



# WJMER

**World Journal of Medical Education and Research**

An Official Publication of the Education and Research Division of Doctors Academy



---

A Case of Lower Limb Myiasis in Hong Kong: Case Report and Brief Review of Existing Literature

---

Single Stitch Mesh Fixation During Laparoscopic Trans-Abdominal Pre-Peritoneal GroinHernia Repair: A Retrospective Study of 3800 TAPP Repairs

---

Medical Student Involvement in and Attitudes towards Audit and Research: The MEDical Student Experience of Audit and ResearCH (MED-SEARCH) Survey

---

Body Mass Index and Pregnancy Outcomes in Expectant Women at Moi Teaching and Referral Hospital, Eldoret Kenya

---

Impressions of Musculoskeletal Medicine Education in Current Doctors

---

The High Ratio of Undiagnosed Cases of Low Back Pain: Implications for Its Management

---

Abstracts from the 8<sup>th</sup> International Academic and Research Conference 2018

**DOCTORS  
ACADEMY**



BETTER EDUCATION, BETTER HEALTH.

ISSN 2052-1715

## Introduction

The World Journal of Medical Education and Research (WJMER) (ISSN 2052-1715) is an online publication of the Doctors Academy Group of Educational Establishments. Published on a quarterly basis, the aim of the journal is to promote academia and research amongst members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from around the world. The principal objective of this journal is to encourage the aforementioned, from developing countries in particular, to publish their work. The journal intends to promote the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting edge technology and those who need to innovate within their resource constraints. It is our hope that this will help to develop medical knowledge and to provide optimal clinical care in different settings. We envisage an incessant stream of information flowing along the channels that WJMER will create and that a surfeit of ideas will be gleaned from this process. We look forward to sharing these experiences with our readers in our editions. We are honoured to welcome you to WJMER.

## Editorial Board

### *Editor-in-Chief*

**Professor Stuart Enoch**, PhD, MBBS, MRCSEd, PGCert (Med Sci), MRCS (Eng)

### *Editor*

**Ms. Karen Au-Yeung**, BSc, MBCh (Hons), MRCS

### *Associate Editor*

**Miss Rebecca Williams**, BA (Hons), MA (Dist.)

### *Advisory Board*

**Dr. Mohammed Hankir**, BSc, MSc, PhD

**Mr. Rajive Jose**, MBBS, MS (Gen Surg), MCh (Plast Surg), DNB (Gen Surg), FRCSEd, Dip Hand Surgery (BSSH), FRCS (Plast Surg)

**Dr. Suzanne Kumar**, MBCh (Hons), MRCP

**Mr. Sri Thrumurthy**, MBChB (Hons), MRCS

**Dr. Jamil David**, BDS, MSc, PhD

**Dr. Bina Raju**, BDS, MSc, PhD

**Mr. Vaikunthan Rajaratnam**, MBBS (Mal), AM (Mal), FRCS (Ed), FRCS (Glasg), FICS (USA), MBA, Dip Hand Surgery (Eur), PG Cert MedEd (Dundee), FHEA(UK)

**Dr. Shiby Stephens**, MBBS, MPhil, FHEA

### ALL RIGHTS RESERVED

Volume 17, Issue 1, 2018, World Journal of Medical Education and Research (WJMER). An Official Publication of the Education and Research Division of Doctors Academy Group of Educational Establishments.

Electronic version

published at

Print version printed  
and published at

ISBN

Designing and Setting

Cover page design and graphics

Type Setting

Contact

Doctors Academy UK, 189 Whitchurch Road,  
Cardiff, CF14 3JR, South Glamorgan, United Kingdom  
Abbey Bookbinding and Print Co.,  
Unit 3, Gabalfa Workshops, Clos  
Menter, Cardiff CF14 3AY  
978-93-80573-66-3.  
Doctors Academy, DA House, Judges Paradise, Kaimanam,  
Trivandrum, 695018, Kerala, India  
Sreekanth S.S  
Lakshmi Sreekanth  
wjmer@doctorsacademy.org.uk

**Copyright:** This journal is copyrighted to the Doctors Academy Group of Educational Establishments. Users are not allowed to modify, edit or amend the contents of this journal. No part of this journal should be copied or reproduced, electronically or in hard version, or be used for electronic presentation or publication without prior explicit written permission of the editorial and executive board of WJMER. You may contact us at: wjmer@doctorsacademy.org.uk



## **WELCOME**

We are delighted to bring you the seventeenth edition of the World Journal of Medical Education and Research (WJMER). This edition encompasses several thought-provoking articles, as well as the abstracts from the Doctors Academy 8<sup>th</sup> International Academic and Research Conference which took place at the University of Manchester, United Kingdom on 11<sup>th</sup> August 2018.

The opening article by Cindy presents a case of lower limb myiasis in a 47-year-old female. The author discusses the common risk factors and appropriate management strategies of this condition.

Hussain *et al.* consider the outcomes of single stitch mesh fixation in laparoscopic Trans-Abdominal Pre-Peritoneal (TAPP) repairs of groin hernia. The article studies a cohort of patients who have undergone a TAPP repair and explores the complications of this procedure.

Comprehending the significance of research and audit, Trethewey *et al.* examine medical students' involvement in and attitude towards these aspects. A cross-sectional questionnaire revealed that a number of students find value in research and audit.

Oluoch *et al.* attempt to understand the relationship between BMI and pregnancy outcomes. The study concludes that the appropriate management of pregnant women with an abnormal BMI can minimise maternal and perinatal morbidity.

Kropelnicki assesses the basic competence and confidence of medical professionals in their clinical knowledge of musculoskeletal (MSK) medicine and sports and exercise medicine (SEM). The results highlight that these areas should occupy a central position in the education of medical students in order to ensure confidence in clinical practice.

The final article by Iyalomhe and Vyshlova accentuates the low percentage of diagnosed cases of lower back pain. The authors emphasise the need to improve this percentage and to, therefore, ameliorate the management and outcomes of this condition.

The abstracts from the 8<sup>th</sup> International and Academic Research Conference follow the aforementioned articles. These abstracts broach a variety of fascinating topics and illustrate the ground-breaking research currently being conducted by medical students and junior doctors throughout the world.

We sincerely hope that you find each article in this edition informative, intellectually-stimulating and enjoyable to read.

With very best wishes,

**Ms Karen Au-Yeung**  
Editor

**Ms Rebecca Williams**  
Associate Editor

**Professor Stuart Enoch**  
Editor-in-Chief

## Table of Contents

Introduction	<b>i</b>
Welcome	<b>ii</b>
Table of Contents	<b>1</b>
A Case of Lower Limb Myiasis in Hong Kong: Case Report and Brief Review of Existing Literature <i>Lai VC</i>	<b>2-5</b>
Single Stitch Mesh Fixation During Laparoscopic Trans-Abdominal Pre-Peritoneal Groin Hernia Repair: A Retrospective Study of 3800 TAPP Repairs <i>Hussain A, Owers C, Komolafe O, El-Hasani S</i>	<b>6-12</b>
Medical Student Involvement in and Attitudes towards Audit and Research: The MEDical Student Experience of Audit and ResearCH (MED-SEARCH) Survey <i>Trethewey SP, Morlet J, Reynolds EKM, Trethewey CS, Norman RI</i>	<b>13-22</b>
Body Mass Index and Pregnancy Outcomes in Expectant Women at Moi Teaching and Referral Hospital, Eldoret Kenya <i>Oluoch D, Nyongesa P, Mwaliko E, Odunga J</i>	<b>23-35</b>
Impressions of Musculoskeletal Medicine Education in Current Doctors <i>Kropelnicki A</i>	<b>36-41</b>
The High Ratio of Undiagnosed Cases of Low Back Pain: Implications for Its Management <i>Iyalomhe OE, Vyshlova IA</i>	<b>42-46</b>
Abstracts from the 8 <sup>th</sup> International Academic and Research Conference 2018	<b>47-117</b>



## A Case of Lower Limb Myiasis in Hong Kong: Case Report and Brief Review of Existing Literature

Lai VC

### Institution

Pamela Youde Nethersole  
Eastern Hospital  
3 Lok Man Road  
Chai Wan, Hong Kong

**WJMER, Vol 17: Issue 1,  
2018**

### Abstract

**Background:** Myiasis describes the infestation of flesh by fly larvae. It is still regularly encountered in medical centers in Hong Kong. Depending on the species of larvae and organs involved, resulting tissue damage can be of varying degrees.

**Case Presentation:** In a recent case of lower limb myiasis seen at our center, a 47-year-old homeless woman with a background of hyperthyroidism, pretibial myxedema and recurrent lower limb infections presents with a *Chrysoma bezziana*-infested left shin ulcer. She was stable throughout her stay, with no fever and mildly elevated inflammatory markers only. She was managed with regular dressing and manual removal of maggots followed by formal surgical debridement. She also received a course of broad spectrum antibiotics.

**Discussion:** A review of existing literature reveals numerous cases of *C. bezziana* in this region. Risk factors include low socioeconomic status, impaired cognition, poor mobility, poor hygiene, existing skin conditions and chronic illnesses. This species of maggot feeds on living tissue and is able to penetrate cartilage and facial bones, putting patients at risk of severe functional deficits if essential structures are destroyed.

**Conclusion:** Management should aim to limit the extent of local damage and should include removal of maggots along with the involved tissues. There is also evidence that turpentine oil could be useful for killing the larvae locally.

### Key Words

Human Myiasis; Lower Limb Myiasis; *Chrysoma Bezziana*; Old World Screwworm; Maggots

### Corresponding Author:

Dr Victoria Cindy Lai; E-mail: lai.victoria.c@gmail.com

### Background

Myiasis describes the infestation of flesh by fly larvae. Although myiasis is becoming less common in the urbanized world, it is thought to be under-reported, with many centers in Hong Kong still encountering such cases each year. Depending on the species of the maggot and organ involved, the sequelae of myiasis may vary. It is therefore useful to understand the disease process, risk factors and treatment principles of myiasis in this locality.

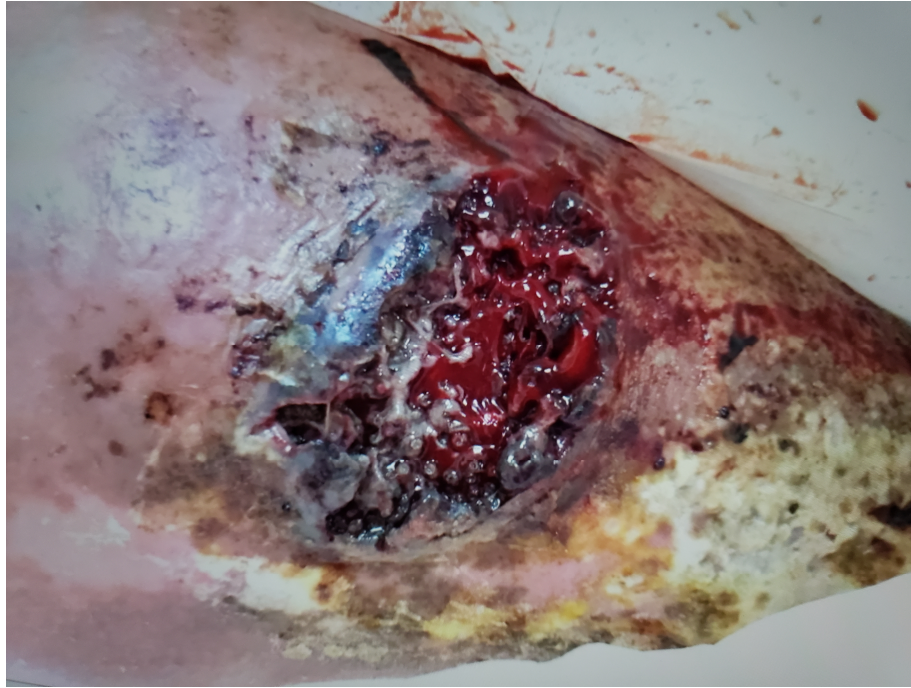
### Case Presentation

A 47-year-old homeless woman was brought in by outreach volunteers for a non-healing, maggot-infested left shin ulceration persistent over five months. The patient was unable to recall the exact duration of maggot infestation. She has known poorly controlled Grave's disease with

resultant atrial fibrillation and pretibial myxedema with multiple previous admissions for superimposed infection. She has been poorly compliant to carbimazole and warfarin all along.

On presentation, she was afebrile with stable vitals. Initial examination revealed bilateral edematous lower limbs with poor hygiene and a 7 x 5cm left shin ulcer down to the subcutaneous level infested with maggots. Surrounding skin showed mild inflammation and X-Ray of the involved lower limb showed no bone involvement. Initial blood tests revealed mildly elevated inflammatory markers (WBC  $10.26 \times 10^9/L$ , CRP 45.1mg/L, ESR 38mm/hr), hyperthyroidism and under warfarinization. ECG confirmed atrial fibrillation and chest X-Ray showed a normal heart size. Random and fasting glucose for this patient have been normal all along.





**Figure 1:** Maggot-infested left shin wound on admission

Mechanical removal of visible larvae and debridement of non-adherent necrotic tissue was performed at the ward. Over one hundred maggots were removed from the subcutaneous layer and sent for identification. The patient was given betadine dressing daily and started empirically on Augmentin for control of local infection. Saved larvae were positively identified as belonging to the species *Chrysomya bezziana*.

Surgical debridement under spinal anesthesia was undertaken after five days of regular dressing and medical optimization. At the time of surgery, the wound already showed granulation with no maggots remaining. Tissue culture revealed heavy growth of *Proteus mirabilis* and moderate growth of Methicillin-resistant *Staphylococcus aureus*, sensitive to Augmentin and vancomycin respectively. Tissue biopsy was compatible with suppurative inflammation with no underlying malignant changes.



**Figure 2:** Wound 3 days after debridement

The patient enjoyed an uneventful postoperative recovery with good wound base granulation. She was discharged against medical advice before adequate warfarin titration on postoperative day 5 and instructed to complete the course of oral Augmentin. Although she continued to have

repeated emergency admissions for poor lower limb hygiene and infections, reassessment of the wound at post-operative 7 weeks showed good healing with healthy ulcer base. She did not attend any further outpatient clinics with our department.



Figure 3: Wound on readmission at post-operative 7 weeks

### Discussion and Conclusion

Also known as the Old World Screwworm, *Chrysomya bezziana* is a common cause of myiasis in the South-East Asia locality. This species completes a life cycle every 24 days and causes obligatory myiasis, beginning when females lay eggs in existing skin lesions or mucosal surfaces, with larvae hatching 15 hours later. These larvae feed on living tissue and are able to travel beyond the subdermal layer, often creating lesions 4-5cm deep. Each female is also able to lay large batches of eggs, which can result in wounds being infested by up to 3000 larvae<sup>1</sup>. Its penetrative ability, together with the number of larvae involved, explains the ability of this species to cause extensive local damage to host tissues.

In the present case, the patient is a homeless person living on the streets, with pretibial myxedema and previous recurrent lower limb infections due to poor hygiene. Risk factors commonly mentioned in literature include poor hygiene, existing skin conditions and chronic illnesses. Affected individuals are also often of compromised mental state and lower socioeconomic background, making them

vulnerable to delayed diagnosis and treatment of deteriorating wound conditions. In the two latest case series of myiasis due to *C. bezziana* in Hong Kong<sup>2,3</sup>, of the combined twelve cases, nine were care home residents, eight had cognitive deficits, seven were bedridden, six were noted to have poor local hygiene and three patients had underlying malignancies. Five patients were reported to have known existing local skin conditions such as decubitus ulcers or recurrent cellulitis with ulceration.

Other than simple cutaneous infestations, there have also been multiple reported cases of ophthalmic<sup>4, 5, 6</sup>, nasal<sup>7,8</sup>, oral<sup>9, 10, 11, 12, 13</sup> and auricular myiasis<sup>14, 15</sup>. In such cases, the resulting damage often leads to loss of function of the involved organ which is of particular significance in ophthalmic infestations. These infestations can often result in blindness due to rapid destruction of the orbital cavity and its contents within days<sup>6</sup>. A review of these cases illustrates the immense penetrative ability of *C. bezziana* larvae, from the destruction of cartilaginous structures such as the anterior nasal septum<sup>7</sup> to bony structures such as the lamina

papyracea<sup>7</sup> and the anterior palate<sup>13</sup>. There is, theoretically, also the risk of intracranial extension in orbital<sup>6</sup> and auricular myiasis. Rarer cases include myiasis involving a tracheostomy site<sup>16</sup>, prolapsed rectum<sup>17</sup> and perianal condyloma acuminata<sup>18</sup>.

Regardless of the location of myiasis, the principle of management is achieving early local damage control. In all the reviewed cases, removal of maggots was performed, either en-bloc with the surrounding affected tissues, or stepwise with manual removal of visible larvae followed by formal debridement of necrotic and infected tissues. Some also opted for use of turpentine oil during manual removal to first kill and immobilize the maggots, which is helpful clinically and has been proven to be 100% effective in vitro<sup>19</sup>.

In conclusion, myiasis by *C. bezziana* is a regularly encountered condition that requires early treatment due to its penetrative abilities, which could result in severe tissue and organ damage. It is important to be aware of common risk factors such as low socioeconomic status, impaired cognition, poor mobility, poor hygiene, existing skin conditions and chronic illnesses. This species can affect a variety of organs, but the principle of maggot removal and debridement is consistent across the various cases reviewed. Turpentine oil could be considered for local control of maggots before proceeding to definitive treatment.

#### References:

1. Robbins K, Khachemoune A. Cutaneous myiasis: a review of the common types of myiasis. *Int J Dermatol*. 2010;49(10):1092-8.
2. Chan JC, Lee JS, Dai DL, Woo J. Unusual cases of human myiasis due to Old World screwworm fly acquired indoors in Hong Kong. *Trans R Soc Trop Med Hyg*. 2005;99(12):914-8.
3. Lam KH, Lui TH. Myiasis of the foot and leg caused by *Chrysomya bezziana*. *J Foot Ankle Surg*. 2014;53(1):88-91.
4. Berenji F, Hosseini-farash BR, Marvi-moghadam N. A Case of Secondary Ophthalmomyiasis Caused by *Chrysomya bezziana* (Diptera: Calliphoridae). *J Arthropod Borne Dis*. 2015;9(1):125-30.
5. Khataminia G, Aghajanzadeh R, Vazirianzadeh B, Rahdar M. Orbital myiasis. *J Ophthalmic Vis Res*. 2011;6(3):199-203.
6. Yeung JC, Chung CF, Lai JS. Orbital myiasis complicating squamous cell carcinoma of eyelid. *Hong Kong Med J*. 2010;16(1):63-5.
7. Sabarigirish K, Nithya V, Saxena S, Dutta A. Nasal myiasis by . *Med J Armed Forces India*. 2018;74(1):82-84.
8. Mircheraghi SF, Mircheraghi SF, Ramezani awal riabi H, Parsapour A. Nasal Nosocomial Myiasis Infection Caused by (Diptera: Calliphoridae) Following the Septicemia: A Case Report. *Iran J Parasitol*. 2016;11(2):284-289.
9. Jimson S, Prakash CA, Balachandran C, Raman M. Oral myiasis: case report. *Indian J Dent Res*. 2013;24(6):750-2.
10. Aggarwal A, Daniel MJ, Shetty RS, et al. Oral Myiasis Caused by *Chrysomya bezziana* in Anterior Maxilla. *Case Rep Dent*. 2014;2014:518427.
11. Kumar GV, Sowmya G, Shivananda S. *Chrysomya bezziana* oral myiasis. *J Glob Infect Dis*. 2011;3(4):393-5.
12. Sankari LS, Ramakrishnan K. Oral myiasis caused by *Chrysomya bezziana*. *J Oral Maxillofac Pathol*. 2010;14(1):16-8.
13. Ng KH, Yip KT, Choi CH, et al. A case of oral myiasis due to *Chrysomya bezziana*. *Hong Kong Med J*. 2003;9(6):454-6.
14. Rohela M, Jamaiah I, Amir L, Nissapatorn V. A case of auricular myiasis in Malaysia. *Southeast Asian J Trop Med Public Health*. 2006;37 Suppl 3:91-4.
15. Abed-benamara M, Achir I, Rodhain F, Perez-eid C. [First Algerian case of human otomyiasis from *Chrysomya bezziana*]. *Bull Soc Pathol Exot*. 1997;90(3):172-5.
16. Prasanna kumar S, Ravikumar A, Somu L, Vijaya prabhu P, Mundakannan subbaiya periyasamy subbaraj R. Tracheostomal myiasis: a case report and review of the literature. *Case Rep Otolaryngol*. 2011;2011:303510.
17. Rathi S, Pednekar K, Pathak A, Singh P. Screw-worm myiasis of prolapsed rectum. *Indian Pediatr*. 2014;51(1):53-4.
18. Pandhi D, Singal A, Das S. Myiasis arising in condylomata acuminata: an unusual presentation. *Int J STD AIDS*. 2011;22(4):238-40.
19. Kumarasinghe SP, Karunaweera ND, Ihalamulla RL. A study of cutaneous myiasis in Sri Lanka. *Int J Dermatol*. 2000;39(9):689-94.





# Single Stitch Mesh Fixation During Laparoscopic Trans-Abdominal Pre-Peritoneal Groin Hernia Repair: A Retrospective Study of 3800 TAPP Repairs

Hussain A\*, Owers C\*, Komolafe O\*, El-Hasani S\*\*

## Institution

\*Doncaster and Bassetlaw  
NHS Foundation Trust,  
Armthorpe Road, Doncaster,  
DN2 5LT, UK

\*\*Princess Royal University  
Hospital, Farnborough  
Common, BR6 8ND

**WJMER, Vol 17: Issue 1,  
2018**

## Abstract

**Background:** Two major techniques are currently used for groin hernia repair: the laparoscopic and the open repair. The aim of this study is to demonstrate the outcomes of single stitch mesh fixation in laparoscopic Trans-Abdominal Pre-Peritoneal (TAPP) repairs of groin hernia.

**Material and Methods:** Between 2000 and 2016, 3800 TAPP repairs were performed using a 10mm umbilical port and two 5mm ports on either side of the umbilicus, 5cm lateral to the rectus muscle. In this technique, a peritoneal flap is raised, the sac reduced, and 10x15cm polypropylene mesh fitted in the space to cover potential defects. This is then fixed by a single vicryl stitch at its upper edge with no additional tacking. The peritoneum is closed with a vicryl suture. A polydioxanone stitch is used to close the sheath at the umbilicus and monocryl sutures used for the skin. This study examines the complications, both early and late, from this large series of patients by retrospectively examining notes and GP referrals to our team or other colleagues within our department.

**Results:** A total of 3260 patients underwent 3800 TAPP operations during the 16-year period of this study: 3106 men and 694 women aged 17-92 years of age. Body mass index (BMI) ranged from 19-52. Of these TAPP repairs, 2258 were right sided, 1002 left and 540 were bilateral hernias. Types of hernia included: 3268 indirect, direct or pantaloon; 190 femoral; and 342 recurrent groin hernias. A significant number of cases were performed as day-case operation (2641). Complications identified included: 11 vas deferens injuries; 216 patients experienced post-operative urinary retention. Nine patients (0.23%) required conversion to open operation for a variety of reasons (see Table 1). Only five patients (0.13%) experienced a recurrence of their groin hernia.

**Conclusions:** Mesh fixation using single vicryl stitch results in negligible recurrence of the hernia in TAPP groin hernia repair.

## Key Words

Trans Abdominal Pre-Peritoneal repair; Totally Extra Peritoneal repair

## Corresponding Author:

Mr Oluyemi Komolafe; E-mail: oluyemi.komolafe@gmail.com

## Introduction

The Trans-Abdominal Pre-Peritoneal (TAPP) groin hernia repair is a popular technique with the advantage of intraoperative peritoneal diagnosis (i.e. the type of hernia) and is a relatively less challenging approach<sup>1</sup>. The Totally Extra Peritoneal repair (TEP)<sup>2</sup> is another technique with excellent results. The debate as to which of these techniques is superior is ongoing, with some studies demonstrating superiority of one technique over the other<sup>2</sup>. However, the general consensus is that both techniques can produce equivalent, and satisfying, results<sup>1</sup>, although some studies have demonstrated lower recurrence rates following open repair<sup>3</sup>. Laparoscopic repair is beneficial in numerous situations including bilateral or recurrent hernias<sup>4</sup>, those keen for a shorter recovery period<sup>5</sup> and where patients specify a preference for laparoscopic surgery. Both methods are preferential to the open tech-

nique, although some studies show lower recurrence after open repair<sup>6</sup>.

Whilst mesh fixation is not recommended in TEP repair<sup>7</sup>, various different methods of mesh fixation have been suggested for TAPP repairs<sup>8,9</sup>.

A potential cause of recurrence after TAPP repair could include the method of mesh fixation and alignment. Therefore, the aim of this study is to report the outcomes of using single stitch fixation for mesh in a large series of TAPP repairs.

## Material and Methods

This study includes a retrospective review of prospectively collected data from 3800 patients. All patients were treated by one of two consultant surgeons (AH or SE), in one of two University Hospitals in the UK (Princess Royal in London or Don-

caster Royal Infirmary in South Yorkshire), following referral from their General Practitioner. Patients were assessed and consented for surgery by a consultant surgeon or their deputy. Consecutive patients over the age of 16 years, eligible for laparoscopic surgery were included, minimising selection bias. Patients unwilling to undergo TAPP repair; those unsuitable for general anaesthesia or laparoscopic surgery, patients with indirect hernia defects > 5cm, and those with recurrence following previous laparoscopic repair were excluded.

Demographic data was collected, including: hospital number, date of birth, gender, date of admission, date of operation and date of discharge. Data specific to the operation was also collected including: the type of groin hernia, the site of operation (right or left), BMI, the type and numbers of meshes used, post-operative complications (such as vas deferens injury, inferior epigastric artery injury, spermatic cord injury, bladder injury, bowel obstruction, conversion to open operation), post-operative morbidities and length of hospital stay. Post-operative morbidities of interest included: hernia recurrence, seroma, infection, organ injury, urine retention and chronic groin pain. The usual Numeric Rating Scale NRS from 0-10 (11-point scale) was used for assessment of chronic groin pain. Finally, data pertaining to readmission rates and the follow-up examination findings were recorded. All data was placed into an excel file sheet.

Post-operative assessment was carried out by the operating surgical team, therefore complete elimination of assessment bias was not possible. However, complications were recorded by the operating surgeon (AH or SE). In most cases, this assessment was performed at eight weeks, and in the absence of any complication requiring additional surgical input, the patient was discharged back to the care of their General Practitioner. Upon discharge, General Practitioners were instructed to refer the patient back to the surgical department in the event of any late complication or recurrence. For those with a complication (seroma, infection, recurrence, groin pain), further follow up was arranged until complete resolution of the morbidity, or a referral to another speciality occurred.

For the purposes of this study, early recurrence was defined as occurring during the first eight weeks post-operatively (by which time the patient was reviewed in the outpatient clinic). Late hernia recurrence was noted by a re-referral to the surgical department from primary or emergency care; where clinical or radiological recurrence was noted, these were managed by re-operation.

Simple statistical analyses were performed using an

Excel spreadsheet.

### **Operative technique**

A standard operating technique was used for all hernias. Patients are placed head down with the laparoscopic stack at the foot end, with the surgeon stood on the contralateral side to the hernia. TAPP repairs are performed using three ports; a 10mm umbilical utility port allowing for mesh introduction and camera use. Two 5mm ports are inserted on either side of the 10mm umbilical port, 5cm lateral to the rectus muscle on either side.

Upon entering the abdominal cavity, inspection for other pathology is made and the hernia identified. A peritoneal incision is made approximately 2cm above the edge of the apparent defect, medially extended to the lateral umbilical ligament, exposing the medial edge of the rectus; superiorly and laterally the dissection is extended as much as required to obtain 3-5cm overlap of the lateral edge of the hernia defect. Inferiorly, the peritoneal flap is dissected to overlap the pubic bone in the pre-vesical space, providing adequate space for the mesh to lie flat on the psoas muscle. In the male patient, the lower peritoneal flap is dissected off the vas and cord; in female patients, usual practice is to clip and transect the round ligament, which is then reflected with the peritoneum.

Hernias are repaired with polypropylene mesh size 10 x 15cm (Cousin Biotech, France). Irrigation of the mesh with antibiotics is not routinely performed. Mesh is aligned to the medial border of the contralateral rectus muscle. The mesh should lie flat on the abdominal wall without creases as these are believed to contribute to chronic pain via rolling and mesh displacement. If the first mesh does not adequately overlap the hernia defect superiorly or laterally then another mesh is inserted to provide sufficient overlap. There is a low threshold for the use of more than one mesh. Meshes are fixed using a single 2/0 vicryl stitch at the middle of the top edge of the mesh and away from the inferior epigastric artery.

Following satisfactory mesh placement, the peritoneum is closed using vicryl stitches. The 10-millimetre port is closed with polydioxanone (PDS) stitch(es) and the skin incisions closed with moncryl. Twenty millilitres of local anaesthetic (0.5% Marcaine) is infiltrated at the wounds.

### **Results**

A total of 3260 patients underwent 3800 TAPP operations; 3106 (81.73%) males and 694 (18.26%) females aged 17-92 years. A wide range of body mass index patients were included (BMI range 19-52). Of these operations, 2258 (59.42%) were right

sided repairs, 1002 (26.36%) left sided and 540 (14.21%) were bilateral hernias. Types of hernia included: 3268 (86%) indirect, direct and or pantaloon; 190 (5%) femoral and 342 (9%) recurrent groin hernias. Two thousand six hundred and forty-one (69.5%) patients were treated as day case surgeries; 1159 (30.5%) were planned elective admissions and 74 (1.94%) were readmitted from day surgery (failed day case surgeries).

Although all operations were started as TAPP repairs, nine patients (0.23%) required conversion to open repair for a variety of reasons (see Table 2). Of the documented complications, injury to the vas deferens was the most common organ injury, noted in 11 patients (0.28%). Post-operatively, 216 (5.68%) patients experienced urinary retention, which was the most common post-operative complication overall. Other complications included three mesh

<b>Total number of patients (operations)</b>		3261 (3800)
<b>Male</b>		3106 (81.73%)
<b>Female</b>		694 (18.26%)
<b>BMI</b>		19-52
<b>Age</b>		17-91
<b>ASA</b>		1-3
<b>Site</b>	Bilateral Left Right	540 (14.21%) 1002 (26.36%) 2258 (59.42%)
<b>Type</b>	Femoral Recurrent Indirect, Direct and or Pantaloon Incidental hernias	190 (5%) 342 (9%) 3268 (86%) 241 (6.34%)
<b>ASA</b>		1-3
<b>Hospitalization</b>	Inpatient Day cases Admitted from day surgery	1159 (30.5%) 2641 (69.5%) 74 (1.94%)

**Table 1:** Demographic features, diagnosis and hospitalisation

<b>Operative complications</b>	<b>Number (%)</b>	<b>Post-operative complications</b>	<b>Number (%)</b>
<b>Vas deference injury</b>	11 (0.28)	<b>Urinary retention</b>	216 (5.68)
<b>Inferior epigastric injury</b>	8 (0.21)	<b>Seroma /haematoma</b>	96 (2.52)
<b>Spermatic cord injury</b>	6 (0.15)	<b>Lateral thigh paraesthesia</b>	32 (0.84)
<b>Bladder injury</b>	1 (0.026)	<b>Recurrence</b>	5 (0.13)
<b>Bowel obstruction</b>	1 (0.026)	<b>Mesh infection</b>	3 (0.07)
<b>Conversion to open</b>	9 (0.23)	<b>Needed blood transfusion</b>	3 (0.07)
		<b>Port site hernia</b>	2 (0.05)
		<b>Chronic post-operative groin pain</b>	5 (0.13)
		<b>Mortality</b>	0 (0)

**Table 2:** Complications



infections (0.07%) in inguinal hernias, two of which responded to antibiotics and one of which was salvaged by radiological aspiration of the abscess and antibiotics. Five cases (0.13%) of chronic groin pain were reported, also following inguinal hernia repairs. These patients were fully investigated by Ultrasound scanning (USS) and Magnetic Resonance Imaging (MRI) scans before referral to the pain team. Overall, only five (0.13%) port site hernias were reported and repaired by open surgical technique (tables 1 and 2). Five patients (0.13%) experienced recurrence of their inguinal hernia, which was managed by open repair. No complications were recorded following femoral hernia repairs.

### Discussion

TAPP repair of the groin hernia is a popular technique and has the advantages of being diagnostic (i.e. able to determine the type of hernia), unlike the TEP technique<sup>10</sup>. Both techniques provide comparable results with regards to mesh infection, recurrence, chronic pain and quality of life<sup>11-13</sup>. These results were clearly demonstrated by the low incidence of complications in this, one of the larger case series published in the literature.

There are numerous variations in surgical technique which can be used during TAPP repair. For example, the authors would advocate that it is mandatory to dissect and reduce the hernia sac. This is in order to decrease the risk of recurrence<sup>30</sup>. In TAPP repair for femoral hernias, it is almost always necessary to incise the medial edge of the femoral ring for safe and total delivery of the sac and contents from the femoral canal, without jeopardising the femoral vein<sup>14</sup>. For the indirect inguinal hernia sac, care is taken to reduce the sac without injuring the spermatic cord or the vas<sup>14</sup>.

For sacs that are stuck deep in the inguinal canal towards the scrotum, the dissection may cause unnecessary bleeding or injury to the cord, so there should be a low threshold to circumcise the sac as safely as possible distally, toward the scrotum. When the sac is circumcised, it is important that the hole in the peritoneal flap is closed using a Vicryl stitch. Should a long indirect inguinal sac be reduced, then it is necessary to ligate this sac with Vicryl in order to avoid leaving a potential space for further bowel herniation<sup>15</sup>.

An interesting point for debate during TAPP repair of groin hernias is whether or not to fix the mesh. Numerous methods of mesh fixation have been described in the literature<sup>8, 9, 16, 17</sup>. Studies have shown that mesh fixation is unnecessary in most patients<sup>18</sup> and may not affect the incidence of chronic groin pain<sup>9</sup>, the main concern of those surgeons who do not advocate mesh fixation<sup>19</sup>. The

authors in this study used a single stitch mesh fixation, as it was considered effective in reducing the incidence of mesh slippage and therefore may have led to a decreased rate of hernia recurrence<sup>20</sup>. The use of tackers to fix the mesh is controversial as it is costly<sup>21</sup>. Given that this case series included 3800 repairs, suture fixation rather than specialist tacking devices is estimated to have saved the equivalent of approximately \$130 000 to 200 000. However, the advent of new meshes which do not require fixation removes the need for suturing or tacking and may therefore negate this concern<sup>22</sup>. However, the cost of this type of mesh may have significant financial implications, especially when used in a series as large as the one reported in this article (3800 repairs). In the author's experience, mesh fixation to the edges of the defect (with sutures, or more commonly, with tackers) is only required in large, wide hernias (more than 5cm defect) in order to prevent protrusion of the mesh through the defect into the scrotum; these patients were not included in this study. Avoiding use of a tacking device can decrease the cost of the operation; it is also potentially associated with less neuralgic pain<sup>23</sup>, although some studies debate this issue<sup>24</sup>. Following placement of the mesh (with or without fixation), meticulous closure of the peritoneal defect and any peritoneal defect using Vicryl stitches is crucial to avoid potential herniation of the bowel which may require further surgery<sup>15</sup>.

In terms of which mesh to use, in the experience of the operating surgeon (AH), absorbable synthetic materials are more susceptible to bacterial colonization than non-absorbable materials, thus polypropylene mesh was used for all patients in this series. In spite of the fact that mesh infection is very low, supported by this study, the first two mesh infections were treated with antibiotics. However, one patient who presented with pain and raised inflammatory markers 15 days following surgery had formed an abscess cavity around the mesh; this was subsequently treated by ultrasonography guided aspiration in addition to antibiotics. All meshes were salvaged.

The causes of recurrence after TAPP repair are variable and it cannot be categorically stated that single stitch fixation of the mesh is solely responsible for our low recurrence rate. It is also difficult to conclude that operative and post-operative bleeding is less with single stitch fixation compared to tackers, although the use of multiple fixation points using a tacking device is more likely to injure vessels in the dissection field and cause bleeding; this risk is significantly reduced with single point fixation. However, the cost of surgery is most certainly reduced<sup>21</sup> and the authors hypothesise that it has most likely reduced the incidence of pain after surgery given that

previous studies have linked pain to the use of tackers<sup>25</sup>.

There is a debate about the discovery intra-operatively of contralateral (and often incidental) hernias, and whether or not to repair them at the same operative sitting<sup>26</sup>. The authors would advocate that this can, and may, be done safely in a selected group of patients (if they are fit enough for laparoscopic surgery, without significant comorbidities), as TAPP repair lends itself well to this technique. The size of the mesh and the nature of the technique imply that contralateral hernias are automatically repaired. In the authors' routine practice, contralateral or concurrent hernias are repaired during the same operation; all patients were informed during the consent procedure that an incidental hernia on the contralateral site will be repaired, especially if the patient declares minor symptoms on that side. However, long operative time, the risk of surgical emphysema, patient age and physiology is taken into consideration and where the risk is deemed too high, contralateral incidental herniae may be left alone, or a future repair planned if the patient is keen.

Post-operative pain can be difficult to manage, especially when chronic<sup>27</sup>. Patients are usually pain free by the end of the first post-operative week. Occasionally, patients complain of groin discomfort, describing "twinges" when they widely abduct or flex the thigh.

In the authors' experience, most of these symptoms dissipate within three months following surgery. On rare occasions, the patient may complain of chronic groin pain after this time. Within this series, this occurred in five (0.13%) patients. Clinical and radiological assessment (ultrasound and MRI examinations) often do not show any abnormality, and local wound exploration may exacerbate the problem. In most cases, the authors would advocate referral to the chronic pain specialist. Patients may also complain of paraesthesia on the upper lateral aspect of the thigh along the distribution lateral cutaneous nerve. In this series, where patients complained of this loss of sensation, follow up was extended for up to 18 months; in all cases the paraesthesia sensation either improved or resolved.

Recurrence following any type of hernia repair is widely acknowledged, and many new operative techniques have been suggested over the years to try to prevent this complication from occurring. One study published in 2003 reported recurrence rate of 2.3%, however a later study showed the recurrence rate to be as little 0.68% after five years<sup>14, 28</sup>.

Within our study, a very low recurrence rate (five patients; 0.13%) was demonstrated. Recurrence after TAPP repair is most likely to occur if the medial dissection is short of the midline, and if the lower edge of the mesh is not placed flat, as it can roll up with consequent herniation through the inguinal or femoral canal. If the mesh is not fixed to the edges of a large defect, there is the potential for herniation into the inguinal canal. Therefore, it is important to ensure that the mesh is large enough to provide adequate coverage of the hernia defect and surrounding tissues.

Laparoscopy and exploration of the groin area can be offered to active patients who present with chronic groin pain with no gastrointestinal or urological symptoms and where radiological investigation has excluded any musculoskeletal cause for their pain. When performed, the peritoneal flap should be dissected, as, in the authors experience, there are occasions where there may be a hernia, but the defect is filled with pre-peritoneal fat without a peritoneal sac. Therefore, diagnosis can only be made by peritoneal dissection. Dissection for groin pain is the same as dissection for a hernia. Out of the 117 patients who had laparoscopic exploration of the groin for chronic pain and repair of a previously undiagnosed hernia with mesh, 91 (78%) patients had complete relief of their pain post-operatively. However, these patients should be selected carefully, often after consultation with orthopaedic colleagues.

With regards to post-operative complications, seromas may occur due to the collection of reactionary serous fluid in the potential space left in the groin region following hernia reduction. All patients should be counselled regarding the possibility of seroma formation; in the event of seroma occurrence, they should be reassured at any consequent follow-up or hospital visit that this is not a hernia recurrence. This is particularly important for large or inguino-scrotal hernias which may have a larger incidence of seroma<sup>29</sup>. The majority of seromas are asymptomatic<sup>30</sup>; however, for those patients with tenderness or symptoms suggestive of early infection, seromas can be aspirated under strict aseptic technique. In the experience of these authors, where there is persistence on clinical examination for more than three months following the operation, the presentation is often an organised haematoma rather than a seroma, as seromas are usually absorbed before three months<sup>30</sup>.

Retention of urine following hernia repair is common in both the laparoscopic and open approach. Two hundred and sixteen (5.68%) patients developed retention in this series. Distension of the blad-

der may displace the medial part of the mesh and also may disrupt the closure of the peritoneal flaps. Both of these effects may lead to a recurrence of the hernia, or entrapment of the bowel through the peritoneal defect. All patients should be encouraged to empty their bladder before they go to theatre, and it is policy within the authors' units that if the bladder is distended at laparoscopic exploration, a catheter be inserted while the patient is anaesthetised and removed two hours after surgery.

This is a very large case series, showing favourable results in terms of technique and complications. However, given that this was a retrospective study, there are some limitations. The most important one, as is the same for many published hernia series, is the follow up. Standard follow up following laparoscopic groin hernia repair is for eight weeks as per local guidelines. This allowed for detection of early complications. The late complications of recurrence, mesh infections and chronic groin pain however, are only identified and confirmed after referral from GPs, admissions from the emergency department or by direct contact between surgeon and patient. As not all patients were seen after eight weeks of follow up (patients not attending the clinic), some cases of recurrence or chronic groin pain may not have been reported and therefore the final figures reporting these complications may be considered low.

The other limitation of the study is in the assessment of chronic groin pain. Given that if, following their initial clinic appointment, patients were considered well, they were discharged, there is a potential for missing patients who developed 'chronic' groin pain. Patients who were referred back to the department via their GP or A+E were reviewed and treated for chronic pain. However, there is no way to know if patients were referred to other hospital departments, or managed in the primary care setting only, despite patients being told to contact the department if they experienced any chronic groin pain. Unfortunately, long-term data for this potential complication of groin hernia repair may therefore not be accurate.

### Conclusions

TAPP repair of groin hernia using single stitch mesh fixation is safe, effective and associated with negligible rate of recurrence and chronic groin pain in a large cohort of patients. The authors therefore recommend the use of this technique in routine clinical practice.

### References:

1. Gass M, Banz VM, Rosella L, Adamina M, Candinas D, GÄfÄ¼ller U. TAPP or TEP? Population-Based Analysis of Prospective Data on 4,552 Patients Undergoing Endoscopic Inguinal Hernia Repair. *World journal of surgery*. 2012;36(12):2782-6.
2. Gass M, Banz VM, Rosella L, Adamina M, Candinas D, Guller U. TAPP or TEP? Population-based analysis of prospective data on 4,552 patients undergoing endoscopic inguinal hernia repair. *World J Surg*. 2012;36(12):2782-6.
3. Scheuermann U, Niebisch S, Lyros O, Jansen-Winkeln B, Gockel I. Transabdominal Preperitoneal (TAPP) versus Lichtenstein operation for primary inguinal hernia repair - A systematic review and meta-analysis of randomized controlled trials. *BMC Surg*. 2017;17(1):55.
4. Pisanu A, Podda M, Saba A, Porceddu G, Uccheddu A. Meta-analysis and review of prospective randomized trials comparing laparoscopic and Lichtenstein techniques in recurrent inguinal hernia repair. *Hernia*. 2015;19(3):355-66.
5. Hamza Y, Gabr E, Hammadi H, Khalil R. Four-arm randomized trial comparing laparoscopic and open hernia repairs. *Int J Surg*. 2010;8(1):25-8.
6. Beets GL, Dirksen CD, Go PM, Geisler FE, Baeten CG, Kootstra G. Open or laparoscopic preperitoneal mesh repair for recurrent inguinal hernia? A randomized controlled trial. *Surg Endosc*. 1999;13(4):323-7.
7. HerniaSurge G. International guidelines for groin hernia management. *Hernia*. 2018;22(1):1-165.
8. Nagahisa Y, Kawashima R, Matsumoto R, Harada M, Hashida K, Okabe M, et al. Feasibility of a novel tacking method of securing mesh in transabdominal preperitoneal inguinal hernia repair: Secure tacking against recurrence. *Asian J Endosc Surg*. 2018.
9. Andresen K, Fenger AQ, Burcharth J, Pommergaard HC, Rosenberg J. Mesh fixation methods and chronic pain after transabdominal preperitoneal (TAPP) inguinal hernia surgery: a comparison between fibrin sealant and tacks. *Surg Endosc*. 2017;31(10):4077-84.
10. Hussain A, Nicholls J, El-Hasani S. Technical tips following more than 2000 transabdominal preperitoneal (TAPP) repair of the groin hernia. *Surg Laparosc Endosc Percutan Tech*. 2010;20(6):384-8.



11. Sharma D, Yadav K, Hazrah P, Borgharia S, Lal R, Thomas S. Prospective randomized trial comparing laparoscopic transabdominal preperitoneal (TAPP) and laparoscopic totally extra peritoneal (TEP) approach for bilateral inguinal hernias. *Int J Surg.* 2015;22:110-7.
12. Kockerling F, Bittner R, Kuthe A, Hukauf M, Mayer F, Fortelny R, et al. TEP or TAPP for recurrent inguinal hernia repair-register-based comparison of the outcome. *Surg Endosc.* 2017.
13. Gass M, Scheiwiller A, Sykora M, Metzger J. TAPP or TEP for Recurrent Inguinal Hernia? Population-Based Analysis of Prospective Data on 1309 Patients Undergoing Endoscopic Repair for Recurrent Inguinal Hernia. *World J Surg.* 2016;40(10):2348-52.
14. Bittner R, Leibl BJ, Jäger C, Kraft B, Ulrich M, Schwarz J. TAPP - Stuttgart technique and result of a large single center series. *J Minim Access Surg.* 2006;2(3):155-9.
15. Kohler G, Mayer F, Lechner M, Bittner R. Small bowel obstruction after TAPP repair caused by a self-anchoring barbed suture device for peritoneal closure: case report and review of the literature. *Hernia.* 2015;19(3):389-94.
16. Zhang G, Zhang X, Zhan H, Hu S. Vacuum suction fixation versus staple fixation in TAPP laparoscopic hernia repair: introduction of a new technique for mesh fixation. *Surg Endosc.* 2016;30(1):114-20.
17. Lederhuber H, Stiede F, Axer S, Dahlstrand U. Mesh fixation in endoscopic inguinal hernia repair: evaluation of methodology based on a systematic review of randomised clinical trials. *Surg Endosc.* 2017.
18. Li W, Sun D, Sun Y, Cen Y, Li S, Xu Q, et al. The effect of transabdominal preperitoneal (TAPP) inguinal hernioplasty on chronic pain and quality of life of patients: mesh fixation versus non-fixation. *Surg Endosc.* 2017.
19. Ayyaz M, Farooka MW, Malik AA, Khan A, Mansoor R, Toor AA, et al. Mesh fixation vs. non-fixation in total extra peritoneal mesh hernioplasty. *J Pak Med Assoc.* 2015;65(3):270-2.
20. Mayer F, Niebuhr H, Lechner M, Dinnewitzer A, Köhler G, Hukauf M, et al. When is mesh fixation in TAPP-repair of primary inguinal hernia repair necessary? The register-based analysis of 11,230 cases. *Surg Endosc.* 2016;30(10):4363-71.
21. Kleidari B, Mahmoudieh M, Yaribakht M, Homaei Z. Mesh fixation in TAPP laparoscopic hernia repair: introduction of a new method in a prospective randomized trial. *Surg Endosc.* 2014;28(2):531-6.
22. Birk D, Pardo CG. Self-gripping Parietene and Parietex Progrid mesh laparoscopic hernia repair: have we found the ideal implant? *Surg Technol Int.* 2012;22:93-100.
23. Chandra P, Phalgune D, Shah S. Comparison of the Clinical Outcome and Complications in Laparoscopic Hernia Repair of Inguinal Hernia With Mesh Fixation Using Fibrin Glue vs Tacker. *Indian J Surg.* 2016;78(6):464-70.
24. Andresen K, Fenger AQ, Burcharth J, Pommergaard HC, Rosenberg J. Mesh fixation methods and chronic pain after transabdominal preperitoneal (TAPP) inguinal hernia surgery: a comparison between fibrin sealant and tacks. *Surg Endosc.* 2017.
25. Shah NS, Fullwood C, Siriwardena AK, Sheen AJ. Mesh fixation at laparoscopic inguinal hernia repair: a meta-analysis comparing tissue glue and tack fixation. *World J Surg.* 2014;38(10):2558-70.
26. van den Heuvel B, Beudeker N, van den Broek J, Bogte A, Dwars BJ. The incidence and natural course of occult inguinal hernias during TAPP repair: repair is beneficial. *Surg Endosc.* 2013;27(11):4142-6.
27. Werner MU. Management of persistent postsurgical inguinal pain. *Langenbecks Arch Surg.* 2014;399(5):559-69.
28. Czechowski A, Schafmayer A. [TAPP versus TEP: a retrospective analysis 5 years after laparoscopic transperitoneal and total endoscopic extraperitoneal repair in inguinal and femoral hernia]. *Chirurg.* 2003;74(12):1143-9.
29. Kockerling F, Bittner R, Adolf D, Fortelny R, Niebuhr H, Mayer F, et al. Seroma following transabdominal preperitoneal patch plasty (TAPP): incidence, risk factors, and preventive measures. *Surg Endosc.* 2018;32(5):2222-31.
30. Cihan A, Ozdemir H, Ucan BH, Acun Z, Comert M, Tascilar O, et al. Fade or fate. Seroma in laparoscopic inguinal hernia repair. *Surg Endosc.* 2006;20(2):325-8.

Video link on Youtube: <https://www.youtube.com/watch?v=zYzHNhi9tNA>



# Medical Student Involvement in and Attitudes towards Audit and Research: The MEDical Student Experience of Audit and ResearCH (MED-SEARCH) Survey

Trethewey SP\*, Morlet J\*, Reynolds EKM\*\*, Trethewey CS\*\*\*, Norman RI\*\*\*

## Institution

\*University Hospitals Birmingham NHS Foundation Trust, Birmingham, UK.

