and relevant not only in its support of specialty trainees but also to the Naval Service as a whole.

Whilst it is always a pleasure to return to INM, the symposium requires a great deal of organisation and the specialty trainees are enormously grateful to Surg Capt Howell and his team, including Lt Murray, Sgt McCaffery, Mrs Val Mondey and Mrs Kerrie Maclean, without whom this annual event would not occur. On that note, the event is an ideal platform for trainees to showcase their experiences, research and audit and is continually looking to improve upon past performance. This is only possible with the cadre’s support and ideas to enhance the annual Seconded Medical and Dental Officers Symposium would be welcomed. Should you wish to contribute to next year’s program please contact the MOIC of INM, Surg Capt Howell, on NAVYINM-MOIC@mod.uk

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Third Annual Institute of Naval Medicine (INM) Seconded Medical and Dental Officers’ Research Symposium

AM Wood, IM Wood

For the third year running (1,2), research from across the Royal Navy was presented at the Institute of Naval Medicine (INM), as part of the Seconded Medical and Dental Officers’ (SMODO) Symposium. Whilst there were several projects generated from the conflict in Afghanistan, there was also a variety of other research presented. Surg Capt Howell, Medical Officer in Charge at INM, judged that first prize should be awarded to Surg Lt Cdr Calum Arthur Image 1 and his co-authors for their presentation on Anterior Cruciate Ligament (ACL) injuries in Royal Marine Training. This study looked at the issues regarding the rehabilitation of Royal Marines who sustain ACL injuries and the likely outcome with regard to completion of training for operative and non-operative management. Second place was awarded to Surg Lt Iain Edgar with his article on the effect of the Medical Evacuation Response Team (MERT) on casualty evacuations and the use of blood products. This interesting study warrants further investigation as it may shape policy in due course.

Surg Lt Cdr Jowan Penn-Barwell presented on three occasions during the SMODO symposium. He demonstrated that he is a budding radiologist in his analysis of angles when assessing Femoral Acetabular Impingement, and in his role as a member of the editorial committee of the Journal of the Royal Naval Medical Service he talked about the advances the Journal will be making over the coming months. Thirdly, he demonstrated the improved survival of casualties over the last ten years of conflict in Afghanistan and Iraq. Surg Lt Cdr Daniel Ablett gave an interesting review of Major Kate Brown’s paper (3), looking at how the patients she analysed recovered after their major limb trauma. He questioned some of her assumptions and asserted that the Mangled Extremity Survival Score (MESS) is of limited value in military trauma.

Surg Lt Cdr Amanda Edwards described a useful technique for keeping upper limb patients comfortable.
Conference Updates

for evacuation from war zones; this technique can be used on Aeromed and looks promising as a method for keeping patients comfortable on maritime transfers. Surg Lt Cdr Iain Wood gave a neat demonstration that audit does not need to involve hours of work to produce savings and improvements in treatment. With the increased use of Pregabalin in the NHS and military practice, GP registrars could run this audit in their own practice and make significant savings for minimal effort.

With recent exposure to a North or England Trauma unit, Surg Lt Cdr ‘Doogie’ Howes gave the audience a topical ‘heads-up’ on the management of trauma in a Trauma Unit, with an interesting presentation about what was happening prior to the introduction of the Major Trauma Network. This was followed by Surg Lt Cdr Melvin Leong who analysed the Human Factors in a Major Incident and even managed to shoe-horn in a naval reference about the flooding of his Emergency Department. Surg Lt Cdr Sudipta Roy presented a review of the literature on penetrating rectal injuries.

The research session was followed by an interesting overview of Surgeon General’s research into bone health. Dr Jo Fallowfield, Dr Trish Davey and Surg Lt Cdr Mike Lindsay gave an informative lecture on the initial findings and the ongoing Vitamin D studies.

Once again, this year’s symposium provided a broad overview of the research that is going on in multiple specialties and provoked interesting discussion. It is hoped that this symposium will go from strength to strength in order to further the dissemination of Royal Naval research. As in previous years, the abstracts are published below. Correspondence can be directed to the authors directly or through Surg Lt Cdr Sandy Wood as detailed above.

