influence of karyotype and thyroid autoantibodies on thyroid disorder in patients with TS has been investigated. We therefore set out to determine the prevalence of thyroid dysfunction in Irish girls with TS. The impact of underlying karyotype and thyroid autoantibodies has also been examined. The presence of thyroid dysfunction was assessed by measuring serum thyroid-stimulating hormone (TSH), thyroid (T4) and anti-thyroid peroxidase antibodies (TPO-Ab) values. The association between TPO-Ab values and thyroid dysfunction (hypothyroidism and hyperthyroidism) was also assessed.

We studied 32 girls with TS; mean (SD) [range] age 16.7 (2.6) [12.4-20.2] years. Of 32 girls, 14 (43.75 %) had structural X abnormalities, 12 (37.5%) experienced monosomy 45, X and 6 (18.75%) exhibited mosaicism monosomy X. In this group of girls with TS, thyroid abnormalities were reported in 5 of 32 girls (15.6%), of whom 4 of 5 (80%) had hypothyroidism and 1 of 5 (20%) experienced hyperthyroidism. Of 4 girls with hypothyroidism, 2 (50%) had monosomy X chromosome (45, X) and 2 (50%) exhibited isochromosome-X structural abnormalities (45,X(46,X)i(Xq)q/47,X(i(Xq)q) and 46,X(i(Xq)X)/46,XX). Hyperthyroidism was found in 1 girl with X structural abnormalities (46,X(del)(X)p11.2p22.3). In this study, hypothyroidism occurred...
in girls with monosomy X chromosome and isochromosome-X structural abnormalities, but not mosaicism monosomy X. In this group of patients with TS, the underlying karyotype does not appear to influence the risk of hypothyroidism (p value = 0.93), whether it would have reach significant level if the number of patients would have been higher is unclear. Further study with larger number of patients may be required to explore this issue. TPO-Ab values were higher than the reference ranges in 8 of 32 girls (25%), of whom 3 (37.5%) exhibited normal thyroid function, 4 (50%) had hypothyroidism and 1 (12.5%) had hyperthyroidism, TPO-Ab showed significant association with thyroid dysfunction (p value < 0.02).

In conclusion, the prevalence of hypothyroidism in girls with TS is higher than the general population and anti-thyroid peroxidase antibodies values, but not the underlying karyotype, appear to influence risk. With respect to the relatively high prevalence of thyroid dysfunction in Irish girls with TS, the potential risks and benefits of thyroid disorder screening should be discussed with young people and their families. Our experience underlines the importance of monitoring for thyroid function in patients with TS.

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References
A Randomised Controlled Trial using the Epidrum for Labour Epidurals

Question 1
The number of patients enrolled in the study was
a) 260
b) 270
c) 280
d) 290
e) 300

Question 2
In the epidrum group the number of epidurals that had to be sited by a second anaesthetist was
a) 6
b) 7
c) 8
d) 9
e) 11

Question 3
The number of accidental dural punctures in the epidrum group was
a) 4
b) 5
c) 6
d) 7
e) 8

Question 4
The number of patients in epidrum group who suffered a post dural puncture headache was
a) 1
b) 2
c) 3
d) 4
e) 5

Question 5
The number of patients in the epidrum group who received a blood patch was
a) 1
b) 2
c) 3
d) 4
e) 5

Improving Surgical Site Infection Prevention Practices through a Multifaceted Educational Intervention

Question 1
The number of patients included in the pre-intervention was
a) 44
b) 46
c) 48
d) 50
e) 52

Question 2
The number of patients included in the post-intervention was
a) 41
b) 43
c) 45
d) 47
e) 49

Question 3
Post intervention, prophylaxis within 60 minutes prior to incision increased to
a) 62%
b) 64%
c) 66%
d) 68%
e) 70%

Question 4
Appropriate postoperative prescribing improved to
a) 88%
b) 90%
c) 92%
d) 94%
e) 96%

Question 5
The number of males in the study was
a) 1
b) 2
c) 3
d) 4
e) 5

Open-Access Ultrasound Referrals from General Practice

Question 1
The number of ultrasounds included in the study were
a) 1070
b) 1080
c) 1090
d) 1100
e) 1110

Question 2
The number of ultrasounds with positive findings were
a) 300
b) 302
c) 312
d) 322
e) 332

Question 3
The mean waiting time for the ultrasound investigation was
a) 50 days
b) 52 days
c) 54 days
d) 56 days
e) 58 days

Question 4
The number of patients who had follow up investigations were
a) 69
b) 71
c) 73
d) 75
e) 77

Question 5
The number of abdominal ultrasounds with positive findings was
a) 82
b) 84
c) 86
d) 88
e) 90

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It pays to protect your income

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Income protection will provide you with an alternative regular income if you suffer an illness or injury that prevents you from working.

Why should you consider this form of protection?
Since March 31st 2014 paid sick leave for public service employees including HSE employees has been reduced:

<table>
<thead>
<tr>
<th>Old arrangement:</th>
<th>New arrangement:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six months full pay</td>
<td>Three months full pay</td>
</tr>
<tr>
<td>Six months half pay</td>
<td>Three months half pay</td>
</tr>
</tbody>
</table>

The facts
There are numerous products on the market with similar features:

➢ Benefit cannot exceed 75% of pre-disability income
➢ Benefits cease on recovery, return to work, retirement or death
➢ It can pay out after 4, 8, 13, 26 or 52 weeks following illness or injury
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➢ Tax relief is available on your premiums at your marginal rate of tax

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* Includes a percentage of overtime when calculating maximum benefit

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