\*\*Birmingham Women's and Children's NHS Foundation Trust, Birmingham, UK.

\*\*\*Leicester Cancer Research Centre, University of Leicester, Leicester, UK

*WJMER, Vol 17: Issue 1, 2018*

## Abstract

**Background:** Medical research and audit are fundamental to evidence-based medicine. It is unclear how medical students perceive these activities. This study aimed to explore medical student involvement in and attitudes towards research/audit.

**Methods:** An anonymous, cross-sectional, 70-item questionnaire was administered to medical students from all years at the University of Leicester. A mixture of open, closed and Likert Scale questions were used. Multivariate analysis was performed to evaluate the relationship between participant characteristics and research/audit skill confidence.

**Results:** In total, 114 questionnaires were completed. Forty-eight respondents (42%) had been involved in research/audit during medical school. Frequently cited benefits included 'professional development', 'skill acquisition' and 'CV building'. Over half considered that they needed to participate in research/audit to achieve their career aspirations. Frequently cited barriers included 'time constraints', 'lack of advertisement' and 'lack of awareness of opportunities'. A higher proportion of respondents considered that participation in audit should be mandatory compared to participation in research (47% vs. 34%). In multivariate analysis, previous participation in research/audit, having a prior degree, participation in research/audit during medical school and participation in an intercalated BSc were significantly associated with increased confidence in several research/audit skill domains.

**Discussion:** Many medical students participate in research or audit and perceive value in doing so. Over half of respondents to this survey considered participation in medical research/audit to be necessary to achieve their career aspirations. Medical educators should consider integrating optional research/audit projects into curricula to maximise benefit for students.

## Key Words

Medical Student; Research; Audit; Attitudes; Confidence

## Corresponding Author:

Dr Samuel P Trethewey; E-mail: s-trethewey@doctors.org.uk

## Introduction

Medical research and audit are key drivers of advancement and quality improvement in healthcare. The General Medical Council (GMC) emphasise the importance of research and audit in their 'Outcomes for graduates' guidance<sup>1</sup> and previous work has identified benefits of participation in research and audit as an undergraduate<sup>2</sup>. However, there is considerable variation between different medical schools regarding the level of exposure that medical students receive in research and audit skills training as an undergraduate<sup>3</sup> and many medical students do not have a clear understanding of what constitutes research<sup>4</sup>.

Although publishing is seen as important for career progression by the majority of British medical students, only a small proportion seem to publish<sup>5</sup>. One way to guarantee student involvement in research and audit is to include mandatory projects

as part of the curriculum. However, it is unclear if mandatory research projects would be welcomed by all medical students<sup>6-8</sup>. This study aimed to explore medical student involvement in and attitudes towards research and audit in a UK medical school. Key aims of this study were to evaluate student perceptions of the benefits of participation, explore attitudes towards mandatory research and audit projects and investigate factors associated with confidence in research and audit skills.

## Methods

An anonymous, cross-sectional, 70-item self-report questionnaire was administered to current medical students from all years of the University of Leicester following ethical approval (3920-rin1-medicaleducation) from the University of Leicester Ethics Sub-Committee for Medicine and Biological Sciences.

### **Questionnaire design**

The questionnaire was constructed following consultation of the literature to identify gaps in current understanding of medical student attitudes towards audit and research. A mixture of open, closed and Likert Scale questions were used. The questionnaire underwent piloting to test acceptability. Completion of the questionnaire took around 15-20 minutes on average. Questions were grouped into six main themes: 'Background information', 'Experience of research/audit prior to medical school', 'Experience of research/audit during medical school', 'Attitudes towards research/audit', 'Perceptions of and attitudes towards research/audit opportunities during medical school' and 'Perceptions of and attitudes towards research/audit skills'.

### **Data collection**

All registered medical students were sent an email invitation to complete the on-line (Google Form) or paper survey. Email invitations were supplemented by verbal explanation of the survey following selected lectures. Prospective participants were provided with a participant information sheet summarising the project. Student participation in the study was entirely voluntary. No rewards were offered as incentives or gratitude for participation.

### **Data analysis**

Statistical analysis was carried out using SPSS (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Figures were constructed in Microsoft Excel 2007 (Microsoft, USA). Categorical data were expressed as number (percentage). Non-parametric data were expressed as median [inter-quartile range]. Responses to open questions were analysed using a thematic approach and categorised into common themes by SPT and reviewed by RIN. The relationship between participant characteristics and self-reported confidence in research and audit skills was evaluated using Spearman's correlation and Kendall's Tau-b statistic for continuous and dichotomous explanatory variables respectively. To facilitate logistic regression analyses, Likert scale data were dichotomised into two groups:  $\geq 3$  and  $< 3$ . Multiple logistic regression was used to evaluate the relationship between research/audit skill confidence and age adjusted for course year.

Forward stepwise logistic regression analyses were conducted to evaluate the relationship between participant characteristics and self-reported confidence in research and audit skills in a multivariate model. A  $p$ -value  $< 0.05$  was considered statistically significant.

### **Results:**

In total, 114 surveys were completed. Participant characteristics are detailed in Table 1. Forty-six respondents (40%) reported that they had participated in or were currently participating in one or more research or audit projects during their time at medical school. Of those claiming involvement, 25 respondents (54%) stated that they had participated on an extra-curricular basis, while 14 (30%) had done so during a student selected module, 13 (28%) during an intercalated BSc and four (9%) as part of their clinical placement.

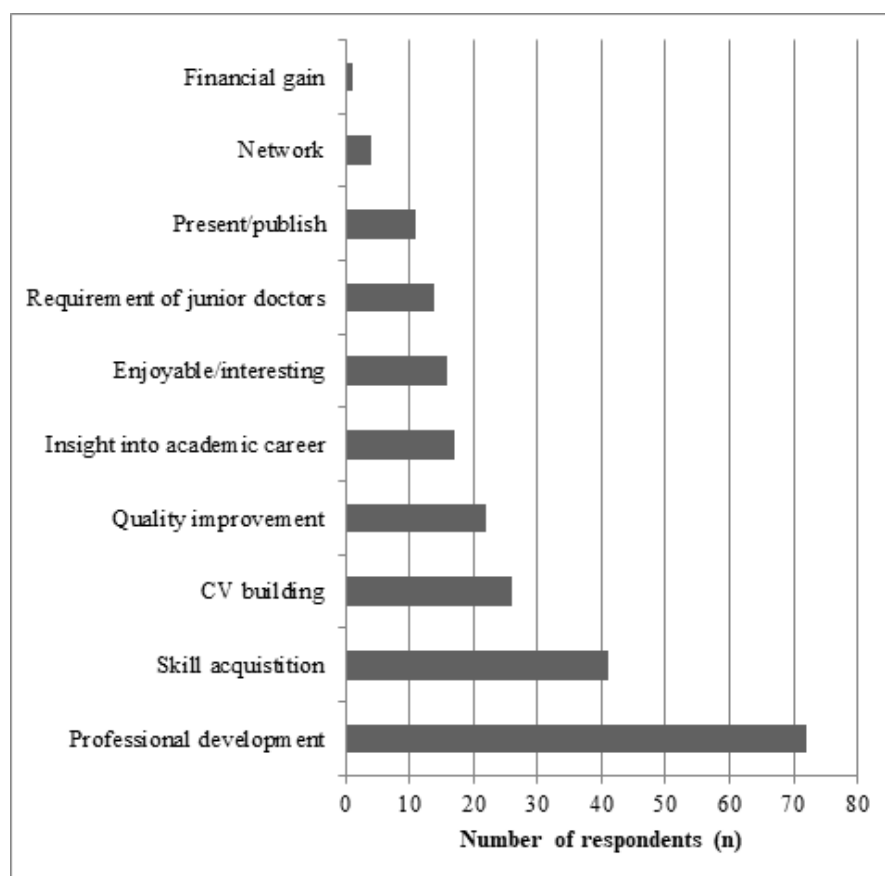
### **Attitudes towards Research and Audit**

One hundred and eleven respondents (97%) considered that medical students can benefit from participating in research and 107 (94%) considered that medical students can benefit from participating in audit. In open questions, frequently cited benefits included 'Professional development' ( $n=72$ , 63%), 'Skill acquisition' ( $n=41$ , 36%), 'CV building' ( $n=26$ , 23%) and 'Quality improvement' ( $n=22$ , 19%); summarised in Figure 1. Respondents identified specific skills that medical students can gain or improve by participating in research and/or audit including: 'Presentation/academic writing skills' ( $n=40$ , 35%), 'Data analysis skills' ( $n=33$ , 29%), 'Critical appraisal/literature review skills' ( $n=27$ , 24%), 'General research/audit skills' ( $n=25$ , 22%), 'Scientific thinking/reasoning skills' ( $n=20$ , 18%) and 'Organisational skills' ( $n=20$ , 18%); summarised in Figure 2.

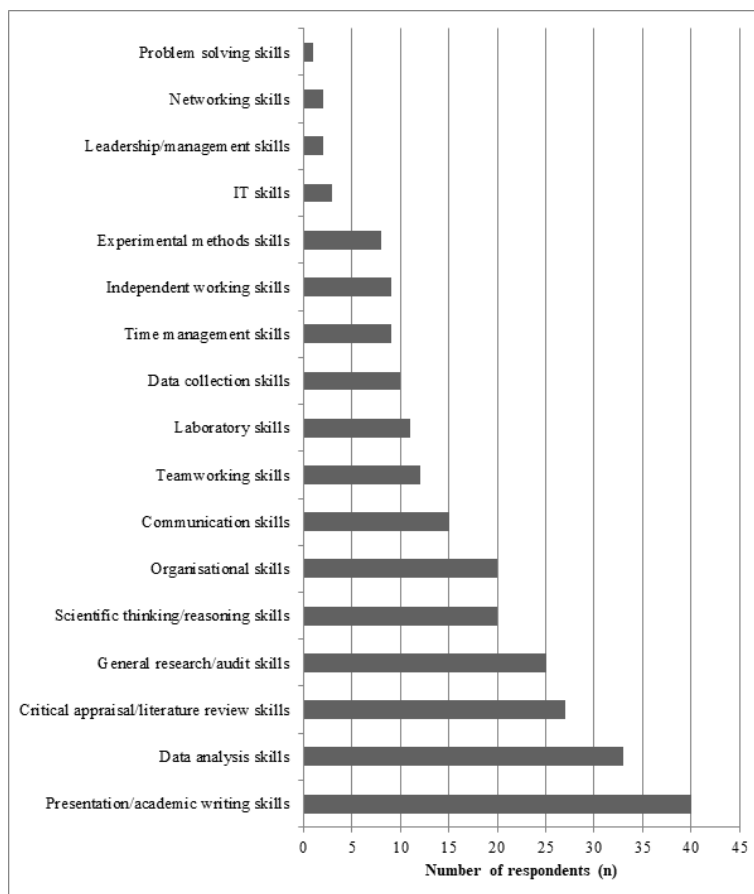
Sixty-one respondents (54%) reported that they needed to participate in research and 66 (58%) reported that they needed to participate in audit to achieve their career aspirations. The median amount of time that respondents reported that they would invest in a research or audit project, if it meant they would become an author on a publication in a peer reviewed journal with a Pubmed ID, was 114 hours [140].

Participant characteristics	Respondents (n=114)
Age (years)	22.7 (3.1)
Gender (male)	39 (34%)
Additional degree	39 (34%)
Participation prior to medical school	33 (29%)
Audit	9 (8%)
Basic Science	11 (10%)
Clinical	10 (9%)
Other	3 (3%)
Presentation prior to medical school	8 (7%)
Poster	4 (4%)
Oral	5 (4%)
Publication prior to medical school	8 (7%)
Participation during medical school	46 (40%)
Audit	24 (21%)
Basic Science	7 (6%)
Clinical	15 (13%)
Other	11 (10%)
Presentation during medical school	22 (19%)
Poster	12 (11%)
Oral	11 (10%)
Publication during medical school	3 (3%)

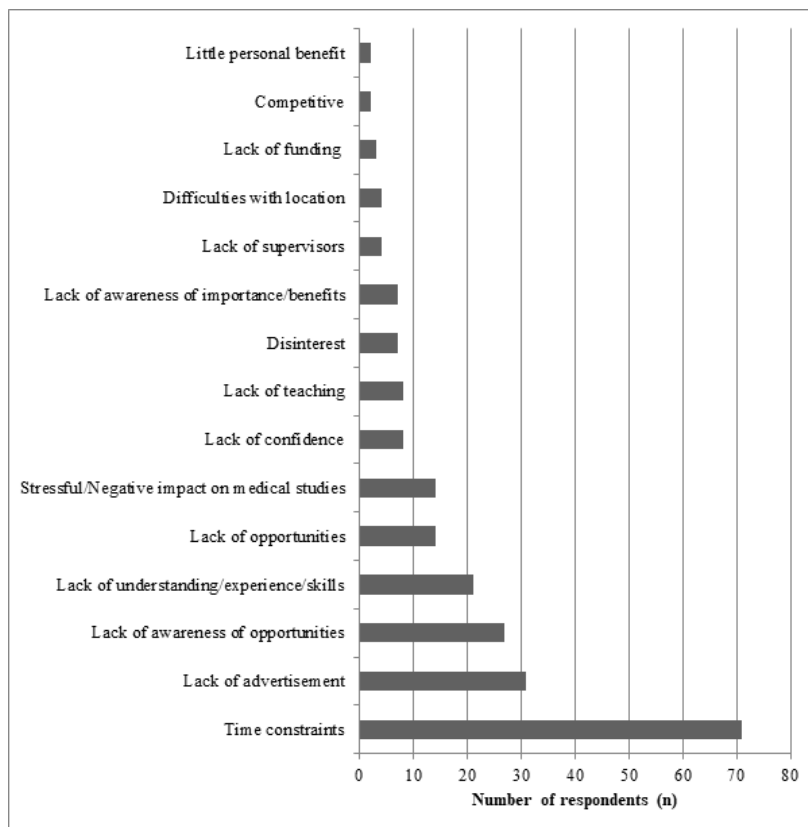
**Table 1:** Participant characteristics



**Figure 1:** Themes identified in responses to open question regarding ways in which medical students can benefit from participating in research/audit



**Figure 2:** Themes identified in responses to open question regarding skills that medical students can gain/improve by participating in research/audit

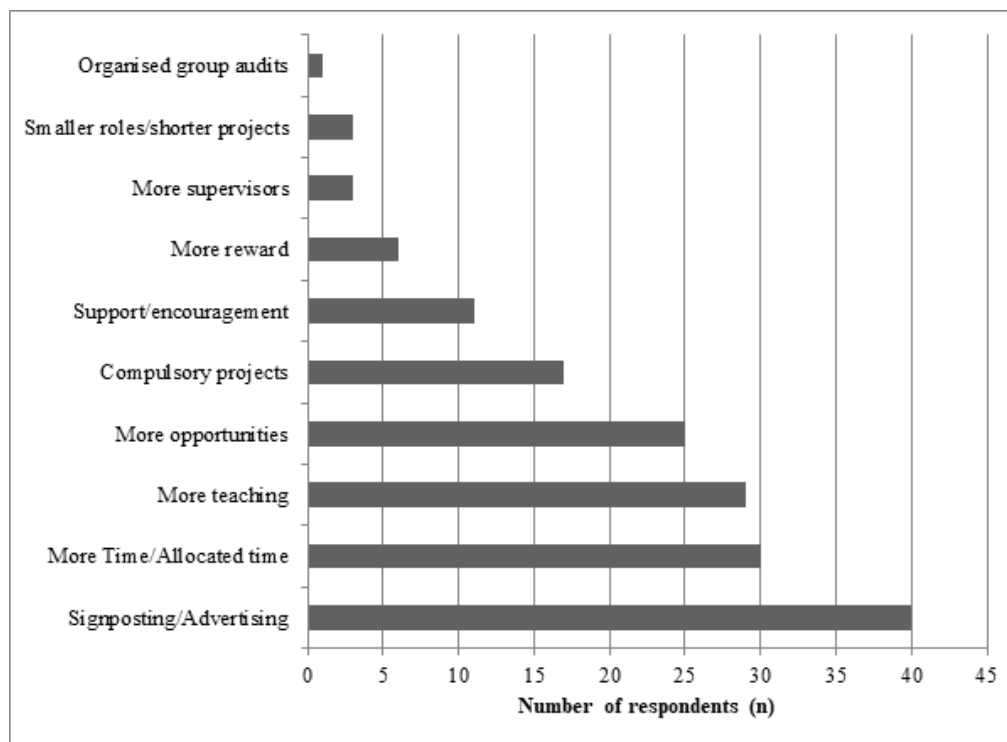


**Figure 3:** Themes identified in responses to open question regarding barriers to participation in research/audit

### Research and Audit Opportunities

In open questions, frequently cited barriers to accessing research and/or audit opportunities included 'time constraints' (n=71, 62%), a 'lack of advertisement' (n=31, 27%) and a 'lack of awareness of opportunities' (n=27, 24%); summarised in Figure 3. Suggestions to increase student involvement in

research and audit included 'Better advertising and signposting of opportunities' (n=40, 35%), 'More time/allocated time to carry out research and/or audit' (n=30, 26%), 'More teaching' (n=29, 25%) and 'More opportunities' (n=25, 22%); summarised in Figure 4.

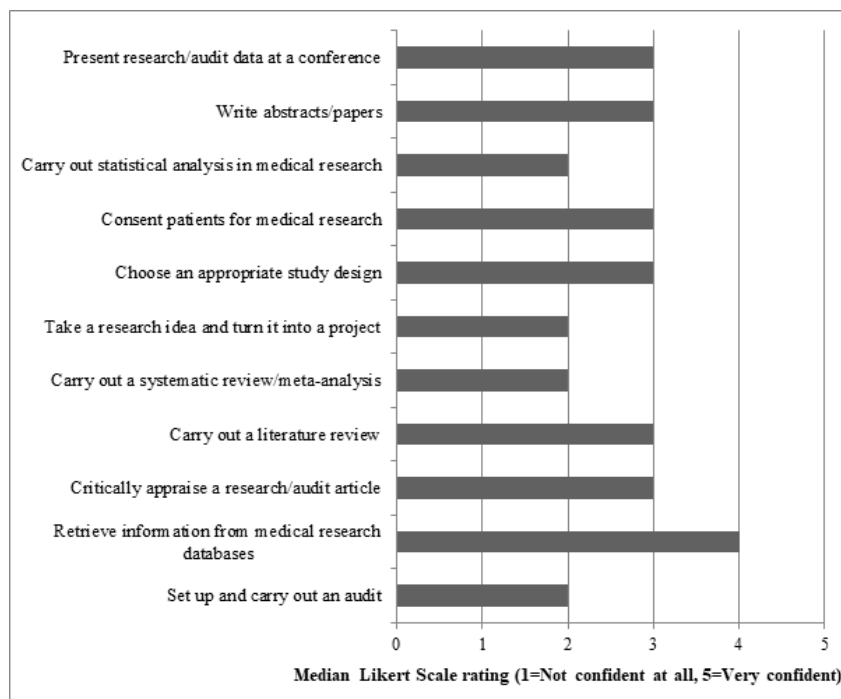


**Figure 4:** Themes identified in responses to open question regarding suggestions to increase participation in research/audit

One hundred and nine respondents (96%) favoured provision of an optional, dedicated research project-based module for students interested in research but not wanting to commit to a full intercalated BSc year. Only 39 respondents (34%) considered that a research project should be mandatory, whereas 54 respondents (47%) considered that an audit project should be a mandatory part of the curriculum. Of those in favour of mandatory research and audit projects, the median length of time that respondents stated should be allocated to carry out such projects were six weeks and three weeks, respectively. In univariate analysis, there were no significant differences in participant characteristics between those in favour versus those not in favour of mandatory research or audit projects.

### Research and Audit Skills

Of the 11 research and audit skill domains surveyed, students reported the highest level of confidence regarding their ability to 'retrieve information from medical research databases'. Students were least confident regarding their ability to 'set up and carry out an audit', 'carry out statistical analysis in medical research', 'carry out a systematic review/meta-analysis' and 'take a research idea and turn it into a project (i.e. proposal writing, grant writing, seeking ethical approval)'. Figure 5 summarises respondent confidence in the 11 research/audit skill domains. Sixty respondents (65%) specified that formal teaching of the process of research and audit should occur earlier (pre-clinical years), while 23 (25%) specified that this should occur later (clinical years) during medical training.



**Figure 5:** Self-reported confidence in the 11 research/audit skill domains surveyed

### **Univariate analysis**

In univariate analysis, age was significantly associated with confidence in several research and audit skill domains and remained a significant predictor after adjustment for course year using multiple logistic regression, summarised in Table 2. Participation in research/audit during medical school was associated with confidence in only one of the 11 research and audit skill domains: 'ability to set up and carry out an audit' (Kendalls Tau-b 0.361,  $p < 0.001$ ). Participation in an intercalated BSc was associated with confidence in respondents' ability to 'set up and carry out an audit' (Kendalls Tau-b 0.204,  $p = 0.017$ ), 'critically appraise a research/audit

article' (Kendalls Tau-b 0.17,  $p = 0.048$ ) and 'consent patients for medical research' (Kendalls Tau-b 0.177,  $p = 0.037$ ). Male gender was associated with confidence in respondents' ability to 'take a research idea and turn it into a project' (Kendalls Tau-b 0.293,  $p = 0.001$ ), 'carry out statistical analysis in medical research' (Kendalls Tau-b 0.197,  $p = 0.022$ ) and 'present research/audit data at a conference' (Kendalls Tau-b 0.203,  $p = 0.016$ ). Previous participation in research and having a degree prior to medical school were both significantly associated with several research and audit skill domains, summarised in Table 3.



Skill domain	Age		Age adjusted for course year			
	Spearman's rho	P-value	P-value	Odds Ratio	Lower 95% CI	Upper 95% CI
Set up and carry out an audit	0.373	<0.001**	0.011*	1.240	1.050	1.464
Retrieve information from medical research databases	0.217	0.020*	0.755	0.971	0.809	1.166
Critically appraise a research/audit article	0.272	0.003**	0.011*	1.285	1.058	1.560
Carry out a literature review	0.504	<0.001**	<0.001**	1.541	1.233	1.926
Carry out a systematic review/metanalysis	0.294	0.002**	0.058	1.148	0.995	1.325
Take a research idea and turn it into a project	0.226	0.016*	0.153	1.103	0.964	1.262
Choose an appropriate study design	0.052	0.583	0.250	1.083	0.945	1.242
Consent patients for medical research	0.326	<0.001**	0.020*	1.224	1.033	1.451
Carry out statistical analysis in medical research	0.014	0.880	0.349	0.931	0.802	1.081
Write abstracts/papers	0.281	0.002**	0.070	1.136	0.990	1.304
Present research/audit data at a conference	0.397	<0.001**	0.009**	1.270	1.061	1.519

**Table 2:** Spearman's rank correlation analysis and multiple logistic regression (age adjusted for course year) of the relationship between age and research/audit skill confidence

Skill domain	Prior degree		Prior research	
	Kendall's tau-b	P-value	Kendall's tau-b	P-value
Set up and carry out an audit	0.083	0.341	0.041	0.644
Retrieve information from medical research databases	0.254	0.003**	0.137	0.115
Critically appraise a research/audit article	0.243	0.004**	0.138	0.107
Carry out a literature review	0.443	<0.001***	0.266	0.001**
Carry out a systematic review/metanalysis	0.235	0.007**	0.286	0.001**
Take a research idea and turn it into a project	0.218	0.012*	0.278	0.001**
Choose an appropriate study design	0.107	0.217	0.205	0.017*
Consent patients for medical research	0.236	0.005**	0.060	0.481
Carry out statistical analysis in medical research	0.053	0.538	0.125	0.148
Write abstracts/papers	0.335	<0.001***	0.343	<0.001***
Present research/audit data at a conference	0.335	<0.001***	0.317	<0.001***

**Table 2:** Univariate analysis of the relationship between participation in research prior to medical school, having a degree prior to medical school and research/audit skill confidence

### **Multivariate analysis**

Forward stepwise logistic regression identified several independent predictors of research and audit skill confidence using available participant characteristics. Data presented as: odds ratio, 95% confidence interval, p-value. Having a degree prior to medical school was associated with participant confidence in their ability to: 'set up and carry out an audit' (OR 3.02, 1.17-7.81,  $p=0.023$ ), 'critically appraise a research/audit article' (OR 4.05, 1.55-10.61,  $p=0.004$ ), 'carry out a literature review' (OR 9.65, 3.39-27.45,  $p<0.001$ ) and 'consent patients for medical research' (OR 4.6, 1.7-12.45,  $p=0.003$ ). Participation in research/audit prior to medical school was associated with participant confidence in their ability to: 'carry out a systematic review/metanalysis' (OR 3.82, 1.59-9.17,  $p=0.003$ ), 'take a research idea and turn it into a project' (OR 2.52, 1.03-6.15,  $p=0.043$ ), 'choose an appropriate study design' (OR 2.6, 1.08-6.28,  $p=0.033$ ), 'write abstracts/papers' (OR 5.23, 2.05-13.36,  $p=0.001$ ) and 'present research/audit data at a conference' (OR 6.38, 2.2-18.54,  $p=0.001$ ). Participation in research/audit during medical school was associated with participant confidence in their ability to: 'set up and carry out an audit' (OR 7.17, 2.85-18.07,  $p<0.001$ ) and 'consent patients for medical research' (OR 0.36, 0.14-0.93,  $p=0.034$ ). Participation in an intercalated BSc was associated with participant confidence in their ability to: 'critically appraise a research/audit article' (OR 4.02, 1.04-15.45,  $p=0.043$ ), 'consent patients for medical research' (OR 13.02, 2.41-70.39,  $p=0.003$ ), 'write abstracts/papers' (OR 3.72, 1.16-11.9,  $p=0.027$ ) and 'present research/audit data at a conference' (OR 4.97, 1.3-19.05,  $p=0.019$ ). Male gender was associated with participant confidence in their ability to 'take a research idea and turn it into a project' (OR 4.13, 1.76-9.72,  $p=0.001$ ).

### **Discussion:**

This study suggests that medical students perceive value in obtaining experience of research and audit during their training and over half of respondents to this survey considered this experience to be necessary to be able to achieve their career aspirations. Many students go on to participate in research or audit projects during their time at medical school and a large proportion of these students appear to do so in their own time. While many respondents expressed interest in participating in research and audit, the majority did not favour inclusion of a mandatory research or audit project during medical school.

Given the demanding nature of medical school curricula, the extra-curricular participation in research and audit by medical students highlights the motivation and drive that many of them possess.

Despite their interest in research and audit, however, respondents to this survey identified barriers to participation. In open questions, the most frequently cited barrier to participation in research and/or audit was 'time constraints'. Medical school curricula are notoriously demanding, which can make decisions concerning time allocation challenging. Integration of research and audit into medical curricula could enable medical students to meet the criteria set out in the GMC's 'Outcomes for Graduates' guidelines in which research and audit skills are highlighted as a requirement<sup>1</sup>. However, many respondents to this questionnaire did not favour mandatory projects. These data suggest that many students support an optional research project-based module for students wishing to participate in research but not wanting to undertake a full intercalated BSc year.

Providing optional research and audit opportunities may be an effective way to engage students in projects while at medical school. A literature review carried out by Chang et al.<sup>2</sup> suggested that optional and mandatory research projects do not differ in terms of student productivity and students appear to derive more satisfaction from optional/elective projects. The authors postulate that this may be because students participating in voluntary projects are self-selected and are therefore more likely to have positive perceptions regarding research. Moller et al.<sup>9</sup> investigated medical student perceptions of their learning environment during a mandatory research project. The authors found that individual supervision, continuous feedback and a positive atmosphere characterised by varied learning interactions and a sense of trust were characteristics of a 'good' learning environment. The authors also found that students who participated in basic science and epidemiological projects rated their learning environment and supervision more highly than those participating in clinical research projects. The authors suggest that this may be because basic science projects are typically carried out within teams who work in close collaboration. Another study from the same group<sup>10</sup> found that students who undertook pre-clinical research projects expressed greater interest in participating in part-time research in the future while students who undertook clinical research projects were least interested in participating in further research projects. Parsonnet et al.<sup>11</sup> highlight the pros and cons of mandatory research projects and conclude that medical educators should consider if such projects are an essential component of their institutions' 'educational mission'. If the answer to this question is 'yes', the authors argue that educators should carefully consider the resources required as providing mandatory components may be resource intensive.

Some barriers to participation in research and audit may be easier to address than others and addressing these barriers may have a significant impact on the number of students participating in projects. For example, interventions such as providing greater support and encouragement and increasing student awareness of research and audit opportunities via improved advertising and signposting may result in greater student engagement. Similarly, organisation of group audits and research projects, modelled on the successful STARSurg initiative<sup>12</sup> may facilitate student involvement. Collaborations enable students to share the workload of a large-scale research or audit project by playing a small, clearly defined role within a set timeframe. Having a structured approach to research and audit in this manner may enable students, who are inevitably busy with course commitments, to participate in meaningful research and gain valuable skills which they can utilise in future projects.

Interestingly, many respondents felt that participation in research and audit was necessary to achieve their career aspirations. This is in-keeping with findings from a study carried out by Giffin and Hindocha<sup>5</sup> which found that British medical students viewed publishing as important for career progression. The authors note that despite the importance that medical students place on publishing, only a small proportion seem to publish. The discordance between student perceptions of publishing and the number who publish may be partly due to time constraints, which has been highlighted by many respondents in this study.

#### **Confidence in research and audit skills**

Respondents to this questionnaire expressed lower levels of confidence in their ability to 'set up and carry out an audit', 'carry out statistical analysis in medical research', 'carry out a systematic review/meta-analysis' and 'take a research idea and turn it into a project'. In multivariate analysis, several characteristics were identified as independent predictors of confidence in the 11 skill domains. Prior experience of research or audit, having a degree prior to starting medical school, participation in an intercalated BSc and participation in research or audit during medical school were strongly associated with increased confidence in several skill domains. Some of these findings are unsurprising however it is of interest that participation in an intercalated BSc was associated with increased confidence. This suggests that participation in an intercalated BSc may facilitate professional development and enable students to develop additional skills outside of the undergraduate medical curriculum. Furthermore, participation in intercalated degrees may lead to improved performance in undergraduate

examinations and may increase likelihood of pursuing academic careers<sup>13</sup>. Interestingly, this study found that male gender was associated with participants confidence in their ability to 'take a research idea and turn it into a project'. This was an unexpected finding and suggests that gender gaps may still exist to some extent in academia. Many respondents considered that medical students should receive more formal teaching of research and audit skills; the majority felt that research and audit skill teaching should take place early in the course, during pre-clinical years. Early exposure to research and audit may enable students to begin developing specific skills at an early stage, this may in turn lead to greater confidence and more opportunities to participate in projects later during undergraduate medical training. Further research is needed to evaluate the value of early research and audit exposure and identify optimal timing of research and audit skill teaching.

#### **Limitations**

The main limitations of this study are the self-report survey design, which carries a risk of response bias, and the voluntary nature of this study which will have reduced the response rate. Furthermore, the survey was relatively long in duration, taking around 20 minutes to complete, which may have contributed to a reduction in overall response rate. Finally, this study was conducted at a single centre and for findings to be generalisable this study would need to be performed at other UK medical schools.

#### **Conclusion:**

Many medical students perceive value in obtaining experience of research and audit during medical school. This cross-sectional survey suggests that a proportion of students would prefer involvement in research and audit to be voluntary. Several factors appear to influence medical student confidence in research and audit skills, including prior participation in research/audit projects, having an additional degree and participation in an intercalated BSc. These findings would benefit from confirmation in a larger cohort including other UK medical schools. Medical educators should consider ways to integrate optional research and audit opportunities, in addition to targeted research and audit skills teaching early in the undergraduate medical curriculum to maximise benefits for students.

#### **References:**

1. General Medical Council. Outcomes for graduates: Outcomes 1 - the doctor as scholar and scientist. 2009; Available at: [https://www.gmc-uk.org/education/undergraduate/undergrad\\_outcomes\\_1.asp](https://www.gmc-uk.org/education/undergraduate/undergrad_outcomes_1.asp). Accessed 02/04/2018.

2. Chang Y, Ramnanan CJ. A review of literature on medical students and scholarly research: experiences, attitudes, and outcomes. *Acad Med* 2015 Aug;90(8):1162-1173.
3. Amgad M, Man Kin Tsui M, Liptrott SJ, Shash E. Medical Student Research: An Integrated Mixed-Methods Systematic Review and Meta-Analysis. *PLoS One* 2015 June 18;10(6):e0127470.
4. Murdoch-Eaton D, Drewery S, Elton S, Emmerson C, Marshall M, Smith JA, et al. What do medical students understand by research and research skills? Identifying research opportunities within undergraduate projects. *Med Teach* 2010;32(3):152.
5. Griffin MF, Hindocha S. Publication practices of medical students at British medical schools: experience, attitudes and barriers to publish. *Med Teach* 2011;33(1):1.
6. Siemens DR, Punnen S, Wong J, Kanji N. A survey on the attitudes towards research in medical school. *BMC Med Educ* 2010 Jan 22;10:4.
7. Hunt JE, Scicluna H, McNeil P. Development and Evaluation of a Mandatory Research Experience in a Medical Education Program: The Independent Learning Project at UNSW. *Medical Science Educator* 2011 April;21(Suppl 1):78-85.
8. Acuña JM, Ward-Peterson M, Zevallos JC, Castro G, Rodriguez de la Vega, Pura, Guzzone F, et al. Development of a Mandatory Research Scholarship Course at a New Medical School in Miami, Florida. *Medical Science Educator* 2017 June;22(2):155-158.
9. Moller R, Ponzer S, Shoshan M. Medical students' perceptions of their learning environment during a mandatory research project. *Int J Med Educ* 2017 Oct 20;8:375-381.
10. Moller R, Shoshan M. Medical students' research productivity and career preferences; a 2-year prospective follow-up study. *BMC Med Educ* 2017 Mar 3;17(1):7.
11. Parsonnet J, Gruppuso PA, Kanter SL, Boninger M. Required vs. elective research and in-depth scholarship programs in the medical student curriculum. *Acad Med* 2010 Mar;85(3):405-408.
12. Chapman SJ, Glasbey JC, Khatri C, Kelly M, Nepogodiev D, Bhangu A, et al. Promoting research and audit at medical school: evaluating the educational impact of participation in a student-led national collaborative study. *BMC Med Educ* 2015 Mar 13;15:1.
13. Jones M, Hutt P, Eastwood S, Singh S. Impact of an intercalated BSc on medical student performance and careers: a BEME systematic review: BEME Guide No. 28. *Med Teach* 2013 Oct;35(10):1493.



## Body Mass Index and Pregnancy Outcomes in Expectant Women at Moi Teaching and Referral Hospital, Eldoret Kenya

Oluoch D, Nyongesa P, Mwaliko E, Odunga J

### Institution

Moi University, Usain Gishu County, Academic Highway, Eldoret, Kenya

*WJMER, Vol 17: Issue 1, 2018*

### Abstract

**Background:** Globally, obesity among women has become a significant public health concern. In Sub-Saharan African countries including Kenya, the prevalence of overweight and obesity increases by about 5% per year on average. In Kenya, 12% of women are overweight while 7.2% are obese. Maternal obesity has been identified as risk to safe pregnancy. Understanding the relationship between BMI and pregnancy outcomes is important in improving pregnancy outcomes. Despite the rising prevalence of obesity worldwide, little information is known about pregnancy outcomes in relation to BMI in our region

**Objective:** To describe pregnancy outcomes in relation to BMI among women seeking ante natal care at Moi Teaching and Referral Hospital.

**Methods:** Study Population was expectant women seeking care at Moi Teaching and Referral Hospital. Study design was a prospective cohort study. Consecutive Sampling was used. The sample size was determined using Hulley et al, (2007) formulae. Interviewer-administered structured questionnaires were used to collect data. Data analysis was done using R: A language and environment for statistical computing (R Core Team, 2017). Data is presented in form of tables and graphs.

**Results:** A total of 255 participants were included in the study. Among them were 128 (50.2%) abnormal BMI and 127(49.8%) normal BMI. Among the abnormal, 11.4% were underweight, 36.5% overweight and 2.4% obese. History of complications in pregnancy, both maternal and neonatal, showed that 36.9% of the participants had experienced some complications during previous pregnancy. Up to 80.4% of the participants attained term pregnancy and delivered normally. There were 13 (5.1%) reported cases of miscarriage, 10 (3.9%) cases of postpartum hemorrhages, and 25 (9.8%) cases of caesarean deliveries. There was one case each for antepartum hemorrhage, and intra uterine fetal death. There were 214 (83.9%) children who were born alive, 26 (10.2%) stillbirths, and 15 (5.9%) cases admitted to NBU. There was no difference in the proportion of participants who had maternal complications between participants who had abnormal weight compared to those who had normal weight ( $p = 0.218$ ). A higher proportion of participants who had abnormal weight reported complications with their newborns compared to those who had normal weight (47.2% vs. 24.5%,  $p < 0.001$ ). High blood pressure (SBP  $> 140$  mm Hg | DBP  $> 90$  mm Hg) was associated with abnormal weight (6.7% vs. 0.8%,  $p = 0.024$ ). There was no evidence of any association between anemia and abnormal weight ( $p = 0.056$ ).

**Conclusion:** Maternal abnormal BMI is associated with increased neonatal complications and hypertension. There is no sufficient evidence from the data to link maternal complications to abnormal BMI ( $p = 0.204$ ).

**Recommendation:** Therefore, those with abnormal BMI should be followed up in the high risk clinic and delivered in specialized centers.

### Key Words

Body Mass Index; Maternal Outcomes; Neonatal Outcomes

### Corresponding Author:

Mr Daniel Oluoch; E-mail: danoluoch83@gmail.com

### Background Information

Globally, incidence of obesity among women has become one of the most significant public health concerns<sup>1,2</sup>. BMI differ among different population. In USA, 2% of pregnant women have a BMI of  $< 18.5$  and more than 50% have a BMI  $> 25$ . Another study has shown that the incidence of obesity in

pregnancy varies from 18.5% to 38.3% in USA as per the definition used<sup>3,5</sup>.

In United Kingdom, 56% of all women are over the normal BMI, with 33% of them classified as overweight (BMI  $> 25$ ) and 23% are obese (BMI  $> 30$ ). The confidential inquiry into maternal and child

health found that 35% of all maternal deaths that occurred in the year 2000 to 2003 were associated with high body mass index among these women<sup>6</sup>. In Asia, women generally have a lower BMI and a smaller gestational weight gain than in developed countries<sup>7</sup>.

High maternal body mass index (BMI) has been shown to increase adverse pregnancy outcomes such as pre-eclampsia, eclampsia, pre- and post-term delivery, induction of labor, macrosomia, caesarean section, postpartum hemorrhage, poor Apgar score, neonatal I.C.U admission and even neonatal deaths in the West<sup>8-10</sup>.

The Institute of Medicine of the National Academies in United States suggested that the maternal weight gain during pregnancy should be based on pre-pregnancy BMI. For women with BMI <19.8kg/m<sup>2</sup>, a weight gain of 12.5-18kg was recommended; with BMI of 19.8-24.9kg/m<sup>2</sup>, a mean gain of 11.5-16kg; with a BMI of 25.0-29.9kg/m<sup>2</sup>, a weight of 7-11.5kg; and with a BMI >29.9kg/m<sup>2</sup>, a weight gain of at least 6kg with no upper limit is recommended<sup>11</sup>.

In 2006, the participants at the Institute of Medicine conference on the impact of pre-pregnancy weight on maternal and child health recommended that further research should be done on the influence of weight gain in pregnancy (National Academies press, 2007).

The definition of overweight, obesity and underweight differ in different studies but body mass index (BMI expressed as weight in kilograms over height in meters squared (kg/m<sup>2</sup>) is widely accepted measure between underweight and overweight. The BMI classification according to WHO 2011 has underweight, BMI below 18, normal weight BMI of 18 to 24.9, overweight, BMI of 25 to 29.9 and obese, BMI above 30, with obesity further classified into obese I, obese II, and III (morbid obesity)<sup>12</sup>.

The rising rate of obesity is a major public health problem worldwide, with up to 28% of women in western countries being overweight and 11% being obese<sup>13</sup>. High maternal body mass index (BMI) has been shown to increase adverse pregnancy outcomes such as pre-eclampsia, eclampsia, pre- and post-term delivery, induction of labor, macrosomia, caesarean section, postpartum hemorrhage, poor Apgar score, neonatal ICU admission and even neonatal deaths in the west<sup>8-10</sup>.

Other antenatal complications include miscarriage, congenital abnormalities, pregnancy induced hypertension, diabetes mellitus and venous thrombosis<sup>14-16</sup>. Other studies have reported a

protective effect of maternal underweight on certain pregnancy complications and interventions<sup>17</sup>. It has been demonstrated that the cost of prenatal care in overweight women exceed that of normal weight control women by 5.4 to 16.2 fold depending on the degree of obesity<sup>18</sup>.

Overweight and obesity are increasing in sub-Saharan Africa, including Kenya at a rate of 5% per year on average. It is reported to be common in women specifically in the 25 to 44 age group. The study by IASO revealed that 12 per cent of Kenyans are overweight. It noted that 7.2 per cent of women in the country were obese<sup>19</sup>.

Despite a rising prevalence worldwide, there is limited data on pregnancy outcome in relation to BMI in our set up and Africa in general.

Provision of antenatal care is also a big challenge as the current guidelines do not clearly show how best to adequately addresses the antenatal care needs of the obese pregnant women.

## Methods

### Study setting

The study was carried out at the antenatal clinic, antenatal ward and labor ward of Moi Teaching and Referral Hospital. The hospital is the second largest public hospital in Kenya and serves as a referral facility for western Kenya, some parts of Eastern Uganda, South Sudan and Tanzania. It has a catchment population of approximately 16.24million (20). There are approximately 30 deliveries being conducted daily. The hospital also serves as a teaching facilities for medical undergraduate and post graduate students.

### Study design

This was a prospective cohort study. The sampled women were examined and recruited during the first trimester and followed up in second and third trimester and/or at the end of pregnancy. After recruitment, the subjects' weights and heights were taken upon which BMI was determined. Follow up entailed filling structured questionnaire during subsequent visits or admissions and phone calls where no visits were made subsequently in the second and third trimester and /or at the termination of the pregnancy.

The study population was women seeking antenatal care services at Moi Teaching and Referral Hospital.

### Sampling Technique

MTRH was purposively sampled because it is a referral center with functional maternity wing. We

utilized systematic random sampling strategy to select the participants for the study with a sampling interval of 2. MTRH records show that an average of 60 – 90 mothers in their first trimester seek ANC services at this facility. For reasons of sampling we assumed that there would be an average of 75 expectant women in their first trimester who would attend MTRH hospital in search of ANC services per month during the six months' study period. Hence the sampling interval was calculated as  $450 / 256 \approx 2$ .

### Data collection

Research assistants stationed at the triage area of the ante-natal clinic identified potential clients, invited them to a private room, explained to them study objectives and procedures after which those who agreed to participate gave written informed consent. Those who declined were thanked and proceeded on with routine care.

Data was collected using interviewer-administered structured questionnaires. At least two and at most four questionnaires were filled per subject. These captured the demographic characteristics, anthropometric measurements and medical history of the participants. Medical records were also reviewed and relevant clinical and laboratory data was obtained and entered into the data collection form/structured questionnaire.

Follow up involved filling of follow up questionnaires at the end of second and third trimester, for those who got there, either at the clinic or through phone calls for those who didn't come back to MTRH. Information on pregnancy related complications was gathered at any time if they occurred before delivery at the hospital. Participant left the study after termination of their pregnancy.

Data entry was done on SPSS version 22. The data was de-identified at entry and the database was encrypted to ensure confidentiality of the information contained therein. The questionnaires are kept in a safe cabinet under lock. Backups to the created databases was created to ensure safety of the data. Access to the data was allowed to the principal investigator and the statistician for analysis only.

### Data analysis and presentation

Data analysis was done using R: A language and environment for statistical computing<sup>21</sup>. Categorical variables such as age groups, place of residence marital status, and education level among others were summarized using frequencies and the corresponding percentages. Continuous variables such as height, weight, and body mass index (BMI)

among others were summarized using mean and the corresponding standard deviation if the Gaussian assumptions held, else median and the corresponding inter quartile range were used. Gaussian assumptions were assessed using Shapiro-Wilks test and the using histograms to check the distributions.

Associations between categorical variables was assessed using Pearson's Chi Square test. Fishers' exact test was used when the Pearson's Chi square assumptions were violated. We reported the associated p-values. Logistic regression model was used to assess the predictors of abnormal BMI, and neonatal admission to NBU or stillbirths. We reported the odds ratios (OR), and the corresponding 95% confidence interval (95% CI) for the abnormal BMI outcome, and relative risk (RR) and the corresponding 95% confidence interval (95% CI) for the delivery outcome. Results are presented using tables and graphs.

### Ethical considerations

Approval was sought from IREC before the study commenced. The permission to conduct the study was obtained from the management of Moi Teaching and Referral Hospital.

All the participants were notified about the purpose of the study and politely asked without any coercion, or force or pressure to give a signed written informed consent before participating. The culturally sensitive questions were designed to address the research objectives properly and respect the privacy and confidentiality of the participant. Data management practices that ensured adequate confidentiality were maintained and these included storing data in key locked cabinets, password coded databases and consenting in private consultation room. There was no direct financial benefit or compensation for participating in the study. Sound clinical judgment was involved in all stages and aspects of this research.

### Results

A total of 255 participants were included in the study. Two thirds of the participants (66.3%) were aged between 21 – 30 years. There was one participant who was older than 40 years. Up to 88.2% of the participants were from Uasin Gishu.

Three quarters of the study participants (77.6%) were married, more than half (51.8%) had a tertiary level of education and 64.5% (n=167) were either formally employed or self-employed. A summary of the socio demographic characteristics are shown in Table 1.



Variable	N	n (%)
Age (Years)		
< 20		17 (6.7%)
21-30	255	169 (66.3%)
31-40		68 (26.7%)
>40		1 (0.4%)
Residence		
Uasin Gishu		255 (88.2%)
Other	255	30 (11.8%)
Marital status		
Married	255	198 (77.6%)
Single		57 (22.4%)
Education		
Primary		50 (19.6%)
Secondary	255	73 (28.6%)
Tertiary		132 (51.8%)
Occupation		
Formal employment		74 (29.0%)
Self-employment	255	93 (36.5%)
Cash crop farmer		4 (1.6%)
Unemployed		84 (32.9%)

**Table 1:** Socio-demographic characteristics

### **BMI characteristics of women seeking antenatal care at MTRH**

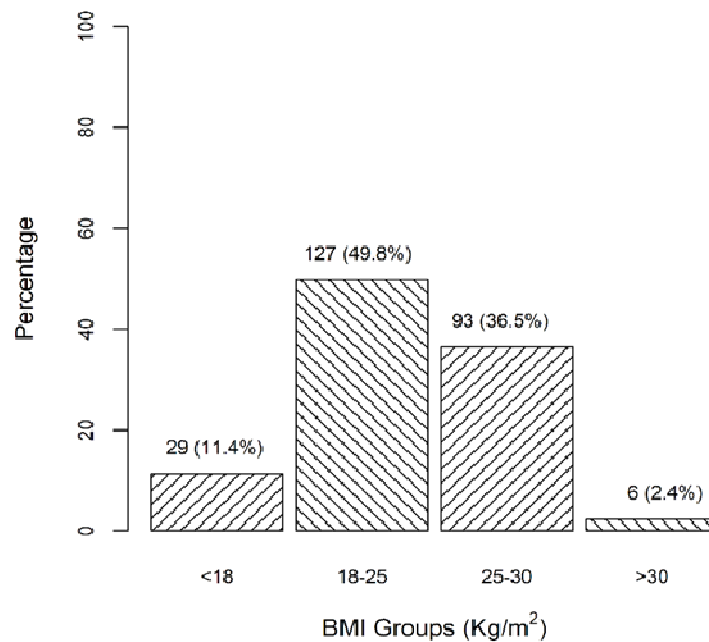
The average height was 1.6 (SD: 0.1) meters with a

minimum of 1.5 meters and a maximum of 1.9 meters. The average weight was 63.8 (SD: 12.8) kilo grams, and the average BMI was 23.6 (SD: 4.0) kilo grams per square meter.

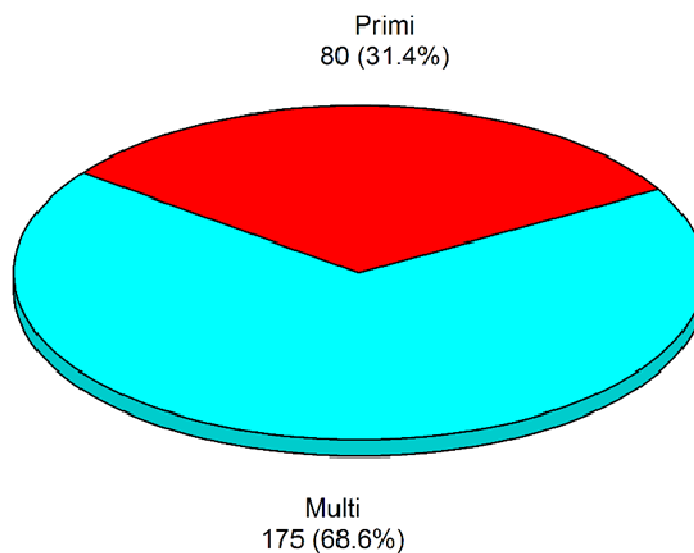
Variable	N	Mean (SD)
Height (meters)	254	1.6 (0.1)
Range (Min. - Max.)		1.5 - 1.9
Weight (Kilograms)	255	63.8 (12.8)
Range (Min. - Max.)		40.0 - 92.9
BMI pregnancy (Kg/m <sup>2</sup> )	254	23.6 (4.0)
Range (Min. - Max.)		15.3 - 31.4

There were 128 (50.2%) participants who were either underweight, overweight or obese (abnormal weight).