Long-term outcomes following lower limb salvage in UK service personnel injured in modern combat operations in Iraq and Afghanistan

Dj Ablett

Lower limbs injuries account for a significant proportion of all injuries in modern combat and are the most common reason for medical discharge. Controversy exists regarding outcomes following limb salvage versus primary amputation.

The Mangled Extremity Severity Score (MESS) has been shown to have poor applicability to battlefield trauma. Retrospective cohort study of UK casualties who had limb salvage following severe lower limb injuries over 5-year period (2003 - 2008). Case note review.

Forty-two casualties (79%) were followed up. Forty-three percent returned to full military employability, 40% were medically discharged, 17% were permanently downgraded and four had late amputations at average of 16.5 months.

Those with foot/ankle injuries had worse outcomes compared to tibial/fibular or femoral injuries regarding rehabilitation time (46, 35.2, 24.1 months respectively) and medical discharge rate (75%, 33%, 11% respectively).

In those medically discharged, 29% had Post Traumatic Stress Disorder (PTSD) diagnosed and all had chronic pain. MESS did not predict late amputation or correlate with functional outcome. Distal limb injuries result in longer rehabilitation times and poorer functional outcomes than proximal limb injuries. Good pain management is essential and psychological support to our injured troops cannot be underestimated. MESS is of no value in military trauma.

Does the method of Aeromedical Evacuation from the point of wounding to a field hospital affect subsequent blood product requirements and patient physiology?

IA Edgar, CJ Thompson, AJ Burgess, SHunter, AW Lambert

Evacuation to the Role 3 Field Hospital at Camp Bastion is well established on operations in Afghanistan. This paper looks at casualties suffering bilateral traumatic lower limb amputations evacuated by this method.

Between 1 April and 30 June 2011, adult male patients with bilateral traumatic lower limb amputations, arriving alive at the hospital, were recruited. Group I were transferred by Medical Emergency Response Team (MERT) in a CH-47 Chinook helicopter. Group II were transferred by PEDRO in an HH-60 Pavehawk helicopter. The time of injury (ToI), arrival time of the helicopter, blood product requirement in flight and in total and their physiological status on arrival in the Emergency Department (ED), were prospectively recorded.

Twenty-five casualties were recruited, mean age 23.5 years (range 18 – 31 years). Three were excluded due to incomplete data sets. For Group I (n = 19), the mean time from ToI to arrival of the air frame was 28.7 minutes (range 19 – 56 minutes). Casualties received a mean total of 5.1 units Red Blood Cells (RBC) and 5.6 units Fresh Frozen Plasma (FFP) prior to arrival in the operating theatre, of which a mean of 2.8 units of blood and 2.3 units of FFP was transfused in flight. For group II (n = 3), the mean time of arrival of the air frame was 37 minutes (range 34 –
Casualties received a mean total of 13 units RBC and 12.7 units FFP prior to transfer to the operating theatre, of which only 1.3 units of RBC and 1.3 units FFP were received in flight. Group I casualties had a mean heart rate of 119, mean systolic blood pressure of 116 mmHg, mean respiratory rate of 13.6 and iSTAT pH (Abbott iStat® Systems) of 7.23 on arrival in ED. For Group II the mean pulse rate was 119, with average systolic blood pressure of 91 mmHg, respiratory rate of 21.3 and iSTAT pH of 7.27. There was no difference in the time spent in ED between the two groups with a mean of 35 minutes (range 17 – 57 minutes). All casualties survived to the operating theatre.

In this small group, the MERT arrives more quickly, casualties receive more aggressive resuscitation in flight, and require fewer blood products prior to surgery. Casualties transferred by MERT had better physiology on arrival in the ED. When tactically possible, MERT appears to be the superior aeromedical evacuation method for this group of patients.

Military considerations for supraclavicular catheter in gunshot wound forearm.

AM Edward

1 Institute of Naval Medicine

A 19-year-old Royal Marine sustained an isolated gunshot wound to the left forearm whilst on foot patrol in Helmand, Afghanistan. At the Role 3 hospital in Camp Bastion, he underwent a plain x-ray followed by immediate debridement and fasciotomies.