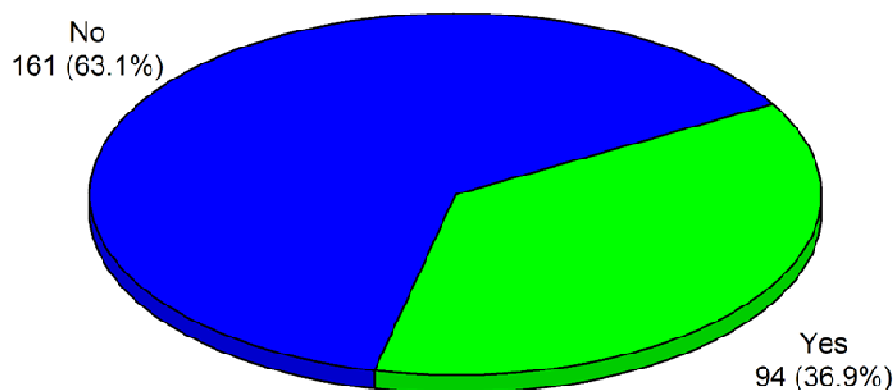
**Table 2:** Anthropometric measures



**Figure 1:** Distribution of participants by BMI

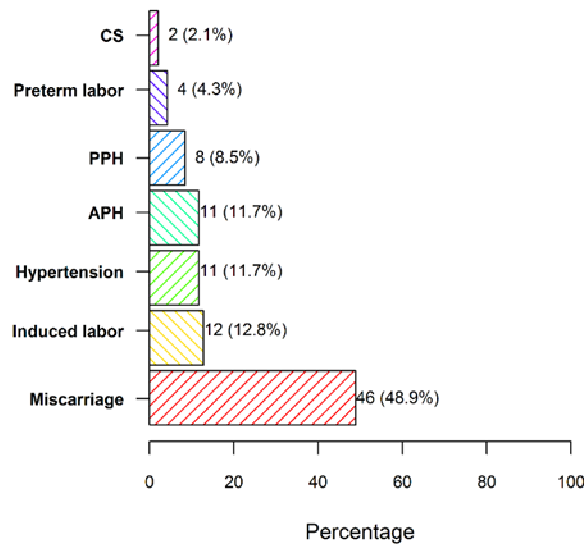


**Figure 2:** Parity of study participants  
Multigravida participants accounted for 68.6% of the study population.

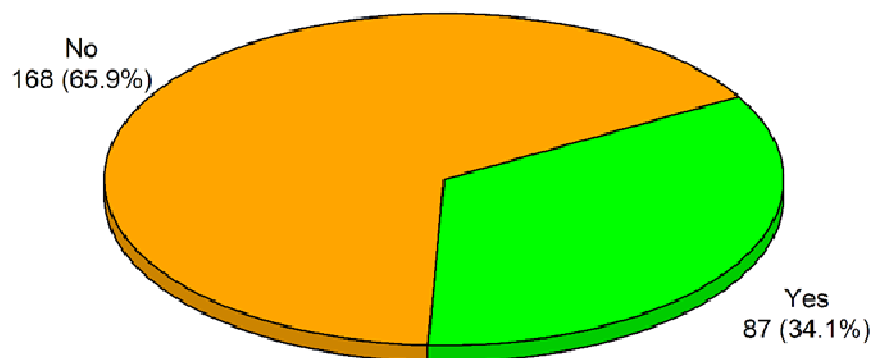


**Figure 3:** History of complications in pregnancy

History of complications in pregnancy showed that 36.9% of the participants had experienced some complications during pregnancy. The complications were as shown in Figure 4.



The main complication was miscarriage (46.9%) followed by labor induction (12.8%), and hypertension in pregnancy (11.7%). Up to 11.7% and 8.5% of the participants experienced antepartum hemorrhage, and postpartum hemorrhage in previous pregnancies respectively. Preterm labor, and caesarean delivery was reported for 4.3% and 2.1% respectively.



**Figure 4:** Complications in previous pregnancy

Variable	N	Mean (SD) or Median (IQR)
Systolic blood pressure (mm Hg)	233	115.0 (12.7)
Range (Min. - Max.)		92.0 - 168.0
<100		26 (11.2%)
100-120		128 (54.9%)
120-140		71 (30.5%)
>140		8 (3.4%)
Diastolic blood pressure (mm Hg)	233	73.5 (9.1)
Range (Min. - Max.)		55.0 - 106.0
<60		6 (2.6%)
60-80		181 (77.7%)
80-90		45 (19.3%)
>90		1 (0.4%)
SBP >140 mm Hg   DBP > 90 mm Hg		8 (3.4%)
Temperature (°C)	253	35.8 (0.8)
Range (Min. - Max.)		31.7 - 37.6
Random blood sugar (mmol/l)	182	4.9 (4.4 - 5.4)
Range (Min. - Max.)		3.6 – 7.3
Hemoglobin (g/dl)		
<10	250	16 (6.4%)
>10		234 (93.6%)
Urinalysis		
Protein present	253	7 (2.8%)
Glucose present	253	6 (2.4%)

**Table 3:** Medical examinations

Variable	N	Normal BMI (N=147)	Abnormal BMI (N=71)	
		n (%)	n (%)	P
Age (Years)				
< 20		4 (2.7%)	13 (12.0%)	0.007
21-30	255	106 (72.1%)	63 (58.3%)	0.030
>30		37 (25.2%)	32 (29.6%)	0.516
Residence				
Uasin Gishu		122 (83.0%)	103 (95.4%)	0.005
Other	255	25 (17.0%)	5 (4.5%)	
Marital status				
Married	255	120 (81.6%)	78 (72.2%)	0.103
Single		27 (18.4%)	30 (27.8%)	
Education				
Primary		18 (12.2%)	32 (29.6%)	<0.001
Secondary	255	52 (35.4%)	21 (19.4%)	0.008
Tertiary		77 (52.4%)	55 (50.9%)	0.918
Occupation				
Formal employment		48 (32.7%)	26 (24.1%)	0.176
Self-employment	255	40 (27.2%)	53 (49.1%)	<0.001
Cash crop farmer or Unemployed		59 (40.1%)	29 (26.9%)	0.038
Parity				
Primi	255	37 (25.2%)	43 (39.8%)	
Multi		110 (74.8%)	65 (60.2%)	0.019

**Table 4:** Association between demographic characteristics and BMI

A higher proportion of participants age < 20 years had abnormal weight (12.0% vs. 2.7%,  $p = 0.007$ ). On the contrary, a higher proportion of participants aged 21-30 had normal weight (72.1% vs. 58.3%,  $p = 0.030$ ). There was however, no difference in the proportion of participants aged > 30 years among those who had normal weight compared to those with abnormal weight ( $p = 0.516$ ).

A higher proportion of participants with abnormal weight were from Uasin Gishu county (95.4% vs. 83.0%,  $p = 0.005$ ). There was no association between marital status and BMI ( $p = 0.103$ ).

Participants who had primary level of education were more likely to have abnormal weight (29.6% vs. 12.2%,  $p < 0.001$ ) while those who had secondary

level of education were less likely to have abnormal weight (35.4% vs. 19.4%,  $p = 0.008$ ). There was no difference in the proportion of participants who had tertiary level of education between the participants who had normal weight from those who had abnormal weight ( $p = 0.918$ ).

The proportion of employed participants were similar among those who had normal weight compared to those who had abnormal weight ( $p = 0.176$ ). A higher proportion of self-employed participants had abnormal weight (49.1% vs. 27.2%,  $p < 0.001$ ), and cash crop farmers or unemployed participants were less likely to have abnormal weight (26.9% vs. 40.1%,  $p = 0.038$ ). Multiparous participants were less likely to be have abnormal weight (60.2% vs. 74.8%,  $p = 0.019$ ).

		Normal BMI (N=147)	Abnormal BMI (N=71)	
Variable	N	n (%)	n (%)	P
Have history of complications	255	49 (33.3%)	45 (41.7%)	0.218
Have history of newborn complications	255	36 (24.5%)	51 (47.2%)	<0.001
SBP > 140 mm Hg   DBP > 90 mm Hg	233	1 (0.8%)	7 (6.7%)	0.024 <sup>f</sup>
Hemoglobin (g/dl)				
<10	250	5 (3.5%)	11 (10.3%)	0.056
>10		138 (96.5%)	96 (89.7%)	

<sup>f</sup>Fisher's exact test

**Table 5:** Association between presence of complications and BMI

There was no difference in the proportion of participants who had complications between participants who had abnormal weight compared to those who had normal weight ( $p = 0.218$ ).

A higher proportion of participants among those who had abnormal weight reported complications with their newborns compared to those who had normal weight (47.2% vs. 24.5%,  $p < 0.001$ ).

High blood pressure (SBP > 140 mm Hg | DBP > 90 mm Hg) was associated with abnormal weight (6.7% vs. 0.8%,  $p = 0.024$ ).

There was no evidence of any association between anemia and abnormal weight ( $p = 0.056$ ).

	Unadjusted	Adjusted	
Variable	OR (95% CI)	OR (95% CI)	P value
Age (Years): 21-30 vs. <20	0.54 (0.37, 0.80)	0.07 (0.02,0.22)	0.002
Age (Years): >30 vs. <20	1.25 (0.83, 1.88)	0.13 (0.04,0.47)	
Residence (Uasin Gishu vs. Others)	0.24 (0.11, 0.49)	0.23 (0.09,0.56)	
Education: Secondary vs. Primary	0.44 (0.29, 0.68)	0.07 (0.03,0.17)	0.823
Education: Tertiary vs. Primary	0.94 (0.65, 1.36)	0.25 (0.11,0.57)	0.094
Occupation: Self-employed vs. employed	2.58 (1.75, 3.79)	3.80 (1.85,7.79)	
Occupation: Unemployed vs. employed	0.55 (0.37, 0.81)	0.45 (0.20,0.98)	0.344
Parity: Multiparous vs. primi	0.51 (0.34, 0.75)	0.06 (0.03,0.12)	0.001
History of newborn complications	2.76 (1.87, 4.08)	17.14 (8.72,33.67)	0.130

**Table 6:** Predictors of abnormal BMI

Participants aged between 21 – 30 years had up to 93% reduced odds of abnormal weight compared to those aged <20 years, OR: 0.07 (95% CI: 0.02, 0.22). Those aged >30 had 87% reduced odds of having abnormal weight, OR: 0.13 (95% CI: 0.04, 0.47).

Participants from Uasin Gishu county had 77% reduced odds of abnormal weight compared to participants from other counties, OR: 0.23 (95% CI: 0.09, 0.56).

Secondary, and tertiary levels of education compared to primary level were associated with

93% and 75% reduced odds of abnormal weight, OR: 0.07 (95% CI: 0.03, 0.17) and 0.25 (95% CI: 0.11, 0.57) respectively. Unemployed participants or participants doing cash crop farming were associated with 55% reduced odds of abnormal weight, OR: 0.45 (95% CI: 0.20, 0.98).

Multiparous participants compared to primi were less likely to have abnormal weight, OR: 0.06 (95% CI: 0.03, 0.12). Participants who newborn babies had complications were associated with seventeen times increased odds of having abnormal weight, OR: 17.14 (95% CI: 8.72, 22.67).

		Normal BMI (N=147)	Abnormal BMI (N=71)	
Variable	N	n (%)	n (%)	P
Diagnosis				
Term normal pregnancy	255	114 (77.6%)	91 (84.3%)	
Miscarriage, Antepartum hemorrhage, Post term hemorrhage, Intrauterine fetal death, Had caesarean section		33 (22.4%)	17 (15.7%)	0.204
The proportion of mothers who had either a miscarriage, antepartum hemorrhage, post term hemorrhage, intrauterine fetal death or had caesarean section was 15.7% among the mothers who had abnormal BMI, and 22.4% among the mothers who had normal BMI. The test shows no sufficient evidence from the data to link unfavorable diagnosis to abnormal BMI (p = 0.204).				

**Table 7:** Association between maternal outcome and BMI

		Normal BMI (N=147)	Abnormal BMI (N=71)	
Variable	N	n (%)	n (%)	P
Delivery outcome				
Baby born alive		137 (93.2%)	77 (71.3%)	
Stillbirth or Admitted to NBU	255	10 (6.8%)	31 (28.7%)	<0.001
Birth weight (Kg)				
< 2		0 (0.0%)	3 (4.2%)	
2-3	176	72 (68.6%)	50 (70.4%)	0.088
>3		33 (31.4%)	18 (25.4%)	

**Table 8:** Association between delivery outcome and BMI



A higher proportion of mothers with abnormal BMI had stillbirths or their babies were admitted to NBU (28.7% vs. 6.8%,  $p < 0.001$ ). There was no evidence from the data to link abnormal maternal BMI to bad weight for the babies ( $p = 0.088$ ).

The predictors of BMI in Table 6 were included in the neonatal outcome model to mitigate bias in the effect of BMI on the neonatal outcomes that was significantly different by BMI levels. However, employment status and history of new born complications were dropped from the model. The effect of abnormal BMI on unfavorable delivery outcomes using relative risk as a measure of association was assessed as shown on Table 10.

Variable	RR (95% CI)	RR (95% CI)
BMI: Abnormal vs. Normal	4.22 (2.16, 8.23)	3.62 (1.84, 7.15)
Education: Secondary vs. Primary	1.03 (0.56, 1.91)	0.64 (0.34, 1.21)
Education: Tertiary vs. Primary	0.34 (0.18, 0.65)	0.30 (0.16, 0.58)
Occupation: Self-employed vs. employed	1.00 (0.56, 1.80)	-
Occupation: Unemployed vs. employed	1.09 (0.61, 1.96)	-
History of newborn complications	13.90 (5.66, 34.16)	-
After adjusting for level of education the participants who had abnormal weight had more than three times increased risk of neonatal admission to NBU or stillbirth, RR: 3.62 (95% CI: 1.84, 7.15).		

**Table 9:** Effect of abnormal weight on the delivery outcome adjusting

## Discussion

### BMI and Maternal Outcomes

The results of this study show that normal and abnormal BMI were not associated with adverse maternal outcomes. Mothers who had either a miscarriage, antepartum hemorrhage, post-partum hemorrhage, intrauterine fetal death or had caesarean section were 15.7% among the mothers who had abnormal BMI, and 22.4% among the mothers who had normal BMI ( $p = 0.204$ ). This shows that there was no significant link to BMI and adverse outcomes. These results were inconsistent with the results of a study done in India which found that lean and obese women carry a risk for adverse pregnancy outcome; therefore pregnant women should maintain a normal BMI to achieve a healthy pregnancy outcome<sup>22</sup>.

Bhattacharya and their colleagues found that increasing BMI is associated with increased incidence of pre-eclampsia, gestational hypertension, macrosomia, induction of labour and caesarean delivery; while underweight women had better pregnancy outcomes than women with normal BMI<sup>23</sup>. These results show that women with both normal and abnormal BMI carry a similar risk of adverse pregnancy outcome.

Results of this study show significantly higher rates of cesarean section among participants with abnormal BMI 7% ( $n=18$ ) as compared to those with normal BMI 3% ( $n=8$ ). This is consistent with a retrospective cohort study conducted in the United States of America<sup>24</sup>.

### BMI and delivery outcomes

This study found that a higher proportion of mothers with abnormal BMI had stillbirths or had their babies admitted in the NBU (28.7% vs. 6.8%,  $p < 0.001$ ). These results are consistent with findings from studies conducted in both developed and developing countries. The study results support the hypothesis that being overweight had negative influence on the prevalence of preterm birth and the birth weight of the newborn. The study findings are also supported by a retrospective study done at the Department of Reproductive Medicine of the Ghent University Hospital, Belgium<sup>26</sup>.

A cohort study done in Charite University Hospital found that pregnancy outcome is worst in babies from mothers with abnormal body mass index compared to mothers with normal BMI with respect to increased incidence of preterm birth, lower birth weight and increased neonate morbidity and mortality on the neonatal ward<sup>27</sup>. Other studies

that report an increased risk for children from mothers with abnormal BMI to be admitted to neonatal care after birth include<sup>28-31</sup>.

### **BMI and Previous Pregnancy Complications**

History of complications in pregnancy showed that 36.9% of the study participants had experienced some complication during pregnancy. The leading pregnancy complication was miscarriage (46.9%) followed by labor induction (12.8%) and hypertension in pregnancy (11.7%). Some studies conducted in India have not considered previous pregnancy outcomes as a risk factor for adverse pregnancy outcomes in the current pregnancy<sup>32,33</sup>. Other studies find that previous pregnancy outcome as a critical predictor of adverse pregnancy outcome in the current pregnancy<sup>34</sup>. This was adjusted for in our analysis and found to be insignificant.

### **Conclusion and Recommendations**

There is no significant influence of maternal BMI on maternal outcome.

There is significant influence of maternal BMI on neonatal outcome.

With proper management of pregnant women with abnormal BMI, improvement in awareness amongst the women and increasing their accessibility to medical facilities, maternal and perinatal morbidity and mortality can be minimized. Preconception weight loss and limited pregnancy weight gain can be helpful in achieving the goal we all strive for, a healthy mother and a healthy baby.

### **Recommendations**

1. There is need for increase awareness among all pregnant women to be aware of the fetomaternal complications arising due to abnormal body mass index.
2. More studies with a larger sample size to allow investigation of important factors including confounding factors should be conducted.
3. Research on methods to be used to increase the awareness of women with abnormal BMI regarding pregnancy complications should be conducted.

### **References:**

1. Linne Y. Effects of obesity on women's reproduction and complications during pregnancy. *Obes Rev*. 2004;5(3):137-43.
2. Bhattacharya S, Campbell, DM., Liston, WA., Bhattacharya, S. Effect of body Mass index On Pregnancy outcomes in Nulliparous women delivering singleton babies. *BMC public Health*. 2007;7:168.
3. Garbaciak J, Richter, MD., Miller, S., Barton, JJ.

- Maternal weight and pregnancy complications. *Am J ObstetGynecol*. 1985;152:238-45.
4. Abrams B, Laros, RK. Prepregnancy weight, weight gain and body birthweight. *Am J ObstetGynecol*. 1986;154:503-9.
5. Naeye R. Maternal body weight and pregnancy outcome. *Am J Clin Nutr*. 1990;52:273-9.
6. CEMACH. Report of the Confidential Enquiry into Maternal and Child Health. *Why mothers die*; 2000–2003. 2007.
7. Ota E, Haruna, M., Suzuki, M., DucAnh, D., Tho, LH., Thanh., Tam, NT., Thiem, VD., HienAnh, NT., Isozaki, M., Shibuya, K., Ariyoshi, K., Murashima, S., Moriuchi, H., Yanai, H. . Maternal body mass index and gestational weight gain and their association with perinatal outcomes. *Vietnam Bull World Health Organ*. 2011;89(2):127–36.
8. Berghoft T, Lim, LK., Jorgensen, JS., Robson, MS.,. Maternal body mass index in the first trimester and risk of cesarean delivery in Nulliparous women in spontaneous labor. *Am J ObstetGynec*. 2007;196(2):163.
9. Villamor E. Interpregnancy weight change and risk of adverse pregnancy outcomes: a population-based study. *Lancet*. 2006;368(9542):1164–70.
10. Cedergren MI. Maternal Morbid Obesity and the Risk of Adverse Pregnancy Outcome. *Obstetricians and Gynecologists*. 2004;103(2):103:219 –24.
11. IOM. Nutritional status and weight gain. Washington, DC: Institute of Medicine, 1990.
12. WHO. BMI Classification. New York: World Health Organization, 2011.
13. RCOG tOPR. Press Releases. 2006.
14. Ray J, Wyatt, PR., Vermeulen, MJ., Meier, C., Cole, DE.,. Greater maternal weight and the ongoing risk of neural tube defects after folic acid flour fortification. *Obstetrics and gynecology*. 2005;105(2):261-5.
15. Bodnar L, Catov, JM., Klebanoff, MA., Ness, RB., Roberts, JM., . Pregnancy body mass index and the occurrence of severe hypertensive disorders of pregnancy. *Epidemiology*. 2007;18(2):234-9.
16. James A, Jamison, MG., Brancazio, LR., Myers, ER.,. Venous thromboembolism during pregnancy and the postpartum period: incidence, risk factors, and mortality. *American Journal of Obstetrics and Gynecology*. 2006;194(5):1311-5.
17. Sebire N, Jolly, M., Harris, JP., Regan, L., Robinson, S.,. Is maternal underweight really a risk factor for adverse pregnancy outcome? A population based study in London. *BJOG*. 2001;108:61-6.
18. Galtier-Dereure F, Montpeyroux, F., Boulot, P., Bringer, J., Jaffiol, C. Weight excess before

- pregnancy: complications and cost. *International Journal of Obesity and Related Metabolic Disorders*. 1995;19:443-8.
19. IASO. Global Prevalence of Adult Overweight & Obesity by Region. WORLD OBESITY FEDERATION. 2015.
  20. Statistics KNBo. Kenya population Census survey report. 2010
  21. R Core Team. R foundation for statistical computing. Vienna, Austria. 2013;3(0).
  22. Sahu MT, Agarwal A, Das V, Pandey A. Impact of maternal body mass index on obstetric outcome. *J Obstet Gynaecol Res*. 2007;33(5):655-9.
  23. Bhattacharya S, Campbell DM, Liston WA, Bhattacharya S. Effect of Body Mass Index on pregnancy outcomes in nulliparous women delivering singleton babies. *BMC Public Health*. 2007;7:168.
  24. Berendzen JA, Howard BC. Association between cesarean delivery rate and body mass index. *Tenn Med*. 2013;106(1):35-7, 42.
  25. Metwally M, Ong KJ, Ledger WL, Li TC. Does high body mass index increase the risk of miscarriage after spontaneous and assisted conception? A meta-analysis of the evidence. *Fertil Steril*. 2008;90(3):714-26.
  26. De Frène V, Vansteelandt S, T'Sjoen G, Gerris J, Somers S, Vercruysse L, et al. A retrospective study of the pregnancy, delivery and neonatal outcome in overweight versus normal weight women with polycystic ovary syndrome. *Human Reproduction*. 2014;29(10):2333-8.
  27. Kalk P, Guthmann F, Krause K, Relle K, Godes M, Gossing G, et al. Impact of maternal body mass index on neonatal outcome. *European Journal of Medical Research*. 2009;14(5):216-22.
  28. Abenhaim HA, Kinch RA, Morin L, Benjamin A, Usher R. Effect of prepregnancy body mass index categories on obstetrical and neonatal outcomes. *Arch Gynecol Obstet*. 2007;275(1):39-43.
  29. Usha Kiran TS, Hemmadi S, Bethel J, Evans J. Outcome of pregnancy in a woman with an increased body mass index. *Bjog*. 2005;112(6):768-72.
  30. Callaway LK, Prins JB, Chang AM, McIntyre HD. The prevalence and impact of overweight and obesity in an Australian obstetric population. *Med J Aust*. 2006;184(2):56-9.
  31. Raatikainen K, Heiskanen N, Heinonen S. Transition from overweight to obesity worsens pregnancy outcome in a BMI-dependent manner. *Obesity (Silver Spring)*. 2006;14(1):165-71.
  32. Chaurasia AR. Obstetric risk and obstetric care in central India. *Social Change*. 2006;36(4):48-66.
  33. Singh P, Pandey A, Aggarwal A. House-to-house survey vs. snowball technique for capturing maternal deaths in India: a search for a cost-effective method. *Indian J Med Res*. 2007;125(4):550-6.
  34. Singh D, Goli S, Parsuraman S. Association between obstetric complications & previous pregnancy outcomes with current pregnancy outcomes in Uttar Pradesh, India. *The Indian Journal of Medical Research*. 2014;139(1):83-90.



## Impressions of Musculoskeletal Medicine Education in Current Doctors

Kropelnicki A

### Institution

Hillingdon Hospital, Pield  
Heath Road, Uxbridge  
UB8 3NN

**WJMER, Vol 17: Issue 1,  
2018**

### Abstract

**Background:** Musculoskeletal (MSK) and/or sports and exercise medicine (SEM) is frequently encountered in the practice of many medical specialties. Basic competency and confidence in clinical assessment and knowledge would be expected. However, a review of the literature shows low confidence and low knowledge of this specialty within the medical profession.

**Methods:** As much of the literature is 10 years old, we aimed to demonstrate whether this situation has changed in recent years by surveying current doctors, the vast majority of whom qualified within the last 10 years.

**Discussion:** We showed that, across many different specialties, the MSK medicine burden is around 30%, consistent with previous studies. Our results, however, demonstrate very little, if any, MSK medicine teaching at medical schools and beyond. Further, confidence levels in managing these presentations is low and many believe this should have been taught at some stage within their formative years.

**Conclusion:** It is time that medical schools appreciated SEM/MSK medicine as an important, widely relevant discipline in its own right (as has been done by the medical profession for over 10 years) and consider adding this to their core curriculum.

### Key Words

Confidence; Education; Musculoskeletal; Medicine

### Corresponding Author:

Dr Anna Kropelnicki; E-mail: [anna@krop.co.uk](mailto:anna@krop.co.uk)

### Introduction

Basic competency in musculoskeletal (MSK) medicine is vital in many specialties including GP, Rheumatology, Emergency Medicine, and Trauma and Orthopaedics<sup>1</sup>, and is a key educational recommendation of the GMC<sup>2</sup>. MSK medicine has been reported to comprise between 15-30% of encounters in general practice<sup>3</sup>, with similar amounts presenting to the Emergency Department<sup>4</sup> and considerably higher to Rheumatology and Orthopaedics. Despite this, musculoskeletal medicine does not form a core part of the medical school curriculum and may be further deteriorated by decreasing exposure to cadaveric work<sup>5</sup> where visual 3D understanding of anatomy and its relations is learned.

The UK government has been very positive in introducing many initiatives to encourage an increasingly sedentary population to become more active. This includes such innovations as 'Couch to 5K' and 'Change4life', as well as increasing fitness-focused programmes on public television. However, there is a disproportionately low amount of time dedicated to MSK medicine considering this and the high proportion of clinical MSK encounters seen in

medical practice. Medical schools rarely teach sports and exercise medicine and have limited exposure to sports orthopaedics. A study from Canada reported that less than 3% of the curriculum was dedicated to MSK medicine<sup>4</sup>. The secondary knock-on effect of this lack of exposure is then the lack of doctors wishing to pursue a career in SEM, leaving a gap in overall NHS care for the public, especially the amateur athlete<sup>6</sup>. Further, 8.9 million work days were lost to MSK issues in the UK in 2016-2017<sup>7</sup>. This underlines the real significance of a financial impact to the economy of the lack of availability of MSK medicine specialist knowledge.

Knowledge and confidence in MSK medicine post-qualification has been tested across the world, all with disappointing results. In a survey of 297 GPs, Abuo-Raya<sup>8</sup> showed low confidence, with 80% stating they lacked confidence in dealing with MSK presentations. This is elaborated upon by Roberts *et al*<sup>9</sup> who showed very low levels of confidence in GPs dealing with specific MSK issues including lower back pain (LBP), with 69% saying they were not comfortable dealing with LBP, 62% uncomfortable when dealing with osteoarthritis, and 58% lacking

confidence when dealing with sports injuries.

Knowledge of MSK topics has widely been shown as lacking through tests administered to a variety of groups across the world and chosen specialties within medicine. Abou-Raya<sup>8</sup> showed that 75% of practicing GPs failed a basic MSK rheumatology test. Similarly, 70% of GPs failed a MSK exam set by Queally<sup>1</sup>. A variety of doctors (n=334) were tested by Matzkin<sup>10</sup> where only 21% passed their MSK test. Similar levels of scoring have been shown in many

similar tests run in the US looking at medical students and doctors.

### Methods

A questionnaire was designed which focused on current doctors and their impressions of their preparation for their current experiences within medicine. The main body of the questionnaire is included in Figure 1. This survey was disseminated over closed social networks and across trainees at Hillingdon Hospital. It was left open for a total of

1. During Medical school, how many weeks were spent in
  - a. Orthopaedics
  - b. Sports Medicine / MSK
2. In your current practice, what percentage of time is spent dealing with MSK/SEM consultations?
3. Do you feel you were adequately prepared for the demands of your current workload regarding
  - a. MSK medicine
  - b. Orthopaedics
4. How satisfied are you that medical school prepared you adequately for your current workload in
  - a. MSK medicine
  - b. Orthopaedics
5. How satisfied are you that Foundation training prepared you adequately for your current workload in MSK medicine/Orthopaedics
6. What aspect of MSK medicine do you find most challenging?
7. Which anatomical system do you find most challenging?
8. Do you think additional time at Medical School in MSK medicine would have been useful?
9. Do you think additional time at Medical School in orthopaedics would have been useful?

**Figure 1:** Body of the Questionnaire circulated

**Figures 2a, b and c. Demographics of respondents (n=50) in their current position within medicine (a), their year of qualification (b) and country of qualification (c).**

Position	Number	Percentage
GP	5	10
GP Trainee	5	10
Emergency Medicine Trainee	14	28
Medical Trainee	13	26
Orthopaedic Trainee	7	14
Surgical Trainee	1	2
Foundation Trainee	5	10

**Figure 2a**



Figure 2b

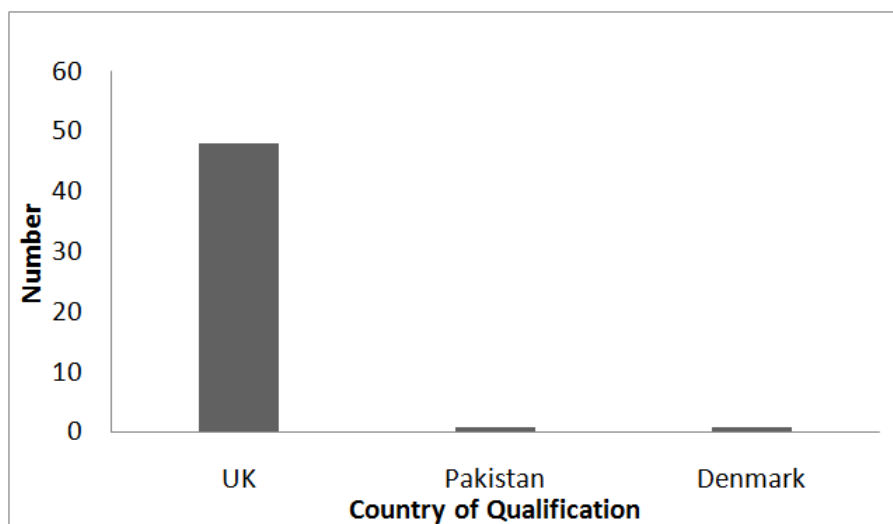


Figure 2c

one month. Fifty responses were received. The demographics of the respondents are shown in Figures 2a-c.

## Results

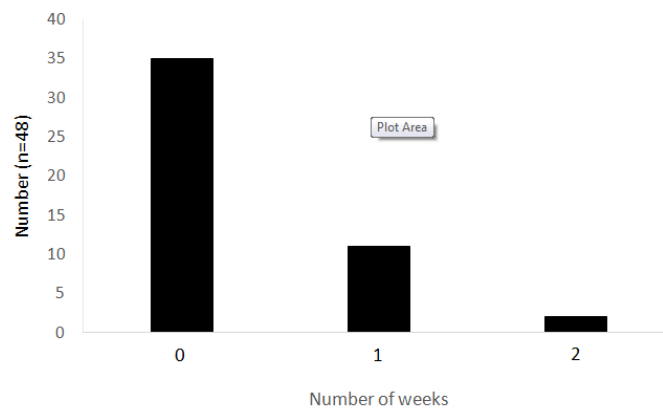
The total number of weeks spent in Orthopaedics and SEM/MSK medicine in medical school is presented in Figure 3. Figure 4 shows the different rotations experienced by recent trainees in the Foundation and Core Training. On average, the participants report that MSK/SEM consultations represent 30% of their total workload and 26% is orthopaedic. When asked whether they felt adequately prepared by medical school for their current workload regarding SEM/MSK medicine 54% said 'No'. When asked to rate their satisfaction with SEM/MSK preparation from medical school, only 28% were 'Satisfied' or 'Very Satisfied'. This only changed very slightly when asked the same question of Foundation Training, with 32% saying they were 'Satisfied' or 'Very Satisfied'. When asked if they

thought more time dedicated specifically to MSK/SEM medicine at medical school would have been helpful, 72% said 'Yes'.

In terms of what our current doctors find most challenging, Figure 5 shows the majority of doctors lack confidence when dealing with paediatric MSK issues. Four respondents answering 'Other' felt they found no aspects challenging and one felt he/she found all aspects of MSK/SEM medicine most challenging. Further defining this into anatomical systems, Figure 6 shows that most find Foot and Ankle and Spine to be the most challenging regions to see and assess. Within the two respondents answering 'Other', one stated he/she did not find any aspect most challenging and 1 stated he/she found all of it most challenging.

## Discussion

Despite many and international representative organisations in sports and exercise medicine being



**Figure 3:** Number of weeks reported to have been spent studying MSK/SEM during medical school. n=48 as 2 respondents failed to answer the question

Foundation Training		Core Training	
	Number		Number
SEM/MSK Medicine	0	SEM/MSK Medicine	0
Emergency Medicine	39	Emergency Medicine	22
General Practice	21	General Practice	10
Orthopaedics	25	Orthopaedics	8

**Figure 4:** Table showing the different specialty rotations the participants rotated to within Foundation and Core Training

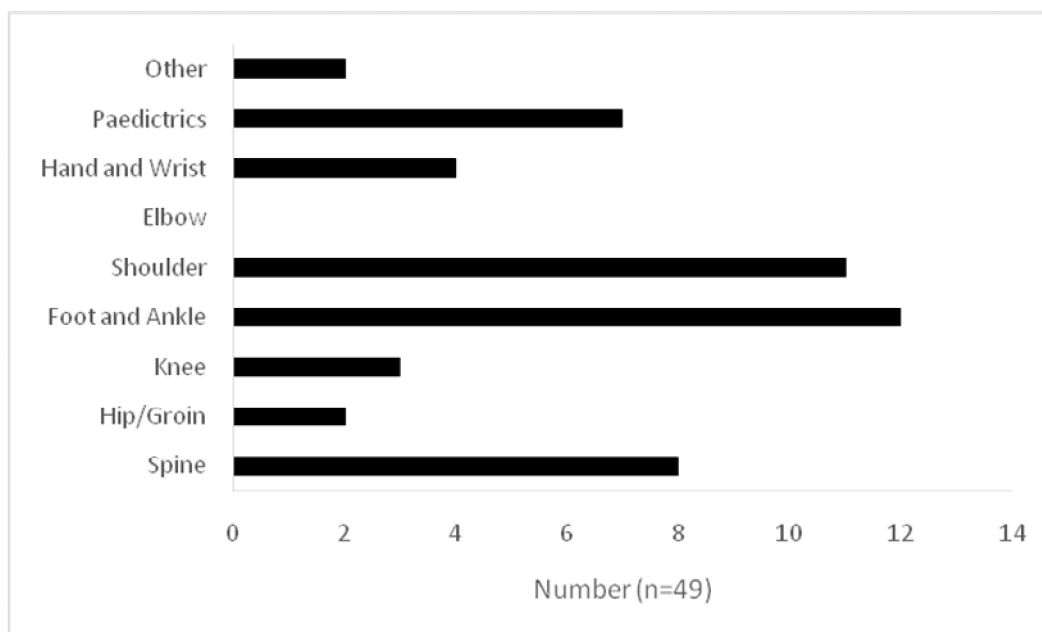


**Figure 5:** Graph showing the results from the question 'what aspects of MSK medicine do you find most challenging?' n=48 as 2 respondents failed to answer the question

formed in the 1905s (e.g. BASEM), it was not until 2007 that MSK/SEM became a separately recognised medical specialty. Nevertheless, since then there appears to have been no change in the fundamental teaching within the medical school environment. Not only can MSK/SEM medicine be considered a separate, stand-alone specialty, but our survey shows a huge overlap of this topic within many other specialties. In line with previous studies, it is clear that doctors in a range of specialties encounter MSK issues in around 30% of their practice. Basic competency and confidence in MSK

medicine, therefore, really should be expected. Many studies have shown this not to be the case<sup>1,3,4,8,10</sup> and made suggestions of how to readdress this issue. The most logical starting point would be at medical school since MSK medicine is represented across many different specialties within medicine and surgery including, but not limited to, Primary Care, Emergency Medicine, Orthopaedics, and Rheumatology. Further, with the shift in health, fitness and exercise within the UK, possibly as part of the legacy following the London 2012 Olympic Games, as well as the recognition of the need to





**Figure 6:** Graph showing the results from the question 'which anatomical system in MSK medicine do you find most challenging?'. n=49 as one participant failed to answer the question

improve public health, increasing numbers of MSK-related issues are likely to present in the future.

Our study showed that no-one reported studying more than two weeks in MSK/SEM medicine within their medical school programme. This is consistent with the findings of Craton and Matheson<sup>4</sup> who showed that exposure to MSK medicine was less than 3% of the total programme in Canada. We additionally show that 72% of our cohort believe that more time dedicated to this discipline would have been useful for their current practice. We point out that our cohort was from a very mixed background of specialties within medicine. Further, only 28% of participants reported they were satisfied or very satisfied with the teaching they received at medical school in this topic. This would suggest that the potential argument postulated that MSK/SEM is taught within and as part of other specialties such as Orthopaedics is therefore rendered somewhat moot since only just over a quarter of respondents are satisfied with this current approach to MSK teaching. In addition, Matzkin demonstrated that this assumed integrated method of learning MSK medicine within the overall teaching in medical school is not effective since only 21% passed a basic MSK exam. Notably, only 58% of those passing being from an orthopaedic background suggesting that even postgraduate exposure to a higher percentage of MSK issues is insufficient. It is important to recognise that even small, focussed interventions can make a big difference to skills learning. Even something as small

as a one-day course on MSK medicine can lead to a significant improvement in confidence in examination skills in the medical student<sup>3</sup>.

This basic questionnaire raises several very important points regarding medical school exposure and the importance of MSK/SEM teaching. Despite its high prevalence throughout many medical and surgical disciplines, and being recognised as a speciality in its own right, SEM/MSK medicine is still not being adequately addressed in medical education, leaving doctors dissatisfied with their preparation in this topic from medical school and leaving them with low confidence in dealing with this type of consultation.

#### References:

1. Queally JM, Kiely PD, Shelly MJ, O'Daly BJ, O'Byrne JM and Masterson EL. Deficiencies in the education of musculoskeletal medicine in Ireland. *Ir J Med Sci* 2008 177:999-105
2. [www.gmc.org.uk](http://www.gmc.org.uk)
3. Truntzer J, Lynch A, Kruse D and Prisilin M. Musculoskeletal education: an assessment of the clinical confidence of medical students. *Perspect Med Educ* 2014 3(3): 238-44
4. Craton N, and Matheson GO. Training and clinical competency in musculoskeletal medicine. Identifying the problem. *Sports Med* 1993 May 15(5): 328-37
5. Day CS and Ahn CS. Commentary: The importance of musculoskeletal medicine and anatomy in medical education. *Acad Med* 2010

- 85:401-2
6. <http://www.dailymail.co.uk/news/article-5640171/Injured-amateur-sportspeople-fed-NHS-treatment.html>
  7. <http://www.hse.gov.uk/statistics/causdis/musculoskeletal/>
  8. Abou-Raya A, Abou-Raya S. The inadequacies of musculoskeletal education. Clin. Rheumatol. 2010 29:1121-1126
  9. Roberts C, Adebajo AO and Long S. Improving the quality of care of musculoskeletal conditions in primary care. Rheumatol 2002 41 (5):503-8
  10. Matzkin E, Smith EL, Freccero D and Richardson AB. Adequacy of education in musculoskeletal medicine. J Bone Joint Surg Am 2005 87(2): 310-4



# The High Ratio of Undiagnosed Cases of Low Back Pain: Implications for Its Management

Iyalomhe OE, Vyshlova IA

## Institution

Stavropol State Medical  
University, Stavropol, Russia

*WJMER, Vol 17: Issue 1,  
2018*

## Abstract

**Background:** Low back pain, which has a lifetime prevalence of about 84%, has remained a major medical problem worldwide. It has become a burden to the national economy. Of the many cases of low back pain, only about 15% are specifically diagnosed, and the remaining 85% attributed to non-specific causes go undiagnosed, resulting in poor treatment and management outcomes.

**Aim:** This review aims to draw attention to the low percentage of diagnosed cases of low back pain, emphasize the dire need to improve on this percentage, and hence improve upon the disease management outcomes.

**Method:** Manual literature and internet databases (Google Scholar, PubMed, Embase, HINARI, Cochrane Library) were searched for relevant information.

**Results and Discussion:** Clinical research and reviews have shown that the ubiquitous complaint of low back pain remains and increases due to a poor understanding of its aetiology, lack of first-time consultation with specialists in the field, the need for extensive differential diagnosis, and follow-up of patient symptoms.

**Conclusion:** Low back pain causes more global distress and disability than any other condition and, unfortunately, it is poorly diagnosed. There is need for pragmatic and qualitative research to better understand the field of low back pain and to improve its diagnosis as well as management strategies.

## Key Words

Low Back Pain; Non-Specific Low Back Pain; Diagnosis

## Corresponding Author:

Mr Oshozimhede Emeghomhe Iyalomhe; E-mail: oshoz@rocketmail.com

## Background

Low back pain is a major and increasing international health challenge. Apart from the well-known pain and disability associated with it, it also has a significant negative impact on work through excuse duty. Moreover, it generates very high costs by way of healthcare expenditure as well as disability insurance<sup>1</sup>. In fact, recent research has shown that low back pain causes more years lived with disability (expressed in disability-adjusted life years [DALYS]) than any other health condition<sup>2</sup>.

Low back pain does not imply a diagnosis but refers to a clinical entity or symptom defined as pain and or discomfort, localised below the costal margin and above the inferior gluteal folds, with or without referred leg pain. Like other symptoms such as fever and headache, it can have varying causes<sup>2-3</sup>. Low back pain that resolves in less than three months is said to be acute or subacute. Chronic low back pain is defined by symptoms that persists for a period greater than three months<sup>3</sup>. Along with pain and impaired function, people with chronic low back pain frequently experience anxiety and depression,

as well as negative effects on social, recreational and work-life. Recognition of this widespread impact has led to the formulation of the biopsychosocial model of low back pain as well as efforts to develop interventions that target all facets of the disorder. The biopsychosocial model combines physical, psychological, educational and/or work related components and it is usually implemented by a team of specialist healthcare providers with expertise in different fields. Increasing widespread acceptance of the biopsychosocial model, along with the relatively modest performance of monotherapies in clinical trials, has led to more research into the effectiveness of multidisciplinary rehabilitation<sup>3-6</sup>.

Multidisciplinary rehabilitation is an umbrella team applied to programmes that adhere to the biopsychosocial conceptualization of chronic pain and include more than just a physical treatment. Substantial variation may exist in the approach used by a particular health facility, the intensity of each component, and the skill and experience of the healthcare practitioners in charge<sup>6</sup>.

The first task of the clinician is to diagnose and/or exclude possible underlying specific causes of low back pain. This has given rise to a simple and practical classification guideline (which has gained international acceptance), the so-called diagnostic triage<sup>7</sup>. The goal of the diagnostic triage of low back pain is to exclude non-spinal causes and to allocate patients to one of three broad categories: specific spinal pathology (<1% of cases), nerve root pain or radicular pain (about 5-10% of cases), or non-specific low back pain which represents 90-95% of cases and is diagnosed by exclusion of the first two categories<sup>7-8</sup>. For specific spinal pathologies (e.g. vertebral fracture, malignancy, infection, axial spondyloarthritis or cauda equina syndrome), a clinical assessment may reveal the key alerting features. For radicular syndrome, clinical features distinguish three subsets of nerve root involvement: radicular pain, radiculopathy and spinal stenosis. Differential diagnosis of back-related pain is complex and clinical manifestations are highly variable<sup>8</sup>.

In view of the fore-going, the present review was solicited to draw attention to the low percentage of diagnosed cases of low back pain, emphasize the fact that with dogged commitment to improve on the diagnosis, the high percentage diagnosis of non-specific low back pain can be reduced and this will translate to improved management outcomes.

### Methods

We searched the literature and internet databases (Google Scholar, PubMed, Embase, HINARI, Cochrane library) for relevant information using the keywords: Diagnosis of non-specific low back pain; diagnosis of low back pain. Search filters were set to cover the years 2010-2018 and later set to order results by relevance. The following studies were selected: Research supporting the hypotheses that the ratio of diagnosed cases of low back pain is low; that an increase in the ratio of diagnosed cases proposes better treatment outcome; and that there remains a poor understanding of the causes of non-specific low back pain.

### Results and Discussion

Among the reported cases of low back pain globally, specific causes are uncommon (<15%) and about 85% of cases remain undiagnosed hence, classified as non-specific low back pain<sup>4, 6-10</sup>. However, careful examination and follow-up of symptom progression by specialists can lead to an improvement in the number of diagnosed cases of low back pain, which in turn leads to early commencement of treatment and an overall improved outcome.

For example, the Yamaguchi Low Back Pain Study<sup>9</sup> conducted in Yamaguchi Prefecture, Japan, aimed to

prove the hypothesis that the proportion of diagnosable low back pain in previous studies was quite low, despite accurate low back pain diagnosis being the most important step prior to the start of treatment. A total of 320 patients (160 men and 160 women; average age, 55.7 years) with low back pain who sought treatment between April and May 2015 were examined, diagnosed and treated by orthopaedics working in the Japanese clinical setting.

In this study, 78% (250) of low back pain cases were diagnosed and only 22% (70) remained undiagnosed i.e. were classified as non-specific low back pain. Of the 78% of diagnosed cases, 57% had specific causes; 21% had *red flag* lower back pain i.e. required further diagnostic work-up for serious disorders<sup>9, 11</sup>. This presents a marked difference from previous reports that about 10-20% of low back pain cases are often diagnosed. The study also reported that another reason for this low percentage of diagnosable low back pain was due to initial examination by clinicians who were not specialized in the neurological and physical examinations required for accurate diagnosis of low back pain.

Wahl et al,<sup>12</sup> reported a case of a 36 year-old male with chronic lower back and toe pain whose initial physical therapy evaluation supported a diagnosis of mechanical low back pain. However, symptom progression through two treatment sessions indicated that a non-mechanical source of pain was instead the likely cause of the patient's symptoms. Specialists were consulted and a thorough compilation of clinical, laboratory, and imaging findings led to a diagnosis of human leukocyte antigen B-27-positive spondyloarthropathy, urging clinicians to be proficient in screening for non-mechanical low back pain that may mimic a musculoskeletal origin of symptoms.

Nienhaus and van de Laar<sup>13</sup> also suggested that the major reason for lack of effectiveness in treating low back pain is due to the low percentage of diagnosed cases and consequently a high percentage of undiagnosed cases. They argued that the reason for these disappointing results lies in the 'non-specific' nature of low back pain in that the causes for non-specific low back pain are not properly understood albeit research has continued to focus on its treatment even though there is a major lack of understanding of its aetiology.

Traditionally, the notion that the cause of about 85% of low back pain cases is unknown has been perpetuated across decades<sup>14-15</sup>. Fundamentally, any spinal structure can serve as the source of low back pain in affected patients provided the structure is innervated; is capable of causing pain similar to that

encountered clinically; and is susceptible to disease or injury known to be painful. Investigators<sup>14-16</sup>, have adduced the above principles to identify the structural causes of low back pain in adult patients. Independent studies of adult low back pain patients have estimated prevalence rate for painful lumbar intervertebral discs disruption (IDD), facet joint pain (FJP) and sacroiliac joint pain (SIJP) of 39%, 15-32% and 13-18.5%, respectively<sup>14</sup>.

Age is associated with the prevalence of IDD, FJP, and SIJP in adult low back pain patients. The common aetiology of low back pain in the young to middle age adult is IDD, followed by FJP and SIJP with the latter two occurring at a seemingly, similar prevalence rate<sup>14</sup>. It has been reported<sup>10,12,14</sup> that an increase in age is significantly associated with a decrease in the probability of IDD as the source of low back pain and an increase in the probability of FJP or SIJP being the source of low back pain until approximately the age of 70. In simpler terms, the younger the low back pain patient, the likely his or her low back pain is discogenic in origin. In contrast, the older the low back pain patient the more likely his or her low back pain is facetogenic or SIJP in origin. For the oldest of the population, other sources of low back pain (Baastrup's disease or insufficiency fractures) have been suggested<sup>14, 17-19</sup>.

Chronic low back pain has been associated with abnormal brain anatomy and function. When compared with pain-free controls, individuals with chronic low back pain have been shown to have reductions in cortical grey matter in the bilateral dorsolateral prefrontal cortex, thalamus, brainstem, primary somatosensory cortex and posterior parietal cortex<sup>20-21</sup>. In addition to chronic low back pain, cortical abnormalities occur in a wide variety of other chronic pain conditions, such as chronic headache, arthritis and fibromyalgia<sup>20</sup>. Several studies have also indicated abnormal cortical function in people with chronic low back pain<sup>22-23</sup>. Additionally, there is evidence that some people with chronic pain such as chronic low back pain, also have cognitive impairment. This cognitive impairment may be the result of demands that pain puts on cognitive brain networks because cognitive load-related activity is enhanced by pain<sup>20,24</sup>. Heartily, these brain abnormalities are normalised by effective treatment<sup>20</sup>.

It appears that low back pain, will remain a major medical challenge notwithstanding the many national guidelines, recommendations and research focused on effective non-pharmacological and pharmacological modes of treatment. It appears so because there is a yawning gap in understanding of the aetiology and pathology of low back pain<sup>17-19</sup>. Nonetheless, accurate diagnosis of the specific

source of low back pain will help break the futile cycle into which many patients are directed after ineffective spinal procedures. For example, it would seem indefensible that a 35-year-old chronic low back pain patient would experience low back pain relief after undergoing neurotomy of the bilateral L4 medial branches and L5 dorsal rami. Despite the performance of technically sound neurotomy procedures, this procedure is doomed for a poor outcome because the most likely source of this patient's symptoms resides within the anterior column unaffected by a procedure targeting a posterior element. In essence, the therapeutic utility of the diagnosis itself is that treatment can then be directed, or avoided, toward the source of symptoms<sup>14,17-19</sup>.

Although many health care practitioners have now noted that psychosocial issues influence the natural history of low back pain, highlighting these factors that influence the outcome of (sub)acute low back pain is a major challenge to improving prognosis. Despite several studies on this topic, besides the well known biomedical conditions and occupational biomechanical characteristics, research is still ongoing to determine which psychosocial factors might prospectively be associated with transition from sub(acute) to chronic low back pain in primary health care<sup>5,17-19,25-28</sup>. Indeed, the prognosis for low back pain is not as good as previously thought, particularly because of frequent relapse or transition to chronic low back pain. Thus, primary healthcare practitioners often feel frustrated, due in part to the impression of failure and to the absence of specific treatment<sup>25,29-30</sup>.

## Conclusion

Low back pain is a global health challenge that causes more years lived with disability than any other health conditions. Low back pain is a symptom and not a diagnosis. Careful differential diagnosis is required and in primary care, the diagnostic triage of low back pain is the anchor for correct diagnosis. A diagnosis of non-specific low back pain presumes exclusion of specific pathologies and nerve root involvement. As opposed to traditional beliefs that about 85% of low back pain cannot be diagnosed, reports by numerous investigators have now demonstrated that the converse is, in fact, true<sup>6,9-10,12,13-16,18-20,25,27-30</sup>. A biopsychosocial model of care underpins nonspecific low back pain- this includes managing pain intensity and considering risk for disability.

For improved outcome in the treatment and management of low back pain, an increase in the percentage of diagnosed cases is imperative. As much as possible, patients should consult clinicians who are specialists in the physical and neurological

examinations required for accurate diagnosis of low back pain. Extensive differential diagnosis as well as sensitivity and specificity tests should be carried out before a final diagnosis is made. There should be proper follow-up of symptom progression or regression. New directions of research will lead to a better understanding of the various mechanisms undergirding low back pain. Research should focus more on understanding the aetiology, course and trajectory of non-specific low back pain. The problem of low back pain could also be ameliorated by conducting awareness campaigns urging those with the said complaint to consult specialist physicians as well as educating the public on the impact of low back pain and ways to reduce its incidence.

## References

- Clark S, Horton R. Low back pain: a major global challenge. *Lancet*. June 2018. Vol 391 (10137), pg 2302 DOI: [https://doi.org/10.1016/50140-6736\(18\)30725-61](https://doi.org/10.1016/50140-6736(18)30725-61). Hoy D, March L, Brooks P, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study (Extended Report). *Annals of the Rheumatic Diseases*. June 2014. Vol 73, pg 963-974.
- Kamper SJ, Apeldoorn AT, Chiarotto A, et al. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis. *British Medical Journal*. Feb 2015. Vol 350, h444 doi:10.1136/bmj.h444.
- Airaksinen O, Brox JJ, Cedraschi C, et al. European guidelines for the management of chronic nonspecific low back pain. *European Spine Journal*. March 2006. Vol 15 Suppl 2, pg 192-300.
- Qaseem A, Wilt TJ, McLean RM, Forciea MA. Clinical Guidelines Committee of the American College of Physicians. Noninvasive treatments for acute, subacute and chronic low back pain: A clinical practice guideline from the American College of Physicians. *Annals of Internal Medicine*. April 2017. Vol 166(7), pg 514-530.
- Synnott A., O'Keeffe M., Bunzli S., et al. Physiotherapists report improved understanding of and attitude toward the cognitive, psychological and social dimensions of chronic low back pain after Cognitive Functional Therapy training: a qualitative study. *Journal of Physiotherapy*. October 2016. Vol 62 (4), pg 215-221.
- Waddell G. Volvo award in clinical sciences. A new clinical model for the treatment of low-back pain. *Spine*. September 1987. Vol 12(7), pg 632-644.
- Bardin LD, King P, Maher CG. Diagnostic triage for low back pain: a practical approach for primary care. *The Medical Journal of Australia*. April 2017. Vol 206(6), pg 268-273.
- Suzuki H, Kanchiku T, Imajo Y, et al. Diagnosis and characters of non-specific low back pain in Japan: The Yamaguchi Low Back Pain Study. Sumitani M, ed. *PLoS ONE*. August 2016. Vol 11 (8), e0160454. doi:10.1371/journal.pone.0160454.
- Krismser M, van Tulder M. Low back pain (non-specific). *Best Practice and Research. Clinical Rheumatology*. February 2007. Vol 21(1), pg 77-91.
- Underwood M, Buchbinder R. Red flags for back pain. *British Medical Journal*. December 2013. Vol 347, f7432. doi: 10.1136/bmj.f7432.
- Wahl EC, Smith D, Sesto M, Boissonnault W. Differential diagnosis of a patient with low back and toe pain. *The Journal of Manual and Manipulative Therapy*. May 2013. Vol 21(2), pg 81-89. doi:10.1179/2042618612Y.0000000023.
- Niënhaus BEC, van de Laar FA. Lage rugpijn: niet leren behandelen, maar begrijpen. *Nederlands Tijdschrift voor Geneeskunde*. 2017. Vol 161(0), D2032. Article in Dutch.
- DePalma MJ, Ketchum JM, Saullo T. What is the source of chronic low back pain and does age play a role? *Pain Medicine*. February 2011. Vol 12(2), pg 224-233.
- Spratt KF, Lehman TK, Weinstein JN, et al. A new approach to low back physical examination. Behavioural assessment of mechanical signs. *Spine*. February 1990. Vol 15 (2), pg 96-102.
- Balagué F, Mannion AF, Pellise F, Cedraschi C. Non-specific low back pain. *Lancet*. February 2012. Vol 379(9814), 482-491.
- Chou R, Qaseem A, Snow V, et al. Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society. *Annals of Internal Medicine*. October 2007. Vol 147(7), pg 478-491. doi: 10.7326/0003-4819-147-7-200710020-00006
- van der Windt DA, Dunn KM. Low back pain research-future directions. *Best Practice and Research. Clinical Rheumatology*. October 2013. Vol 27(5), pg 699-708. doi: 10.1016/j.berh.2013.11.001. Epub 2013 Nov 14.
- Kongsted A., Kent P., Axen I., Downie A.S., Dunn K.M. What have we learned from ten years of trajectory research in low back pain? *BioMed Central Musculoskeletal Disorders*. May 2016. Vol 17, pg 220. doi:10.1186/s12891-016-1071-2.
- Seminowicz DA, Wideman TH, Naso L, et al. Effective treatment of chronic low back pain in humans reverses abnormal brain anatomy and function. *The Journal of Neuroscience*. May 2011. Vol 31(20), pg 7540-7550.

21. Buckalew N, Haunt MW, Morrow L, et al. Chronic pain associated with brain volume loss in older adults: preliminary evidence. *Pain Medicine*. March 2008. Vol 9(2), pg 240-248.
22. Taliaucuchi E, Balenzuela P, Fraiman D, et al. Brain resting state is disrupted in chronic back pain patients. *Neuroscience Letters*. November 2010. Vol 485(1), pg 26-31.
23. Baliki MN, Geha PY, Apkarian AV, et al. Beyond feeling: chronic pain hurts the brain, disrupting the default mode network dynamics. *The Journal of Neuroscience*. February 2008. Vol 28 (6), pg 1398-1403.
24. Lee DM, Pendleton N, Tajar A, et al. Chronic widespread pain is associated with slower cognitive processing speed in middle-aged and older European men. *Pain*. October 2010. Vol 151(1), pg 30-36.
25. Ramond A, Bouton C, Richard I, et al. Psychosocial risk factors for chronic low back pain in primary care--a systematic review. *Family Practice*. February 2011. Vol 28(1), pg 12-21. doi:10.1093/fampra/cm072.
26. Kent PM, Keating JL. Can we predict poor recovery from recent-onset nonspecific low back pain? A systematic review. *Manual Therapy*. February 2008. Vol 13(1), pg 12-28.
27. Melloh M, Elfering A, Egli PC, et al. Identification of prognostic factors for chronicity in patients with low back pain: a review of screening instruments. *International Orthopaedics*. April 2009. Vol 33(2), pg 301-313.
28. Young CC, Greenberg MA, Nicassio PM, et al. Transition from acute to chronic pain and disability: a model including cognitive, affective and trauma factors. *Pain*. January 2008. Vol 134 (1-2), pg 69-79.
29. Chew-Graham C, May C. Chronic low back pain in general practice: the challenge of the consultation. *Family Practice*. February 1999. Vol 16(1), pg 46-49.
30. Truchon M. Determinants of chronic disability related to low back pain: towards an integrative biopsychosocial model. *Disability and Rehabilitation*. November 2001. Vol 23(17), pg 758-767.

Abstracts from the 8<sup>th</sup> International Academic and Research Conference  
11<sup>th</sup> August 2018, University Place, University of Manchester

*Postgraduate Prize Winner*

**SURVIVAL OF OSTEOSARCOMA PATIENTS FOLLOWING DIAGNOSIS OF SYNCHRONOUS SKIP METASTASES**

**Yang P**, Evans S, Gilg M, Parry M  
Royal Orthopaedic hospital, Birmingham, United Kingdom

**Background and Aims:** Skip metastases occur in 2% of high grade osteosarcomas. They are defined as smaller foci of tumour that occur completely separately from the primary lesion within the same bone. We aim to investigate the prognostic implications of synchronous skip metastases in osteosarcoma by presenting the largest single centre series to date.

**Methods:** A retrospective study was conducted on all 21 osteosarcoma patients with skip metastases treated at our unit between 1983 and 2004. Patients' demographic data was collected, along with information about margin status, percentage of necrosis, response to chemotherapy, and presence of lung metastasis at initial presentation.

**Results:** The incidence of skip metastases in patients presenting with osteosarcoma is 1.3%. The median age at diagnosis was 14 years. Overall survival was 81% at 12 months, 60% at 24 months, and 31% at 36 months. Nine patients (43%) had lung metastases at diagnosis, and the remaining 12 patients had no other sites of metastasis. Seventeen patients (81%) underwent limb salvage, and four patients (19%) were treated with amputation. No statistical difference in overall survival was demonstrated when comparing presence of lung metastases to those without ( $p=0.859$ ). No statistical difference was found in overall survival according to age group ( $<18$  yrs vs.  $>18$  yrs;  $p=0.126$ ). We found no statistical difference in overall survival according to percentage of chemotherapy-induced bone necrosis ( $<95\%$  vs.  $>95\%$ ;  $p=0.056$ ).

**Conclusion:** The presence of skip metastases confers a very poor prognosis as an independent variable, and also confers a worse prognosis than synchronous lung metastasis. Osteosarcoma patients with skip lesions who require surgical amputation carry a poor prognosis post-surgery due to large tumour size and neurovascular invasion.



Grand Prize Winner

**DIABETIC RETINOPATHY SCREENING PROGRAMME (DRSP): A RETROSPECTIVE SERVICE EVALUATION OF THOSE DEEMED UNSUITABLE FOR PHOTOGRAPHIC ASSESSMENT**

**Mansoor N.** Boztepe O

*University of Leeds School of Medicine, United Kingdom*

**Background:** The DRSP was established to identify early retinopathy and treatment. The screen involves Digital Photographic Assessment (DPA) where each eye is graded (referable or non-referable). Some patients fail DPA due to pathology, such as cataract and corneal scarring, and must undergo Slit Lamp Biomicroscopy (SLB). DR cannot be treated while this pathology persists.

**Aims:** To assess whether information gained from one eye can be used as an indicator of disease of the other eye which cannot be visualised and graded by slit lamp. Hence, use the gradable eye as reference for making clinical management decisions in the upgradable eye.

**Methods:** Data was obtained retrospectively from the Leeds DRSP database for patients who failed photographic assessment and had been sent for slit lamp examination between 01/01/2015 and 31/12/2015. During this period, 881 patients failed photographic assessment. One hundred and fifty-three patients with missing data were excluded, leaving a sample of 728. Conditional probability was used to analyse the data.

**Results:** The majority of patients had the same grade of retinopathy (92%) and maculopathy (99%) bilaterally. In patients with differences in retinopathy grades between eyes, 91% had a difference of one grade only. Conditional probability analysis showed that in 99% of cases, if *non-referable* retinopathy is found in one eye, it is also present in the other. Analysis also showed a greater propensity for retinopathy in the left eye.

**Discussion:** This study provides evidence of using the gradable eye as an indicator of disease in the upgradable eye. Results empower clinicians to be more confident about the likelihood of pathology (or no pathology) in the upgradable eye based on the reference eye *before* pathology has progressed to advanced stages (e.g. vitreous haemorrhage and retinal detachment). There is also evidence to suggest lateralisation of disease to the left, which requires further research.

**Abstracts from the 8<sup>th</sup> International Academic and Research Conference  
5<sup>th</sup> August 2017, University Place, University of Manchester**

**Winners in Individual Categories  
Oral presentations**

**First Prize  
Category: Clinical and Basic Science Research**

**RAN GTPASE PROMOTES MALIGNANT MELANOMA CELL PROLIFERATION, MIGRATION AND  
INVASION BY DEREGLATING MET-MEDIATED DOWNSTREAM SIGNALLING**

**Kouzoukakis I**, Ilyas M, Elseikh S  
Queen's Medical Centre, University of Nottingham, United Kingdom

**Background and Aims:** Ras-related nuclear protein (Ran) is a GTPase that is essential for important cellular functions, such as nucleocytoplasmic trafficking and mitosis. Recently, it was discovered that Ran is over-expressed in several tumour types compared with normal counterparts, suggesting a role in driving cancer development. However, Ran expression and its significance in cancer cell proliferation, migration and invasion have not been investigated in malignant melanoma. This study aims to examine if Ran GTPase promotes malignant melanoma cell proliferation, migration and invasion by deregulating met-mediated downstream signalling.

**Materials and Methods:** A375 and G361 malignant melanoma cell lines derived from patients were cultured in T75 flasks. Ran expression was investigated with real-time PCR and SDS-PAGE. Ran expression knockdown and cell transfection was achieved with siRNA technology. Cancer cell proliferation for transfected and non-transfected melanoma cells was assessed with a resazurin-based assay. Cell migration and invasion were assessed with a transwell assay without or with the use of matrix matrigel respectively and with a wound healing assay. Immunofluorescence was used to detect the c-Met receptor. Statistical analysis was carried out using GraphPad Prism.

**Results:** Ran expression was detected in both cell line models. Ran knockdown with siRNAs resulted in as much as 94% efficiency. Ran knockdown significantly reduced melanoma cell proliferation, migration and invasion, and increased wound closure time. Furthermore, reduction in Ran levels resulted in c-Met down-regulation.

**Discussion:** Ran is vital for cancer cell survival so targeting Ran could reduce melanoma progression. However, more data is needed from *in vivo* studies. The findings relate to studies with Ran knockdown in other cancers.

**Conclusion:** Our findings show for the first time that Ran is a potential target for novel therapeutic strategies for malignant melanoma.

**Winners in Individual Categories**  
**Oral presentations**

**Second Prize**  
**Category: Clinical and Basic Science Research**

**EXPLORING THE RELATIONSHIP BETWEEN TONGUE MUSCLE STRENGTH AND CLINICAL SIGNS AND SYMPTOMS IN AMYOTROPHIC LATERAL SCLEROSIS (ALS)**

McDermott CJ, Shaw PJ, Alix JP, French SJ, Kyrtata N  
Royal Lancaster Infirmary, United Kingdom

**Background and Aims:** Bulbar dysfunction is a presenting feature in approximately 20% of patients with amyotrophic lateral sclerosis (ALS). However, there are currently no validated biomarkers for the assessment of bulbar dysfunction in the context of clinical trials. Since the tongue has shown to be affected most by weakness compared to other bulbar muscles, tongue strength (TS) has been identified as a potential biomarker for bulbar disease. This study aims to assess the extent to which TS can detect bulbar dysfunction in ALS patients.

**Methods:** TS measurements (obtained using a quantitative muscle testing system) were recorded in 27 patients with bulbar ALS and 26 healthy age- and sex-matched volunteers. Patients' and volunteers' TS measurements were compared using Student's t-test. The relationship between patients' TS measurements and ALS functional rating scale (ALSFRS) scores (total and bulbar sub-scores) was assessed using Pearson's correlation. Multiple correlations were made between volunteers, patients without, and patients with tongue wasting (a clinical sign of bulbar dysfunction). These were assessed using the one-way ANOVA test.

**Results:** TS measurements differed significantly between patients and volunteers ( $p < 0.0001$ ). A significant difference was also shown between TS measurements of patients with and patients without tongue wasting ( $p < 0.0001$ ), and between volunteers and patients without tongue wasting ( $p < 0.0001$ ). TS did not correlate with total ALSFRS scores ( $r = 0.1807$ ,  $p = 0.2044$ ), but correlated significantly with ALSFRS bulbar sub-scores, with  $r = 0.7102$  ( $p < 0.0001$ ).

**Conclusion:** The difference between TS measurements of volunteers and patients without tongue weakness or wasting suggests that TS may have the potential to detect preclinical signs. This could facilitate a more accurate prediction of disease progression and greatly impact future clinical decision-making. Its ability to detect changes overtime would need to be examined before it can be considered a valid tool for the assessment of bulbar dysfunction in ALS.

**Winners in Individual Categories**  
**Oral presentations**

**Third Prize**  
**Category: Clinical and Basic Science Research**

**THE PROGNOSTIC VALUE OF PSOAS MUSCLE THICKNESS MEASURED ON COMPUTERISED TOMOGRAPHY SCANS IN ALCOHOLIC LIVER DISEASE**

**Osunronbi T**, Dhanda A

*Plymouth University Peninsula Schools of Medicine and Dentistry, United Kingdom*

**Background:** The United Kingdom Model for End-Stage Liver Disease (UKELD) score is used to predict mortality in patients with alcoholic liver disease, and prioritise the waiting list for liver transplantation. However, the UKELD score has been shown to be unreliable in patients with low UKELD score and refractory ascites. Sarcopenia is an independent predictor of mortality in ALD, and psoas muscle thickness may be a measure of sarcopenia.

**Aims:** To determine whether psoas muscle thickness measured on CT scan can be used to predict mortality in patients with ALD.

**Methods:** A retrospective study of abdominal CT images of 54 patients with ALD admitted to a tertiary hepatology unit in a one-year period. We identified the status of each patient four years post-admission: alive (n = 26); dead (n=28). Axial and transverse psoas muscle thickness was measured on CT scans at the level of the umbilicus. Mann Whitney U Test ( $\alpha < 0.05$ ) was used to test for significant difference in psoas thickness in alive vs. dead patients. Spearman's rank-order correlation ( $\alpha < 0.05$ ) was used to test for correlation between psoas thickness and UKELD score.

**Results:** No significant difference in psoas thickness in alive vs. dead patients: transverse thickness ( $p = 0.29$ ), and axial thickness ( $p = 0.49$ ). No significant correlation between psoas thickness and UKELD score: transverse thickness ( $r = 0.05$ ,  $p = 0.74$ ), and axial thickness ( $r = -0.27$ ,  $p = 0.07$ ).

**Discussion:** Our findings imply that psoas thickness may not be a reliable measure of sarcopenia. However, this study was limited by a small sample size and a lack of complete data set due to the retrospective study design.

**Conclusion:** Our data set suggests that psoas muscle thickness on CT scan is not a reliable prognostic tool to predict mortality in patients with ALD. A large prospective study is needed.

**Winners in Individual Categories**  
**Oral presentations**

**First Prize**  
**Category: Clinical Audit**

**STAKEHOLDERS' VIEWS OF SURGEON-SPECIFIC MORTALITY DATA**

**John U**, Choo H, Pettengell C, Martin G, Bicknell C, Riga C  
*Cardiff University School of Medicine, United Kingdom*

**Background and Aims:** Public release of Surgeon-Specific Mortality Data (SSMD) was mandated by the National Health Service in 2013, with the aim of enhancing transparency, driving quality improvement and facilitating patient choice. Literature evaluating the impact of SSMD publication is conflicting and there is a current paucity of research elucidating its importance to patients. As such, this study's aims were to evaluate the views of vascular patients regarding current public outcome reporting at both the surgeon- and hospital-level and to investigate patients' priorities for future outcome reporting.

**Methods:** A novel questionnaire was designed and trialled with patients to ensure content and construct validity. This was then distributed to patients in vascular-outpatient clinics across three sites at Imperial College Healthcare Trust over a six-week period. Patients with confirmed or suspected arterial disease were recruited. Statistical analyses were conducted to evaluate relationships between responses and demographic variables and to ascertain patients' preference for surgeon- or hospital-level reporting.

**Results:** Overall, 165 patients participated in the survey (response rate 63%, n=261). Most were unaware of SSMD (80%), with only 10% accessing it pre-operatively. Factors influencing patient awareness of SSMD included education level ( $p=0.047$ ) and salary ( $p=0.049$ ). Patients recognised SSMD's utility in choice of treatment (60%) or surgeon (53%). However, most prioritised the patient-surgeon relationship (90%) and past surgical experiences (71%) when making pre-operative decisions. In line with views expressed by healthcare professionals in the literature, respondents favoured hospital mortality data (66%) over surgeon-level reporting (49%) ( $p=0.000006$ ), with 63% expressing that patients were likely to misinterpret SSMD.

**Conclusion:** The aims of public-outcome reporting in informing patient choice are not being met by current methods. Patients express preference for data at the hospital-level and prioritise previous experiences and metrics other than mortality in their pre-operative decision-making. Therefore, policy makers should expand SSMD to include hospital-specific mortality data and consider publishing accessible and contextualised patient-directed outcomes at the hospital-level.

**Winners in Individual Categories**  
**Oral presentations**

**Second Prize**  
**Category: Clinical Audit**

**MAINTENANCE IV FLUID DOCUMENTATION AND PRESCRIBING PRACTICE IN ADULT SURGICAL PATIENTS**

**Hopkins A**, Suliman A

*Macclesfield District General Hospital, Macclesfield, United Kingdom*

**Background:** IV fluids for maintenance are commonly prescribed in the inpatient setting. Inappropriate prescribing can lead to significant patient morbidity and mortality.

**Aims:** The study aimed to evaluate the appropriate use of IV fluids in surgical patients.

**Methods:** We investigated the current compliance of IV fluid prescription and documentation with national standards which included: details of patient assessment; documentation of rate, volume and type of IV fluid to be administered; and IV fluid management plan and electrolyte needs over next 24 hours. Prescription of 1 mmol/kg/day of potassium, sodium and chloride, 25–30 ml/kg/day of water, and 50–100 g/day of glucose. These standards were set with an expected compliance of 100%. Data were collected from three surgical wards over a 14-day period. All adult surgical admissions were reviewed for inclusion. Only those patients requiring maintenance fluids were included in analysis. A total of 20 patients were included in the audit. Data were recorded using a self-designed audit collection tool.

**Results:** Documentation: Details of fluid assessment were documented in 5% of patients. Type, rate and volume of fluid to be administered were documented correctly in 100%. An IV fluid management plan was documented in 20%. Fluid and electrolyte needs over next 24 hours were documented in 10%. Prescription: Mean potassium received was 18.397% of target, mean sodium received was 511.68% of target, and mean chloride received was 471.034% of target. Mean water received was 136.397% of target. 25% patients received target glucose.

**Discussion:** This study demonstrated that 100% compliance of standards set was not achieved. IV fluid prescribing and documentation remain poor. An educational campaign is required to increase awareness of NICE IV fluid guidelines and the risks associated with poor prescribing of IV fluids. We aim to make alterations to the Trust drug chart to aid improved documentation and prescribing practice.

**Winners in Individual Categories**  
**Oral presentations**

**Third Prize**  
**Category: Clinical Audit**

**AUDIT ON THE DIAGNOSIS, INVESTIGATION AND TREATMENT OF PANCREATIC  
NEUROENDOCRINE TUMOURS IN HULL HOSPITALS**

**Gross AK**, Brown V, Sathyapalan T  
Hull York Medical School, United Kingdom

**Background:** Incidence of pancreatic neuroendocrine tumours (PNETs) is increasing in the UK. They may be functioning (with symptoms due to hormone excess) or non-functioning. Imaging of PNETs involves CT, MRI and Octreotide scans. Treatments are based on tumour grade and histological diagnosis. The mainstay of PNET treatment is surgery. The European Neuroendocrine Tumour Society (ENETS) guidelines provide a consensus on the diagnosis and treatment of PNETs.

**Aims:** To retrospectively audit patients with a histological diagnosis of PNETs in Hull hospitals between February and October 2015. To review patient characteristics (age and gender). To assess if investigations and management are in line with ENETS guidelines.

**Methods:** A list of patients was obtained from a Hull MDT pathologist. A dedicated neuroendocrine database has been created to collate information on each patient, with data obtained via the clinical system Lorenzo.

**Results:** Preliminary data on 14 PNET patients. There were equal proportions of men and women; the mean age at diagnosis was 66 (range 33-82). The majority of patients (57%) were diagnosed with a Grade 1 PNET (Ki-67 index of <2%). Histological results following curative surgery was the most common form of diagnosis. The average tumour diameter on histological resection was 1.8 cm. Most patients (71%) were diagnosed with localised disease. Octreotide is recommended by ENETS, but was only performed in 14% of patients. 40% of PNETs were found on incidental investigation, and 21% of patients were diagnosed with a functional PNET; the majority of these were glucagonomas. 79% of patients underwent surgery as initial management with curative intent.

**Conclusion:** The preliminary results from this local audit support evidence from other sources that most PNETs are non-functioning and a significant proportion are diagnosed incidentally. More data needs to be collected to sufficiently analyse the performance of this local neuroendocrine centre compared to European guidelines.

**Winners in Individual Categories**  
**Oral presentations**

**First Prize**  
**Category: Clinical and Patient Related Work**

**AN ATYPICAL PRESENTATION OF INFECTIVE ENDOCARDITIS IN LYMPHANGIECTASIA: AN EDUCATIONAL AND ETHICAL CASE**

**Ashcroft J**, Sun L, Xiang J

*West Middlesex University Hospital, Isleworth, United Kingdom*

**Background:** Lymphangiectasia is a rare pathological dilatation of the intestinal lymphatics, causing a protein-losing gastroenteropathy.

**Case Study:** A 74-year-old female, with known small bowel lymphangiectasia requiring total parenteral nutrition through a central venous catheter, presented to her routine nutrition clinic with a three-week history of fever, shivering, weakness, and generalised muscular pain. Blood cultures identified staphylococcus aureus infection, and the patient was advised to attend her local Accident and Emergency Department. On assessment, the patient had a previously undocumented pansystolic murmur. A transthoracic echocardiogram detected a mitral valve rupture, suggesting infective endocarditis. Infective endocarditis was confirmed by a transoesophageal echocardiogram which found 1.7cm vegetation on the anterior mitral valve, causing a prolapse of the anterior leaflet. The patient commenced a course of vancomycin and gentamicin as per Trust microbial guidance, and the indwelling central venous catheter was removed. A new central venous catheter was recommended five to seven days following commencement of antibiotic therapy to meet the patient's nutritional requirements. She had become anxious about "bugs growing all over a new line" and wished to trial an oral diet. This was discussed in a Multi-Disciplinary Team meeting and it was agreed that the patient could attempt an oral diet with monitoring of her metabolic blood panel. The patient's albumin level continuously dropped, requiring human albumin solution replacement which contributed to a pulmonary oedema and severe respiratory failure. This lead to admission to the Intensive Therapy Unit. The patient required ventilatory support and a central venous catheter was inserted to optimise treatment.

**Discussion:** This raises the ethical issues of autonomy and beneficence in the face of a quickly changing clinical scenario and patient capacity.

**Conclusion:** The patient was treated for pulmonary oedema, stepped down to the coronary care unit, and transferred to a tertiary centre for mitral valve replacement.



**Winners in Individual Categories**  
**Oral presentations**

**Second Prize**  
**Category: Clinical and Patient Related Work**

**CERVICAL SPINE OSTEOMYELITIS IN AN INTRAVENOUS DRUG USER: AN INDOLENT  
CONDITION WITH HIGH MORBIDITY**

**You YH**, Low J, Mbakada N, Yap D, Banerjee I  
*Royal Blackburn Hospital, Blackburn, United Kingdom*

**Background:** Cervical spine osteomyelitis (CSO) is a rare condition with an increasing incidence due to the aging population and an increase in immunocompromised states such as in Intravenous Drug Users (IVDU). Diagnosis can be challenging as patients often present subclinically with normal blood tests and radiographs initially. If this condition is missed, it can result in serious complications, such as permanent neurological deficits.

**Case Study:** We present a case of a 36-year-old male IVDU who presented to the emergency department with neck pain. Examination findings, radiograph and blood test were unremarkable. The patient returned two months later with new symptoms of bilateral hand paraesthesiae, malaise and restricted neck movements. A CT scan revealed bone destruction in the vertebral bodies C4 to C6 due to osteomyelitis. He underwent debridement with spinal fixation and received a six-week course of antibiotics. He made a full recovery with no lasting complications.

**Discussion:** In patients with CSO, blood tests may be normal with negative blood cultures, especially in the immunocompromised. The imaging of choice in suspected CSO is an MRI which has high sensitivity and specificity for this condition. The mainstay of treatment is a minimum six-week course of antibiotics. Surgery may be indicated in patients with neurological deficits and various approaches are available.

**Conclusion:** CSO may not be included in the differential diagnosis as it is not a commonly encountered condition and neck pain is usually secondary to a benign condition. However, with the rising incidence, it should be suspected in patients who present with neck pain, especially in IVDU. An early diagnosis will reduce morbidity and mortality.

**Winners in Individual Categories**  
**Oral presentations**

**Third Prize**  
**Category: Clinical and Patient Related Work**

**HERNIATION OF AN INTRAGASTRIC BALLOON**

**Sharma E,** Chakravartty S  
St Peter's Hospital, Chertsey, United Kingdom

**Background:** Intra gastric balloons are a surgical method for treating obesity. Obesity is a leading global health problem today. It is becoming more and more common to perform non-invasive and invasive treatments to help combat this growing problem, with over 16,000 cases being operated on in the UK alone between 2011-2013. Studies have shown a greater mortality rate in patients with a higher BMI. Therefore, minimally invasive, non-surgical options for weight loss are gaining popularity as a mechanism to help achieve this preoperative weight loss, one of these being intra gastric balloon.

**Case Study:** We present a case of a 61-year-old female who presented with vomiting and was found to have an abdominal wall hernia through which stomach containing the balloon had migrated. She had coughed on the day and then had noticed continual vomiting, was unable to keep anything down, and had noted that her hernia had become firm. Bowels had not opened since then, but she continued to pass wind and urine. An urgent CT scan of the abdomen and pelvis revealed a large anterior abdominal wall hernia with a defect of approximately 10 x 7.5cm. The pylorus of the stomach containing the 12cm gastric balloon, alongside a loop of small bowel and colon, were found to be within the hernia sac. There was no evidence of obstruction. OGD was performed the evening of admission and the balloon was deflated and removed. The patient tolerated a rapid upgrade of diet the next day and her nasogastric tube was removed. Post-operative recovery was uneventful, and she was discharged later that afternoon.

**Discussion and Conclusion:** Intra gastric balloons are safe invasive procedures used to temporarily induce weight loss prior to further definitive surgery. We present rare complications that are not widely recognised, leading to the thought that further assessment needs to be undertaken when selecting patients suitable for the intervention.

**Winners in Individual Categories**  
**Oral presentations**

**First Prize**  
**Category: Education and Training Category**

**EQUIPPING MEDICAL STUDENTS WITH THE COMMUNICATION SKILLS TO DISCUSS FEMALE GENITAL MUTILATION IN THE CLINICAL SETTING**

John N, Raval H, Handa N  
University of Manchester, United Kingdom

**Background and Aims:** Female Genital Mutilation (FGM) is a practice that has affected an estimated 137,000 women in England and Wales. 20,000 girls in Greater Manchester are at risk of FGM. Despite these figures, skills needed by doctors to handle these cases are not taught. In 2014, UK medical students backed a BMA vote for FGM to be a compulsory component of the undergraduate curriculum. Yet, little has changed. This has led to student initiatives on FGM education, such as a workshop developed by the University of Manchester Obstetrics and Gynaecology Society. This study aimed to investigate the role of this workshop in equipping medical students with the necessary communication skills to discuss FGM in the clinical setting.

**Methods:** The two-hour workshop involved two lectures and role-play clinical scenarios. A pre- and post-intervention questionnaire was completed for participants self-reported competency levels. This covered knowledge of FGM and the UK law surrounding it, how to discuss FGM with patients, and to whom patients should be referred.

**Results:** Student participant profile: eight medical students, four midwifery students, eight nursing students, one psychology student, and one undisclosed. All 22 forms reported that a comparable workshop should be made mandatory for healthcare students. All 16 medical and nursing students suggested that the workshop had improved their knowledge of FGM. Of medical student participants, 75% reported that the workshop increased their confidence to a level where they could communicate with a patient about FGM, and 50% revealed that they would now know what to do clinically if a patient presented with a type of FGM.

**Discussion:** FGM communication competency was significantly increased in medical students. We propose that, based on the feedback from this event, it is in the best interests of both the patients and the students to receive formal teaching on the communication and management of FGM. The intervention is inexpensive to recreate and beneficial particularly for medical students in areas with high FGM statistics. We are therefore keen to encourage this based on our initial model.

**Winners in Individual Categories**  
**Poster presentations**

**First Prize**

**POST-OPERATIVE TRANSFUSION PRACTICES IN HIP FRACTURE PATIENTS**

**Craven J.** Nadimi J, Gillespie K, McCann J  
Warrington Hospital, Warrington, United Kingdom

**Background and Aims:** Every day, 4000 UK hospital beds are occupied by patients with hip fractures. Severe anaemia is a common post-operative complication, and many patients require blood transfusion. We completed an initial audit which looked at blood transfusion practices in hip fracture patients within our Trust. We found that the Trust was mostly non-compliant with NICE guidelines. We introduced a strategy of *"Transfuse and Check"*, alongside additional quality improvement actions. Following implementation, we re-audited practice. The overall aim was to implement the NICE guidelines on transfusion (NICE CG 24) published in November 2015, and the NICE Quality Standards for Trusts published in April 2017.

**Methods:** A retrospective cohort study of fractured neck of femur patients over a 12-month period from Warrington Hospital (UK Hip Fracture Database). Post-operative red blood cell transfusions were identified using electronic patient records, Sunquest ICE and hospital transfusion records. Pre- and post-haemoglobin Hb checks, units transfused, and Hb checks after each unit were recorded.

**Results:** Two hundred and ninety-two fractured neck of femur patients over a 12-month period. Forty-six (15.7%) of these patients were transfused. Twenty-seven (56%) patients were transfused a single unit only. A total of 60.4% of the patients received an Hb check after one unit transfused. On re-audit, 61% fewer RBC units were transfused and there was a 30.4% improvement in post-transfusion Hb targets. A 40.4% increase in single unit transfusion was revealed. An average saving of £112 per patient requiring transfusion was noted.

**Discussion:** Since the introduction of the *"Transfuse and Check"* protocol to encourage restrictive transfusion practice, there has been a significant reduction in the number of post-operative red blood cell transfusions in hip fracture patients. This has resulted in reduced risk, reduced cost and a reduced need for red blood cell units not only in our Orthopaedic Department, but also throughout the Trust.

**Conclusion:** Our *"Transfuse and Check"* protocol has reduced liberal transfusion of post-operative fractured neck of femur patients.

**Winners in Individual Categories**  
**Poster presentations**

**Second Prize**

**MEMORY INTERFERENCE IN MICE**

**Sachdev A**, Hardt O

*University of Edinburgh College of Medicine and Veterinary Medicine, United Kingdom*

**Background and Aims:** The question of how memories are forgotten is equally as important to consider as how memories are formed. It is suggested that interference of new memories during the process of learning can increase forgetting. This is relevant to conditions such as Alzheimer's disease where there is increased susceptibility to interference. If we can minimise interference, it may be possible to improve memory retention by allowing undisturbed consolidation of information. This study aims to investigate this postulation.

**Methods:** To explore this question, this study uses an object identification recognition test to compare the memory retention between control mice and J20 mice models of Alzheimer's disease. This test is a good model for human episodic declarative memory, which deteriorates in Alzheimer's disease. The mice were either exposed to visual interference immediately after studying the objects or underwent a period of sensory deprivation in a black box. They were then tested on their object memory.

**Results:** Our results show that, although J20 mice had lower memory retention than control mice ( $F(1) = 3.502$ ,  $p = 0.068$ ), neither group benefitted from minimising interference after learning ( $F < 1$ ,  $p = 0.928$ ). There was no difference in exploratory behaviour between all groups.

**Discussion:** These results suggest that minimising visual interference alone is not sufficient in reducing the rate of forgetting. The main limitation of this study was that the age of the mice was not kept constant, which meant that the J20 mice had different stages of Alzheimer's disease. Nevertheless, this theory should not be dismissed as it has been successful in previous literature. We propose that further research should focus on minimising different types of sensory interference such as auditory, smell and tactile.

**Winners in Individual Categories**  
**Poster presentations**

**Third Prize**

**TO WHAT EXTENT ARE PRENATAL ANDROGENS INVOLVED IN THE DEVELOPMENT OF MALE HOMOSEXUALITY IN HUMANS?**

**Tasos E**

*University of Cambridge School of Clinical Medicine, United Kingdom*

**Background and Aims:** Male sexual orientation has recently received significant publicity due to the worldwide advancement of LGBT+ rights. However, scientific research has not determined its biological basis. Reduced prenatal exposure to androgens is a potential causal factor in male homosexuality, with animal models demonstrating same-sex mate preference when exposure is altered during prenatal or early postnatal development. This review aims to investigate the extent to which prenatal androgens are involved in the development of male homosexuality in humans.

**Review Description:** As similar studies in humans are impossible, indirect physical and cognitive measures of androgen exposure must be used to examine prenatal exposure to androgens. Some, but not all, studies suggest that physical measures affected by prenatal androgens, including the index-to-ring finger ratio, growth indices, and facial structure, are more 'feminine' in gay men. Gay men also exhibit significant childhood gender non-conformity and a 'feminised' anatomical and functional brain pattern in sexual arousal, as well as domains such as language, visuospatial skills and hemispheric relationships, the changes in which are similar to the changes observed with altered prenatal androgen exposure.

**Discussion:** Although these features are useful indicators of prenatal androgen exposure, they are also confounded by other factors throughout the person's life and fail to provide information on when sexual orientation is determined during gestation. Factors such as genetic influences or maternal immunisation may also underlie the observed differences, and require further investigation. Research has also been hampered by inconsistencies in the reporting of sexual orientation and the potentially unrepresentative populations of gay men studied, while additional complexities pertaining to gender conformity and sexual role may also influence results.

**Conclusion:** While existing findings suggest that prenatal androgen exposure is involved in the development of male homosexuality in humans, future research should examine the effects of androgens on the brain throughout development and how other factors interact with androgens or act independently to influence male sexual orientation.

## Oral Presentations

### Category: Clinical and Basic Science Research

#### CIRCADIAN REGULATION OF REJECTION AFTER KIDNEY TRANSPLANTATION

**Iftikhar H**, Blaikley J, Papachristos S  
University of Manchester, United Kingdom

**Background and Aims:** Circadian rhythms comprise of oscillations of the levels of important regulatory molecules such as hormones. Consequently, these rhythms influence a number of physiological processes, including the immune system. Disruption of circadian rhythms is associated with pathology. Kidney transplants are of the few types of operations that can occur at any time over 24 hours. This retrospective observational study aims to explore the impact of circadian rhythms in generating rejection.

**Methods:** Data from 974 transplants that occurred in one hospital unit between 2004 and 2014 was collected, and time of organ reperfusion and presence of rejection was recorded.

**Results:** From these records, 89 were those that had inconclusive biopsy results and, for these, hospital records were investigated to find the diagnosis. 43 of these patients were those of whom notes were not found and these patients were assumed to not have rejection. There was a pattern of increased rejection for transplant performed between 16:00 and 20:00. Statistical analysis of this pattern using JTK\_CYCLE and CircWave was used to determine involvement of circadian rhythms in rejection and found that there was weak circadian contribution.

**Discussion:** Whilst a weak association between kidney transplant rejection has been identified, this association is not significant enough to provide support for the higher number of rejected transplants carried out between 16:00 and 20:00. A number of other confounding factors also need to be considered, such as cold ischemia time, surgical complications and adherence to immunosuppressive therapy. Missing medical records also limit the significance of these results.

**Conclusion:** There is a weak association between kidney transplant carried out in the evening and rejection. This association is not significant enough to suggest that individuals who have transplants in the evening are more likely to have rejection.

#### PROGNOSIS AND TREATMENT OUTCOMES OF SMALL CELL LUNG CANCER PATIENTS AT PRINCESS NORAH ONCOLOGY CENTRE (PNOC), JEDDAH, SAUDI ARABIA

**Enani MZ**, Noman GA, Babeer GA, Al-Fayea T  
King Abdulaziz University, Jeddah, Saudi Arabia

**Background and Aims:** Lung cancer is the second most common cancer and the most common cause of cancer-related death. Small cell lung cancer (SCLC) constitutes 13%-15%, and is clinically divided into limited-stage disease (LD-SCLC) and extensive-stage disease (ED-SCLC). The median overall survival rate is poor in both subtypes. This study aims to explore the prognosis and treatment outcomes of SCLC in patients at PNOC, Jeddah.

**Methods:** In this retrospective cohort study, data were collected from patients' medical records for 50 SCLC patients, aged over 18, diagnosed at or referred to PNOC between January 2000 and August 2016. These patients were identified from 360 lung cancer cases. Overall survival rates were investigated using Kaplan-Meier method. Prognostic factors were analysed using Cox proportional hazards model.

**Results:** The mean age of diagnosis is  $61.66 \pm 11.587$ . 45 patients were males and five were females. 43 patients had ED-SCLC and seven had LD-SCLC. The most common presenting symptoms were cough, dyspnoea and weight loss, respectively. The response rate was three of six patients treated with concurrent chemo radiation, eight of 34 patients treated with first line chemotherapy, and one of 13 patients treated with second line chemotherapy. The mean overall survival rate is 31.945 months (95%CI: 21.455- 42.436) among LD-SCLC patients while the median overall survival rate is 6.209 months (95%CI: .697 -11.721) among ED-SCLC patients.

**Discussion:** It has previously been reported that the median survival among LD-SCLC patients is approximately 23 months while the median survival is seven to 12 months among ED-SCLC patients. In this study, the mean overall survival for LD-SCLC patients is approximately 32 months and the median overall survival for ED-SCLC patients is six months. Two studies mentioned that the significant prognostic factors were performance status ( $p < 0.001$ ) and female gender ( $p < 0.0001$ ). This pilot study revealed that sex and performance status were insignificant prognostic factors.

**Conclusion:** Further local studies are recommended to better understand the epidemiology, prognosis and treatment outcomes of SCLC.

## NUCLEATION OF MICROTUBULE BUNDLES BY TAU DROPLETS IN VITRO

Zhan JR, Evans L, Ali J, Livesey F

University of Cambridge School of Clinical Medicine, United Kingdom

**Background and Aims:** Microtubule-associated protein tau is associated with a number of neurodegenerative diseases, including Alzheimer's disease and familial front temporal dementia, for which there is currently no cure. Familial front temporal dementia is a rare form of dementia caused by autosomal dominant mutations in the MAPT gene, such as the P301S mutation. This work aimed to investigate the biological differences between wild-type and P301S mutant tau to further our understanding of how the mutant form of tau induces the early age of onset of neurodegeneration.

**Methods/Results:** Wild-type tau has been shown to undergo liquid-liquid phase separation to form tau 'droplets', which could sequester tubulin and promote the nucleation of microtubules *in vitro*. This project showed that P301S mutant tau could undergo the same phenomena. P301S tau formed more liquid droplets under the same tau concentrations and microtubules polymerised out of these droplets at a faster rate compared to wild-type tau. Overall, the results were used to design an *in vitro* assay to dissect the differences between wild-type and the P301S mutant tau in the nucleation and stabilisation of microtubule bundles. Co focal microscopy was used to visualise liquid-liquid phase separation of both wild-type and P301S mutant tau. When low levels of tubulin were mixed with the solution of tau, live imaging using a confocal microscope captured the sequestration of tubulin into the tau droplets, which promoted the nucleation and polymerisation of microtubules.

**Discussion:** This study provides the opportunity for future examination of the effects of other tau mutants and post-translational modifications (such as hyperphosphorylation) of tau on microtubule dynamics to further our understanding of tauopathies. This will hopefully lead to the development of novel therapies for neurodegenerative diseases involving tau.

## GENE REGULATION ASSOCIATED WITH THE ONSET OF POSTOPERATIVE DELIRIUM

Mill J, Green RJ, Ryoichi S, Smart NJ

University of Exeter Medical School, United Kingdom

**Background and Aims:** Postoperative delirium (PD) is a common and serious condition that affects up to 50% of elderly patients undergoing surgery. Global financial costs of PD have been estimated to be in excess of \$340bn. The underlying pathological mechanisms that lead to the development of PD have not been elucidated and their link with dementia is poorly understood. Altered gene expression and epigenetic processes are important in common human diseases. The extent to which these play a role in the onset of delirium is not known. The aim of this study is to investigate gene regulation following major surgery and their link with short-term and long-term outcomes.

**Methods:** Our study is on a cohort of 30 patients over 65 years old enrolled for colorectal and orthopaedic surgery at the Royal Devon and Exeter NHS Foundation Trust in 2015. Blood samples were collected before surgery, one day postoperatively and seven days postoperatively, and past medical history was collected. DNA from samples was used to quantify DNA methylation. Levels of gene expression in key genes highlighted from previous work on methylation patterns will be quantified using qPCR at the RILD site. Follow-up data from these patients will be collected in 2018, three years postoperatively, to observe longer-term outcomes.

**Results:** Five patients exhibited hypoactive delirium postoperatively. Multiple differentially methylated regions (DMRs) associated with both surgery and the onset of PD was identified in a previous study. We are currently quantifying the expression of gene transcripts annotated to 10 of those DMRs to confirm they are associated with alterations to gene expression.

**Conclusion:** We are undertaking a study to explore the hypothesis that epigenetic regulation of gene expression is involved in the pathogenesis of PD. We will be quantifying gene expression using qPCR laboratory methods. Our research will provide insight into the mechanisms linking major surgery to the clinical presentation of PD.



## TARGETING P63 UPREGULATION MAY PREVENT DEVELOPMENT OF MAPK-INHIBITOR RESISTANCE IN MELANOMA

Patel A, **Borg T**, Bergamaschi D, Harwood C  
*Barts and the London School of Medicine and Dentistry, United Kingdom*

**Background:** Melanoma progression is often characterized by mutations in the mitogen-activated protein kinase (MAPK) and phosphoinositol-3-kinase (PI3K) pathways. Understanding regulation of these pathways has led to development of novel targeted therapies which show high response rates. However, many patients relapse with ensuing resistant disease. P63, a p53 homologue, carries a poorer prognosis when over expressed. In keratinocytes, degradation could be regulated by two ubiquitin ligases, MDM2 and FBXW7. This project explored expression of p63, MDM2 and FBXW7 in MAPK-inhibitor (MAPKi) sensitive and resistant melanoma cell lines.

**Method:** Morphology change associated with development of resistance was assessed by actin immunostaining using epifluorescence microscopy (Figure 1). Western blot and immunofluorescence experiments enabled analysis of p63, FBXW7 and MDM2 protein expression. Finally, a novel technique of flow cytometry enabled analysis of cell death in MAPKi-resistant melanoma cells treated with Nutlin-3A.

**Results and Discussion:** MAPKi resistance in melanoma cells is associated with increased p63 expression (Figure 2). Resistance is furthermore associated with reduced FBXW7 expression (Figure 3) and enrichment of nuclear MDM2 (Figure 4), suggesting a potential nuclear interaction between MDM2 and FBXW7. The resultant inactivation of FBXW7 explains the increased p63 expression upon MAPKi- resistance. Furthermore, by treating MAPKi-resistant cells with the MDM2-inhibitor Nutlin-3A, we were able to restore FBXW7 expression and promote p63-degradation, with resulting increased melanoma cell death.

**Conclusion:** This project identifies FBXW7 and MDM2 as regulators of p63 expression in MAPKi-resistant melanoma and proposes a possible role for Nutlin-3A in treating advanced MAPKi-resistant melanoma.

## WHAT NEURODEVELOPMENTAL OUTCOMES ARE BEING MEASURED IN CONGENITAL INFECTIONS INCLUDING ZIKA – A SYSTEMATIC REVIEW OF THE LITERATURE

**Rai P**, Gladstone M, Patel A, Milner K  
*University of Liverpool Faculty of Health and Life Sciences, United Kingdom*

**Background and Aims:** There is an emerging interest in the outcomes of children affected by congenital infections since the outbreak of Zika virus. The virus has been linked to congenital neurodevelopmental disorders in children in low and middle-income country settings, where few tools are adapted and standardised to assess children appropriately. This study aims to investigate the neurodevelopmental outcomes measured in congenital infections, including Zika.

**Methods:** A systematic review of the literature to identify what outcome measures have been used in children affected by congenital infections (including Zika). We searched PubMed, Scopus, Google Scholar and Cochrane from 1960 to 2017 to identify studies where outcomes were measured secondary to in-utero viral infections at birth. We collated studies to evaluate the coverage of outcomes against the framework of the International Classification of Functioning and Disability (ICF), synthesising an outcome matrix to understand the extent of coverage of domains in the framework.

**Results:** Fifty-three studies were identified with information relating to outcomes measured in children exposed to viral infections in utero from the preterm period to 19 years of age. The most populated ICF-CY domain measured was structure, which included microcephaly, eye, ear and neurological structures. The functioning domain was also well reported with a wide range of tools used (Bayley Scales of Infant Development (BSID); Teller acuity cards; Auditory Brainstem Responses (ABR); Gross Motor Function Classification; sleep patterns). Few studies reported outcomes in the activities and participation domain and the environmental outcomes of the ICF-CY. A total of 34 out of 53 studies concentrated on microcephaly (58.8% defining microcephaly as OFC  $\leq 2SD$ , three studies using multiple definitions, and some had no definition). Only 24.6% of studies measured other factors. Almost all of these focused on child development using (BSID) for 0-2 years and cognitive functioning utilising the Wechsler Intelligence Scale for Children (WISC) (6-17 year olds). Other outcomes measured motor functions, vision and hearing but methods of measurement and validity of those measures are vastly under-reported.

**Conclusion:** The review demonstrated a lack of cohesiveness and consistency in reporting and measuring outcomes. Studies focus more on health structure and functioning rather than on the other relevant social, psychological and participatory parts of the ICF which may be more relevant for families and children.

## LACK OF AWARENESS ABOUT PREVALENCE OF DEVELOPMENTAL COORDINATION DISORDER (DCD) IN PRETERM INFANTS IN THE NORTHERN ALBERTA NEONATAL PROGRAMME

Ahmed H, Sollereeder P, Reichert A, Kamps P, Qureshi MJ  
*Royal Alexandra Hospital, Edmonton, Alberta, Canada*

**Background and Aims:** Developmental Coordination Disorder (DCD) has a prevalence rate of ~ 5% among school-age children, more commonly among preterm male infants born  $\leq 32$  weeks gestational age (GA). Data on DCD in Northern Alberta, Canada is lacking. We hoped to elucidate the prevalence of DCD among preterm infants in Northern Alberta and identify its associated risk factors.

**Methods:** Analytics, Data Integration, Measurement & Reporting (DIMR) services of Alberta Health Services provided a list of preterm infants (<37 weeks GA) born in Northern Alberta from 2000-2008, admitted to Royal Alexandra Hospital, and diagnosed with DCD based on ICD-10 code. Perinatal and neonatal variables, and developmental testing scores, were abstracted from health and school records, after parental consent. Exclusion criteria: cerebral palsy, significant cognitive delay (full-scale IQ<70), and/or legally blind (VA<20/200). Research Ethics Board of the University of Alberta granted approval.

**Results:** Of the total number of infants born <37 weeks (11,787) in Northern Alberta during this study period, 150 infants were identified with DCD based on ICD-10 code. Fifty-two infants were ineligible, and 14 were lost to follow up. Although coded by HIM, 68 infants did not fulfil criteria for DCD diagnosis. Sixteen infants fulfilled the DCD diagnosis criteria with average GA  $32.1 \pm 4.3$  weeks (mean  $\pm$  SD) and average birth weight  $1790 \pm 732$  g (mean  $\pm$  SD), mostly prevalent in males and  $\geq 34$  weeks GA.

**Discussion:** A survey amongst a physician sample recruited from Canada, USA and UK revealed only 23–41% of physicians are familiar with DCD. Our study agreeably revealed a significantly lower number of DCD cases in preterm infants than is reported in the literature.

**Conclusion:** Awareness of DCD at a regional, educational, and health education management level is significantly lacking. Increasing awareness of the prevalence of DCD, its impact on daily life, and the serious consequences if left unrecognised is essential.

## COMPARING P-POSSUM AND ACS-NSQIP SURGICAL RISK CALCULATOR TO BEST PREDICT UNFAVOURABLE OUTCOMES AFTER SURGERY

Kalenderov R, Soop M  
*Tameside General Hospital, United Kingdom*

**Background and Aims:** All surgical interventions are associated with risks of morbidity and mortality. The ability to individually risk-stratify patients preoperatively is highly desired. This project aimed to compare two risk calculators, P-POSSUM and the ACS-NSQIP Universal Calculator, at predicting unfavourable outcomes.

**Methods:** A retrospective analysis of 158 patients who underwent an emergency laparotomy at Salford Royal Hospital between January 2015 and June 2016 was carried out. The medical notes were reviewed in order to establish what risk prediction score would have been given to each patient by the two calculators preoperatively. This was compared with the actual 30-days outcomes and analysed with observed to expected (O: E) ratios and Brier scores.

**Results:** ACS-NSQIP and P-POSSUM calculators produced O: E ratios of 1.29 and 0.84 respectively for mortality, 0.88 and 0.34 respectively for serious complications, and 2.15 and 1.02 for any complications. ACS-NSQIP produced superior Brier scores for both mortality and serious complications.

**Conclusion:** The observed results show that the ACS-NSQIP Universal Calculator has an advantage over P-POSSUM when applied to emergency laparotomy procedures. However, it is worth noting the small sample size, limited to emergency laparotomy procedures only, which was studied. Further work should be conducted to perform a more robust comparison of the two models, which would allow increased confidence in the choice of risk calculator.

## 18F-FDG PET IN THE DIAGNOSIS OF VASCULAR PROSTHETIC GRAFT INFECTION: A DIAGNOSTIC TEST ACCURACY META-ANALYSIS

**Rojas MD**, Kontopodis N, Antoniou S, Ioannou C, Antoniou G  
*Royal Oldham Hospital, Oldham, United Kingdom*

**Background and Aims:** The diagnosis of vascular prosthetic graft infection (VPGI) is a complex process, often requiring an intra-operative peri-graft biopsy to confirm an infection. Controversy exists regarding the use of imaging techniques in the diagnostic process. We aimed to evaluate the diagnostic accuracy of 18-fluorine fluorodeoxyglucose (18F-FDG) positron emission tomography (PET) in VPGI.

**Methods:** We conducted a systematic search of electronic databases to identify studies assessing the use of 18F-FDG PET in the diagnosis of VPGI. We conducted a meta-analysis using a mixed-effects logistic regression bivariate model.

**Results:** We identified 12 studies reporting a total of 433 prostheses, out of which 202 were proven to be infected. Analysis of PETs scan was performed using five different methods: graded uptake, focal uptake, maximal standardised uptake value (SUVmax), tissue-to-background ratio (TBR), and dual-time point (DTP). The pooled estimates for sensitivity and specificity for graded uptake were 0.89 (95% CI 0.73 to 0.96) and 0.61 (95% CI 0.48 to 0.74), respectively; they were 0.93 (95% CI 0.83 to 0.97) and 0.78 (95% CI 0.53 to 0.92) for focal uptake; 0.98 (95% CI 0.42 to 0.99) and 0.80 (95% CI 0.70 to 0.88) for SUVmax; 0.57 (95% CI 0.39 to 0.73) and 0.76 (95% CI 0.64 to 0.85) for TBR; and 1.00 (95% CI 0.48 to 1.00) and 0.88 (95% CI 0.68 to 0.97) for DTP.

**Conclusion:** Our meta-analysis suggests that 18F-FDG PET scan has a high sensitivity in diagnosing VPGI, and its accuracy can be further increased by combining PET with computed tomography (CT).

## THE EFFECT OF SOLITARY HOUSING ON MICROGLIAL CELLS - A POSSIBLE EXPLANATION BEHIND THE GLASGOW EFFECT

**MacDonald S**, Wyse C, Dewar D  
*Royal Hospital for Sick Children, Glasgow, United Kingdom*

**Background and Aims:** The circadian rhythm, or internal body clock, is a daily cycle of biological activity observed across species and is based around the 24-hour day. It has been shown that disruption of this rhythm by low levels of light at night can lead to negative health consequences such as cardiovascular disease, depression, and early mortality, among others. This study aimed to investigate the effect that Dim Light at Night (dLAN) would have on markers of microglia in the hippocampus of the mouse brain and to assess whether living in isolation has any effect on these levels.

**Methods:** Adult mice (n=32) were allocated to be singly housed or housed in groups of four and were randomised to a dLAN (12h dim light: 12h bright light) or control (12h dark: 12h light) group. Immunohistochemistry was performed on sections of the hippocampus for microglia using an antibody to Iba1, a marker present on microglia.

**Results:** There was a significant difference in immunopositivity between the different housing conditions in the hippocampus ( $p=0.02$ ), with the socially isolated mice having increased Iba1 expression (2.34% v 1.58%). There was no statistically significant difference between the lighting groups ( $p=0.18$ ).

**Conclusion:** These results give evidence to the hypothesis that living in social isolation increases levels of inflammation in the hippocampus, an area which functions to modulate the stress response. Social isolation is postulated to prime the brain through neuroinflammation, which may lead to an increased risk of negative health effects in those who live in urban environments. This may be one of the explanations behind the 'Glasgow effect', as Glasgow has one of the highest levels of social isolation of any city in the UK. This phenomenon describes greater health problems in Glasgow even when compared with equally deprived cities around the UK.

### A Qualitative Study to Identify the Opportunity for Health Promotion Intervention in the Emergency Department

**Robson S,** Gray A

*University of Edinburgh, United Kingdom*

**Background:** Emergency department (ED) staffs frequently see patients with potentially modifiable risk factors for acute, chronic or subsequent illness. Health promotion interventions delivered in the ED have been advocated for these patients but delivery remains suboptimal. This study aimed to compare the perspectives of doctors and nurses in the emergency department (ED) in order to recommend improved strategies and opportunities for health promotion interventions.

**Methods:** A multicentre, qualitative study was conducted in three EDs in Scotland in 2017. ED staffs at one large teaching hospital and two general hospitals were approached during hand over meetings. All staff who provided direct patient care were eligible for the study (n=273) and offered a multicomponent survey. Two pilot phases of the survey conducted before department role out.

**Results:** Of the 197 respondents (72% response rate), 79 (40%) were doctors and 118 (60%) were nurses. More doctors (86.1%, CI [76.8-92.1]) than nurses (51.7%, CI [42.8-60.5]) report offering health promotion interventions; specifically, for alcohol misuse, smoking, drug misuse and sexual health interventions. Time constraints (n=172, 87.3%) and a lack of health promotion infrastructure (n=100, 50.7%) in the ED were found to challenge widespread delivery (groups not mutually exclusive). Staff felt patients whose presentation was directly related to smoking and alcohol/drug misuse or patients with new-found hyperglycemia should be prioritised for brief interventions

**Discussion:** This is the first staff perspective study in the UK and shows encouraging rates of health promotion intervention being reported by ED staff, exceeding those previously reported in US and Australian studies. Staffs acknowledge the benefit of health promotion, in agreement with other studies, but time constraints and insufficient ED resources are unanimously recognised as barriers to practice.

**Conclusions:** Staffs require additional training in brief intervention techniques and treatment options to enhance their delivery of preventive care in the ED.

### AN ANALYSIS OF THE CAUSES OF DEATH IDENTIFIED AT AUTOPSY IN THE OBESE POPULATION

**Dunnigan AV,** Roberts I, Winter L

*Milton Keynes General Hospital, Milton Keynes, United Kingdom*

**Background and Aims:** Obesity is the fifth largest risk factor impacting on global mortality and its incidence is rising. Contribution of obesity to death rates is only measurable if included on death certificates. Obesity causes deaths directly e.g. obesity cardiomyopathy (OCM), and indirectly as a risk factor for coronary heart disease (CHD) and other conditions. In this study, we aim to investigate the reporting of obesity and its inclusion in death certificates in a single centre coronial autopsy service.

**Methods:** Retrospective review of autopsy reports in the Oxford pathology database across a three-year period (2014-2016). Autopsy reports were reviewed for height, weight and BMI, prevalence of obesity and obesity-specific conditions, all-cause mortality, CHD-related mortality, and mean age of death from CHD in different BMI categories.

**Results:** Height and weight were omitted without adequate reason in 14% of reports analysed (n= 1,514). Obesity is poorly recognised on death certificates where present (just 5.1% overall). Identification of OCM in the morbidly obese is rising; 6.6% compared to 2.0% in the previous largest study to date. In total, 739 (40%, n= 1,868) autopsies were performed on obese individuals. Obesity/obesity-specific pathology where included in the death certificates in 0.2% of obese (BMI 30-35), 7.4% of severely obese (BMI 35-40) and 25.7% of morbidly obese (BMI >40) individuals.

**Discussion:** CHD accounted for 26.4% of deaths in morbidly obese individuals and 20.7% of deaths in those of normal BMI. Strikingly, morbidly obese individuals died from CHD on average nine years earlier (mean age of death 68 years) compared to those of ideal BMI, mean age of death 77 years (p= 0.000004, 95% CI 5-13); this effect was not accounted for by concurrent presence of diabetes or hypertension.

**Conclusion:** This study links obesity to earlier death from CHD and indicates that obesity is under-recorded on death certificates by pathologists.

## THE MANAGEMENT OF ST-ELEVATED MYOCARDIAL INFARCTION IN A MIDDLE-INCOME SOUTH ASIAN COUNTRY: A MULTI-CENTRE STUDY

**Iddawela S**, Pittams A, Mortimer N, Sirisena T, Gunaratne A

*University of Birmingham College of Medical and Dental Sciences, United Kingdom*

**Background and Aims:** ST-elevated myocardial infarction (STEMI) is a leading cause of death in Sri Lanka and its outcomes are not well documented. The United Kingdom is a developed country whose treatment and management modalities differ significantly. This study aims to characterise the presentation and outcomes of STEMI patients in Sri Lanka, investigate the predictors of adverse outcomes, and compare the treatment pathways between the two countries to draw recommendations.

**Methods:** A retrospective analysis of 205 patients presenting over three months to a major tertiary care centre in Sri Lanka was performed. Data from the UK originated from the PCI database at the Queen Elizabeth Hospital, Birmingham, UK. Logistic regression was conducted to determine predictors of adverse outcomes.

**Results:** The rate of in-hospital mortality in Sri Lanka was 10%, significantly higher than in the UK. Thrombolysis was the mainstay of treatment in Sri Lanka. The estimate of late presenters was 27%. Sri Lankans were significantly younger than the British, with higher rates of diabetes and hypertension but lower rates of smoking. Country was not a predictive factor of in-hospital mortality among the Asian ethnicity.

**Discussion:** The high rate of in-hospital mortality of STEMI patients in Sri Lanka, combined with the frequency of late presentation and thrombolysis, highlight the need for a paradigm shift in the treatment, management and education of the population. The mortality of Asians presenting with STEMI was not significantly improved by being in the UK, despite its sophisticated health system. Although further research is needed to conclude, this indicates the need for targeted interventions in high risk groups within the UK, including Asians.

**Conclusion:** Implementation of primary care, patient education and pre-hospital care are important recommendations to improve outcomes in Sri Lanka. Research regarding the effectiveness of interventions in Asians within the UK is recommended.

## IDENTIFYING FACTORS OF MICROPARTICLES MODIFIED WITH ARGININE DERIVATIVES THAT INDUCE PHENOTYPIC SHIFTS IN MACROPHAGES

**Dunn-Sale AJ**, Bratlie KM

*Hull York Medical School, United Kingdom*

**Background and Aims:** Macrophages are key players in the progression of many diseases, ranging from rheumatoid arthritis to cancer. Drug delivery systems have the potential not only to transport payloads to diseased tissue, but also to influence cell behaviour. In microtumour environments, macrophage phenotypes become inappropriately shifted towards their angiogenic form, promoting the growth of cancerous tissue with the development of new blood vessels. If this behaviour could be controlled to avoid this, or even shift to more inflammatory behaviour, then tumour growth could be hindered. For example, topical microparticle treatment with this effect might be applied in surgical oncology to treat post-excision sites and reduce the chances of any satellite tumour particles from establishing themselves again. This study aims to identify factors of microparticles modified with arginine derivatives that induce phenotypic shifts in macrophages.

**Methods:** Poly (N-isopropylacrylamide-co-acrylic acid) (pNIPAm-co-AAc) microparticles were modified with 14 different arginine derivatives. These particles were then incubated with interleukin-4 or lipopolysaccharide-stimulated macrophages or naive macrophages (RAW264.7). The phenotypic state of the macrophages was assessed by measuring arginase activity, tumour necrosis factor- $\alpha$  (TNF- $\alpha$ ) secretion, and nitrite production.

**Results:** Partial least-squares analysis revealed material properties and descriptors that shifted the macrophage phenotype for the three cell conditions in this study. Material descriptors relating to secondary bonding were suggested to play a role in shifting phenotypes in all three macrophage culture conditions.

**Conclusion:** These findings suggest that macrophage responses could be altered through drug delivery vehicles, and these descriptors identified to be involved could be employed to assist in screening further potential candidates.

## **PREVALENCE OF DRY EYES IN PREGNANT WOMEN IN COMPARISON WITH NON-PREGNANT WOMEN**

**Verma R.** Kalra N, Baranwal VK  
*Army College of Medical Sciences, India*

**Background and Aims:** Pregnancy is a physiological state in a woman which alters all the systems in the body. Ocular changes such as dry eye, though mostly reversible, can cause enough discomfort in a patient to actively seek medical help. This study aims to establish whether there is a significant association between the occurrence of dry eyes and the pregnant state by comparing the prevalence of dry eyes in pregnant women with that in non-pregnant women of the same age group.

**Methods:** It is a cross-sectional, observational, case-control study with 400 participants. The test group consisted of 200 pregnant women whilst the control group comprised of 200 non-pregnant women. These participants were given a questionnaire that included the Ocular Surface Disease Index Score (OSDI score). They were also subjected to Schirmer's test (type 1). The paired t-test was used to test the significance of the hypothesis. Additional parameters have been used to determine the relation of dry eyes with the age, trimester and the parity in pregnant women.

**Results:** In the test group, 19 women were Schirmer's positive while, in the control group, 16 women were Schirmer's negative. The p value=0.007 was obtained, which is statistically significant. Observed data indicates a higher prevalence in primigravida females, pregnant women in the age group of 25-29 years, and pregnant women in their first trimester.

**Conclusion:** The study indicates that the relation between the prevalence of dry eyes and the pregnant state is statistically very significant. Hence, the hypothesis that the pregnant state is associated with a higher prevalence of dry eyes should be accepted.

Category: Clinical Audit

**DOES GRADE OF HALLUX RIGIDUS CORRELATE WITH FAILURE RATE FOLLOWING MINIMALLY INVASIVE DORSAL CHEILECTOMY?**

**Tan W**, Teoh K, Hariharan K  
*Cardiff University School of Medicine, United Kingdom*

**Background and Aims:** Hallux rigidus is a degenerative condition of the first metatarsophalangeal (MTP) joint, typically resulting in impingement pain and limitation of movement of the first MTP joint due to a dorsal osteophyte. Following failure of conservative treatment, traditionally a dorsal cheilectomy can be performed for patients in early stages of hallux rigidus. Minimally invasive forefoot surgery is becoming more popular with advances in technology and it is now possible to perform a minimally invasive dorsal cheilectomy (MIDC) of the first metatarsal with a wedge burr. The aim of this study was to determine if grade of hallux rigidus correlates with failure rate following MIDC.

**Methods:** We retrospectively analysed patients in our centre who had a symptomatic hallux rigidus treated with MIDC following failed conservative treatment between 2011 and 2016. They were graded preoperatively by Coughlin and Shurnas Classification.

**Results:** There were 89 patients (98 feet; 44 right, 36 left, 9 bilateral) in our series. The average age was 54 (range: 29 – 71) years old, with 25 male and 64 female. The Coughlin grades were as follows: Grade 1, n=33; Grade 2, n=54; Grade 3, n=11. Seven feet went on to have a first MTP joint fusion for ongoing pain (Coughlin Grade 2, n=6; Grade 3, n=1). There was no correlation between grade of hallux rigidus and failure of MIDC ( $p=0.38$ , chi square test).

**Conclusion:** Grade of hallux rigidus does not correlate with failure of MIDC, although there was no failure in Grade 1.

**A CLINICAL AUDIT ON PRIMARY POSTPARTUM HAEMORRHAGE IN NHS TAYSIDE**

**Subramanian A**  
*University of Dundee School of Medicine, United Kingdom*

**Background and Aims:** Primary postpartum haemorrhage (PPH) is defined as vaginal blood loss of 500ml or greater within 24 hours of delivery. PPH occurs frequently in the UK and is the leading cause of maternal death in developing countries. The objective of this clinical audit is to assess primary PPH risk factors and evaluate current PPH management in NHS Tayside.

**Methods:** The design is a retrospective audit for 15 weeks. Participants had vaginal delivery with PPH of 500-1500ml. Current practice is compared with a new PPH management checklist developed by MCQIC alongside Scottish Patient Safety Programme. Main outcomes measured are antenatal risk factors, perinatal risk factors and management from the checklist. Data was collected through obstetric notes.

**Results:** 83 patients were included. The most prevalent antenatal risk factor was anaemia (34.9%). Other common antenatal risk factors were antepartum haemorrhage (30.1%) and previous PPH (21.7%). The largest perinatal risk factor was labour induction (53%). Comparison between expected and achieved standards showed 100% attainment in administering uterotonics, genital tract inspection and blood transfusion. Some of the least achieved standards were uterine massage, emptying bladder and IV fluids.

**Discussion:** Patients at high risk of PPH require specialised care. The multidisciplinary team needs to assess risk factors regularly and anticipate PPH in these patients. They should ideally deliver in a consultant-led unit. Modifiable risk factors such as anaemia should be addressed before delivery. PPH management was generally well conducted in NHS Tayside, but quick management steps such as uterine massage and bladder emptying were not always documented.

**Conclusion:** Regular risk assessment and prompt management of PPH is crucial for good prognosis. Introducing risk assessment forms in antenatal and intrapartum care can improve recognition of risk factors. The use of checklists during PPH can help documentation. Implementing the new checklist or a similar tool for PPH is targeted to enhance the current practice.

## EVALUATING THE ADHERENCE OF PRIMARY HEALTHCARE CENTRES IN GAZA STRIP TO THE WHO-PEN PROTOCOL 1: A CROSS-SECTIONAL STUDY

**Affifi JT**, Alwali A, Dwekat D, Alyazouri H, Elessi K  
*Islamic University of Gaza, Palestine*

**Background and Aims:** Cardiovascular disease is common in the general population. It is a multi-factorial disease. Certain risk factors, such as family history, gender, ethnicity and age, cannot be changed. Other risk factors, including high blood pressure, high cholesterol and diabetes, are modifiable. This study evaluates the adherence of primary healthcare centres in Gaza to the WHO-PEN protocol.

**Methods:** A cross-sectional study involving 200 patients who were already diagnosed with NCDs was conducted at healthcare centres in Gaza. Data was collected retrospectively using a self-designed questionnaire based on the WHO-PEN checklist. Patients' files were selected randomly.

**Results:** Based on the analysis of whole cohort (200 cases). The prevalence of DM was 39% and hypertension was 28.5%, whereas 32.5% had both in 2017. There were only 17 smokers among patients, representing 8.5% of the sample. Using WHO/ISH - WHO/International Society of Hypertension - risk prediction charts, half of patients had a risk of less than 10%. On the other hand, 10% of patients had a risk of over 40% which means they need to be given statins. However, 1% did not receive statins. In patients under 55 years old, there was over prescription of baby aspirin. Conversely, diuretics were not used as addressed in WHO-PEN protocol. Interestingly, there were four patients of the whole sample on no medications. All patients were counselled on diet, exercise and smoking cessation.

**Discussion:** There were slight differences between the two centres. In the first centre, there was better prescription of statins. Contrariwise, in the second centre, drug combination was conserved for advanced cases. Both centres had good counselling and follow-up. Eventually, both show good adherence to WHO-PEN protocol in practice as well as documentation.

**Conclusion:** Results demonstrate high adherence to WHO-PEN protocol in these centres, reflecting a high quality of care and follow-up. However, there were some deficiencies in the risk estimation, which should be documented for better counselling for patients with high risk.

## ASSESSMENT OF PREDISPOSING RISK FACTORS FOR SURGICAL SITE INFECTION IN PATIENTS ADMITTED TO THE SURGICAL WARDS OF BAGHDAD TEACHING HOSPITAL

**Al-Jasim AAH**, Mahmood AA  
*University of Baghdad - College of Medicine, Baghdad, Iraq*

**Background and Aims:** Surgical site infections are the most common nosocomial infection in surgical patients, and contribute to an increase in postoperative hospital stay and cost of care. Previous studies have identified some of the risk factors, including diabetes, steroid use and obesity. This study aims to re-assess some of these risk factors.

**Methods:** A case-control study took place in the Baghdad Teaching Hospital. Data collection was by a paper survey with interviewing of both patients and the surgical teams that are directly responsible for them. Cases were patients with surgical site infection admitted and treated in the surgical wards during the period from 1<sup>st</sup> July to 20<sup>th</sup> September 2017. Controls were conveniently selected as patients undergoing surgeries at Baghdad Teaching Hospital and followed up for 30 days for exclusion of the development of surgical site infection. For each participant, pre-surgical, post-surgical and demographic parameters were collected. Each parameter was compared between cases and controls for significant difference using IBM SPSS version 22.

**Results:** Total number of (N=51) cases were collected; all of them had superficial type of infection. Of them (N=19) were males and (N=32) were females. Controls were (N=65), of which (N=44) were males and (N=21) were females. Age showed a significant difference (P=0.002) between cases (average age= 48.22 years) and controls (average age= 38.20 years). Diabetes Mellitus showed to be the factor of highest effect (Odds ratio = 6.354, P=0.001). Pre-operative hygiene measures, including pre-surgical bath and shaving (P=0.039, P=0.001 respectively), also significantly affected the rates of infection.

**Conclusion:** Surgical site infection showed to be of higher occurrence in diabetic and obese patients. Higher care for such patients should therefore be implemented to reduce their risk. Increased care of pre-operative prophylactic measures is recommended as it showed to be of effect in reducing the risk of infection.



## A PRIMARY AND SECONDARY CARE COLLABORATION TO IMPROVE THE MANAGEMENT OF INTERMITTENT CLAUDICATION

**Chandy T**, Lewis D, Minton D  
*Cardiff University School of Medicine, United Kingdom*

**Background and Aims:** First line treatment of patients with intermittent claudication (IC) should be optimal medical therapy (OMT): a combination of cardiovascular risk modification and a supervised exercise programme (SEP). Further investigation of IC patients is only indicated if vascular intervention is being considered. Our aim was to review the value added to patient care by referral of IC patients to a vascular surgeon.

**Methods:** Both quantitative and qualitative evaluations of IC patients' care were undertaken by: a review of IC referrals, interviews with the patients, and GP interviews. New IC referrals over a 10-week period were reviewed. Data was extracted regarding OMT, definitive diagnosis and investigation initiation. Qualitatively, 10 patients at clinics and seven GPs via telephone were interviewed. Themes were identified as: understanding and management, exercise therapy opinions, and expectations of secondary care.

**Results:** Thirty-eight referrals were reviewed and showed only 60% were on antiplatelet therapy (APT), 68% were on a statin, whilst 32% were current smokers and 37% included ABPIs. Only two referrals mentioned exercise therapy; this was not SEP but non-specific advice. Interviews showed that patients lacked an understanding of their condition and its best clinical management. GP interviews highlighted that current management could be significantly improved to ensure OMT is delivered at the earliest opportunity.

**Conclusion:** The majority of IC patients do not need to see a vascular surgeon and should be referred directly to a SEP. Value added care should focus on OMT, smoking cessation and exercise. Subsequently, Primary and Secondary Care together have developed a new IC management pathway, as GPs can now refer directly to the National Exercise Referral Scheme which provides the SEPs. An educational patient leaflet emphasising the importance of SEP has been developed. All GP practices now have received hand-held Dopplers and practice nurses are being trained to measure ABPIs.

## UNCONTROLLED HYPERTENSION; FROM DETERMINANTS TO FIRST ENCOUNTER MANAGEMENT AT EMERGENCY UNIT OF BAGHDAD TEACHING HOSPITAL

**Al-Jarshawi MH**, Al-Halaq SY, Al-Saffar MBA  
*University of Baghdad, Iraq*

**Background:** Hypertension is uncontrolled when blood pressure reading is more than 140/90 mm Hg. This condition places the individual at a risk of developing hypertensive crisis, whether emergency or urgency.

**Aim:** To identify the proportion and evaluate the management of uncontrolled hypertension in the emergency department and review some characteristics of uncontrolled hypertensive patients.

**Methods:** Four hundred and nine cases presented with blood pressure (>140/90 mm Hg), irrespective of past medical history of hypertension, to the emergency unit at Baghdad Teaching Hospital were included in this retrospective cross-sectional study. Data on socio-demographics, chief complaints, past medical history, work-up, management with anti-hypertensive and disposition was collected from patient records in the archives between July and September 2017.

**Results:** Cases with uncontrolled hypertension formed 6.56% of all admissions to emergency department. Means of systolic and diastolic blood pressure readings were 169.98 and 96.66 mm Hg, respectively. In this study, 45.47% were male and 54.52% were female. Average age was 54.95. One hundred and fifty-one (2.4%) were cases of hypertension crisis among emergency unit attendants. Diabetes mellitus was the single most common past medical condition among all cases. Shortness of breath was the main chief complaint (22%) in hypertension crisis cases; chest pain was the most common presenting complaint in all included cases. Management was not documented in records of 214 (50%). However, in most of the remaining cases, 137 (70%) consisted of: loop diuretics (furosemide), angiotensin-converting enzyme inhibitors in 22 (11%), calcium channel blockers in 17 (8%), and beta blockers in 13 (6%).

**Conclusion:** One third of patients who attended the emergency department with elevated blood pressure were cases of hypertension crisis. Diabetes mellitus was the major co-morbidity. Local practice in management was not compliant to the guidelines and severity but subjected to the availability of medication.

## AN EVALUATION OF LOCAL SMOKING CESSATION THERAPIES PRESCRIBED BY DOCTORS, THEIR KNOWLEDGE AND THEIR PRESCRIPTION TENDENCIES

Caruana Montaldo B, Grech B, Debono S, Pizzuto M  
*University of Malta Faculty of Medicine and Surgery, Malta*

**Background and Aims:** Smoking is a common practice which negatively affects one's health in increasing the risk of cancers (such as lung and bladder). It is also a major risk factor for cardiovascular disease. Locally, one can find nicotine replacement patches (NRP), lozenges (NRL), gums (NRG) and inhalers (NRI), as well as varenicline and bupropion, as smoking cessation therapies to quit smoking. This audit focused on NRP and varenicline, which are the two commonest therapies used locally. It aims to evaluate the knowledge and prescription tendencies of doctors to local smoking cessation therapies.

**Methods:** Data was collected in the form of questionnaires, with the questions being related to doctors' prescription tendencies, their knowledge and their most commonly prescribed medication.

**Results:** One hundred and ten doctors (54 junior doctors, 32 senior doctors and 24 specialists) participated in the questionnaire. Most of the junior doctors had heard of only NRP (56%) and only 31% had heard of varenicline, whilst the specialists had heard of all the available modes of medications and therapies (75% for NRP and 75% for varenicline). All doctors were more likely to prescribe nicotine replacement patches (68% for junior doctors, 56% for senior doctors and 35% for specialists), but specialists listed varenicline as a close second (28%). Thirty-one percent of junior doctors, 21% of senior doctors and 25% of specialists were unaware of the side effects of NRP, whilst 65% of junior doctors, 34% of senior doctors and 25% of specialists were unaware of the side effects of varenicline.

**Discussion:** To further evaluate knowledge, the doctors were asked about the correct way of prescribing both NRP and varenicline. For the former, 28% of junior doctors, 57% of senior doctors and 75% of specialists answered correctly whilst, for the latter, only 20% of junior doctors, 53% of senior doctors and 50% of specialists answered correctly.

**Conclusion:** Nicotine replacement patches remain the treatment of choice amongst doctors locally for stopping smoking.

## HEART FAILURE DISCHARGE LETTERS: A QUALITY IMPROVEMENT PROJECT

Dulay MS, Shah M\*  
*London North West Healthcare University NHS Trust, United Kingdom*

**Background and Aims:** Heart failure (HF) is an increasingly prevalent condition due to the ageing population and improved acute cardiovascular therapies. HF patients have frequent exacerbations and consequent readmissions. The discharge letter summarises the admission details, and is useful for both primary and secondary care physicians, as well as for clinicians, during readmission episodes. The content of such letters is often written with varying quality. This study implements a quality improvement project (QIP) approach using "Plan-Do-Study-Act" (PDSA) cycles with an aim to improve the quality of HF discharge letters.

**Methods:** Existing letters were retrospectively analysed objectively using an evidence-based ten-point scale (cycle 1). Further cycles included: education of cardiology junior doctors (cycle 2); stratification of data by discharging team to analyse for any discrepancies between specialties (cycle 3); targeted education and posters to general internal medical (GIM) junior doctors (cycle 4); further stratification of data by discharge specialty (cycle 5).

**Results:** Cycle 1 data demonstrated a mean score of 4.7/10 (n=20), which increased to 6.2/10 (n=44) in cycle 2. In cycle 3, stratification demonstrated a change in discharge summary quality by the cardiology team (cycle 1 mean 4.7/10; cycle 2 mean 6.8/10, n=47) in contrast with those patients discharged by GIM specialties (cycle 1 mean 4.5/10; cycle 2 mean 4.2/10, n=17). Cycle 4 showed an improved overall mean score of 6.8/10 (n=32). Final stratification in cycle 5 demonstrated improvement in both cardiology and GIM specialties (cardiology mean 7.5/10, n=21; GIM mean 5.4/10, n=11).

**Discussion:** This study demonstrates that a QIP can be used to improve the content of HF discharge summaries with simple interventions and to identify areas of suboptimal practice.

**Conclusion:** Our simple interventions have substantially improved HF discharge summaries at our Trust. Changes to the electronic discharge letter template would ensure that these improvements have longevity.

## THE ROLE OF PLAIN ABDOMINAL X-RAYS IN ACUTE ABDOMEN

**Paul S**

*Scunthorpe General Hospital, Scunthorpe, United Kingdom*

**Background and Aims:** This audit was carried out to ascertain the value of abdominal X-rays in finding the cause of acute abdomen, clinician's compliance to guidelines, and if further imaging was performed.

**Methods:** Data was collected retrospectively using RIS and included A&E patients who had an abdominal X-ray in September. Two hundred and twenty-one patients were included. Data including the indication, findings and evidence for further imaging were collected from PACS.

**Results:** Out of 221 films, 135 met the standard for AXR whilst 86 did not meet the standard. Out of 135 films, 122 were reported as normal and 13 as abnormal. Of the normal AXRs, 29 patients went on to have further imaging, 14 of which were normal CT scans. The remainder were a mix of pathologies. All 13 patients with X-ray abnormalities had CT scans; 10/13 were abnormal.

**Discussion:** One hundred and twenty-two of 135 patients who met the criteria had normal AXRs. This amounts to 88% sensitivity of AXR. The reason for which further imaging was performed despite this requires further investigation. Determining the grade of the requesting clinician may be valuable. In patients with normal AXR who still had a CT, only 53% were reported as being normal. Abnormalities such as bladder perforation and caecal mass were noted on CT. In the majority of these cases, the indication had been pain. Bypassing an AXR in such serious cases for an immediate CT scan may have been more appropriate.

**Conclusion:** In conclusion, AXRs are often requested inappropriately. This audit highlights the need for educational posters about indications for AXR being circulated. The use of various imaging modalities should be reiterated at radiology meetings or incorporated into E-learning for doctors.

## FACTORS AFFECTING QUALITY OF HISTOLOGICAL SPECIMENS IN LAPAROSCOPIC ANTERIOR RESECTIONS – A RETROSPECTIVE COHORT STUDY

**O'Connor A**, Asaad P, Sardar M, Iqbal I

*Royal Albert Edward Infirmary, Wigan, United Kingdom*

**Background and Aims:** Laparoscopic resections for colorectal cancer are common. High quality specimens are determined by a clear resection margin (R0 resection) and adequate numbers of lymph nodes. One large study showed R0 rates of 86.7%. We aimed to explore the factors that could potentiate obtaining poor quality specimens during laparoscopic colorectal cancer surgery.

**Methods:** We performed a retrospective cohort study over one year. Patients undergoing laparoscopic anterior resection by one consultant surgeon at Wigan were included. Data was extracted from online notes. Gender, tumour, R0/R1, lymph nodes resected, distance from anal verge and pTNM were recorded.

**Results:** Thirty patients were included. R0 resection rate was 93% and the median number of lymph nodes was 13 (range 2 – 28). On analysing the two R1 resections, they were low anterior resections of T3 tumours with the mean distance from the anal verge 7.6cm. Mean distance from the anal verge for all other anterior resections was 13.7 (range 6.1-35cm). Both R1 resections were male. The mean size of the tumour for all anterior resections was 3.62, while that of the R1 tumours was 2.45cm. Only one patient who had an anterior resection had less than five lymph nodes isolated. The distance of this tumour from the anal verge was 8cm, and the size of the tumour was 0.3cm. The patient was male. 33% of patients who had an anterior resection had less than 10 lymph nodes isolated. Their mean distance from the anal verge was 14.7cm and the mean size of the tumour was 3.22cm. 78% were male.

**Discussion:** Smaller tumour size, shorter distance to the anal verge, and male gender appear to increase the risk of obtaining a poor-quality specimen.

**Conclusion:** The results appear to show factors affecting specimen quality following laparoscopic colorectal cancer resection are: gender, distance from the anal verge, and tumour size.

## A CLOSED LOOP AUDIT OF PRE-OPERATIVE ADMINISTRATION OF ANTIBIOTICS: WHERE SURGICAL OPINION AND GUIDELINES DISAGREE

**Bhamra N**, Layton GR, Naqvi M  
*Manor Hospital, Walsall, United Kingdom*

**Background and Aims:** Antimicrobial resistance has risen, driven by inappropriate and over use. The aim of this audit was to reduce elective surgery antibiotic consumption within a DGH to meet the "Antimicrobial Resistance CQUIN 2017/18".

**Methods:** Retrospective data collection of antibiotic used, indication, administration time and adherence to local guidelines was undertaken (October 2017). Ten elective patients were randomly selected from each sub-specialty (Breast, Colorectal, Ear, Nose & Throat/Maxillo-Facial, General Surgery/Vascular, Gynaecology, Orthopaedics, Upper Gastro-Intestinal, and Urology). Findings were presented locally, the guidelines were updated, then re-audited prospectively in 2018.

**Results:** Originally, 52.5% (n=42) patients were given antibiotics. Sixty-four percent (n=27) were inappropriate (not required/incorrect antibiotic). Thirty-three percent (n=15) received Tazocin. On re-audit, 55% (n=44) received antibiotics; 61% (n=27) inappropriately, with no Tazocin prescriptions. Original guidance advised prophylaxis be administered 30-60 minutes before knife to skin (KtS); only 26% (n=11) adhered. After feedback, Trust policy followed national guidelines, suggesting antibiotics be given as close to KtS as possible, preferably within one hour; 100% (n=44) followed the policy. Of 38 (47.5%) patients not given prophylaxis, original guidelines suggested 19 (50%) should receive antimicrobials. Sub-specialty case reviews deemed none necessary, but guidance was not amended. On re-audit, of 36 (45%) patients without antibiotics, potentially two (1.3%) required antimicrobials.

**Discussion:** Preserving institutional microbiology knowledge is difficult: doctors frequently rotate hospitals, and accessing information is time consuming and often impractical. Consequently, clinicians either use a "one-size-fits-all" antimicrobial – a broad-spectrum antibiotic - or align with national guidance. Although local broad-spectrum antibiotic recommendations remained unchanged, on re-audit no Tazocin was administered. However, inappropriate prophylaxis increased. This may reflect an increased clinical awareness of inappropriate Tazocin prescribing following audit presentation, with selection of alternative agents.

**Conclusion:** Despite policy changes, our local guidelines still over-estimate prophylactic antibiotic requirements and do not reflect sub-specialty opinion. Implementation of a single, national guideline could ensure appropriate antibiotic prophylaxis. Regular re-audit and presentation publicises recommendations and encourages adherence.

## AN AUDIT ON PREOPERATIVE FASTING TIMES IN PATIENTS ON THE ACUTE TRAUMA LIST

**Ul-Haq J**, Mruthunjaya H  
*Royal Albert Edward Infirmary, Wigan, United Kingdom*

**Background and Aims:** Patients are fasted preoperatively in order to prevent aspiration and regurgitation of gastric contents. Guidelines recommend patients fast six hours from food and two hours from fluids preoperatively. However, excessive fasting on emergency lists is common. Prolonged fasting has shown to increase patient discomfort, prolong wound healing, increase hypoglycaemic episodes, cause electrolyte imbalances, and result in longer hospitalisation. Research has shown that giving carbohydrate drinks two hours before procedures is safe and reduces postoperative complications. The aim of this audit is to assess the preoperative fasting times in patients on the trauma list to prevent prolonged fasting.

**Methods:** A prospective study was conducted in which we looked at patients operated on the surgical trauma list over a two-month period. Patient demographics, co-morbidities, and the operation performed were collected from patient notes. Information on preoperative fasting times were recorded using patient notes and from directly questioning patients.

**Results:** A total of 104 patients were identified from this study. The average time for which patients were fasted was 14 hours and 28 minutes. The maximum time for which patients were fasted was 26 hours and 46 minutes. Overall, this study showed that 98% of patients were excessively fasted preoperatively. A significant portion of patients had co-morbidities such as diabetes that would have been affected by prolonged fasting or were at increased risk of malnutrition.

**Discussion:** The results from this audit show that the majority of patients on the trauma list are being excessively fasted. This prolonged fasting can have effects on patient morbidity and increase the likelihood of postoperative complications. Better communication between teams and new protocols on fasting patients on the trauma list can help address this. In addition, the use of carbohydrate rich drinks two hours before operations can help reduce excessive fasting and improve patient outcomes.

## DOES ADJUVANT SUB-TENON TRIAMCINOLONE (STTA) AID IN THE MANAGEMENT OF DIABETIC MACULAR OEDEMA?

**Khalil M.** Al Turki R  
*University of Dundee, United Kingdom*

**Background:** DMO is a major cause of visual impairment. There remains a need to improve care.

**Aims:** Does STTA injection affect the number of intravitreal anti-VEGF injections needed for treatment of DMO?

**Methods:** One hundred six eyes from 56 patients from one vitreoretinal surgeon were studied retrospectively between 01/12/2015 and 30/12/2016. Inclusion criteria: adequate media clarity for fundus visualisation, verification of macular oedema by optical coherence topography (OCT), and absence of coexisting retinal disease. Analysis was done using Mann-Whitney U test with  $p < 0.05$  as significant.

**Results:** Ninety-two eyes received anti-VEGF alone; the mean number of anti-VEGF injections needed was 2.74 in one year. Fourteen eyes received adjuvant STTA; the number of anti-VEGF injections needed was 1.42. On average, patients receiving adjuvant STTA required less anti-VEGF injections ( $p = 0.005$ ). For eyes receiving STTA, baseline mean logMAR VA was 0.82 (Snellen equivalent 20/132) and Corneal macular thickness (CMT) was 464 microns. At 12 months, logMAR VA was 0.64 (Snellen 20/87), and CMT was 294 microns. For eyes that did not receive STTA, baseline logMAR VA was 0.30 (Snellen 20/40) and CMT was 342 microns. At 12 months, logMAR VA was 0.25 (Snellen 20/35) and CMT was 290 microns. 3/14 patients receiving STTA developed non-sight threatening rise in IOP requiring anti-glaucoma medications (21%). None required cataract surgery.

**Conclusion:** Anti-VEGF with adjuvant STTA appears to reduce the recurrence rate of DMO and, significantly, the need for more anti-VEGF injections by almost half. Side effects are manageable. The benefits clearly outweigh the risks.

## THE INITIAL MANAGEMENT OF PATIENTS MEETING THE SIRS CRITERIA AT A LARGE TERTIARY CARE TEACHING HOSPITAL

**Vindla S.** D'Souza F, Gautam N  
*Royal Liverpool University Hospital, Liverpool, United Kingdom*

**Background and Aims:** Sepsis is the initiation of the systemic inflammatory response syndrome (SIRS) due to infection. It is a major cause of patient mortality and morbidity. Sepsis may present as changes in vital signs: the SIRS criteria. The UK Sepsis Trust guidelines state that patients fulfilling two of the SIRS criterion should be screened for sepsis and treated if necessary. This service evaluation aimed to retrospectively assess the management of patients meeting the SIRS criteria at a tertiary care hospital.

**Methods:** From a larger study involving approximately 30,000 patients, 39 were randomly selected. It was assessed whether: patient notes indicated if infection was considered; any relevant investigations for infection were performed; and any antimicrobial treatment was administered. The time at which each of these occurred was also assessed to determine the quality of care received.

**Results:** Consideration of infection was documented in only 48.7% of subjects. However, 87% of patients received at least one of the following: infection indicated in the notes; an investigation; or antimicrobial treatment. The median time to perform an investigation for infection was longer than the time taken to administer antimicrobials (23.5 and 8.4 hours, respectively). In addition, fewer patients had investigations performed (56.4%) than antimicrobials prescribed (76.9%). In 13%, no investigation was performed or antimicrobial prescribed.

**Discussion:** In some subjects, sepsis may have simply not been considered. However, the proportion of patients receiving investigations and antimicrobials suggests that infection was often considered but poorly documented, and that antimicrobials were mostly administered empirically. In some cases, infection screening may not have been performed because the patient's clinical presentation suggested this was unlikely.

**Conclusion:** It is recommended that hospitals utilise alerting systems, such as NEWS, to identify patients meeting the SIRS criteria. In addition, a sepsis tool should be made available to aid documentation and guide management.

## AN AUDIT ASSESSING THE IMPACT OF TIME FROM PRESENTATION TO PYELOPLASTY UPON MAG3 RENOGRAM OUTCOME AND THE BENEFIT OF REPEAT RENOGAMS

**Haywood-Alexander B**, Hosney K, Hann Y  
*Royal Blackburn Hospital, Blackburn, United Kingdom*

**Background:** A MAG3 renogram/scan investigates the drainage of urine from the kidneys into the bladder. It can also be used to check for 'reflux'. Pyeloplasty is the surgical reconstruction of the renal pelvis in order to drain and decompress the kidney. The purpose of the surgery, in almost all cases, is to relieve a uretero-pelvic junction obstruction.

**Aims:** To compare the outcomes of pyeloplasty in those with split function with those who have a poorly functioning kidney.

**Methods:** We compared the outcomes of pyeloplasty in those with split function of >30% with those who had a poorly functioning kidney (split function ≤30%). A total of 175 patients were included. The mean length of FU was 573 days. The mean pre-operative split renal function was 39.4%. Thirty-five patients had split function of ≤30%. The mean waiting time from presentation to operation was 207 days. The mean interval between pyeloplasty and first post-operative renogram was 118 days. The second post-operative renogram was performed at a mean interval of 355 days following the first scan.

**Results:** A total of 89 patients had split function documented in one pre-operative and two post-operative renograms. Seventy-two cases (81%) showed stable or improved function on their first post-operative renogram (58 stable; 14 improved), and the second post-operative renogram showed renal function remained stable or improved in 68 cases (95%). In the remaining four patients, the split function only marginally deteriorated (average of -7%). Of the 17 cases with worsening renal function on the first post-operative renogram, the split function continued to deteriorate in only two cases. Patients who had worsening split function post-operatively had a longer waiting time for their procedure (the majority of those who waited over 200 days had poor functional outcomes). Pain was the most common presenting symptom (80% of cases); 79.2% of these patients had improved symptoms post-operatively. Those with split function of ≤30% showed higher levels of pain following the procedure (26.7%) compared to those with better function (20.8%).

**Discussion:** Longer waiting times from presentation to definitive treatment appear to have a significant negative impact on split renal function post-pyeloplasty. The majority of patients received functional and symptomatic improvement post-pyeloplasty, but there was no significant difference in outcome between those with split renal function of ≤30% compared to those with better renal function. Those with favourable results on the first post-operative renogram may not require further imaging.

## CHRONIC LYMPHOCYTIC LEUKAEMIA (CLL): AN AUDIT OF COMPLIANCE WITH KEY ASPECTS OF BRITISH SOCIETY FOR HAEMATOLOGY (BSH) GUIDELINES ON DIAGNOSTIC WORK-UP

**Vohra S**, Patel H  
*Royal Albert Edward Infirmary, Wigan, United Kingdom*

**Background:** Chronic lymphocytic leukaemia (CLL) is a malignant clonal disorder of B lymphocytes with levels greater than  $5 \times 10^9/L$  ( $5 \times 10^9/\text{microliter}$ ) involving the bone marrow and peripheral blood. The incidence of CLL increases with age. Upon diagnosis, British Society for Haematology (BSH) recommends that all patients should undergo specific tests such as full blood count, reticulocyte count, direct antiglobulin test (DAT), immunophenotype, and serum immunoglobulins. In addition to this, screening for hepatitis B and C, TP53 deletion and a baseline CT scan should be performed prior to treatment.

**Aims:** The aim of the audit is to assess the compliance with key aspects of BSH guidelines on diagnostic work-up for CLL.

**Methods:** Electronic records for 32 patients diagnosed with CLL between January 2016 and May 2017 in Royal Albert Edward Infirmary (England) were analysed.

**Results:** The demographics show a higher proportion of males (59% - 19 of 32 patients) compared to females (41% - 13 of 32 patients). Similar studies show a male-to-female ratio of 2:1 which is comparable to our results. The mean age at diagnosis was 72 years. Three patients (9.4%) had haemoglobin levels below 100 g/l of which no patients had a reticulocyte count and direct antiglobulin test done. All 32 patients had an immunophenotype typical of CLL. Eight patients (25%) did not have their serum immunoglobulins checked. Three of 32 patients (9%) received treatment with FCR (Fludarabine, Cyclophosphamide, Rituximab) as first line therapy. Before treatment, all three patients had screening for hepatitis B and C, TP53 deletion and baseline CT scan.

**Conclusion:** We suggest that patients with low haemoglobin levels should have direct antiglobulin test and reticulocyte count performed. All patients should have their serum immunoglobulins checked. A diagnostic work-up and pre-treatment checklist should be designed to guide specialist teams.

## EVALUATION OF DEATH CERTIFICATION PRACTICES AT WEST WALES GENERAL HOSPITAL - AN AREA FOR QUALITY IMPROVEMENT?

**Sandhar S.** Kungwengwe G, Gupta A  
*West Wales General Hospital, Carmarthen, United Kingdom*

**Background and Aims:** As outlined by the Office for National Statistics' (ONS) Death Certification Advisory Group, the quality of death certification conveys several epidemiological and clinical implications. More specifically, this data is often implicated in population health monitoring and in the design and evaluation of Public Health interventions, to mention but a few. Subsequently, our aim was to analyse current documentation practices and improve the quality of Medical Certificates of Cause of Death (MCCDs) and Death Advice Letters (DALs) at West Wales General Hospital.

### Methods:

#### Patient Selection

Retrospective analysis of 55 randomised cases between January 2016 and August 2017.

- Inclusion criteria: 1) deceased between the time-period; 2) under medical and/or surgical care
- Exclusion criteria: 1) illegible DALs\*; 2) case referred to Coroner  
\*MCCDs are kept within the National Registry. Therefore, DALs were used as a surrogate.

#### Analysis of Patient Notes

Paper and electronic notes were scrutinised.

- Non-adherence to National (ONS) Guidelines was determined by the use of 1) abbreviations; and 2) vague terms
- Non-compliance with recommended hospital practice was determined by the absence of a 'Senior Discussion Stamp'.

**Results:** 45/55 cases eligible based on exclusion criteria. In line with ONS Guidelines, 22/45 (48% surgical vs. 50% medical) entries were non-adherent, with 23/45 (52% surgical vs. 50% medical) recorded as adherent. Of the 22 non-adherent entries, 82% were due to the use of vague terms and 18% as a result of abbreviation use. Interestingly, no entries contained the Senior Discussion Stamp.

**Discussion:** Despite the medico-legal implications of inaccurate patient documentation, the quality of MCCD/DAL completion was poor. These results highlight the need for targeted education amongst medical professionals to improve this process.

**Conclusion:** In light of our findings we have developed an educational resource for implementation within the hospital. In addition, emphasis on the documentation of discussions between Junior and Senior teams is warranted.

## ARE PATIENTS SUFFERING FROM CHRONIC KIDNEY DISEASE (CKD) STAGE 3 MONITORED REGULARLY IN PRIMARY CARE AS PER THE NICE GUIDELINES?

**Ahmad M.** Alhennawi N, Chaudhary Y, Akhter Z  
*Lancashire Teaching Hospitals NHS Trust, United Kingdom*

**Background:** Worldwide, Chronic Kidney Disease (CKD) is associated with significant mortality and morbidity. Ranked 14<sup>th</sup> in the leading causes of death in 2012, it is becoming increasingly challenging to manage. Predicting disease progression is difficult in patients, especially those with co-existing comorbidities. Risks associated with accelerated glomerular filtration rate (GFR) decline include cardiovascular and end-stage renal disease (ESRD), the latter proving to be a substantial burden on the NHS. The National Institute for Health and Care Excellence (NICE) and Kidney Disease: Improving Global Outcomes (KDIGO) have produced guidelines on how to approach, monitor and manage these patients.

**Aims:** To assess whether CKD patients have been monitored as per NICE guidance in primary care. To develop a protocol on managing fluctuating GFR parameters for primary care use.

**Methods:** A cohort of CKD patients registered at primary care practice were investigated over a 12-month period; monitoring of GFR/ Urine albumin to creatinine ratio (ACR) and stage 3 of the disease were the prerequisite. Further discussion revealed the need of a local protocol on approaching those with changing GFRs. Relevant literature was reviewed and national recommendations were studied.

**Results:** Forty-nine patients were identified, 44 of which had a GFR tested but only 17 who had combined GFR and ACR monitored. The algorithm produced consisted of managing patients whose decline in GFR was due to either pharmacological reasons or pathological causes.

**Conclusion:** The results indicate the need for regular monitoring with both a blood test and urine dip to adhere to advice given by national health bodies. The aim of the protocol is to detect initial stages of progressive disease and to refer to a specialist for early intervention.

## THE RATE OF SURGICAL SITE INFECTIONS FOLLOWING SPINAL SURGERY: A CLINICAL AUDIT

**Clark M**, Wright E, Treanor S, Berg A  
*Stepping Hill Hospital, Stockport, United Kingdom*

**Background and Aims:** Post-operative surgical site infections are associated with post-operative morbidity and present a significant burden to the NHS in relation to readmission rates, extended inpatient stay and poor outcomes. Smith et al. established the overall rate of surgical site infections following 108,419 spinal procedures as 2.1%; the accepted gold standard. This audit aims to compare the rate of post-operative surgical site infections with this expected rate, and to assess whether there is any correlation between rate of infection and type of procedure.

**Methods:** A retrospective search was conducted of all cervical and lumbar spine surgeries requiring a general anaesthetic between 3<sup>rd</sup> January 2017 and 20<sup>th</sup> November 2017, totalling 188 procedures. All patients were nursed on a spinal unit throughout admission. Electronic hospital records were reviewed for any evidence of treatment or readmission for infection within six weeks of surgery.

**Results:** Of 188 cases, four were re-operations and 34 were joint consultant cases. No surgical site infections were identified during admission. However, three were identified following discharge, two of which required readmission. This gave an overall infection rate of 1.06%. There were two systemic infections during initial admission (one UTI and one LRTI). There was no correlation between the type of surgery and the rate of infection.

**Discussion:** Although surgical site infections conformed to standards, introduction of GIRFT ring fencing of orthopaedic elective beds has the potential to further improve this. Educating nursing staff regarding the signs of wound infections and appropriate management would help to identify infections promptly and reduce complications.

**Conclusion:** Post-operative surgical site infection rates conformed to and exceeded the expected standards. This may be related to the management of patients on a solely spinal unit under the care of experienced orthopaedic nurses. There was no increase in infection rate associated with prosthesis insertion, suggesting good operative sterility.

## LONG-TERM RESULTS OF THE ONCOLOGICAL SAFETY OF THE THERAPEUTIC MAMMOPLASTY: RESULTS IN A SINGLE CENTRE

Ballance L, Durrani S, **MacArthur A**, Murthy LB, Boland G  
*Royal Preston Hospital, Preston, United Kingdom*

**Background and Aims:** Therapeutic Mammoplasty (TM) is a combination of breast-conserving surgery and oncoplastic techniques. It allows the conservation of the natural shape of the breast whilst removing a larger amount of tissue, thus achieving an oncologically safe excision. There is little data available on the long-term oncological follow-up. The primary aim of this study is to assess local recurrence. The secondary aim is to determine 30-day readmission rate, wound infection rate and mortality rate.

**Methods:** A retrospective database of all patients undergoing TM at a single unit by three oncoplastic breast surgeons was created. Data on clear surgical margins, re-excision rate and loco-regional recurrence, surgical technique, complications, need for reoperation, and post-operative histopathology was recorded.

**Results:** A total of 49 patients were identified. The mean age was 52 (range = 29-74) and the mean BMI was 29.3. Ten percent of patients were current smokers. Two patients underwent neo-adjuvant chemotherapy. The study shows that the incidence of loco-regional recurrence is 6.1% at a mean of five years, ranging up to 84 months. A total of 4.1% had distant recurrence. This was within six to 18 months post-operatively. Overall, the incidence of incomplete incision was 4.1%, and 8.1% of patients encountered a complication. Of these, 6.1% (3/49) were readmitted for infected haematoma or wound dehiscence.

**Conclusion:** Our data shows low rates of required re-excisions and recurrence in TM. These results continue to support the long-term oncological safety of TM.



## IMPLANT-BASED BREAST RECONSTRUCTION WITH ARTIA TISSUE MATRIX

**Fakim B**, Highton L, Murphy J  
*Hull Royal Infirmary, Hull, United Kingdom*

**Background and Aims:** In 2015, Artia™, a new porcine Acellular Dermal Matrix (ADM), was introduced into our breast unit. As clinical studies of its use in breast reconstruction are lacking, the purpose of this prospective study was to assess outcome data for patients who had Artia™ assisted breast reconstruction. We compared this data to other studies of non-human ADMs in widespread use from the literature.

**Methods:** All consecutive patients who had Artia™ assisted breast reconstruction between July 2016 and February 2018 were identified. A prospective database was maintained including patient demographics, type of reconstruction, type of implant, oncological data if applicable, complication rates, and adjuvant treatment delays.

**Results:** Fifty-one patients undergoing 83 implant-based breast reconstructions with Artia™ were included in the study. Of the 83 reconstructions, 62% were performed following risk-reducing mastectomy, 28% following therapeutic mastectomy and 10% for revision procedures. The mean age of the patients at the time of surgery was 42.9 years and the mean BMI was 24.7 kg/m<sup>2</sup>. Over a mean 276-day follow-up period, the complication rate was 10.8%, including six breasts (7.2%) developing seromas, one breast developing a haematoma (1.2%) and two implant losses (2.4%) in a single patient.

**Discussion:** As there is currently no reported experience with this ADM in the literature, we compared our results with those from studies of other non-human ADMs, including Surgimend™ and Strattice™, which remains the most popular ADM in the UK. The complication rate with Artia matched those obtained from larger studies with the well-established ADMs.

**Conclusion:** This is one of the first studies demonstrating that Artia™ assisted implant-based breast reconstruction is associated with low and acceptable complication rates. The results are promising and are comparable to our experience using established ADMs, with an implant loss rate of 4.9% in over 500 ADM-assisted implant reconstructions.

## A SERVICE EVALUATION OF THE IMPLEMENTATION OF CLOSED LOOP OXYGENATION VENTILATION FOR BABIES UNDERGOING NEONATAL TRANSFER

**Underwood CG**, Dady I  
*University of Manchester, United Kingdom*

**Background:** Oxygen therapy is an important aspect of neonatal care; there is strong consensus that SpO<sub>2</sub> levels should be kept within a tight limit. A recent systematic review showed that compliance of oxygen saturation targets is low in neonatal units and, therefore, the potential need for automated ventilation has been proposed.

**Aims:** The aim of this research project was to perform a service evaluation of the Predictive Intelligent Control of Oxygenation (PRICO) mode in a NICU transfer setting. PRICO mode is an automated ventilation system and the research was carried out with the Greater Manchester Neonatal transport team.

**Methods:** A standardised data collection form was produced which included a five-minute log for SpO<sub>2</sub>. This was taken on transfers and data was collected for 20 transfers over the data collection period. In 40% of the transfers, the SpO<sub>2</sub> was kept within the desired range 100% of the time. In the rest of the transfers, the percentage of time within the range set was above 50%, except for three cases.

**Results:** The recent BOOST II study found only half of neonates' oxygen saturations were kept in the desired range. When compared to the literature, this research indicates PRICO works well compared to manual adjustments.

**Discussion:** This study was purely observation and a RCT would need to be designed with a larger sample size to allow for statistical analysis. As with all new technology, PRICO will require surveillance as it is introduced into routine clinical practice.

## THE USE OF SILDENAFIL IN PRETERM INFANTS WITH CHRONIC LUNG DISEASE

**Butcher B,** Gupta R  
*University of Manchester, United Kingdom*

**Background and Aims:** Chronic lung disease (CLD) is a multisystem disorder that affects many preterm infants. It is a significant cause of mortality, developmental delay and family distress. Sildenafil is a selective pulmonary vasodilator which has been shown to have potential in the treatment of neonates with CLD and associated pulmonary hypertension. This study aimed to investigate the use of Sildenafil in preterm infants with CLD.

**Methods:** This case-control audit looked at infants with CLD who were prescribed Sildenafil at Royal Preston Hospital between 2009 and 2016. It compared these infants to a larger population with CLD who were not prescribed Sildenafil. Data was collected from patient notes and analysed using chi-squared testing, unpaired t-tests and Fisher's exact test.

**Results:** The data showed that the babies who went on to receive Sildenafil (n = 14) had significantly lower birthweights by an average of 174g (p = 0.0008) and were more premature by an average of 1.4 weeks (p = 0.0083) than the control group (n = 144). They were more likely to be discharged on steroids and diuretics. They spent longer dependent on invasive ventilation and non-invasive ventilation. They had a significantly higher CLD-related mortality rate (28.6% compared to 1.4% in the control group) and were less likely to be discharged home. Eight babies' level of respiratory support decreased after an average of 23 days Sildenafil therapy. There were no statistically significant differences in maternal risk factors or method of delivery between the two groups.

**Discussion:** This data demonstrates that babies who receive Sildenafil are smaller, more premature, and need more intensive respiratory support. Improvement in over half of the cases who received the drug may inform prescribing practices.

**Conclusion:** Babies who receive Sildenafil are a unique subgroup of the CLD population, at the severe end of the disease spectrum. It should add to existing literature to consider Sildenafil as a useful agent when treating severe CLD.

## SURGICAL MANAGEMENT OF HIGH GRADE GLIOMAS IN THE ELDERLY POPULATION

**Nanayakkara H**  
*University of Manchester, United Kingdom*

**Background:** As the population ages, the number of individuals diagnosed with gliomas is predicted to increase. Surgical resection of gliomas followed by adjuvant therapy based on evidence available could contribute to increase overall survival in the elderly population.

**Aims:** A retrospective study to assess the survival rates in elderly patients with high-grade gliomas against the survival and complication rates found in literature. The secondary objective is to identify whether a significant difference in survival exists between the <75 and ≥75 age groups.

**Methods:** Patients surgically treated for histologically proven gliomas at the Neurosurgical Unit at Salford Royal Foundation Trust from 1<sup>st</sup> June 2011 to 3<sup>rd</sup> March 2016 were included in this study and data was obtained from the Neuro-Oncology Database and Electronic Patient Records.

**Results:** A total of 124 patients older than 65 years with 131 admissions were included. There were 46 males and 78 females. Gross total resection was performed in 25 patients (19%); subtotal resection in 69 patients (53%); partial resection in 12 patients (9%); and biopsy in 25 patients (19%). At last follow-up, seven patients were alive with a median overall survival of 6.4 months. In log-rank analysis, the median survival for <75 was 6.9 months and ≥75 was 5.2 months, with no statistically-significant difference between the two groups. Complication rates amongst subgroups were not different.

**Conclusion:** In selected patients, surgery can be considered as a safe option. If surgery is accurately selected, patients above the age of 75 can benefit from surgical intervention with acceptable morbidity.

## IMPACT OF ADMITTING SPECIALTY ON EMERGENCY LAPAROTOMY MORTALITY

**Khalil T.**, Khalil M, Ibrahim I, Wilson M  
*University of Limerick, Republic of Ireland*

**Background:** Surgical patients may be directly admitted to general surgery or non-general surgery specialties, and their operation may be carried out at different time points. We hypothesise that surgeons are more proficient at diagnosing surgical problems, thereby reducing time to theatre and subsequently reducing mortality rate.

**Aims:** To establish whether patient admission through general surgery vs. non-general surgery affects the mortality of patients undergoing emergency laparotomy.

**Methods:** Retrospective analysis of patients undergoing emergency laparotomy between January 2009 and December 2014. Emergency theatre logbooks were used to identify those who underwent emergency laparotomies. Admission dates, admitting specialty, discharge dates, date of death, and postcodes were recorded using The Open Patient Administration System (TOPAS). Exclusion criteria included: emergency department admissions; gynaecological patients; and vascular patients. Fisher's exact test was used to identify statistical significance. End points were 30-day, 90-day, one-year and three-year mortality.

**Results:** We included 578 laparotomies in total. Mean patient age: 63 for both surgical and non-surgical admissions. A total of 50.3% of patients were male and 49.7% were female. The overall mortality at 30 days, 90 days, one year and three years were 13.1%, 16.8%, 23.5% and 32.4%, respectively. Data comparing surgical vs. non-surgical cohorts is displayed in Table 1. P-values were 0.0279, 0.0472, 0.0088 and 0.0046 for 30 days, 90 days, one year and three years mortality, respectively.

**Table 1:** 30-day, 90-day, one year, and three-year mortality in surgical vs. non-surgical cohorts.

Mortality	General Surgery	Non-General Surgery	P-value
30 days	11.6%	19.8%	<b>0.0279</b>
90 days	15.2%	23.4%	<b>0.0472</b>
1 year	21.2%	33.3%	<b>0.0088</b>
3 years	29.6%	44.1%	<b>0.0046</b>

**Conclusion:** Patients admitted directly to general surgery and underwent emergency laparotomy had a much lower mortality rate than those admitted through non-surgical specialties. However, better recognition of the need for laparotomy by a general surgeon is one component of a multi-varied equation that predicts overall mortality and concluding that it is the only reason would be an over simplification.

## POSTNATAL CARE FOR GESTATIONAL DIABETES MELLITUS: AN AUDIT OF A LONDON-BASED GP PRACTICE

**Olaolorun O.**, Pambakian N  
*King's College London GKT School of Medicine, United Kingdom*

**Background and Aims:** Gestational Diabetes Mellitus (GDM) puts women at a high risk of developing Diabetes Mellitus II (DMII). DMII poses a significant disease burden to patients, as well as representing a substantial financial burden on the NHS; approximately £12 billion annually. It is important to identify patients at risk of DMII to enable monitoring and early treatment, and to prevent comorbidities. NICE recommends that every woman who has GDM should receive an annual HbA1c as part of their follow-up care. The aim of this study was to evaluate if a particular GP practice complied with the above recommendations.

**Methods:** An audit was carried out at the local GP practice and the service was compared to the NICE recommendations. A search on the practice database was performed to find all the patients who have had GDM. The study evaluated if they all had their HbA1c checked within the last year.

**Results:** It was found that 73% of patients with a history of GDM had their HbA1c checked within the last year. The main reasons identified for not meeting the NICE standards were that some patients were not being recalled to have their HbA1c checked. Other patients had been recalled but did not have the blood tests. New patients who moved into the area were also missed as recalls were not entered into the system for them.

**Discussion:** As a result of the audit, all the patients identified were put into the system for an annual recall. Additionally, each patient was contacted by telephone to explain the importance of annual HbA1c testing and the requests forms were printed for them to collect at the practice. This audit was presented to the doctors working in the practice to increase awareness. The next step is to re-audit the practice in a year's time to assess if there has been any long-term improvement.

## THE USE OF ECG IN THE ASSESSMENT OF CHILDREN PRESENTING WITH CONVULSIVE SEIZURES: A REVIEW OF LOCAL PRACTICE AT THE ROYAL VICTORIA INFIRMARY, NEWCASTLE-UPON-TYNE

**Dennis J**, Leonard H

*Royal Victoria Infirmary, Newcastle Upon Tyne, United Kingdom*

**Background and Aims:** The British Paediatric Neurology Association (BPNA) teaching supports Scottish Intercollegiate Guidelines Network (SIGN) recommendations that every child presenting with a febrile convulsive seizure have a 12-lead ECG performed with corrected QT interval (QTc) calculated. We aimed to review our clinical practice regarding adherence to this.

**Methods:** All children aged 16 or younger attending A&E or the admissions unit at the Royal Victoria Infirmary (RVI) from 01/12/17 to 31/01/18 with admission diagnosis coded as 'seizure' were identified (n=101). Electronic and paper notes were reviewed; those with febrile or non-convulsive seizures and long-term epileptic patients for whom first seizure information was not available were excluded.

**Results:** Twenty-eight patients were included. Twenty-one patients (75%) had an ECG performed, with 81% of these having a normal ECG with normal QTc. Four patients had an ECG but no documentation of interpretation or QTc calculation.

**Discussion:** Although we demonstrate high concordance with SIGN guidelines, 25% of children presenting with an afebrile convulsive seizure had no ECG in their medical records, and a further four had no documentation of ECG interpretation or QTc calculation. Further work should be undertaken to clarify the reason for which ECGs were not performed or documented in these cases. A similar audit in Nottingham in 2014 highlighted only 23% adherence to SIGN guidelines, suggesting greater clarity around clinical guidelines and further education may be required to improve concordance nationally.

**Conclusion:** This audit has highlighted high adherence to SIGN recommendations at the RVI. However, a significant minority of patients were not managed accordingly. Improving this is of utmost importance as, whilst long QT syndrome (LQTS) is uncommon, reflected by the absence of any prolonged QTc in this audit, children with LQTS are prone to life-threatening ventricular arrhythmias. These can manifest clinically as syncope and seizures, and mortality can be reduced significantly with appropriate treatment.

## BLOOD LOSS IN NECK OF FEMUR FRACTURES - IS THERE A ROLE FOR TRANEXAMIC ACID?

**Sanalla A**, Kannan S, Chambers S

*Royal Victoria Infirmary, Newcastle Upon Tyne, United Kingdom*

**Background:** In hip fractures, a majority of in-hospital mortalities have been linked to postoperative blood loss. Studies have also shown that intra-operative blood loss is often significant, and hidden blood loss in hip fracture patients may be as high as 1500cc. Additionally, a study has demonstrated that blood transfusion increases in cost per admission by about £1200.

**Aims:** To quantify and compare the blood loss in patients with neck of femur fractures with and without administration of tranexamic acid.

**Methods:** We collected data for 100 consecutive NOF fractures admitted before July 2017. The on-going re-audit is a data of 50 consecutive patients with NOF fractures who have received tranexamic acid. All statistical tests were performed using SPSS. Frequencies were used to analyse the demographic data; student t-test and Man Whitney U test was used for continuous variables.

**Results:** Mean estimated blood loss was 714 ml. Our study showed no significant increase in blood loss in patients on anticoagulants (p-value = 0.3). Blood loss was significantly higher in patients who had hemiarthroplasty (p 0.04). DHS (p 0.5), IMHS (p. 0.7) and THR (p 0.2) did not cause significant blood loss. The data is being collected and analysed for a cohort of patients who have received tranexamic acid.

**Conclusion:** Neck of femur fracture patients lose close to two units of blood. Patients having hemiarthroplasty are susceptible to blood loss. Hence, these patients may benefit from administration of tranexamic acid.

## AUDIT ON PELVIC FRACTURES AND TIME TO RECONSTRUCTION

**Liaw F**, Govilkar S, Lim J

*University Hospital of North Staffordshire, Stoke on Trent, United Kingdom*

**Background and Aims:** Fractures of the pelvic ring occur following high energy transfer, and are significant injuries with associated morbidity and mortality. These injuries require urgent management with a pelvic binder, followed by either early definitive surgery or temporary mechanical stabilisation if this is unable to be performed. According to the new BOAST (British Orthopaedic Association Audit Standards for Trauma) guidelines on pelvic fractures, pelvic ring reconstruction should occur within 72 hours following stabilisation of a patient's physiological state. This aim of this study was to evaluate the time to reconstruction in patients presenting with pelvic fractures to the Royal Stoke University Hospital.

**Methods:** From a trauma admissions database, we retrospectively reviewed records of 14 patients with pelvic fractures who required operative management from 01/01/2017 to 31/12/2017. Patients were deemed to have achieved a stable physiological state once they had achieved a stable serum lactate result, or once they were stable enough to undergo trauma computed tomography (CT) scan.

**Results:** Of the 14 patients who fitted the inclusion criteria, 13 patients (93%) underwent pelvic ring reconstruction within 72 hours of achieving a stable physiological state. Eight of the 14 patients (57%) had undergone their operation within 24 hours of stabilisation, while 10 of the 14 patients (71%) had their operation within 48 hours of stabilisation.

**Discussion:** A large proportion of patients who presented with pelvic fractures requiring reconstruction to the Royal Stoke University Hospital (Major Trauma Centre) were able to undergo pelvic ring reconstruction within the target time, as all but one (93%) of our patients had met the target time for pelvic ring reconstruction as per the new BOAST pelvic fracture guidelines introduced in January 2018. This was achieved even prior to introduction of the new guidelines.

**Conclusion:** Ninety-three percent of our patients met the target time as set by current BOAST guidelines. Following dissemination of the results via presentation at a department-wide meeting, and circulation of the new guidelines, we will aim to re-audit this following application of these interventions.

## CONSENT FOR COMMON GENERAL SURGICAL PROCEDURES: A RETROSPECTIVE AUDIT

**Hoggett L**, Timms S, Smith D

*Royal Bolton Hospital, Bolton, United Kingdom*

**Background and Aims:** Consent is essential to patient safety. It is covered by the Royal College of Surgeons' 'Good Surgical Practice' guidelines, and has gained attention recently following the Montgomery vs. Lanarkshire case. However, consent taken by doctors is anecdotally highly variable. None of the Surgical Colleges or relevant societies offer procedure-specific consenting guidance. EIDO is a private company which supplies evidence-based patient information leaflets to hospitals for consent, accredited by the Royal College of Surgeons. This study examines the procurement of consent for common general surgical procedures in a district general hospital.

**Methods:** The consent forms for 135 common procedures (50 open inguinal hernia repairs, 39 laparoscopic cholecystectomies, and 46 diagnostic laparoscopies) performed in the preceding six months at a district general hospital were audited. Data was collected on the time between consent and surgery, and whether patients were given a copy of the consent form. Risks were compared with those listed in the EIDO leaflet for each procedure.

**Results:** For each procedure, common risks were well-represented on consent forms, with more serious risks such as bile leak in laparoscopic cholecystectomy (72%) and damage to the spermatic cord in hernia (60%) less frequently recorded. Consultants listed fewer risks than junior doctors. No single consent form recorded all pertinent risks as recommended by EIDO. In 42% of forms, the patient copy was retained in the case notes and not given to the patient. Sixty-seven percent of consent forms were completed on the day of surgery.

**Conclusion:** There was a wide variation between individual clinicians in risks mentioned. Although recent guidance states that consent should be obtained prior to the day of surgery, this is not the case for most patients in this cohort. This data was presented locally at the departmental meeting, and a plan was initiated to provide pre-printed consent forms and patient leaflets in the clinic.

## TRAINING OPPORTUNITIES IN PLASTIC SURGERY TRAINING

**Chu H**, Krishna S, Baden J

*Queen Elizabeth Medical Centre, Birmingham, United Kingdom*

**Background and Aims:** Core Surgical Trainees (CST) undertake a two-year training programme in the UK which provides training in a range of surgical specialities. The Joint Committee for Surgical Training (JCST) states that all CSTs should attend three consultant-supervised sessions of four hours each week (40% of our total working time) and one clinic (8% of working time). Increasing service provision demands due to rota gaps has led to training opportunities being compromised, affecting not only training but also moral and job satisfaction. We aim to review and improve this through our audit.

**Methods:** We carried out a retrospective study of the training opportunities available to the Senior House Officers at Queen Elizabeth Medical Centre's Plastic Surgery Department by documenting service provision and training opportunities from October 2017 to December 2017. Data was collected via weekly rotas and recorded on a spreadsheet. Our findings were presented to the junior doctors' forum to highlight the discrepancies in our training opportunities. A further audit was performed for the following two months using the same database, and the data was analysed.

**Results:** Our original loop over the initial four-month period revealed that 36.34% of our working time was dedicated to theatre and 3.68 % of our working time was allocated to clinic. Following intervention, our theatre time was 43.7% and clinic time was 6.0%.

**Conclusion:** We have demonstrated that our current training model within this hospital is below the standard set by JCST. However, following discussion at our doctors' forum, we have managed to increase our allocated theatre time to above the recommended standard of 40%. In the current climate, training often takes a back seat as the demand for service increases ever more. We must recognise that training is important for career progression, and we have highlighted that, through increased awareness, the balance can be readdressed.

## IMPROVING OUTCOMES OF EMERGENCY COLECTOMY IN PATIENTS WITH ACUTE SEVERE COLITIS: ENHANCED SURGICAL REFERRAL PATHWAY

Chew B, Chaudhry I, Norwood M, **Raheman F**

*Leicester Royal Infirmary, Leicester, United Kingdom*

**Background and Aims:** Acute severe colitis is a life-threatening condition which should be recognised early and managed with prompt initiation of intensive treatment. A delay in surgery due to 'hopeful-expectations' from medical management may lead to increased post-operative complications. This study aims to develop an enhanced surgical referral pathway which will guide the management of patients with acute severe colitis.

**Methods:** A retrospective review of patients diagnosed with acute severe colitis between October 2015 and September 2017 was conducted. Patients who underwent emergency subtotal colectomy were identified. Data was cross-referenced between emergency theatre and inpatient databases; duration of medical therapy, time to surgical referral from diagnosis, and post-operative outcomes were analysed. Current surgical referral pathway was audited to evaluate inpatient care against NICE guidance. Patients were classified in two cohorts based on duration of in-hospital medical therapy and time to surgical referral. Univariate analysis was used to assess the impact on post-operative outcomes, and Student's t-test was used to quantify significance.

**Results:** Twenty-seven patients identified with acute severe colitis; 21 were treated operatively. All received first-line intravenous corticosteroids. Fourteen patients underwent emergency subtotal colectomy. Mean age was 38 (range 20 – 72); mean duration of first-line therapy was 11.5 days (SD 5.1). Time to surgical referral was 7.1 days (SD 5.2); time to surgery (subtotal colectomy) from surgical consult was 4.6 days (SD 3.5).

**Discussion:** Medical therapy >10 days was associated with 50% of all post-operative complications (OR = 5.33 (p = 0.21)). Average time to surgery was 16 days (SD 3.2); colectomy risk RR = 6 (p = 0.11). Those in the <10 days of medical treatment cohort had reduced time to surgery of 7.1 days (SD 1.77) with no complications. Time to surgery for referrals >7 days from diagnosis was 12 days (SD 2.7). A total of 38% suffered complications (OR = 5.00 (p = 0.238)), increasing risk (RR = 4 (p = 0.1744)). Surgical referral <7 days improved time to surgery to 3.5 days (SD 2.0), with one 24-hour ITU admission. Collectively prolonged medical therapy and delayed referral comprised 88% of all complications, increasing colectomy risk (RR = 8.07 (p = 0.036)). A paired t-test (p < 0.0001) quantified our results as significant.

**Conclusion:** Duration of in-hospital medical management of acute severe colitis is associated with an increased colectomy risk, with delay in surgical input worsening this. We developed an enhanced pathway structured on NICE guidance and Oxford Criteria to gauge the severity in those with acute colitis who may require colectomy at the time of admission, allowing early surgical involvement to guide therapeutic management in a multidisciplinary approach.

## MAGNETIC RESONANCE IMAGING (MRI) OF THE INTERNAL AUDITORY MEATUS (IAM): AN AUDIT OF LOCALLY SUBMITTED REQUESTS AND FINDINGS

**Borg D**, Gatt AS  
*Mater Dei Hospital, Malta*

**Background and Aims:** Early detection of acoustic neuroma (AN) translates into timely hearing-preserving surgery and decreased perioperative morbidity. MRI is the gold standard investigation for visualising the cerebellopontine angle (CPA). Being an expensive resource that is in high demand, we sought to identify ways of fine-tuning MR IAM referrals.

**Methods:** A retrospective analysis of 690 MR IAMs ordered between January and December 2016 at Malta's acute general teaching hospital, Mater Dei, was undertaken. Follow-up scans, inadequate and cancelled studies were excluded. Unique first-ever MR IAMs totalled 617. The Radiological Information System (RIS) served as our source of data collection. Patient demographics, referring specialties, inputted reason for examination, and imaging findings were recorded.

**Results:** The commonest symptomatology leading to investigation with an MR IAM was vertigo/dizziness. Eighty-one percent of MR IAM requests were made by otolaryngologists, while the remaining 19% came from all other specialties. Four of 617 (0.65%) MRIs were positive for AN. All four patients had asymmetric sensorineural hearing loss (SNHL). Two of four diagnosed patients were referred from audiology. Asymmetric SNHL was also the commonest non-unanimous complaint among original scans traced back from 2016 follow-up MRIs. Six of 617 (0.97%) patients had significant disease other than AN. Of the scans which were negative for AN/significant pathology, 50 of 607 (8.24%) had incidental findings which we will describe.

**Discussion:** No globally-recognised guidelines for imaging patients with asymmetric SNHL exist. However, various centres in the UK have published regional protocols which describe frequency-specific criteria for targeted screening. Precise request documentation of SNHL asymmetry in decibels (dB) would help ascertain how Maltese patients fit into foreign protocols.

**Conclusion:** Better patient selection through inter-specialty consultation and prior audiovestibular testing may reduce any inappropriate burden on radiology services and the medical financing system, whilst simultaneously safeguarding patients.

## SEPTIC ARTHRITIS MANAGEMENT IN A DISTRICT GENERAL HOSPITAL

**Adrian T**, Morgan B  
*Royal Gwent Hospital, Newport, United Kingdom*

**Background and Aims:** Septic arthritis carries significant morbidity and mortality. Prompt diagnosis and treatment is vital for patient outcome. The BOA recommends joint aspiration prior to commencing antibiotics. NICE advocates initiating the "sepsis six bundle" for all septic patients within one hour of presentation. This study aims to investigate the management of septic arthritis in a large district general hospital.

**Methods:** We retrospectively reviewed patients with septic arthritis who were treated surgically over a one-year period. Penetrating injuries, chronic infections, medically treated patients and paediatric patients were excluded. Compliance with the BOA guidance and "sepsis six bundle" was recorded. Time from referral to aspiration, administration of antibiotics, and surgery were all recorded.

**Results:** Twenty-two patients were identified (native n=15; prosthetic n=7). The knee was the most common joint (16). There were four deaths, all in prosthetic joint infections. Antibiotics were given before aspiration in five of 15 native joint and three of seven prosthetic joint infections. Nineteen of 22 patients were clinically septic on presentation, only 10 of 22 patients had blood cultures taken, and none received antibiotics within one hour. Patients who survived waited, on average, 19 hours for antibiotics and 29 hours for surgery, compared to 54 hours for antibiotics and 170 hours for surgery in those who died.

**Discussion:** A limited number of studies consider the relationship between time delay in initiating antibiotics and mortality in septic arthritis cases presenting with sepsis. Prosthetic joints may receive longer delays to antibiotics as they require sterile conditions in theatre for joint aspiration prior to commencing antibiotics. This study demonstrated that delays in treatment in both prosthetic and native joints may cause higher mortality, prompting early surgical management for all septic arthritis cases.

**Conclusion:** We demonstrated universally-poor compliance with guidelines. Mortality and outcomes were worse with prosthetic joint infections and delays in treatment. We have instigated measures to improve care, aiming to reduce time to aspiration, antibiotic administration, and surgical washout.

## NATIONAL HANDOVER PRACTICES IN 2018: CONCORDANCE WITH GUIDELINES AND THE IMPACT OF THE NEW JUNIOR DOCTOR CONTRACT

**Popova D**, Monti RP, Pidgeon TE, Millip MC, Dad Z, Frew Q  
*Broomfield Hospital, Chelmsford, United Kingdom*

**Background and Aims:** The new junior doctor contract, implemented in phases from October 2016 to April 2017, forced Trusts to ensure compliance of working rotas with the new contract, and may have indirectly prompted a revision of handover practices as a result of re-designed working patterns. In this national, telephone-survey audit, we aim to assess the concordance of handovers across different hospitals in England with handover guidelines from the BMA and NPSA. We endeavour to compare the outcomes of the survey between data collected before and after contract implementation.

**Methods:** A 20-point questionnaire was delivered via a telephone conversation to on-call General Surgery FY1 doctors in over 100 hospitals between November 2017 and February 2018. Equivalent data had previously been collected using identical survey methods in early 2016. Permutation tests were employed in order to determine if there had been a significant change in the response to a particular question over time.

**Results:** The average time (minutes) allocated for handovers increased from 24.10 in 2016 to 30.69 in 2018. Handover time was protected in more cases in 2018 (83% c.f. 65%), it was less likely to be interrupted in 16% of hospitals (37% c.f. 21% in 2018), and it occurred within working hours 11% more than previously recorded (93% c.f. 82%). We also found that 'time used' was correlated with satisfaction in both years, and 'time allocated' strongly correlated with satisfaction in 2018 (spearman coefficient = 0.45,  $p = 0.0008$ ).

**Discussion:** Improvements in handover practices are evident in comparing data collected in 2016 with recent data from 2018, including longer handover time, less interruptions, scheduled handover time within working hours, and improved junior doctor satisfaction. However these improvements cannot be attributed to new contract changes alone, and must be considered in the context of continued handover improvements over a longer period of time.

## DOES THE IMPLEMENTATION OF A WARD ROUND PRO-FORMA IN A MEDICAL WARD IMPROVE ADHERENCE TO BEST PRACTICE GUIDELINES?

**Lunawat S**, Suwathep P\*  
*Chorley and South Ribble District General Hospital, Chorley*

**Background and Aims:** Robust clinical record keeping has been shown to facilitate the delivery of excellent patient care. Documentation of medical ward rounds, in particular, is critical in effectively communicating essential information regarding patient progress and management decisions to members of the Multi-Disciplinary Team. The aim of this study was to evaluate the effectiveness of a ward round pro-forma in a medical ward to ascertain if it adhered to the best practice guidelines.

**Methods:** We first assessed adherence to best practice guidelines of every ward round note in a medical ward over two weeks. We then designed and introduced a ward round pro-forma based on these guidelines, and subsequently audited those notes that were recorded using the pro-forma. Rates of documentation were examined for twenty variables that were grouped into five categories: 1) patient demographics and background; 2) subjective findings; 3) objective findings; 4) assessment and plan; and 5) doctor details.

**Results:** Initial spot auditing of 123 ward round notes revealed poor compliance in all categories, with an overall compliance rate of 54.9%. We then implemented our specifically designed pro-forma in 96 ward round notes over the subsequent two weeks. We detected a statistically significant improvement ( $p < 0.05$ ) in documentation standards with an overall increased compliance of 40.7%, and in each category as follows: category one 45.6%; category two 36.6%; category three 36.3%; category four 16.2%; and category five 46.9%.

**Conclusion:** Our findings support the more widespread use of a standardised pro-forma to document medical ward round notes in line with best practice guidelines.



**Category: Clinical and Patient Related Work**

**ACUTE MASSIVE HAEMOPTYSIS AND RESPIRATORY DISTRESS: A RARE INITIAL PRESENTATION OF METASTATIC TESTICULAR CANCER**

**Hong EH**, Mbhaka N, Yap D, Banerjee I  
*Royal Blackburn Hospital, Blackburn, United Kingdom*

**Background:** Testicular cancer is the most common malignancy in men aged between 20 and 35 years. Testicular germ cell tumours make up 95% of testicular tumours and are the commonest solid malignancies in young men. Risk factors for testicular cancer include cryptorchidism, family history, infertility, tobacco use and Caucasian. Testicular mass is the commonest initial presentation. However, patients with advanced metastatic disease may present with various other symptoms. We report a rare case whereby the initial presentation of a metastatic testicular cancer was acute massive haemoptysis and marked respiratory distress.

**Case Study:** A 38-year-old male patient presented to an emergency department with acute massive haemoptysis and marked respiratory distress. After being stabilised by resuscitative measures, a chest X-ray was taken and showed widespread cannonball metastasis. Tumour markers were elevated; HCG 1539 IU/L (0-10IU/ L) and AFP 132 kU/L (0.0-8.0 kU/L). CT scans reported multiple well-circumscribed lesions throughout the lungs. Head CT scan showed a solitary 3.5cm metastatic deposit within the left parieto-occipital region. Ultrasound scan confirmed a right testicular mass. Orchidectomy was followed and histological report confirmed mixed germ cell, 90% classical seminoma and 10% embryonal carcinoma. The patient remained disease free after one year post chemotherapy. All serum tumour markers were normal.

**Discussion:** From a literature review, only 11 cases were reported whereby haemoptysis was the first initial presentation of a metastatic testicular cancer, usually choriocarcinoma. Primary lung cancer is often thought to be the main differential diagnosis. It is, however, essential to differentiate between primary lung tumour and metastatic lung disease as there is a significant difference in management and prognosis.

**Conclusion:** Physicians need to be cautious when dealing with male patients presenting with haemoptysis as this may be the first presentation of testicular cancer. Early diagnosis and therapy have very good cancer survival rate.

**IS THE PREVALENCE OF ANAEMIA IN PATIENTS IN ATRIAL FIBRILLATION HIGHER IN COMPARISON TO PATIENTS IN SINUS RHYTHM, A CASE-CONTROL STUDY**

**Howell SN**  
*Watford General Hospital, Watford, United Kingdom*

**Background:** Atrial fibrillation has a high impact on morbidity and mortality in the population. Management and prevention of atrial fibrillation requires treatment of potential reversible trigger factors. Anaemia has been observed in patients with atrial fibrillation but no data is available as to date on the prevalence of anaemia in atrial fibrillation.

**Aims:** The main objective is to establish if a relationship exists between anaemia as a risk factor and atrial fibrillation as an outcome factor depending on the prevalence of anaemia. The secondary outcome is a review of other potential contributing risk factors.

**Methods:** Retrospective, case-controlled study investigating the prevalence of anaemia in patients with atrial fibrillation, assigned as cases, compared with patients in sinus rhythm, assigned as controls. Four hundred and five patients with atrial fibrillation and 399 patients in sinus rhythm who presented to the Emergency Departments at Imperial College Hospitals were identified. They were assessed with an electrocardiogram and had a blood test which included a full blood count sample. Data was analysed with a statistical program, State. The anaemia rate in both groups was compared with logistic regression test and categorical variables were compared using the Chi-square test.

**Results:** The study found no difference in the prevalence of chronic anaemia between both rhythm groups after adjustment for acute anaemia. However, gender specific differences in risk factor prevalence were found and hypertension was observed to be a contributing factor overall in the development of atrial fibrillation and anaemia.

**Conclusion:** Anaemia was not found to be an independent risk factor of atrial fibrillation. The overzealous treatment of anaemia bears high risks of transfusion transmitted diseases and reactions, and would not contribute to the prevention of atrial fibrillation.

No treatment of anaemia is required beyond that set out in current guidelines in patients with atrial fibrillation.

## ASSESSING STROKE VOLUME VARIATION AS A PREDICTOR OF FLUID RESPONSIVENESS AFTER A FLUID CHALLENGE: A PROSPECTIVE STUDY AND SERVICE EVALUATION

**Willis M**, Conway D

*North Manchester General Hospital, Manchester, United Kingdom*

**Background and Aims:** A change in stroke volume has for a long time been used as a measure of fluid responsiveness after a fluid challenge. The gold standard measurement for stroke volume is currently pulmonary arterial catheter (PAC) based thermal dilution, but over the years there has been a trend for less invasive monitoring. The Deltex Combi Oesophageal Doppler Machine is one such device that measures cardiac variables including stroke volume variation. This ongoing service analysis aims to look at whether SVV is correlated to stroke volume and can therefore act as a predictor of fluid responsiveness.

**Methods:** Eleven patients whose treatment required the use of the Deltex Combi ODM and PAC were identified. All variables were recorded continuously, five minutes before a fluid challenge and for fifteen minutes post-challenge. Each recorded variable was then correlated with the recorded stroke volume and with the other recorded cardiac variables. The mean average both pre- and post-fluid challenge was also recorded and the difference was analysed. Finally, the diagnostic odds ratio was recorded for the SVV.

**Results:** The correlations for each of the variables with stroke volume are: SVV = 0.823, PPV = 0.841, FTc = 0.62. The correlation of SVV vs. PPV = 0.88, PPV vs. FTc = -0.453, and SVV vs. FTc = -0.487. The mean differences pre- and post-challenge are: SV = 6.93%, SVV = 36.57%, PPV = 50.58%, FTc = 7.93%. The diagnostic odds ratio for SVV is 4.

**Conclusion:** Recording stroke volume with a pulmonary artery catheter as a gold standard measure of fluid responsiveness, a stroke volume variation of >10% showed a strong correlation coefficient of 0.823, a diagnostic odds ratio of 4, and, consequently, could be used as an accurate measure of stroke volume. Flow time corrected has no correlation with stroke volume and cannot be individually used to predict fluid responsiveness.

## PERITONITIS SECONDARY TO FOREIGN BODY PERFORATION OF RECTUM IN THE PRESENCE OF ACUTE PARANOID PSYCHOSIS: A CHALLENGING PRESENTATION

**Koh A**, Awwad A, Tewari N, Adiamah A

*Queen's Medical Centre, Nottingham, United Kingdom*

**Background:** The insertion of rectal foreign body to cause physical injury without suicidal intent is a recognised but poorly understood presentation of Deliberate Self Harm (DSH) in patients with mental health conditions. We report a case of peritonitis secondary to foreign body perforation of rectum in the presence of acute paranoid psychosis.

**Case Study:** A 43-year-old gentleman suffering from paranoid schizophrenia presented with foreign body insertion into his rectum, resulting in rectosigmoid perforation and peritonitis. No further history was obtained. He had historical presentations of DSH, including two episodes in the months prior. This continued behaviour had resulted in detainment under the Mental Health Act. On examination, the patient was septic and had generalised peritonitis. His inflammatory markers were markedly raised. Digital rectal examination and cross-sectional imaging confirmed the presence of a perforating 20cm x 3cm cylindrical object at the rectosigmoid junction abutting the abdominal wall. He underwent a laparotomy and Hartmann's procedure with retrieval of the foreign object.

**Discussion:** A comprehensive search of Medline and EMBASE databases confirmed the paucity of evidential study exploring RFB in the context of mental ill-health. Unruh et al. suggested that management of patients who present with RFB insertion should involve exploring the aetiology to prevent future occurrences. Patients with mental health difficulties require a strong support system (e.g. family and friends, community psychiatric nurses, care coordinators, and psychiatrists), willingness to engage with treatment, and abstaining from substance abuse, amongst others.

**Conclusion:** Attitudes and behaviours of admitting clinicians have historically been blamed for the lack of divulging the intentions underlying these presentations. It is therefore proposed that patients with RFB should ideally have a psychiatric evaluation alongside their surgical management to prevent future occurrences.

## HIGH NUMBER OF BED DAYS SAVED WITH OUTPATIENT PARENTERAL ANTIBIOTIC THERAPY (OPAT) IN MANAGING MALIGNANT OTITIS EXTERNA IN A DISTRICT GENERAL HOSPITAL

**Ahmed T**, Perkins V, Sue-Ho R, Patil S  
*Ipswich Hospital, Ipswich, United Kingdom*

**Background and Aims:** Malignant Otitis Externa (MOE) is a condition associated with high morbidity and mortality, requiring prolonged parenteral antibiotic therapy where duration can extend to months. Our objective is to determine cost savings in treating MOE via the newly established Outpatient Parenteral Antibiotic Therapy (OPAT) service at Ipswich Hospital NHS Trust.

**Methods:** Retrospective data was collected of all ENT referrals to OPAT services from November 2016 to April 2018.

**Results:** Of 14 ENT referrals, 10 were accepted for OPAT; of which 9/10 were MOE (7/9 treated for *Pseudomonas* alone, 1/9 treated for *Pseudomonas* and methicillin-resistant *Staphylococcus aureus*, and 1/9 treated for *Pseudomonas* and anaerobes). All of the MOE patients were elderly; 7/9 were males (mean age: 83.3; range: 73-93) and 2/9 were females (97, 94). Under OPAT, 8/9 MOE patients had successful outcomes (discharge from ENT follow-up, no treatment failures/relapses). However, 1/9 had unexplained death following OPAT to oral switch. The aggregated duration of MOE treatment was 558 days (mean: 62.0; range: 30-130). The aggregated OPAT duration was 448 days (mean: 49.8; range: 14-118) accounting for 80.3% (448/558) of the total treatment days. The remaining 1/10 treated under OPAT had post-mastoidectomy infection (ESBL *E. coli*).

**Discussion:** Ipswich Hospital OPAT services enabled nine MOE patients to have, on average, 80.3% of their total treatment from home, with an estimated average saving of £8,711.11 per patient (calculated at £175 per day). Overall, there was a total estimated saving of £78,400 for all patients throughout the 17-month period.

**Conclusion:** MOE remains a challenging condition to manage with high associated morbidity and mortality, requiring prolonged antimicrobial treatment. OPAT services significantly shortened inpatient hospital stay which resulted in considerable cost savings to the Trust and outcomes comparable to other case series. Patients with MOE can be effectively managed in the community through local OPAT services.

## WHAT IS THE PREVALENCE AND CONTROL OF THE COMMON RISK FACTORS FOR TYPE 2 DIABETES MELLITUS (T2DM) IN GIZO HOSPITAL, SOLOMON ISLANDS (SI)?

**Chamberlain G**  
*University of Birmingham College of Medical and Dental Sciences, United Kingdom*

**Background and Aims:** Type 2 Diabetes Mellitus (T2DM) has reached pandemic proportions and is rapidly increasing; the Solomon Islands are no exception. The effect and burden of T2DM is profound, posing a serious public health challenge, and action is needed. Research is lacking in this area in the Solomon Islands and this study is the first that aims to explore the prevalence and control of the common risk factors of T2DM. This may help to inform improvements made in both managing and preventing the condition within the community setting.

**Methods:** World Health Organisation (WHO) STEPS method for non-communicable diseases was used. Six common risk factors were assessed using behavioural, physical and biochemical readings from 32 subjects (53% females; 46% males) in Gizo Hospital throughout May 2017. Results of each risk factor measured per subject were compared to the recommended clinical targets to establish how well T2DM is being controlled.

**Results:** There was a high prevalence of risk factors, with 78% (n=25) categorised as high-risk from failing to achieve clinical targets for 3-6 risk factors. Smoking was the best controlled risk factor, compared to glycaemic control being the worst (87% and 13% respectively reached the clinical targets).

**Discussion:** This study provides essential baseline data, but further research and improved lifestyle interventions from both a national and community setting is indicated in order to improve risk factor control and subsequently reduce the burden of T2DM.

## FIRST TIME PRESENTATION OF LARYNGEAL HAEMORRHAGE AS A PRESENTING COMPLAINT FOR ACQUIRED HAEMOPHILIA

**Shehata Z**, El-Amin M, Bowen A  
*Royal Bolton Hospital, Bolton, United Kingdom*

**Background:** This is a case study on a very rare manifestation of acquired factor VIII deficiency. Almost 50% of cases of factor VIII deficiency are idiopathic and challenging to our understanding of its occurrence. Acquired haemophilia has a tendency to cause bleeding in the skin, mucous membranes, soft tissue and muscles without joint involvement. Patients typically present with an acute history of bleeding without being known to be of a high bleeding risk.

**Case Study:** A 70-year-old gentleman presented with stridor of acute onset after flu-like symptoms for few days prior to admission. He was previously well with no previous stridor, nor did he have any bleeding under his skin, mucous membranes or from his orifices. The stridor was followed by bruising involving the anterior and upper chest, specifically the suprasternal notch. His general physical examination was normal. Naso-endoscopic examination revealed that the stridor was due to an acute haemorrhagic event. An urgent coagulation sample was sent for INR and APTT analysis, and a diagnosis of secondary acquired factor VIII deficiency was confirmed. The patient responded to steroids, mycophenolate, and fresh frozen plasma.

**Discussion:** The recommendation for similar cases would be to start by measuring the APTT, then conduct mixing studies looking for correction in APTT duration. If correction is achieved, then check factor VIII assay. Recombinant activated factor VII, activated prothrombin complex concentrate, and FEIBA have been shown to be effective in treatment. The second step involves removal of factor VIII inhibitor with prednisolone or cyclophosphamide. Lastly, control the bleed by plasmapheresis or specific immunoadsorption of immunoglobulins

**Conclusion:** Acquired haemophilia A is a rare disease associated with severe bleeding complications. Therefore, its prompt recognition is mandatory to initiate an initial treatment. We report a case with bleeding in the glottis which was challenging in terms of diagnosis and management.

## THE INNOVATIVE USAGE OF PLATYSMA IN THE MANAGEMENT OF PHARYNGOCUTANEOUS FISTULA FOLLOWING A TOTAL LARYNGECTOMY

**Shariff H**, Anesti K  
*University of Exeter Medical School, United Kingdom*

**Background:** Pharyngocutaneous fistula (PCF) is the most common complication following total laryngectomy and is associated with increased morbidity, delay in adjuvant treatment, prolonged hospitalisation and increased treatment costs. Surgical intervention is indicated following a failed conservative approach and may include primary closure, loco-regional flaps, and free flaps. This study examines the use of platysma flap in the management of PCF post-total laryngectomy.

**Aims:** Identifying whether platysma flap has a role in reconstructing PCF in patients who have had a total laryngectomy and are not responding to conservative approaches.

**Materials and Methods:** A retrospective study recruiting consecutive patients who presented (2015-2017) with persistent PCF following total laryngectomy, despite medical management and treatment with the use of platysma flap. There were five patients; all were male with a mean age of 74 years (range 64-82). Post-operative evaluation was carried out with a formal clinical and radiological swallow assessment.

**Results:** Three patients demonstrated no recurrence of leakage using sole muscle flap. Two patients had post-operative complications using myocutaneous flap. The mean total hospital stay for patients following the operation was 36 days (range 13-85). The mean total days post-op for a successful swallow blue dye test was 10.2 days (range 6-15).

**Discussion:** The use of sole muscle flap (as opposed to myocutaneous flap) had a similar mean hospital stay (11 days) and mean post-operative successful swallow blue dye test (7.7 days). Patients are less likely to develop post-operative complications if muscle flap is utilised instead of a myocutaneous flap, no prior chemo/radiotherapy, and have no significant co-morbidities.

**Conclusion:** Platysma muscle flap can serve as a potential surgical intervention for a sub-selected group. Validation via large-scale longitudinal cohorts is needed. It is unlikely, at present, that this novel procedure can replace current conventional surgical intervention methods.

## ATRIAL FIBRILLATION IN THE PERIOPERATIVE PERIOD DURING NON-CARDIAC SURGERY

**Gerald OC**, Chomakhidze PS, Poltavskaya M  
*I.M. Sechenov First Moscow State Medical University, Russia*

**Background:** Episodes of atrial fibrillation (AF) occurring in the perioperative period, especially during non-cardiac surgery, can lead to the destabilisation of haemodynamics, aggravate the patient's condition, and trigger acute coronary syndrome, heart failure and stroke.

**Aims:** To identify the predictors of paroxysmal atrial fibrillation arising in the perioperative period during non-cardiac surgery, using the preoperative examination data.

**Materials and Methods:** A total of 1051 patients yet to undergo abdominal, urological and articular surgeries were used for the analysis. These patients had no history of AF. Preoperative examination was performed: clinical examination; electrocardiogram (ECG) at rest; 24-hour ECG monitoring; echocardiography (EchoCG), including the evaluation of myocardial deformation using the Speckle Tracking Echocardiography (STE) method; cardiopulmonary exercise test (CPX); and, in some patients, coronary angiography.

**Results:** Paroxysmal AF was registered in 61 patients (5.8% of all patients included in the study). Majority (81.9%) of the episodes of AF occurred in the first five days following surgery. In the perioperative period, episodes of AF were regarded as the main cause of 25% of all non-fatal myocardial infarctions (MI), 27% of fatal MIs, and every second episode of acute cerebrovascular accident. Patients with AF significantly more often had a history of diabetes (31.2% vs.13.6%, OR 2.9,  $r = 0.02$ ) and hypertension (82.0% vs.60.9%, OR 2.9,  $r = 0.02$ ). AF developed more often following surgery for oncological pathologies of the abdominal cavity. The results of the EchoCG showed that the development of perioperative episodes of AF was associated with a more than 40 ml/m<sup>2</sup> increase in the index volume of the left atrium (in 17.0% of patients with AF vs. 7.5% in patients without AF, OR 2.5,  $r < 0.01$ ).

**Conclusion:** During non-cardiac surgery in patients with diabetes mellitus, hypertension, and an increase in the volume of the left atrium greater than 40 ml/m<sup>2</sup>, as well as prior to surgery for oncological pathologies of the abdominal cavity, the risk of paroxysmal atrial fibrillation in the perioperative period is significantly higher.

## SCREENING FOR ASYMPTOMATIC RENAL DISEASES AMONG SCHOOL CHILDREN IN MANSOURA, EGYPT

**Hammad MAM**, Elsayed MM, Kabsha MI, Shoaib LOFS, Gad HA, Hammad A, Kanishy G, Shahin M, Refaie AF, Omar N  
*Mansoura University Faculty of Medicine, Egypt*

**Background:** In seemingly healthy youngsters, the preliminary detection of renal diseases can help to subdue the progression of occult renal diseases.

**Aims:** The purpose was to identify asymptomatic renal diseases among school children aged between nine and 18 by urinalysis.

**Materials and Methods:** A cross-sectional study of 870 apparently healthy students was conducted in 11 teaching institutes in Mansoura using urinalysis for microscopic haematuria, proteinuria and pyuria. Students who had renal or medical illness, menstruation or congenital malformation were excluded. After screening was complete, suspected cases of haematuria, proteinuria and pyuria were referred, for free, to Mansoura Urology and Nephrology Center for further checking and follow-up.

**Results:** Abnormal urine findings were encountered in 200 students (approximately 23%) of the 870 students screened: the prevalence in males was 35.4% of the total cases screened whilst the prevalence in females was 17.8%. Of the 200 positive cases, haematuria and proteinuria were the most witnessed: haematuria 28.5%, proteinuria 20%, and pyuria 2%, while combined haematuria and proteinuria cases were 4%.

**Conclusion:** Screening for renal diseases by urine analysis is not only indispensable to identify insidious renal diseases in asymptomatic children but it also proves a pragmatic method to define if further investigation is needed to know the exact aetiology.

## ASSESSMENT AND OUTCOMES OF COLORECTAL CANCER PATIENTS WHO DO NOT UNDERGO SURGERY

**Poustie MA**, Mitchell P  
*University of Manchester Medical School, United Kingdom*

**Background and Aims:** Surgery is the staple curative method of treatment of colorectal cancer. However, not all patients will undergo major operations. More patients are regarded as too frail or too much cancer for operations at Lancashire Teaching Hospital Trusts (LTHT) than the national average. This study aims to determine the outcomes of these non-operative patients.

**Methods:** All patients discussed in the Colorectal Multi-Disciplinary Team meetings over a two-year period (April 2013 – March 2015) were categorised into the National Bowel Cancer Audit (NBOCA) groups of major resection, too little cancer, too much cancer, too frail for surgery, or others. Patient demographics were then documented and survival time post-diagnosis recorded.

**Results:** Four hundred and fifty-three patients (mean age 69.9 years (range 23-98 years)) were found to have colorectal cancer and classified into major resection (n=285), too little cancer (n=38), too much cancer (n=81), too frail (n=41), and others (n=8). Frail and too much cancer patients had a higher proportion of patients with more co-morbidities and a higher performance status than patients that had too little cancer. Median survival times for patients who had too much cancer or were too frail were 8.3 months and 10.4 months, respectively.

**Discussion:** Patients with too much cancer or who are too frail for resection surgeries have a poorer prognosis than those who are fit enough for operations. Pre-operative frailty assessment still has room to be improved, with the introduction of the quantification of frailty using frailty scores and geriatric assessment. Further studies comparing non-operative outcomes and frailty assessment will aid future decision-making.

## PULMONARY FIBROSIS IN A 44-YEAR-OLD FEMALE FROM SOUTHERN ITALY AFFECTED BY HERMANSKY-PUDLAK SYNDROME

**Abraham ST**  
*Università Cattolica del Sacro Cuore Facoltà di Medicina e Chirurgia 'Agostino Gemelli', Italy*

**Background:** Hermansky-Pudlak syndrome, a rare autosomal recessive disorder, is characterised by oculocutaneous albinism, bleeding tendency due to platelet storage pool deficiency, and, in certain individuals, pulmonary fibrosis, granulomatous colitis and/or immunodeficiency. Among the 10 subtypes described, HPS-1, HPS-2 and HPS-4 patients tend to develop pulmonary fibrosis.

**Case Study:** A 44-year-old non-smoker female presented with chronic cough for 10 years and reported moderate dyspnoea worsening over the years. Physical examination revealed albinism, nystagmus and bilateral crackles upon auscultation. Pulmonary function tests showed moderately severe restriction with a TLC of 56% and a reduced DLCO. The chest-CT revealed bilateral upper lobe fibrosis, as well as traction bronchiectasis consistent with UIP pattern. The transbronchial biopsy showed foci of fibrosis and alveolar septal thickening associated with pulmonary fibrosis. A definitive diagnosis of HPS4 was established by the Endocrinological Unit based on clinical findings and a genetic test which identified a newly reported homozygous mutation. Follow-up investigations showed worsening PFTs and fibrotic progression with extensive parenchymal involvement of the left upper lobe, plus the presence of bronchiectasis on chest-CT; consistent with pulmonary fibrosis. Oxygen therapy was promptly initiated following desaturation on room air at 88% SpO<sub>2</sub>.

**Discussion:** Even though pulmonary fibrosis has been largely associated with affected individuals from north-western Puerto Rico, it can also occur in other individuals, as demonstrated by this case. At present, lung transplantation is the mainstay life-prolonging treatment for HPS-PF; the supplemental oxygen is only supportive. The patient was referred to a transplant centre and evaluated to be ineligible due to significant bleeding diathesis. Influenza and pneumococcal vaccination were advised, as well as the avoidance of pulmonary irritants including tobacco use.

**Conclusion:** HPS-PF carries a poor prognosis with progression to death within a decade from the onset of symptoms. This highlights the compelling need for a much more effective management strategy.

## POLAND SYNDROME – CLINICAL PRESENTATION AND CASE REPORT

**Farrugia S**, Said E

*University of Malta Faculty of Medicine and Surgery, Malta*

**Background:** Poland Syndrome is a congenital malformation characterised by the absence or underdevelopment of the pectoralis major, leading to a concave impression in the chest. This condition mostly affects the sternocostal head of the pectoralis major. Another common manifestation of this syndrome is brachysyndactyly on the affected side. The incidence of Poland syndrome varies in different countries, but it is estimated to be present in 1-to-3 per 100,000 individuals.

**Case Study:** This is a case study of a male neonate who was born in January 2017 with features of Poland syndrome. Other members of his family do not show any features of Poland syndrome. On examination, the right palm was smaller than the left, with the second and the third digits of the right hand fused with hypoplastic nails. The right nipple was deviated downwards, and a deep sacral dimple was observed. The right sternocostal head of the pectoralis major muscle was absent. These features are indicative of Poland syndrome.

**Discussion:** The infant was scheduled for surgery in March 2018 to split the skin between the middle and index fingers. During the same procedure, the partial web between the third, fourth and fifth fingers was removed. The patient has now gained full function in his right hand. A further operation has been planned to transfer a segment of the latissimus dorsi to fill the space of the absent right pectoralis major. This procedure will be performed when the patient is five to six years of age.

**Conclusion:** This case explores the diagnosis and prognosis of a patient with Poland syndrome. This report describes past and potential future management plans taken from a biopsychosocial aspect.

## TO DEVELOP HAND-HELD NOTES FOR WOMEN WITH PREMATURE OVARIAN INSUFFICIENCY (POI)

Tadfi D, **Phipps K**, Yonis H, Khan A, Bruce D, Cloke B, Holloway D  
*King's College London, United Kingdom*

**Background:** Women with POI see many healthcare professionals which leads to multiple sets of notes, many of which are either inaccessible or misplaced. Introducing handheld notes would streamline care and increase overall POI patient satisfaction.

**Aims:** Develop handheld notes that will: collate the patient's medical information; allow for autonomy of care; avoid unnecessary investigations; and assist healthcare professionals in understanding the patient's journey.

**Methods:** We designed handheld notes based on Guy's and St Thomas' (GSTT) guidelines, and patients' and healthcare providers' feedback. Ten women, who were seen in the POI Clinic at Guy's Hospital, were invited to a focus group and asked to complete two surveys. Each survey contained 16 questions; questions 1-13 measured patient satisfaction with and without handheld notes (maximum score of 65) whilst questions 14-16 asked about ease of using the notes.

**Results:** In a three-factor model of clinical experience (patient understanding; doctor's knowledge of the patient's journey; ease of service use), we found an improvement in patient satisfaction was enough to raise the global satisfaction score from 2.8 (without notes) to 3.6 (with notes). A t-test showed significant improvement, with a 95% confidence interval. The questions that revealed a significant improvement were related to patient understanding.

**Conclusion:** Overall, handheld notes have shown initial promise by improving patient perception of POI management, ease of bringing to appointments, and overall patient satisfaction. Limitations include a small sample size and limited time resulting in one data collection. This is an ongoing project with an aim to collate longitudinal evidence with a larger sample size and additional feedback from healthcare professionals.

## IMPLICATIONS OF CHANGING OUTPATIENT COLORECTAL PRACTICES ON SURGICAL TRAINING

**Ross T**, Brown S, Smith J, Arora S, Pawa N  
*West Middlesex University Hospital, Isleworth, United Kingdom*

**Background and Aims:** Increased patient and professional demand has led to more index procedures being performed outside the traditional setting of the Outpatient Department. The impact of this on training is undetermined. This study aimed to quantify the reduction in opportunity from a colorectal perspective.

**Methods:** Design: Prospective, cross-sectional study at a District General Hospital.

Sampling: All consecutive patients seen in the colorectal clinic in December 2017 were recruited.

Procedure: Data was collected with regards to the number of index procedures performed in outpatients and corroborated with clinic letters.

**Results:** Four hundred and sixty-two patients attended clinic during the study period. A response rate of 72.5% was achieved. Of these, 100 were targeting two-week wait referrals. Only 13 patients had a procedure performed in clinic (proctoscopy = 11; haemorrhoidal injection = 1), equating to 3% of patients. 41% patients, however, were booked for further diagnostic tests to include flexible sigmoidoscopy and colonoscopy. All target two-week wait patients did not have a procedure performed in clinic.

**Discussion:** A surprisingly low proportion of patients had a procedure performed in clinic, meaning that trainees have reduced exposure to procedures such as proctoscopy in an outpatient setting. The impact on two-week wait patients was particularly interesting, with these patients being more likely to be booked for further diagnostic tests immediately without a clinic procedure.

**Conclusion:** Increasing volume of two-week wait referrals has led to a substantially increased demand for colorectal clinics. Consequently, procedures that were traditionally performed in clinic are now being escalated straight to the endoscopy suite or operating theatre. As a result, trainees have fewer opportunities to meet their competencies.

## PNEUMONIA AS A PRESENTING FEATURE OF FAMILIAL MEDITERRANEAN FEVER (FMF)

**Loneragan B**, Davies K, Hamdy A, Bukhari M  
*Royal Lancaster Infirmary, Lancaster, United Kingdom*

**Background:** A 51-year-old South African lady of Ashkenazi Jewish descent presented with a four-week history of fever, pleuritic chest pain and shortness of breath. This was on a background of intermittent chest pain and fatigue for 18 months, and intermittent abdominal and calf pains for 30 years. Her past medical history included peptic ulceration, depression and social smoking. Her identical twin sister in Israel had a similar history of abdominal pain. Her travel and drug histories were not significant.

**Case Study:** She was treated for LLL pneumonia and a small exudative effusion was drained. She continued to have recurrent pyrexia with a persistently raised CRP/ESR and mild LFT derangement. Investigations for Pyrexia of Unknown Origin (PUO) (including atypical infections, CT-TAP and immunology) were unremarkable. She was discharged with doxycycline and rheumatology follow-up, but re-admitted with fever shortly after. Her symptoms resolved with colchicine, and a provisional diagnosis of Familial Mediterranean Fever (FMF) was made. FMF gene testing was negative, suggesting a novel gene mutation.

**Discussion:** FMF is typically caused by an autosomal recessive abnormality in the MEFV gene, with symptom onset by 20 years. At least 80% of patients experience arthralgia, abdominal pain, constipation, nausea and vomiting, fever, or myalgia. Bloods often show raised CRP/ESR, leucocytosis and raised fibrinogen during flares, which can last 12-72 hours. This patient met both the Tel-Hashomer and Livneh diagnostic criteria for FMF. Colchicine treats symptoms and prevents flares and amyloidosis.

**Conclusion:** This lady presented a diagnostic conundrum for rheumatology, respiratory, cardiology and haematology. She had a lengthy admission, leading to worsening anxiety. Her symptoms were vague, with little objective evidence of illness. She received multiple invasive investigations, with the risk of complications, high cost and further anxiety. The overall learning points are that FMF can present with pneumonia and should be considered in patients with PUO.



**Category: Education and Training**

**COMPARATIVE STUDY OF THE SURFACE ANATOMY OF THE AXILLARY NERVE AND ITS IMPLICATIONS ON RADIOLOGICAL INTERPRETATION**

**Al Quran H**, Stephens S  
Cardiff University, United Kingdom

**Background and Aims:** Being aware of the position of the axillary nerve (AN), particularly in relation to its immediate surroundings, is crucial from an anatomical standpoint. The purpose of this study was to produce a ratio between two different humeral measurements, and subsequently apply it to predict the position of the AN in X-rays. Thus, the ratio would ultimately serve as a potential diagnostic tool, specifically in cases of proximal non-displaced humeral fractures.

**Methods:** Measurements were taken from a total of 25 cadaveric upper extremities in order to produce a ratio between the superior aspect of the greater tubercle of the humerus to the lateral epicondyle (also known as the humeral length), and the superior aspect of the greater tubercle to the AN. The mean ratio produced was then used to predict the position of the AN on radiological images by measuring the distance of the humeral length and dividing the resulting figure by the mean ratio identified.

**Results:** An average ratio of 5.56cm was created; statistical analysis performed on the cadaveric data found a normal distribution of the ratios ( $P>0.05$ ). In addition, further statistical analysis was carried out on the cadaveric data to determine whether upper limb side, sex or age had any effect on the ratio; it was found that there was no significant difference within any of the groups ( $P>0.05$ ), and thus these factors had little, if any, effect on the ratio.

**Conclusion:** The ratio that has been attained in this study may be clinically useful to predict the position of the AN on X-rays of the upper limb. This method may be applied in cases of non-displaced proximal humeral fractures to predict the likelihood of injury to the AN. It also has the potential to reduce the risk of iatrogenic injuries during surgical intervention.

**FACTORS INFLUENCING MEDICAL STUDENTS' CHOICE OF COUNTRY TO PRACTICE**

Zerafa Simler MA, **Zhang Y**, Stabile I  
University of Malta Medical School, Malta

**Background and Aims:** Shortages of doctors in different specialities can have a strong negative influence on the healthcare system, particularly in low- and middle-income countries. This study aims to explore the reasons for which medical students intend to emigrate rather than work in their country of study.

**Materials and Methods:** A total of 39 International Coordinators (IC) were recruited from an online international medical student forum, after sending out a letter of participation. The IC was instructed to circulate an identical survey to medical students in the penultimate and final years of their respective university. The Chi-squared test was used to analyse results.

**Results:** A total of 628 students (74 from Africa, 14 from Asia, 24 from South America and 514 from Europe) participated. Two-thirds of students stated that they were planning to work where they studied following graduation. Females, those aged 25 and under, with previous degrees, or from an Asian university were more inclined to stay in their country of study. The most common reasons for this decision included job development potential (28%), patriotism (19%), and family and friend influences (14%), with 1% of students expressing that they do not have any other choice. There was a statistically significant difference in the reasons between different genders ( $p=0.048$ ), age groups ( $p<0.001$ ), those with or without previous degrees ( $p=0.001$ ), and the continent of study ( $p=0.029$ ).

**Discussion:** The large number of students considering moving away from the country of study following graduation is consistent with the trend of increased multiculturalism and globalisation. Analysis of the influential factors among medical students may provide an insight for employers to create pull factors to fulfil job demands.

**Conclusion:** One-third of students are not planning to work in the country from which they obtain their medical degree. There was a significant difference between student decisions and influences based on student demographics.

## THE VALUE OF SIMULATION TEACHING DURING INDUCTION FOR FOUNDATION TRAINEES TO TRAUMA AND ORTHOPAEDICS

**Measuria HD**, Brunning C, Carpenter C  
*University Hospital of Wales, Cardiff, United Kingdom*

**Background and Aims:** Rotating into a new specialty is often daunting for Foundation Year 1 (FY1) doctors. In order to deliver a clinically-relevant and practical introduction to their clinical attachment, we developed a patient story simulation session as part of their departmental induction. The defined outcomes of the session were to:

- give a basic introduction to approaching trauma.
  - give Foundation Trainees the basic knowledge to deal with a common Orthopaedic emergency.
- improve trainees' confidence in patient management.

**Methods:** A simulated patient pathway was designed and six different simulation stations were created and conducted at induction for the new intake of FY1 trainees. Pre- and post-course questionnaires were completed to quantify the value of teaching and assess the level of confidence.

**Results:** Overall results showed an increase in the level of confidence across all set learning objectives. Before the session, 100% of trainees were 'Not at all' to 'Neutral' in their confidence level towards: 1) managing trauma calls; 2) managing open fractures; 3) applying a POP cast; 4) intra-operative use of drivers, screws and plates; and 5) reading and presenting radiographs. Post-course feedback showed that 57-100% of trainees in the above-mentioned stations were 'Confident' to 'Very confident' in their ability to perform the skills taught in a clinical environment.

**Discussion:** The results show that simulation can be used to improve confidence in patient management for trainees starting in a new specialty.

**Conclusion:** Simulation can be used at induction for FY1 trainees entering a new specialty to assist with confidence levels and to provide basic skills that will be useful within that specialty. Entering into a new specialty with these skills taught at the beginning of the placement should allow for easier transition and a better overall experience in the specialty during their placement. Further study is ongoing to re-assess the value of simulation at the end of trainees' placements.

## THE EFFECTIVENESS OF A BRIEF HEALTH EDUCATION INTERVENTION IN PROMOTING EMOTIONAL WELLBEING IN SCHOOLCHILDREN

**Danielsson-Waters EKH**  
*University of Bristol Faculty of Medicine and Dentistry, United Kingdom*

**Background and Aims:** Mental illness is staggeringly prevalent in adolescents, with 10% of children aged between five and 16 being clinically diagnosed with a mental health condition. Despite NICE Guidelines and Public Health England recommendations, there is currently no national provision of mental health teaching. However, numerous educational interventions have demonstrated success. This study aims to investigate the effectiveness of an educational intervention on the promotion of emotional wellbeing amongst schoolchildren.

**Methods:** A 'quasi-experimental' study with mixed-methods, and wait-list with follow-up design. An educational intervention was delivered to 84 Health and Social Care Class Students (five male; 79 female) in year groups 10 to 13 at an Essex Secondary School. Questionnaires relating to mood and wellbeing (WEMWBS, PANAS) were delivered at various time-points. Baseline wellbeing data was also collected from an additional 19 students.

**Results:** Schoolchildren had an average level of wellbeing of 41/70, considerably lower than that of the general population (50/70). Between t-tests also demonstrated an immediate large improvement on the Positive Affect Scale (mean 1.59,  $d=1.04$ ,  $p<0.001$ ), and a larger effect at significantly reducing Negative Affect (mean 2.33,  $d=2.16$ ,  $p<0.001$ ).

**Discussion:** In keeping with the literature, wellbeing was found to be variable, with males having a higher score. Additionally, feedback questionnaires demonstrated that a short classroom-based intervention affected individuals positively. The study was limited by the timeframe constraints, and was only conducted in one school. The findings of a low level of wellbeing have important implications for students, parents, teachers and the wider society.

**Conclusion:** Wellbeing in schoolchildren can be considerably low. Successful short-term classroom-based interventions can be conducted to improve the state of mental health of schoolchildren. Future research should be conducted in a wider age range and various schools to validate these findings.

## ASSESSING THE USE OF E-LEARNING METHODS TO PROVIDE NUTRITIONAL EDUCATION WITHIN THE UNDERGRADUATE MEDICAL CURRICULUM FOR THIRD YEAR STUDENTS AT BARTS AND THE LONDON MEDICAL SCHOOL: A PILOT AIMED TO ASSESS AND IMPROVE CONFIDENCE AND KNOWLEDGE

**Eden TM**, Blythe J  
*Barts and the London School of Medicine and Dentistry, United Kingdom*

**Background and Aims:** The relationship between food, nutrition and health is complex. Yet, current medical professionals receive limited teaching in the field of nutrition. It is therefore imperative that the current medical curriculum adapts to change this and that learning outcomes are relevant to what is seen in clinical practice. A UK Undergraduate Curriculum in Nutrition exists within Tomorrow's Doctors for Graduates. Yet, learning objectives are often dispersed across existing modules, diluting the content of what is recognised as core learning objectives. By equipping 'Tomorrow's Doctors' with a multifaceted learning tool, we aim to improve confidence and knowledge in nutritional education and translate this into clinical practice.

**Methods:** This pilot study aimed to address this through adopting an e-learning module which targets year three medical students, utilising clinical vignettes in line with the outcomes within the GMC's brief. By providing clinical scenarios encompassing nutritional components, a key aim was to assess students' confidence, knowledge and perception of a given topic. On completion, strengths, weaknesses and perceptions would be identified, guiding future development. A nutritional module was devised by a clinical dietitian and GP with a specialist role in medical education. A half-day teaching session was allocated, with relevant pre-reading material and questionnaire. This provided a comparable baseline and post-assessment of confidence and knowledge. The module was subsequently run across three successive groups (120 students/term) with an anticipated total number of 360 students for the academic year 2017-2018.

**Results:** Term 1 results (n=120 students) show a significant improvement in both knowledge and confidence. Data has also been collected in terms of satisfaction of content, volume and access to the online content. Further knowledge will be tested during the end of year exams.

**Discussion:** Incorporating this specific nutrition teaching into the undergraduate curriculum at an early clinical phase means knowledge can be built upon both theoretically and practically before qualification, and has the potential to be revisited and studied at further depth later in the course as the "spiral curriculum" permits. Further developments include looking towards a national accreditation of the module with the British Dietetic Association, and research across several medical schools in terms of developing undergraduate curriculum content on nutrition.

## CLINICAL MEDICAL STUDENT INTEREST AND KNOWLEDGE OF ANATOMY: A FEEDBACK ANALYSIS OF THE ROYAL COLLEGE OF SURGEONS EDINBURGH 'WADE' WORKSHOPS

**Ooi R**, Agarwal S  
*Cardiff University School of Medicine, United Kingdom*

**Background and Aims:** Time spent on undergraduate anatomy teaching has declined since the introduction of modern medical curricula. Clinical medical students, taught via a case-based learning spiral curriculum, were evaluated on their interest and knowledge of anatomy through aggregated feedback from the annual Royal College of Surgeons of Edinburgh (RCSEd) Workshop in Surgical Anatomy in 2016 and 2017, with the aim to improve similar future events.

**Methods:** A feedback form was used with responses to questions rated on a 4-point scale – 1 (strongly disagree) to 4 (strongly agree). The questions asked if students were able to explain why knowledge of anatomy is important for surgical practice and, secondly, if they felt able to cite examples of anatomical knowledge applied to surgical problems in the head and neck, trunk and limbs. Open-ended feedback from workshop participants was also evaluated.

**Results:** Students (n = 40) strongly agreed that they were able to explain why anatomy is important in surgical practice; mean = 80% (2016, 84%; 2017, 76%). Students were able to cite examples of the application of anatomical knowledge to surgical problems in the head, neck, trunk and limbs; mean = 75% (2016, 74%; 2017, 76%). Improvements included suggestions to provide more time for the workshop (n = 17), to give post-workshop handouts (n = 10), and to offer pre-workshop preparatory reading material (n = 5).

**Conclusion:** The study showed that the RCSEd Wade Surgical Anatomy Workshops are valuable to medical students.

## COMPARATIVE STUDY OF THE RADIAL GROOVE IN HUMAN CADAVERS, DRY BONE, AND X-RAYS

**Tudor M**, Stephens S  
*Cardiff University, United Kingdom*

**Background and Aims:** The objective of this study was to identify a method that could be used to predict the radial groove's position on X-rays. This is clinically relevant due to the radial nerve's close association with the radial groove along the posterior surface of the humeral shaft. When injury occurs to this portion of the arm, such a method may be used to ascertain from an X-ray whether damage to the radial nerve is likely to have occurred. This study aims to compare the radial groove in human cadavers, dry bone specimens, and X-rays.

**Materials and Methods:** Measurements were taken from 20 cadaveric arms and 20 dry bone specimens. The ratio produced between the measurements of the greater tubercle to the lateral epicondyle, and the greater tubercle to the start of the radial groove, was then used to predict the position of the radial groove on 16 X-rays.

**Results:** The cadaver cohort's average humeral length, and average distance between the greater tubercle and the radial groove, was 28.5 cm and 13.2 cm, respectively. The dry bone cohort's average humeral length, and average distance between the greater tubercle and the radial groove, was 29.1 cm and 13.29 cm, respectively. Statistical analysis performed on the cadaver and dry bone data for humeral length found both to be of a normal distribution ( $P > 0.05$ ). The ratio of both groups was generated. An average of the two ratios (2.19) was then used to predict the location of the radial groove on 16 X-rays.

**Conclusion:** The ratio that has been obtained in this study may be clinically useful to predict the position of the radial nerve via the radial groove on an X-ray. It also has the potential to reduce the incidence of iatrogenic radial nerve injuries.

## THE APPLICATION OF 3D PRINTED, KINAESTHETIC MODELS FOR UNDERGRADUATE MEDICAL ANATOMY TEACHING

**Mantelakis A**  
*St George's, University of London, United Kingdom*

**Background and Aims:** Technological advances have facilitated the creation of various novel teaching tools that improve the effectiveness of anatomy teaching, including 3D printed models and the creation of kinaesthetic models, where three-dimensional anatomy models can be physically manipulated to illustrate functional anatomy. The aim of this project is to combine these two modalities, create a 3D printed kinaesthetic anatomy model, and then test its efficacy in teaching undergraduate medical students the biomechanics of the rotator cuff in comparison to the currently used plastic models.

**Methods:** Anonymised CT scans were transferred to ©Cura Software 3.1 for modification and 3D printing. The 3D printed model was then modified to illustrate the biomechanics of movement of the rotator cuff. Twenty-one volunteers were split into two groups of intervention (3D printed model) and control (plastic model), and attended the same teaching tutorial and quiz at the end. The overall scores and qualitative data on the models were then analysed for statistically-significant differences.

**Results:** A kinaesthetic 3D printed model was successfully produced to illustrate all movements of the rotator cuff accurately. No significant differences were found in the overall score of students, but the 3D printed model was generally found to be more "helpful" and "recommended for future teaching".

**Conclusion:** A kinaesthetic, 3D printed model did not increase overall exam performance compared to a plastic model. It was, however, significantly preferred by students and, with some refinement, 3D printed kinaesthetic anatomy models may be used in the future for undergraduate medical teaching.

## KNOWLEDGE OF HEALTHY LIFESTYLES AMONGST GULF MEDICAL UNIVERSITY STUDENTS AND HEALTHCARE PROFESSIONALS IN AJMAN, UAE

Ibirogba E, **Salam J**, Konchwalla A, Alattar K, Abdalla K, Alsharbatti S  
*Gulf Medical University, Ajman, UAE*

**Background:** Non-communicable diseases (NCD) are now at the forefront of mortality rates; this is especially true in the UAE. Leading a healthy lifestyle has been shown to improve NCD morbidity rates and knowledge of what a healthy lifestyle consists of is pivotal to practicing one.

**Aims:** To assess the knowledge of healthy lifestyles according to the WHO/CDC guidelines amongst university students and healthcare professionals (HCPs). To determine the sources of knowledge of healthy lifestyles.

**Methods:** The sample size (670 participants) included students and HCPs. A self-administered questionnaire was used with a cross-sectional study design to assess knowledge of physical activity, diet, sleep and tobacco use.

**Results:** This study shows that 3.7% and 55.4% of participants were aware of the CDC guidelines of physical activity and sleep, respectively. A total of 0.3% of participants were aware of the USDA guidelines for a healthy diet, and 88% of participants understood tobacco use carried a severe or moderate risk to one's health. The most accurate sources of knowledge for healthy lifestyles were from: friends for physical activity (82.5%), academic institutions for diet (23.9%), academic institutions for sleep (90.7%), and family for tobacco use (98.2%).

**Discussion:** The majority of participants had good knowledge of healthy lifestyle guidelines, except for diet and physical activity. Research conducted in India, US and Canada supports our findings for physical activity, sleep and tobacco use, respectively. The most common sources of knowledge included media, academic institutions, and family. Similar findings were reported in Europe and Canada, amongst others.

**Conclusion:** Participants displayed appropriate knowledge regarding the CDC guidelines for sleep, and portrayed awareness of the harmful risks of tobacco use. However, they had incredibly poor knowledge of the CDC guidelines for physical activity and the USDA guidelines for a healthy diet. Academic institutions were the most reliable sources of information for most domains.

## Poster Presentations

### CRITERIA FOR THE DIAGNOSTIC OF THE METABOLIC SYNDROME IN THE ADMINISTRATIVE PERSONNEL OF THE UNIVERSITY

**Belloso-Ibarra LA**, Salazar-Salas JJ, Benitez-Barcelata MA, Contreras-Davito IK, Quintana-Pelayo JA, Partida-Pérez M, Torres-Jasso JH, Viruete-Cisneros SA  
*Universidad de Guadalajara Centro Universitario de la Costa, Mexico*

**Background and Aims:** The Metabolic Syndrome (MetS) is the association of metabolic alterations constituted by central obesity, dyslipidemia, hyperglycemia and arterial hypertension. This study aims to identify the presence of MetS with the criteria of the International Diabetes Federation (IDF), American Heart Association (AHA), the third report of the National Cholesterol Education Program (ATP III), and the World Health Organisation (WHO), in the administrative staff at the Centro Universitario de la Costa.

**Methods:** Descriptive transversal study, with 76 Mexican participants between 21 and 43 years of age. They took socio-demographic and anthropometric measurements, fasting glucose, arterial tension, and serum testing; the latter represented a risk factor according to the criteria for the diagnostic of MetS: IDF, AHA, ATP III and the WHO.

**Results:** The obtained data shows that the cases that represented MetS were 6.57% according to the ATP III criteria, 10.52% according to the AHA, 11.84% according to the criteria for the WHO, and 18.42% according to the IDF, the latter being the one with the highest number of affected.

**Conclusion:** The importance of early diagnosis and the criteria of the IDF are paramount. These factors allow the start of a treatment with a more preventive focus. This will lower the morbimortality associated with this syndrome in the long-term.

### RENAL OUTCOME AMONG SAUDI CHILDREN WITH POSTERIOR URETHRAL VALVE: WHEN TO WORRY?

**Bahashwan MS**, Ismail S, Alsaywid S, Mukharesh L  
*King Abdulaziz University, Saudi Arabia*

**Background:** Posterior urethral valve (PUV) is one of the most common causes of lower urinary tract obstruction in male neonates. The incidence of PUV is < 1 in 8000 fetuses. Most fetuses suffer miscarriage, and those continued with the pregnancy will develop a life-threatening obstructive uropathy which requires urgent surgical intervention. Two surgical approaches are used for the management of PUV: endoscopic valve ablation and urinary diversion.

**Aims:** To evaluate the renal outcome of endoscopic valve ablation versus urinary tract diversion.

**Methods:** An observational, retrospective cohort study involving all patients who were diagnosed with PUV at King Abdulaziz Medical City from 1998 to 2016. The patients were divided into two groups according to the type of intervention: those in Group 1 were offered endoscopic fulguration whilst those in Group 2 were offered urinary diversion. Group 1 comprised of 24 patients (61%) and Group 2 was composed of 15 patients (39%) (either vesicostomy 56% or ureterostomy 44%). The data was collected from the medical records and collated in a data collection sheet.

**Results:** Thirty-nine patients with PUV were managed, 23% of which were preterm. Chronic kidney disease (CKD) developed in 17 patients (45%), and 18% developed end-stage renal disease (ESRD). CKD developed in 60% of patients with urinary diversion compared to 33% of patients undergoing endoscopic ablation; OR = 3 (95% CI = 0.8 - 11.4, P value = 0.09). Patients who underwent diversion had a higher risk of developing ESRD; OR = 2.55 (95% CI = 0.48 - 13.46).

**Conclusion:** Endoscopic fulguration has a better renal outcome compared to urinary diversion. PUV is a rare pathology, but our patients had poor renal outcomes in comparison to international studies.

## AWARENESS OF EYE DISEASES CAUSED BY DIABETES AMONG DIABETIC IN-PATIENTS AT KING ABDULAZIZ UNIVERSITY HOSPITAL, JEDDAH, SAUDI ARABIA

Basheikh A, **Ismail S**, Bahashwan M, Aljawi A, Alghamdi I, Bashmakh I, Filmбан A, Khojah M  
*King Abdulaziz University, Saudi Arabia*

**Background:** Saudi Arabia is the second most common country affected by diabetes mellitus in the Middle East, and is the seventh in the world. Almost 10% of diabetic patients develop visual impairment and blindness due to ocular complications. These could be prevented by increasing awareness.

**Aims:** To assess the awareness of diabetic inpatients about diabetic eye disease at King Abdulaziz University Hospital (KAUH).

**Methods:** A cross-sectional study was conducted in KAUH, Jeddah, Saudi Arabia in 2017 amongst 300 diabetic inpatients in KAUH between 2014 and 2017. The data was collected through a telephone-based interview and analysis was carried out using Chi-square test.

**Results:** The study involved 241 out of 300 patients; 140 (58.1%) were male. Of these patients, 80.9% knew of diabetic eye disease. The study found that educational level and economic status played a key role in the awareness of eye diseases, and 79.7%, 41.9% and 32.8% of patients were aware that retinopathy, cataract and glaucoma, respectively, can be caused by diabetes mellitus.

**Conclusion:** Most of those with diabetes were aware of ophthalmologic complications. Despite their awareness of diabetic retinopathy, more than half of them were unaware that it is curable. Hence, more public health education is needed.

## A RARE CASE OF IVEMARK SYNDROME (RIGHT ISOMERISM) WITH AN EXTREMELY UNFAVOURABLE COMBINATION OF HEART DEFECTS

**Frempong MN**, Luchyshyn N  
*I.Ya. Horbachevsky Ternopil State Medical University, Ukraine*

**Background:** Ivemark syndrome is a rare congenital abnormality typified by heart defects, asplenia and disarrangement of the viscera. The complexity in managing this condition means a high mortality rate in 60% of patients before they reach the first year of their lives, and only 5-10% of affected individuals reach adulthood.

**Case Study:** A three-month-old male Caucasian child was hospitalised in the Paediatric Department due to skin cyanosis, decreased appetite and presence of mucus in stool following antibiotic therapy for acute bronchitis. According to obstetric history, the child was born full-term. Birth weight was 3750g, body length was 53cm, and Apgar rating scale showed 8/8 points. During the third trimester of pregnancy, the mother developed pyelonephritis and anaemia. From the first day of life, the child was hospitalised in the neonatal department with a diagnosis of congenital bilateral pneumonia with cardiovascular syndrome. He was on mechanical ventilation for seven days after birth, and was consulted on the tenth day by cardiology and cardiovascular surgery specialists. He was subsequently treated symptomatically until he died.

**Results:** CT scan of the chest and abdomen revealed: asplenia; full A-V communication (common ventricle); aorta located away from the right ventricle; pulmonary atresia; patent ductus arteriosus; total anomalous pulmonary venous drainage; stomach located on the left; mid-location of liver; non-visualised spleen; kidney without features; large-sized adrenal glands; pancreas located on the right; intestinal malrotation; and small thymus.

**Discussion:** Ivemark syndrome is rare, and cases from the literature are sporadic and multifactorial, indicating varying combinations of presenting anomalies. Hence, evidence to support a specific management approach is lacking. We describe here a case of a three-month-old male child diagnosed with syndrome of heterotaxy.

**Conclusion:** In this case, an extremely unfavourable combination of heart defects made radical correction impossible, eventually leading to the death of child. It is therefore imperative to create an awareness of this rare syndrome in order to motivate prenatal detection of this disease.

## AN IATROGENIC TRACHEOESOPHAGEAL FISTULA IN AN ELDERLY PATIENT COMPLICATING A CENTRAL VENOUS CATHETERISATION PROCEDURE: A CASE REPORT

Mahadi SI, Balila RM, **Saad EA**, Ahmed ME  
*Midland Regional Hospital, Mullingar, Republic of Ireland*

**Background:** Adult tracheoesophageal fistula (TEF) is a rare clinical occurrence that results from various causes. The authors report on an elderly patient with an ESRD who is on regular renal haemodialysis and who had an iatrogenic TEF complicating a central venous catheter (CVC) insertion.

**Case Study:** A 65-year-old Sudanese male with ESRD presented with recurrent cough and choking following meals. The symptoms started soon after he had a CVC inserted at a nephrology centre; he had never experienced these symptoms before prior to the procedure. Barium swallow demonstrated an abnormal flow of contrast into the trachea and main bronchi, with a suspected high tracheoesophageal fistula. A CT of the chest confirmed fistula position, but there were no other abnormal findings in the trachea, main bronchi, lungs or oesophagus. Esophagoscopy and bronchoscopy revealed a large TEF in the cervical oesophagus at 21cm from the incisors. No other luminal pathologies were detected in the oesophagus or bronchi. He underwent surgical repair of the fistula with a vascularised strap flap as it was not amenable to clipping or stenting per bronchoscopist advice. Biopsy was negative for any chronic inflammatory or neoplastic findings. His symptoms resolved with no recurrence over a year.

**Discussion:** Aetiology of adult TEF involves a variety of neoplastic, inflammatory, traumatic and iatrogenic causes. A detailed history, a thorough physical examination, and findings of serial investigations did not reveal any specific cause of our patient's fistula, apart from the CVC procedure he underwent. The onset of complaints correlated with the CVC insertion as he had never experienced TEF symptoms before. Isolated tracheal and oesophageal injuries are well-known complications of CVC insertion.

**Conclusion:** Adult TEF is a rare clinical entity. Nevertheless, a careful clinical work-up is needed to establish the aetiology of the fistula in elderly patients. CVC insertion could be a possible cause of an adult TEF.

## EXTRACELLULAR MATRIX-DERIVED HYDROGEL FROM DECELLULARISED UTERINE TISSUE: A SYNTHESIS AND ANALYSIS

**Vutipongsatorn K**, Kim J, Kawabata K, Narintadeach C, Takeda S, Ushida T, Furukawa K  
*Imperial College London Faculty of Medicine, United Kingdom*

**Background and Aims:** Female infertility is estimated to affect 72.4 million, or 9% of, women of reproductive age. There are multiple causes such as Asherman syndrome, or symptomatic intrauterine adhesions, which results from inappropriate tissue healing after damage to the endometrium's basalis layer (i.e., from surgery, infection or abortion). These adhesions can obstruct sperm passage or embryo implantation, leading to infertility. A modern approach to tissue healing is thus warranted. Extracellular matrix (ECM) derived hydrogel is a novel scaffold that mimics the micro-environment of native tissues. Recently, numerous studies have illustrated its wide-ranging applications in regenerative medicine with one ongoing Phase I Clinical Trial on patients with post-ST elevation myocardial infarction. However, its application in uterine tissues has not been explored or characterised. This study aims to further investigate this.

**Methods:** Uterine tissues were harvested from female Sprague Dawley rats and decellurised using high hydrostatic pressure of 980 MPa. Histological analysis and dsDNA assay were performed to assess decellurisation. Samples were then lyophilised, digested, and used to form hydrogel as per modified Freytes protocol. Cytotoxicity was examined by culturing rat endometrial stromal cells on the hydrogel for two, four or seven days, followed by live/dead double staining assay.

**Results:** After seven days, hydrogel surface was almost entirely covered with living cells, with few dead cells detected.

**Conclusion:** We demonstrated for the first time that ECM-derived hydrogel could be successfully synthesised from decellularised uterine tissues. Its capability to host living cells hints at its potential to facilitate wound healing in the uterus. More research is needed to analyse its characteristics and utilities in clinical medicine.



## A DISSECTION STUDY REGARDING THE ANATOMY OF THE LARYNX: DIFFERENCES BETWEEN GENDERS AND THE RELATIONSHIPS OF THE CARTILAGES INVOLVED

**Shurmer J**

*Royal Preston Hospital, Preston, United Kingdom*

**Background:** Surgical revascularisation of the vertebral artery by transposition to the common carotid artery provides secondary prevention of posterior circulation strokes in patients who have not responded to best medical therapy or endovascular therapy. Surgical revascularisation provides an alternative treatment, however, it is associated with a high complication rate.

**Aims:** To demonstrate the anatomical relations of the vertebral artery to surrounding structures commonly damaged during surgical revascularisation and hypothesise methods to avoid damage.

**Methods:** Hemi neck dissections were undertaken with reference to published surgical approaches to demonstrate the relevant anatomy. Findings: The cervical sympathetic trunk was adhered to the vertebral artery and at greatest risk of injury. The thoracic duct, recurrent laryngeal nerve, phrenic nerve, brachial plexus and apex of the lung were encountered in each approach.

**Discussion:** The study showed that despite an evidence-based approach to the vertebral artery there is still potential to damage structures early in the procedure. Complications can be minimised by following a set of key principles intraoperatively to protect the vertebral artery. Conclusion: The results from the study provide awareness of the anatomical relations of the vertebral artery in a surgical context and potential methods to avoid complications. To continue developing the safest approach to the vertebral artery further dissections are needed to trial the hypothesised methods and directly involve surgeons specialising in the procedure.

## THE EFFECTIVENESS OF FASCIA ILLIACA BLOCKS AS PAIN RELIEF IN NECK OF FEMUR (NOF) FRACTURES AT UNIVERSITY HOSPITAL OF NORTH TEES

**Vella JX**, Jenner L, Jeavons R

*University Hospital of North Tees, Stockton-on-Tees, United Kingdom*

**Background and Aims:** NoF fractures are one of the commonest causes of admission to an Orthopaedic Unit. Fascia iliaca blocks are cheaper than, and have a reduced side effect profile compared to, opioids. This study aims to examine the effectiveness of fascia iliaca blocks as pain relief in NoF fractures.

**Methods:** Data was collected prospectively between the dates of 22/02/18 and 27/03/18. The inclusion criteria for this clinical audit included skeletally mature patients over the age of 18 years who were admitted via the trauma service at UHNT. Patient notes were analysed from the Emergency Department, with the pain relief given to each patient recorded alongside multiple pain scores (between 0-10): post-block, six hours post-block, and 15 hours post-block. Identical measurements were recorded for patients who did not receive a block. Additionally, age, gender, side effects (likely caused by pain relief), and any alterations in AMTS prior to surgical input were recorded.

**Results:** A total of 20 patients were identified from the trauma list. Twelve female and eight male patients were recorded in this audit. The patients varied in age, from 66 to 97 years old (mean 81.1). Sixty percent of the cohort were administered a fascia iliaca block. There was a mean reduction of 4.22 in the pain score immediately post-block, compared to an average instantaneous reduction of 2.5 in the pain score for patients who did not receive a block. An average of 0.54 side effects were experienced by patients who had received a block, compared to a mean of two side effects in the group of patients who were treated without a block.

**Discussion:** We have identified that delivering a series of teaching sessions on the technique used in performing this block to Emergency Department Physicians, Orthopaedic SHOs and Foundation Doctors can act as a route to improving the proportion of NoF patients who receive a block. Additionally, altering the treatment guidelines for the NoF pathway in Accident and Emergency should help further.

**Conclusion:** The benefits in using fascia iliaca blocks have been confirmed by this audit.

## PREDICTING HEART DISEASE USING ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

**Miao KH**

*New York University School of Medicine, USA*

**Background and Aims:** Internationally, heart disease is a leading cause of death amongst patients. To improve their chances of survival, early and accurate diagnoses of heart disease is essential. In this research project, a computational model based on machine learning algorithms is created to aid medical professionals in optimising the accuracy of heart disease diagnoses.

**Methods:** The computational model was developed using ensemble machine learning meta-algorithms and networks for heart disease diagnosis. The model was applied to heart disease data sets from 878 patients (53% male; 47% female) in hospitals and medical institutions located in the United States, Hungary, and Switzerland. Data from 50% of the patients was used to train the machine learning model, and the remaining 50% of the patient data was used for testing performance.

**Results:** The developed machine learning models achieved overall heart disease diagnostic accuracies of 94% based on training data set results and 87% based on testing performance results, exceeding the accuracies of previously published research.

**Discussion:** The machine learning model was evaluated for accuracy, using F-score, Area under the Curve (AUC), and K-S measures. Its average model F-score was 0.89 and average K-S score was 60%. The ensemble machine learning model prediction results were more accurate compared to those of other data mining approaches for heart disease diagnosis, including those of decision trees (80%) and Bagging algorithm (82%).

**Conclusion:** Computer-aided heart disease diagnoses based on machine learning algorithms are clinically useful in aiding medical professionals globally to improve patient outcomes. Furthermore, for patients in areas with fewer heart disease specialists, the machine learning model can serve as a cost-effective option for earlier detection and diagnosis of heart disease.

## TEXTURE ANALYSIS USE IN ASPECT SCORING OF ACUTE STROKE

**Thomas OL**, Alnass M, Mathew S, Doney A

*University of Dundee School of Medicine, United Kingdom*

**Background and Aims:** Acute strokes are one of the major causes of mortality in the UK and are medical emergencies requiring immediate admission to hospital. Upon admission, a brain CT is acquired to check for contraindications before thrombolysis is administered. A 10-point ASPECT score can then be calculated by a senior radiologist using the CT images of patients presenting with middle cerebral artery (MCA) strokes. ASPECTS quantifies ischaemic changes and allows for prediction of outcomes. This study aims to determine if texture analysis can be used to find ischaemic changes that are indistinguishable to the human eye.

**Methods:** In this retrospective single centre study, the scans of 40 patients were equally divided into groups with either low ASPECTS (7) or high ASPECTS (10). The images were collected from Ninewells PACS network and anonymised using the inbuilt software. Images were analysed by manually placing Regions of Interest (ROI'S) on ASPECT regions at the two basal-ganglionic and supra-ganglionic slices using the DICOM viewer "RadiAnt" and texture analysis software "MaZda".

**Discussion:** Limitations of this study included difficulty in placing ROI's manually due to user learning curve and some problems with the programme "MaZda" recognising the DICOM image format of the CTs.

**Conclusion:** At this stage, we are currently awaiting results. However, qualitative results can be discussed. There are a number of pros and cons to the use of TA. Pros include that TA can be conducted on CT images but with some major limitations specific to my project, as previously discussed.

## ALL CABG PATIENTS WHO HAVE NO CONTRAINDICATIONS: DO THEY GET PERIOPERATIVE BETA BLOCKERS?

**Miah MM**, Phelan L, Mehanna M, Ashoub A  
*Queen Elizabeth Medical Centre, Birmingham, United Kingdom*

**Background and Aims:** Atrial fibrillation (AF) is the most common heart rhythm disorder. AF has been reported in up to 15 to 40% of patients in the early postoperative period after CABG. Beta blocker administration reduces the incidence of postoperative atrial fibrillation (POAF) from 30–40% to 12–16% after CABG. This study aims to determine if all CABG patients without contraindications receive  $\beta$ -blockers perioperatively.

**Methods:** Retrospective data was collected. Consecutive 50 patients treated with isolated CABG between August 2017 and October 2017 were included. Patients were excluded if they had physician-documented contraindications to  $\beta$ -blocker therapy, or underwent CABG combined with valvular or other cardiac surgery.

**Results:** According to the standard guidelines, all patient undergoing CABG should receive  $\beta$ -blockers in the immediate postoperative period, namely within 24 hours.  $\beta$ -Blockers were continued perioperatively only in 12% of patients. However, in 20% of patients, it was resumed on the first postoperative day. In 48% of patients,  $\beta$ -Blockers were resumed on the second postoperative day.

**Discussion:** According to the ESC Guidelines issued in August 2009,  $\beta$ -Blockers are recommended in patients with known ischaemic heart disease or myocardial ischaemia on preoperative testing (IB). In our audit, those patients who received  $\beta$ -blockers on the day of surgery or the following morning (Continued + Restarted on 1<sup>st</sup> POD) met the standard guidelines. Thus, according to the data, (12%+20%) 32% of the patients met the standard guidelines. To compare the rate of AF, we divided the patients into two groups: Group A, who followed the guidelines (16 patients), and Group B, who resumed  $\beta$ -Blockers 48 hours onwards (34 patients). In Group A, only one patient developed postoperative AF whereas in Group B, 11 patients developed postoperative AF.

**Conclusion:**  $\beta$ -blockers significantly reduce the incidence of AF after CABG. Considerable attention must also be focused on understanding and improving  $\beta$ -blocker use during the perioperative period. From this audit, it can be said that standards were met – partially.

## PREVALENCE, CLINICAL PATTERN AND DETERMINANTS OF ALLERGIC RHINITIS AMONGST CHILDREN AGED ONE TO SIX IN JEDDAH CITY, KSA

AlKhateeb T, **Alkaf AW**  
*King Abdulaziz University Hospital, Saudi Arabia*

**Background and Aims:** Allergic rhinitis (AR) is an important global public health problem because of its markedly increased prevalence worldwide. It has a considerable impact on the quality of children's life. It affects social life, sleep, school and work, and its economic impact is substantial. This study aimed to evaluate the link between allergic rhinitis and its related determinants among children in Jeddah City.

**Methods:** A cross-sectional analytical study was selected. The questionnaire was distributed to 748 children aged between one and six years who were attending two hospitals in the North and South of Jeddah. Data was collected from the mothers or caregivers of healthy children attending with them using: interview questionnaire, anthropometric measurements, and ISAAC core questionnaire on asthma and allergic disorders.

**Results:** This study was conducted on children aged between one and six years (n=748); 357 males (47.7%) and 391 females (52.3%). A total of 62.8% of the children were from the North of Jeddah, while 37.2% were from the South of Jeddah. Saudi children constituted 47.6% of the sample, while 52.4% were non-Saudis. Out of the 748 children studied, AR was found in 128 children (17.0%). Smoking of the father, the North of Jeddah, high social class families, and family history of allergies were more common among children with AR. Children of male gender, born premature, formula-fed, did not consume milk daily or consume a sweet diet were more likely to suffer from AR. Children with AR were more prone to repeated respiratory tract infection and had asthma symptoms. Only 63.3% of ISAAC diagnosed AR were diagnosed by the doctor as having AR.

**Conclusion:** AR is a major health problem among children aged between one and six years. Socio-economic characteristics, environmental factors and diet are important determinants of AR. Obesity and asthma, as well as family history of allergies, are important clinical disorders associated with AR.

## POLICY COHERENCE, TRADE LIBERALISATION AND OBESITY: A CASE STUDY OF NEW ZEALAND'S TRADE OBJECTIVES AND DEVELOPMENT COMMITMENTS IN THE SOUTH PACIFIC

**Slevin C**

*University of Edinburgh, United Kingdom*

**Background and Aims:** The small domestic economies and limited self-sufficiency of South Pacific islands has led to dependency on foreign nations for development assistance and importation of essential goods. These islands also face a non-communicable disease (NCD) crisis, containing some of the highest rates of obesity in the world. This study aims to consider the connection between trade liberalisation and obesity in the South Pacific.

**Methods:** A literature review was conducted to investigate the significance of the relationship between trade liberalisation and obesity in the South Pacific. Twenty-six articles were reviewed to investigate the pathways of influence and extent of the relationship in this region, with a focus on the nutritional impact of New Zealand's exports. This was followed by a thematic analysis of New Zealand's food, trade and development policies in the South Pacific.

**Results:** Trade liberalisation has facilitated the entry of nutritionally-inferior food products to Pacific nations and reduced subsidies available for domestic production, increasing food-import dependency. Free-trade agreements have also reduced the revenue available to re-invest in health systems over-burdened by the NCD crisis. New Zealand's policy objectives include a reduction in islanders' cardiovascular disease and tobacco use and an increase in domestic export revenue through further free-trade agreements.

**Discussion:** Tensions are evident between New Zealand's objectives to maximise export revenue, particularly from food and beverages, and commitments to reduce NCD incidence. The failure to incorporate health outcomes into economic policies threatens to undermine New Zealand's commitments to policy coherence in the Sustainable Development Goals.

**Conclusion:** The prioritisation New Zealand affords to its economic objectives underpins its failure to achieve policy coherence in the South Pacific. New Zealand appears reluctant to acknowledge its contribution to the NCD crisis, opposing the development of trade-restrictive health policies. Consideration must be given to the disparities in global economic strength between New Zealand and the island nations, with monitoring systems implemented to guarantee greater future policy coherence.

## PATIENT-RELATED OUTCOMES AND EXPERIENCE MEASURES (PROMS/PREMS) RELATING TO ORAL SURGICAL PROCEDURES UNDER IV SEDATION: A SUMMARY OF A LOCAL PROJECT AND A SUGGESTED MOVE TOWARDS A STANDARDISED QUESTIONNAIRE

Adams A, **Kudzinskas A**, Akram S, Kerr R  
*University of Exeter Medical School, United Kingdom*

**Background and Aims:** Conscious IV sedation (IVS) is a useful adjunct for many patients undergoing oral surgical or dental procedures. The clinical team should strive to improve the quality, safety and satisfaction of the service provided for patients. Evidence of this is becoming increasingly important in the commissioning of NHS services. To improve a service, we must first evaluate aspects of it in order to find areas of improvement. The patient's perspective is one major aspect of the quality of a service; patients could receive the best treatment but still be unhappy. Patient Reported Experience and Outcome Measures (PREMS/ PROMS) help us to gain a general idea of the patient's perspective. This study aims to explore the PREMS and PROMS relating to oral surgical procedures performed under IVS at a local hospital.

**Methods:** We studied the PREMS and PROMS of the oral surgery outpatient IVS service at the Royal Devon and Exeter Hospital (RD&E). A questionnaire was formulated which included criteria from two national commissioning documents. One hundred questionnaires were sent by post with pre-paid return envelopes. All patients underwent dental extraction(s) and were over 18 years of age. Forty-three questionnaires were returned and results analysed.

**Results:** Patient satisfaction was generally very high, on a Likert scale from 5 (excellent) to 1 (very poor), 90% answered excellent while 98% answered 4 or higher. A total of 95% of patients would definitely, and 5% would possibly, recommend the service to a friend or family member. Seven percent of patients needed to seek advice or assistance post-procedure, and 5% required additional surgery.

**Conclusion:** Overall, patients were happy with the service provided: 98% would rate it 4 or higher out of 5. Waiting times were identified as the commonest reason for dissatisfaction, which could be overcome by increasing clinic sizes. The widespread use of standardised PROMS/PREMS criteria would help evaluate and compare IVS services consistently across providers. The development of a validated questionnaire would be of future interest.

## PAEDIATRIC AUTISM IN PRIMARY CARE

**AlHennawi N**, AlHennawi S, Ahmad M, Chaudhary Y  
*Lancashire Teaching Hospitals NHS Trust, United Kingdom*

**Background:** Autism Spectrum Disorder (ASD) is a multifactorial, lifelong neurodevelopmental disorder. Several factors have contributed to its aetiology, including genetics, neurological changes, immune dysregulations and environmental elements. ASD is characterised by pervasive communication and impairments in social interaction, in addition to restricted and repetitive behavioural patterns which usually arise in childhood.

**Aims:** This project reviews the diagnostic process and management framework of paediatric ASD in primary care. Furthermore, it aims to provide a means for educating parents and carers about the condition.

**Methods:** National guidelines and international criteria (ICD-10) were used to create a protocol for the identification, referral and management of ASD in general practice. Based on information gathered from literature search, a leaflet was also created to increase public awareness of the condition.

**Results:** A multi-step protocol was produced for General Practitioner use and guidance. Additionally, a case study involving two autistic siblings was conducted to identify challenges encountered by families and the support received. Finally, a leaflet on the condition was created to improve parents' and carers' understanding of ASD and to address their concerns.

**Conclusion:** Being a lifelong condition, this study has reiterated the necessity of early diagnosis and management of ASD for better future outcomes. Due to the diversity of presentations, referral pathways and service provisions differ. However, a set protocol and multidisciplinary approach to every suspected ASD case is chief to maximise the children's potential in the long run. Moreover, providing education and support helps families to cope with the diagnosis, as well as the physical and psychological demands of caring for a child with a disability.

## A DISSECTION STUDY REGARDING THE ANATOMY OF THE LARYNX: DIFFERENCES BETWEEN GENDERS AND THE RELATIONSHIPS OF THE CARTILAGES INVOLVED

**Shurmer J**  
*Royal Preston Hospital, Preston, United Kingdom*

**Background and Aims:** The human larynx is responsible for manipulating sound waves, altering their pitch within a range of 100 to 50,000 Hz. These alterations are the result of rapid movements of the vocal folds, membranous tissue connecting the anterior and posterior cartilaginous surfaces of the larynx. Responsibility for moving these folds falls to the skeleton of the larynx, made of a number of cartilages. The size and orientation of the cartilages therefore have a dramatic effect on voice. Size in particular is influenced by the hormonal influences exhibited during puberty, creating a great sexual dimorphism. This aim of this study was to evaluate the differences in the anatomy of the larynx between genders.

**Methods:** This study used dissection to expose the larger cartilages of the larynx, the hyoid bone and the vocal folds, and measures them across 20 different cadavers; 10 male and 10 female.

**Results:** The results were analysed using one-way and two-way ANOVAs and Kruskal-Wallis to investigate differences, and Pearson's and Spearman's tests for correlations.

**Discussion:** The study showed a significant difference in the larynxes between genders, as expected. The epiglottis was similar to the size of the laryngeal outlet both in width and length, confirming its functional role. Other lesser correlations may show further potential links that result from the developmental processes in the growth of the larynx.

**VALIDATION OF THE OMRON HBP-1300 IN NORMOTENSIVE AND HYPERTENSIVE PREGNANCIES ACCORDING TO THE BRITISH HYPERTENSION SOCIETY PROTOCOL (1993)**

**Salaria M**, Kametas N  
*King's College London, United Kingdom*

**Background:** Automated blood pressure devices have become a popular alternative to the 'gold standard' manual sphygmomanometer. However, few automated devices have been shown to be accurate in pregnancy and pre-eclampsia. The haemodynamic profile of pregnancy, and the challenges this presents to most automated devices, emphasise the importance of separate validation in these subgroups.

**Aims:** The objective of this study is to validate the Omron HBP-1300 monitor for use in normotensive and hypertensive pregnancies using the British Hypertension Society (BHS) protocol.

**Materials and Methods:** Nine consecutive same-arm blood pressure measurements were taken, alternating between the mercury and the Omron HBP-1300. The final seven measurements were used in the analysis. The device was graded according to the BHS criteria.

**Results:** Fifty-three women were recruited, and 50 were included in the study. The Omron HBP-1300 achieved an A/A grade in both systolic and diastolic measurements in normotensive and hypertensive pregnant women, using the BHS protocol.

**Discussion:** The majority of readings were within 5mmHg. Nonetheless, the maximum over-estimation was 25 mmHg. This may be an anomaly. However, it could have a large impact on patient diagnosis and management. Due to the morbidity associated with hypertensive pregnancies, it is imperative that validation studies continue to evaluate the accuracy of automated devices in pregnancy. This will enable better availability of alternatives to mercury sphygmomanometers, and improve upon available technology.

**Conclusion:** The Omron HBP-1300 has achieved the highest-grade possible using the BHS validation criteria and, therefore, can be recommended for clinical use in both normotensive and hypertensive pregnancies.

**A SERVICE EVALUATION OF THE MANAGEMENT OF DEVELOPMENTAL DYSPLASIA OF THE HIP (DDH) AT THE CHILDREN'S HOSPITAL FOR WALES**

**Donnir A**, Carpenter EC  
*Cardiff University School of Medicine, United Kingdom*

**Background:** DDH occurs in 4.9/1000 UK live births and is a leading cause of childhood disability. Early intervention using a Pavlik Harness or hip spica cast can fully correct the abnormality. Late intervention leads to hip instability and arthroplasty.

**Aims:** To evaluate parental perspectives of the screening, diagnosis and management of DDH at the Children's Hospital for Wales (CHfW), and to define the standard of care achieved.

**Methods:** We designed a questionnaire to collect parental feedback about the service provided at the hospital. We also utilised the CHU9D validated paediatric outcomes score to collect patient well-being data.

**Results:** We gave questionnaires to 105 parents and 91 paediatric patients. In the duration of this project, insufficient responses were received. The project is still ongoing until sufficient responses from parents and patients are received.

**Discussion:** Long-term consequences of missed diagnosis or untreated DDH come at a high cost for society, the individual and the family. Such a condition that is treatable during infancy must be studied in order to reduce the incidence of preventable adulthood disability.

**Conclusion:** Current literature scarcely utilises paediatric patient-reported outcomes or evaluates parental experiences. More data is needed to facilitate future practice.

## A PATIENT WITH POLYMYOSITIS

**Espie MJ**

*University of Glasgow School of Medicine, United Kingdom*

**Background:** This case report is a reflection on a seventy-three-year-old lady who I saw in the Rheumatology ward at the Glasgow Royal Infirmary whilst completing a student-selected study module. In the report, I have reflected on the condition with which the patient was diagnosed - polymyositis - and have related the typical clinical presentation of the condition to the specific presentation of this patient.

**Case Study:** Polymyositis is an idiopathic inflammatory myopathy characterised by striated muscle inflammation causing muscle weakness. The inflammatory myopathies are a group of disorders sharing the pathophysiology of immune-mediated muscle injury, but they each differ histologically. The epidemiology of polymyositis is 6-8/100 000 cases/year, and the female to male ratio is 2:1. Polymyositis affects areas of striated muscle, and complications include dysphagia, respiratory muscle weakness leading to respiratory failure, and cardiovascular involvement. The pathophysiology involves infiltration of striated muscle fibres with inflammatory cells, resulting in necrosis of myocytes and inhibition of normal physiological muscle contraction.

**Discussion:** The patient in this case report suffered from many disease complications, including opportunistic infections due to treatment regimes, and her admission was a very long and complex one. The risk of cancer in a female with polymyositis is increased 3.4 times. It was discovered during her admission that this patient had a cystic lesion in the pancreas which is still to be investigated, but it would not be surprising if this lesion turned out to be a malignancy due to the high associated risk with polymyositis.

**Conclusion:** This rare case demonstrates the severe and sudden debilitating impact that polymyositis has on a patient, preventing him or her from being able to stand up unaided, let alone continue to live independently as this particular patient could prior to becoming ill.

## BASE OF TONGUE ABSCESS – A RARE BUT POTENTIAL DIFFERENTIAL TO TONSILLITIS: A CASE REPORT

**El-Amin M, Ward N, Khong G, Mohamed MAE**  
*Royal Bolton Hospital, Bolton, United Kingdom*

**Background:** Tongue abscesses can be classified as either anterior or posterior. Due to the tongue's resistance to infection, abscesses are rare, especially posterior abscesses. Causes of infection of the base of the tongue include lingual tonsillitis, infected remnants of a thyroglossal cyst, and lower molar teeth infections.

**Case Study:** A 37-year-old lady presented to the GP clinic and Accident and Emergency multiple times and was treated for tonsillitis with antibiotics following a one-month history of worsening throat pain, tongue swelling, dysphagia, and breathlessness with a feeling of constriction in her airway. Worsening of symptoms and raised inflammatory markers required admission, IV antibiotics and ENT input. Flexible nasoendoscopy showed swelling of base of tongue on the right side with narrowed but adequate airway. CT scan of the neck showed a large heterogeneous, multi-cystic collection of 5x4.9x4cm at the base of tongue on the right side, crossing the midline and involving the intrinsic tongue muscle. Incision and drainage, and a tracheotomy, were performed.

**Discussion:** Tongue defence mechanisms include the mobility of the tongue and presence of saliva allowing for persistent cleansing, the thick keratinized mucosa acting as a barrier, and the tongue's rich blood supply and lymphatic drainage. Airway obstruction may present acutely due to rapidly expanding base of tongue abscess, management of which is particularly challenging and accounted for 40% of all cases (72 out of 184 patients) reported to the 4<sup>th</sup> UK National Audit Project of Major Airway Complications (NAP 4). Significant recommendations arising from the review of these cases have been instrumental in guiding the assessment, planning, and management strategies of patients with an obstructed airway to optimise their outcome.

**Conclusion:** Although challenging, it is vital to identify and diagnose tongue base abscesses as the resulting swelling may become life-threatening due to upper airway compromise.

## CHRONIC ANAEMIA IN A 30-YEAR-OLD GENTLEMAN: UNUSUAL CASE OF MECKEL'S DIVERTICULUM

**Ikram H**, Ashmore D, Krishnan A, Smith A  
*Airedale General Hospital, Keighley, United Kingdom*

**Background:** Meckel's diverticulum is the most common congenital abnormality of the small bowel and, when symptomatic, can present as intussusceptions.

**Case Study:** A 30-year-old man of oriental origin with no significant past medical history presented to the Emergency Department with a five-hour history of central abdominal pain, generalised abdominal tenderness, and tachycardia on examination. This was his fourth admission in the last five months. Given the multiple presentations of abdominal pain, anaemia with a normal OGD and sigmoidoscopy, a CT scan confirmed a small bowel intussusception secondary to Meckel's diverticulum. The patient was taken to theatre for a short segment small bowel resection.

**Discussion:** Intussusception is defined as the invagination of a proximal segment of bowel into the lumen of an adjacent segment, and is described in only 5% of all cases in the adult population. Almost 90% of intussusception cases in adults are secondary to intra-luminal pathologies: neoplasms, lipomas, inflammatory lesions and, rarely in this case, a Meckel's diverticulum. Whilst a Meckel's diverticulum causing intussusception is rare, a thorough and appropriate investigation of the gastrointestinal tract is required in young adults with repeated presentations, chronic anaemia and normal endoscopies. Recognising this early and confirming the diagnosis is essential to enhance patient outcomes.

## DIABETES STRUCTURED EDUCATION PROGRAMME - EFFECT ON DIABETES CONTROL

**Kan ZW**  
*Royal Liverpool University Hospital, Liverpool, United Kingdom*

**Background and Aims:** The National Institute for Health and Care Excellence (NICE) UK recommends structured education programme (SEDP) as an integral part of diabetes management. This project aims to study the effect of patients' participation in SEDP on diabetes control.

**Methods:** Specially designed questionnaires were distributed to all diabetes patients  $\geq 18$  years old attending the diabetes centre at the Royal Liverpool University Hospital (RLUH) from 13/02/2018 to 01/03/2018. Data on treatment targets and presence of complications were collected from Diabetes Register and hospital database.

**Results:** Out of 221 intended patients, we have a total of 142 respondents, of whom 55 have attended SEDP. Respondents who attended SEDP were more likely to achieve  $HbA1c \leq 58$  mmol/mol (Odds Ratio 1.302, 95% CI: 0.643 to 2.636,  $P=0.464$ ) and cholesterol  $<5$  mmol/L (Odds Ratio 1.294, 95% CI 0.484 to 3.460,  $P=0.607$ ), but less likely to achieve target of blood pressure  $\leq 140/80$  (Odds Ratio 0.687, 95% CI: 0.315 to 1.495,  $P=0.344$ ). They also had reduced odds of getting cardiovascular complications (Odds Ratio 0.698, 95% CI: 0.301 to 1.623,  $P=0.404$ ), peripheral vascular complications (Odds Ratio 0.500, 95% CI: 0.129 to 1.934,  $P=0.315$ ), cerebrovascular complications (Odds Ratio 0.775, 95% CI: 0.222 to 2.706,  $P=0.689$ ) and nephropathy (Odds Ratio 0.657, 95% CI: 0.284 to 1.519,  $P=0.325$ ). No significant difference on the odds of having neuropathy (Odds Ratio 1.073, 95% CI: 0.492 to 2.342,  $P=0.860$ ) and diabetic eye disease (Odds Ratio 1.046, 95% CI: 0.529 to 2.069,  $P=0.897$ ).

**Conclusion:** Participation in SEDP could increase the likelihood of achieving treatment targets and reduce the likelihood of developing most long-term diabetes complications.



## EVALUATION OF THE EFFECTIVENESS OF 'FUNDAMENTALS OF MEDICAL SCIENCE FOR NON-MEDICAL PROFESSIONALS' COURSE

**Williams RC**, Enoch S

*School of Modern Languages, Cardiff University, United Kingdom*

**Background and Aims:** Many non-medical professionals, such as medical translators and interpreters, medical journalists, healthcare lawyers, and medical engineers, have limited knowledge of medical science but are required to work closely with medical professionals. This study considers how a course that proffers a focused overview of fundamental concepts and terminologies pertaining to medical science can assist such professionals in their careers.

**Description:** Entitled 'Fundamentals of Medical Science for Non-Medical Professionals', this structured course was held on two occasions (June 2017 and February 2018) at Cardiff University with different cohorts of medical linguists. The interactive discussions provided delegates with a focused overview of fundamental concepts and terminologies within the field of medical science. The course also offered an insight into the basics of medical history taking, reading and interpreting a medical report, construing expert opinions, understanding hospital transfer reports, and comprehending patient discharge documentations.

**Results:** The feedback (n=15) revealed that the course enabled the delegates to develop a good understanding of medical concepts and terminologies. In response to the question 'Do you feel more confident in understanding medical terminologies as a result of attending this course?', 100% selected 'Most Certainly' in 2017 whilst 67% answered 'Most Certainly', 22% answered 'Certainly', and 11% answered 'Neutral' in 2018. When asked if they were more confident in reading a medical document as a result of attending the course, 100% responded 'Most Certainly' or 'Certainly' in 2017 and 90% responded 'Most Certainly' or 'Certainly' in 2018. One hundred percent of delegates belonging to the 2017 cohort felt 'Very Confident' in applying the knowledge gained through the course to the context of medical translational work, whilst 89% answered between 'Very Confident' and 'Confident' in 2018.

**Discussion:** The value of specialist and focused courses that offer professionals a greater insight into an area with which they frequently interact is notable. Although the cohort in this study were medical linguists, all non-medical professionals working closely with the healthcare profession will benefit from similar courses. This will ultimately facilitate an efficient and fruitful working partnership between the professions.

## A QUALITY IMPROVEMENT PROJECT TO ASSESS AND REDUCE INFECTION RATES IN PATIENTS WITH DISTAL PHALANGEAL FRACTURES TREATED WITH KIRSCHNER WIRE FIXATION

**Wright J**, Shaharan S, Smock E, Pearl R

*University Hospital of North Staffordshire, Stoke on Trent, United Kingdom*

**Background:** Recently, concerns were voiced amongst colleagues in the Department of Plastic Surgery at the Queen Victoria Hospital, East Grinstead that cases of infection amongst patients treated with K-wire fixation for fractures of the distal phalanx were increasing. The use of K-wires for fracture fixation is known to increase the likelihood of patients developing deep infections, namely osteomyelitis, and this can have potentially devastating outcomes.

**Aims:** To determine the incidence of superficial and deep infection amongst patients who had been treated with K-wire fixation at the QVH for fractures of the distal phalanx within the previous 12 months. To use an analysis of the data collected, in conjunction with a systematic review of the literature, to devise a local protocol for the safe and appropriate use of K-wires for fractures of the distal phalanx.

**Methods:** We retrospectively reviewed the notes of all 38 adult and paediatric patients who underwent this procedure at the QVH during the period of December 2016 to December 2017.

**Results:** The overall rate of infection after K-wire fixation in this patient group was 18.4% (n=7). The proportion of patients who developed osteomyelitis was 10.5% (n=4).

**Discussion:** We have made a protocol available in theatres and in trauma clinic that contains a number of recommendations and points for surgeons to consider before using K-wires to treat fractures of the distal phalanx. These recommendations pertain to the timing of fixation, mechanism of injury and fracture location.

**Conclusion:** We are currently unsatisfied with the rate of infection in this patient group. Thus, we have implemented an intervention designed to redress this problem that we hope will have demonstrable results when we prospectively re-investigate in 12 months.

## A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE USE OF TISSUE-DERIVED THROMBIN SEALANT IN DRAINLESS PAROTIDECTOMY

**Rojoa MD**, Wright R, Ghosh S  
*Royal Oldham Hospital, Oldham, United Kingdom*

**Background:** Drains are traditionally placed after parotid surgery, with the intention of reducing post-operative seroma and haematoma formation. This usually denotes an inpatient bed until the drain is removed, depending on an acceptable low output. With the availability of tissue-derived thrombin sealants, wound closure in facial plastics and head and neck procedures can now be facilitated without the use of a drain in the dead space.

**Aims:** To assess whether tissue sealant improves wound-related outcomes in parotidectomy and allows for a drainless procedure.

**Methods:** A systematic literature review was performed using a standardised published methodology and custom database search strategy. Methodological assessment was performed using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) tool, and a fixed-effect meta-analysis of the combined complications was performed.

**Results:** Eleven studies were identified relating to parotidectomies using tissue sealants. Three of them have shown statistically significant decrease in drain output. Tissue sealant use enabled a shorter in-hospital stay (0-2 days) compared to the conventional method (1-5 days), thus lowering the overall cost per case. There was also a tendency for tissue sealants to reduce complication rates, including haematomas and seromas (Odds Ratio 6.25 [1.13, 34.45], 95% CI,  $I^2 = 47\%$ ,  $P = 0.06$ ).

**Conclusion:** The use of drains post-parotidectomy is superseded by tissue sealant due to the shorter admission time and the lower risk of post-operative complications.

## IS THERE A NEW KIND OF DOCTOR? AN INTERVIEW-BASED STUDY OF FORMER BBT TRAINEES AND THEIR SUPERVISORS

**Parmar A**, Bullock A, Webb K  
*Cardiff University School of Medicine, United Kingdom*

**Background and Aims:** As a result of an ageing population, more patients are presenting with chronic, multi-system diseases, increasing the complexity of care. The Shape of Training Review recommended changes to the training of doctors to meet these healthcare needs, including training doctors with more generalist skills. Broad-based training (BBT) was an approach designed to achieve this. Following Foundation Year 2, trainees spend six months in four specialities: General Practice, General Medicine, Paediatrics and Psychiatry.

This longitudinal study aims to consider whether BBT has developed a new kind of doctor. We explore how well BBT prepares trainees for their current role, how BBT impacts on clinical practice, whether trainees adopt a holistic approach to care, and what lessons can be learned for the future.

**Methods:** Following ethical approval, 14 BBT trainees and three clinical supervisors were interviewed by telephone. Recordings were then transcribed and thematically analysed using NVivo.

**Results and Discussion:** Exposure to broad specialities appeared to increase preparedness to meet changing demographics. Greater awareness of NHS facilities and resources improved decision-making and had a positive influence on the management of complex patients. Exposure to BBT specialities improved understanding of the patient journey and speciality integration. This led trainees to think in different ways and to adopt a more holistic approach to care. Despite difficulty disentangling the specific effects of BBT from other clinical experience, participants identified lessons for the future, including calls for a programme with similar principles to run in the future.

**Conclusion:** Changing patient needs had led to an agreement that postgraduate training needs to change. BBT represents one approach. Although BBT appears to develop generalist skills and holistic care, it is not possible, without further research, to conclude that BBT produces a new kind of doctor. However, our results show the benefits of a broader style of training and identify important lessons for the future of medical education.

## THE COMMUNICATION AND CLINICAL ACTION OF BLOOD CULTURE GRAM STAIN RESULTS IN THE HOSPITAL SETTING

Ike S, Urwin G

Ipswich Hospital, Ipswich, United Kingdom

**Background:** Acutely unwell hospital patients may have microbiological blood cultures performed to guide antimicrobial therapy. Gram staining is carried out in the laboratory. The results are communicated to the responsible ward clinician.

**Aims:** To assess the communication of blood culture Gram stain results during normal working hours (NWH) and out of hours (OOH). To ascertain whether the responsible clinician acts on the results received from the consultant or from the laboratory. To assess whether this action is clearly documented in the patient's medical notes.

**Methods:** Multi-departmental data was collected prospectively in January 2018. Thirty-three patient records were analysed over a 10-day period. Databases were accessed to view blood culture Gram stain results, microbiology consultant and laboratory communication, drugs prescribed, and on-call bleep documentation. Multiple visits were made to the wards on which patients were based to view notes. A collection pro-forma was created. No exclusion criteria.

**Results:** Five patients passed away before antimicrobial clinical action could take place. There was one outpatient case. Thus, of the 27 remaining: Doctors visited the wards and acted on the clinical information received from the microbiology consultant (NWH) or laboratory (OOH) in 41% of cases. Written documentation of this was available in 37% of cases.

**Discussion:** Appropriate clinical responses to blood culture Gram stain results are beneficial for patient safety and antimicrobial stewardship. There are differences in the pattern of results collected from OOH cases versus NWH cases; staffing numbers and demands may be causative. Escalation wards, as opposed to permanent wards, also pose difficulties. Education amongst clinicians is paramount. Wider discussion is encouraged and better practice may be influenced.

**Conclusion:** The prompt clinical action and documentation of blood culture results is suboptimal at present; adherence rate is 41% and 37%, respectively. This requires improvement. Re-audit shall take place in late 2018.

## IS THERE AN INCREASE IN FRACTURE NECK OF FEMUR PATIENTS ADMITTED FROM WITHIN THE HOSPITAL YEAR ON YEAR OVER A THREE-YEAR PERIOD AT A LEVEL 1 TRAUMA CENTRE?

Bansal S, Malik S, Chan S

The Queen Elizabeth Hospital, Birmingham, United Kingdom

**Background:** Between 4% and 7% of hip fractures occur in hospital. Mortality is higher in those who sustain hip fracture in hospital than those who sustain a fracture in the community. With an ageing population and multiple co-morbidities, there is an increased length of stay in hospital for elderly patients. These patients can suffer from acute delirium, often on the back of memory problems, and can be susceptible to falls.

**Aims:** To assess the variation and trend of the number of fracture neck of femur (NoF) patients admitted from within the hospital due to falls on the wards at a Level 1 Trauma Centre.

**Methods:** We used our NoF database that holds prospectively-collected data on all the NoF admissions. We then used Clinical Portal to look through the patient notes for information on admission dates, type of surgery, discharge dates, and AMTS. We extracted demographic data, and 30-day and long-term mortality. Age, gender, American Society of Anaesthesiologists (ASA) grade, and time to surgery were also recorded.

**Results:** During the study period of 2015 to 2017, 1533 patients were admitted with fracture NoF. Of these, 58 (3.78%) were sustained while in hospital. There were 23 in-hospital fractures in 2015, 21 in 2016, and 14 in 2017. More females (30/58 (52%)) sustained a fracture in hospital than males, and the median age was 80 years. The most common procedure performed was DHS (23/58 (40%)), followed by a hemiarthroplasty (17/58 (29%)). Overall mortality was 19% (11/58) and 30-day mortality was 16% (9/58).

**Conclusion:** Our in-hospital fracture NoF patients is less (3.78%) than those reported in the literature. We have seen a slight reduction in the number of patients admitted from in-hospital falls over the three-year period. However, as these patients are the sickest, it therefore is not unsurprising to see slightly higher mortality rate compared to those NoF patients admitted from outside the hospital.

## AN AUDIT OF PATIENTS REFERRED WITH CATARACT WHO PROCEED TO SURGERY

**Ibrahim B**, Macewen C  
*Ninewells Hospital, Dundee, United Kingdom*

**Background:** Cataract surgery is the most common surgical procedure carried out on the NHS. Literature shows poor levels of quality in cataract referrals, resulting in many patients not being operated on.

**Aims:** To evaluate cataract referrals made to a large tertiary hospital and to establish the number of referrals that resulted in an operation, as well as the reasons for those that did not. In addition, to see if there was any difference between over- and under-75s when being listed for operations.

**Methods:** Clinic letters were reviewed for all patients seen within a four-week period in 2016 to assess information regarding their surgery, or the reason that they did not undergo surgery.

**Results:** Seventy patients were seen, with a mean age of 73 and a female: male ratio of 2.3:1. A total of 99% (n=69) of patients were correctly diagnosed, with 63% (n=44) listed for surgery. The most common reason for not being listed was that the patient was asymptomatic, accounting for 42% (n=11) of cases. Fifty-three percent (n=37) were under-75, of which 70% (n=26) were listed for an operation. Forty-three percent (n=33) were over-75, of which 55% (n=18) were listed for an operation.

**Discussion:** The epidemiological data retrieved from this cohort is similar to national figures, despite the relatively small scale of this study. Increasing age decreases the likelihood of having a cataract operation, which may be explained by the fact that more elderly patients are more likely to have routine eye checks and therefore be referred while being asymptomatic.

**Conclusion:** This study found that almost all patients had a correct diagnosis of cataract. The most common reason for not listing a patient for an operation was that they were asymptomatic. This was more common in the over-75 cohort. More care should be taken when referring patients for cataract assessment to reduce unnecessary numbers of asymptomatic patients, resulting in a more efficient service.

## PNEUMOTHORAX AS A COMPLICATION OF PERCUTANEOUS LUNG BIOPSIES: TECHNICAL APPROACHES TO IMPROVE PATIENT SAFETY

**Motschenbacher LC**, Syed I, Capuano E, Rabouhans J, Zaman A, Malik Q, Khan S  
*Basildon University Hospital, Basildon, United Kingdom*

**Background and Aims:** A QIP introduced in our Radiology Department focused on the incidence and outcome of pneumothorax as a complication of CT-guided percutaneous lung biopsy. This aim of this study was to evaluate the effectiveness of handover in surgical patients.

**Methods:** This retrospective clinical audit studied a cohort of patients who underwent CT-guided lung biopsy within a six-month period between March and September 2017. Insignia image information system reports and Electronic Patient Records (EPR) were examined, searching for immediate (identified on CT scan) and delayed post-procedure pneumothoraxes (PTX) seen on chest radiograph during the follow-up period.

**Results:** A total of 27 patients were studied; 17 females (63%) and 10 males (37%). The mean age was 68 (range 18 - 83). In terms of lesion type, 4.7% were reported as a mass, 22.2% as multiple nodules, and 33.3% as a solitary nodule. The immediate PTX seen on CT scan accounted for 30% of all lung biopsies and 3.7% required chest drain within the surveillance period. The main biopsy technique was coaxial with 18G or 20G needle, and the number of passes varied from one to four.

**Discussion:** A national survey about current practice and complication rates of percutaneous lung biopsies in the UK gathered a total of 1860 auditable data from 39 centres. Among other complications, this survey showed that pneumothorax accounted for 20.5% of biopsies and that those requiring chest drain was 3.1%. This QIP demonstrated that the incidence of PTX and chest drains in our centre surpassed the national survey by 9.5% and 0.6%, respectively. Although cutting needle with coaxial technique increases diagnostic yield, it is also associated with an increased complication rate.

**Conclusion:** Following the first results of this QIP, prophylactic techniques, for example self-expanding hydrogel plug into the pleural space, and therapeutic post-procedure strategies such as Heimlich valves have been introduced in our department as they have the potential to reduce complications and hospital admissions.

## THE PERCEPTIONS OF HEALTHCARE PROFESSIONALS ON BARRIERS TO THE UPTAKE OF STRUCTURED DIABETES EDUCATION PROGRAMME

**Chen KW**, Ahmad A, Brake J

*Royal Liverpool and Broadgreen University Hospital NHS Trust, United Kingdom*

**Background and Aims:** Diabetes is a chronic and progressive disease that causes significant levels of morbidity. Despite NICE's recommendation to offer all patients with diabetes education within a year of their diagnosis, the number of patients taking part in structured education remains poor. This study aimed to assess perceptions of healthcare professionals (HCPs) relating to factors which influence the promotion of diabetes education.

**Methods:** A structured questionnaire with 10 questions was used to gather responses from HCPs within the diabetes team at a tertiary centre to assess barriers limiting uptake of diabetes structured education. Retrospective data on patient referrals to diabetes education between 2015 and 2017 was audited against the standard outlined in NICE guideline (NG17) and the National Diabetes Audit.

**Results:** Of the 305 patients offered structured education between 2015 and 2017, nearly half had been diabetic for more than 10 years, with only one-tenth receiving a diagnosis within a year. Of those offered education, almost 90% attended the programme. Fifty-seven HCPs completed the questionnaire, with 80% being aware of the education programme and 54% knowing how to refer patients. Only half of the HCPs encouraged their patients to attend education.

**Discussion:** The poor referral rates are likely to be the result of time limitations, perceived low-utility of education, inadequate understanding of the referral process, and service limitations. It would be appropriate to prioritise those patients with the greatest clinical requirement for education, such as those patients with erroneous HbA1c values, morbid obesity, poor compliance with hypoglycaemic agents, poor engagement with the diabetes team, and those patients who face the greatest risk of diabetic complications.

**Conclusion:** The tertiary centre was not meeting all diabetic patients being offered structured education. A key area for improvement includes developing a package of education within the Trust around the benefits and components of structured education and the referral process to increase awareness among HCPs.

## IMPROVING SURGICAL HANDOVER

**Naguleswaran S**, Wilkes R, Iqbal N

*Royal Albert Edward Infirmary, Wigan, United Kingdom*

**Background and Aims:** Handover is an important part of safe, effective patient care. The on-call team covers General and Breast Surgery, with juniors also covering Urology and ENT. Problems were highlighted with a variation in length, quality and lead of handover, and standard of the handover list. The aim was to detect problems with surgical handover and to assess for compliance to 'Safe handover: Guidance from the working time directive working party' by RCS England.

**Methods:** A survey was sent to surgical doctors of all grades which included questions about the main issues with the handover and handover list, the order in which patients should be seen, and suggestions for change to enhance current practice. We received 22 responses in four weeks.

**Results:** Five common themes of issues were found:

- Professionalism
- Communication
- Patient Safety
- Structure and Organisation
- Urology, Breast and ENT

We received many suggestions, which guided the new handover list template and some of the changes implemented.

**Discussion:** Based on the results, a '3 steps to a safe surgical handover' was created. This involves:

- 1) Introductions
- 2) FY/CT handover of Urology/ENT patients and jobs
- 3) Registrar handover starting with patients for theatre, unwell patients of which to be aware, followed by post-take patients

Posters of the '3 steps' have been created for the handover room and printed as handouts. We have also created register and checklists to be completed at each handover in order to monitor changes and compliance. Part of the recommendations has been to include a lecture on how on-calls and handovers work for surgical and FY1 induction. A new list template has been made to clearly identify unwell patients and patients for theatre, as well as include useful contacts.

**Conclusion:** With the changes implemented, there has been an increase in structured handovers with fewer missed patients. This project is being reassessed with checklists and re-surveying.

## PREVALENCE OF THE ATHEROGENIC INDEX AS A RISK FACTOR FOR THE DEVELOPMENT OF METABOLIC SYNDROME IN ADMINISTRATIVES AT CENTRO UNIVERSITARIO DE LA COSTA, PUERTO VALLARTA: PROPOSAL OF NUTRITIONAL APPROACH

Contreras-Davito IK, Salazar-Salas JJ, Quintana-Pelayo JA, Benítez-Barcelata MA, Belloso-Ibarra LA, Partida-Pérez M, Torres-Jasso JH, Viruete-Cisneros SA  
*Universidad de Guadalajara Centro Universitario de Ciencias de la Salud, Mexico*

**Background and Aims:** The atherogenic index (IA) is useful for predicting peripheral arterial disease linked to cardiovascular events. This is calculated by dividing total cholesterol (CT) and high-density lipoprotein cholesterol (HDL-C). In the same way, hypertension and hypertriglyceridemia are relevant abnormalities in the metabolic syndrome (MS). According to la Encuesta Nacional de Salud y Nutrición de Medio Camino (ENSANUT 2016), 28% of the Mexican population has high cholesterol problems. For this reason, this study aims to identify its frequency as a risk factor in MS and to propose strategies for its prevention and treatment.

**Methods:** A descriptive, cross-sectional study was carried out with a total of 76 participants aged between 21 and 43 years. Anthropometric measures were taken, fasting glucose and blood pressure were recorded, and serum tests were performed. In the first instance, the results were interpreted according to the International Diabetes Federation criteria to find at least one risk factor after the lipid profile test was applied.

**Results:** A high prevalence of AI was found in 10.52%. It was also found that 42% of the population had some of the risk factors for MS, of which 25% had hypertriglyceridemia, 15.6% had abnormal HDL, 34.37% had total cholesterol elevated, and 25% had an atherogenic index greater than 4.5.

**Discussion:** The consumption of monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA), as well as the Mediterranean diet and DASH, favours the control of blood pressure, coagulation, endothelial function and insulin resistance. This has beneficial effects on the prevention and treatment of MS, and such dietary suggestions should thus be implemented in the guidelines.

**Conclusion:** Both the prevalence of high AI and the frequency of dyslipidemia are similar in relation to that reported in recent years in our country. Hence, there is a need to act early with a specific nutritional approach.

## FRACTURED NECK OF FEMUR ADMISSION PROFORMA - A COST SAVING INTERVENTION WHICH IMPROVES PATIENT CARE

Lawson J, Matheron G, Vun J, Gogi N  
*Huddersfield Royal Infirmary, Huddersfield, United Kingdom*

**Background and Aims:** Neck of femur fracture (NOF) carries a high mortality risk. Quality of NOF care in NHS Trusts in England has been audited against national standards, and financial incentives are provided to Trusts meeting these standards as Best Practice Tariff (BPT). We conducted a closed loop audit in an attempt to assess whether the care of NOF patients in our Trust meets national standards, and to determine its associated cost implications.

**Methods:** This closed loop audit was conducted over four-week periods by retrospectively analysing electronic patient records used in our Trust. Criteria assessed included: operation within 36 hours of admission; adequate pre-operative investigation (blood tests, ECG, and chest X-rays); analgesia; and documentation of Abbreviated Mental Test (AMTS) and pre-admission mobility. Following the first audit cycle, we introduced a printed departmental clerking proforma highlighting the essential criteria required for BPT, and stressed the mandatory completion of these forms for all NOF admissions.

**Results:** There were 33 and 35 patients in the first and second audit cycle, respectively. The department's performance (1st vs. 2nd audit cycle) was as follows: AMTS (58% vs. 89%); documentation of pre-admission mobility (73% vs. 89%); operation within 36 hours (76% vs. 86%); analgesia (91% vs. 97%); and pre-operative investigation (92% vs. 94%).

**Discussion:** Introduction of clerking proformas improved performance across all criteria monitored; more significantly in documentation of AMTS and pre-admission mobility, and time to surgery (within 36 hours). This also brought in £13000.00 as BPT incentive.

**Conclusion:** We demonstrated how the effective use of a simple, well-designed clerking proforma has led to (i) less duplication of work; (ii) better adherence to best practice; and (iii) cost savings, which allows for money to be invested in other facets of care. All these ultimately translate to better care for this group of patients with fragility fracture.

## A COST-EFFECTIVENESS REVIEW OF MOHS MICROGRAPHIC SURGERY VERSUS SURGICAL EXCISION FOR TREATING PRIMARY NON-MELANOMA SKIN CANCERS

Al-Allaf O\*, **Ahmed W**

University of Exeter Medical School, United Kingdom

**Background:** Non-melanoma skin cancers (NMSC) are the most prevalent skin cancers, with high financial burden for the NHS. It is generally accepted that Mohs micrographic surgery (MMS) is the treatment with the lowest recurrence rates.

**Aims:** To compare the cost-effectiveness of MMS vs. surgical excision (SE) for the treatment of NMSC.

**Methods:** We conducted a literature search on PubMed, Google Scholar and Springer-Link, using the search terms; 'Mohs', 'Surgical Excision', 'Skin Cancer', and 'Cost'. We found 71 publications and, after applying our exclusion criteria, we were left with six papers to review (Figure 1).

24 older than 20 years	2 not in English	16 Reviews and Case studies	2 Duplicates found	3 publications were on animals	14 not relevant to the topic	4 didn't differentiate primary and secondary NMSC
------------------------	------------------	-----------------------------	--------------------	--------------------------------	------------------------------	---

Figure 1: Summary of The Article Selection Process

### Results:

Summarised below (Table 1).

Study	Year of Publication	Number of tumours (n)	NMSC type	End Point	Cost of MMS (US \$)	Cost of SE (US \$)	Difference (SE - MMS ) (US \$)
Sebaratnam et al. <sup>(4)</sup>	2016	n = 309	BCC	Initial margin clearance	\$491.89	\$445.65	-\$46.24
Ravitskiy et al. <sup>(5)</sup>	2012	n = 406	BCC and SCC	5 years	\$804.72	\$1025.83	\$221
Cook and Zitelli <sup>(6)</sup>	1998	n = 400	BCC and SCC	5 years	\$1243	\$1167	-\$76
Bialy et al. <sup>(7)</sup>	2004	n = 98	BCC and SCC	Initial margin clearance	\$937	\$1029	\$92
Seidler et al. <sup>(8)</sup>	2009	n = 98	BCC and SCC	5 years	\$957	\$1248	\$292
Mosterd et al. <sup>(9)</sup>	2008	n = 270	BCC	5 years	\$1522.12	\$1207.45	- \$314.67
Mean		n = 263.5			\$992.62	\$1020.49	\$28.02

(Rated used to exchange all figures into USD were AUD 1:0.79 USD and Euro 1:1.22 USD)

Table 1: Cost analysis of MMS versus SE

**Discussion:** The mean cost difference was \$28.02 in favour of MMS. However, the range of values varied significantly; from MMS being cheaper by \$292 to being more expensive by \$314.67 (€258) compared to SE.

**Conclusion:** Generally, MMS has been found to have lower recurrences and higher QALY's compared to SE, and may also be more cost-effective. In an era of increased NHS strain, more rigorous trials are required to determine cost-effectiveness.

The World Journal of Medical Education & Research (WJMER) is the online publication of the Doctors Academy Group of Educational Establishments. It aims to promote academia and research amongst all members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from all parts of the world. The journal intends to encourage the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting-edge technology and those who need to innovate within their resource constraints. It is our hope that this interaction will help develop medical knowledge & enhance the possibility of providing optimal clinical care in different settings all over the world.

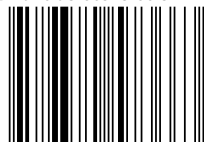


# WJMER

**World Journal of Medical Education and Research**

An Official Publication of the Education and Research Division of Doctors Academy

ISBN 978-93-80573-66-3



9 789380 573663 >