A joint intra-operative decision was made to proceed to Continuous Peripheral Nerve Block (CPNB) for post-operative pain management. Patient consent was not obtained in the Emergency Department due to substantial tourniquet pain and subsequent Ketamine administration.

Considerations included the prolonged evacuation chain back to the UK, opiate avoidance as risk of aspiration strapped supine to stretcher, and the possible need for further surgery.

An ultrasound guided supraclavicular catheter was sited, the patient extubated and airlifted that night. CPNB infusion was administered via an aircraft friendly elastomeric ‘bomb’. The patient, nursing staff and evacuation chain advantages to a simple, single use pump outweigh the less reliable infusion rates and lack of interrogation and bolus facilities that a more complex device would offer.

A standard infusion of Ropivicaine 0.2% at 10ml/hr was used. Ropivicaine has a wider margin of safety with the same analgesic effect, but causes less motor blockade than Bupivicaine. Although marginal, these remain important considerations for an early ambulatory patient in a prolonged airborne evacuation chain.

Pilot of a Human Factors debriefing tool following a major incident

MJ Leong

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Following a major incident, subsequent investigations and reports often focus upon the non-technical aspects and organisational factors surrounding the event. There is less examination of the individual experiences that occur.

Debriefing tools developed in medical simulation and training were used to identify key ‘Human Factors’ that affect an individual’s performance during a Major Incident. A new tool, consisting of a priming questionnaire, a structured interview and debrief was designed. This tool was trialled following an internal major incident within a civilian Emergency Department.

The tool emphasised a number of the learning points that had been previously identified in other post-incident reports. However, the tool also identified other learning points which were specific to the participants.

This new Human Factors debriefing tool assists individuals to not only to improve their performance in similar situations in the future but also disseminate lessons to colleagues. Besides being used following a major incident, this tool might also be useful in less dramatic settings such as critical incidents.

Sustained improvement in survival in UK combat casualties from Iraq and Afghanistan over a decade of war: 2003-2012

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The aim of this study was to examine the temporal changes of injury patterns by body region, survival and trauma system performance in UK military casualties following a decade of conflict in Iraq and Afghanistan.

There were 2792 casualties sustaining 14069 injuries over the study period. 70% of casualties from hostile action were injured by explosive munitions. Other than in 2003, the ratio of explosive to gunshot wounds remained approximately 3:1. The extremities were the most commonly injured body region, involved in 43% of all injuries. The New Injury Severity Score (NISS) associated with a 50% chance of survival rose each year from 38 in 2003 to 62 in 2012. The odds ratio of surviving with a Trauma Revised Injury Severity Score (TRISS) of 50% increased by a factor of 1.349 (95% CI = 1.265 - 1.442) per year. The TRISS
value associated with a 50% chance of survival dropped every year from 35.3% in 2003 to 0.9% in 2010 and was effectively zero in 2011 and 2012.

A consistent and dramatic improvement in survival over the 10-year period has been demonstrated. Traditional metrics for measuring improvement in military trauma care performance have reached a ceiling. The authors recommend that new more complex measures of performance are required.

A literature review looking at the management of penetrating extraperitoneal rectal injury.

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Penetrating extraperitoneal rectal injury has historically been associated with significant mortality. Survival has improved over the course of the twentieth century with the introduction of surgical management. This study aims to identify and appraise the evidence for the management of the injury itself and the roles of presacral drainage and distal rectal washout.

Articles published in English from 1990 to 2012 considering the management of penetrating rectal injury were identified using searches of Medline, EMBASE, CINAHL, BNI, AMED and OpenGrey. Articles were critically appraised using the CASP appraisal tool.

Literature searching identified seventeen suitable articles and ten of these articles were considered suitable for further analysis. Extraperitoneal injuries were almost all managed with faecal diversion. One study managed patients conservatively and reported no adverse outcomes. There was little evidence for benefit in the use of presacral drainage or distal rectal washout.

Extraperitoneal rectal injuries can be managed with faecal diversion alone, there does not seem to be a demonstrable benefit in the application of presacral drainage or distal rectal washout.

Prevalence of radiographic features of femoral-acetabular impingement syndrome in asymptomatic active servicemen

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Over the last 15 years a new clinical diagnosis has emerged which is believed to be a significant cause of hip pain in young adults and early onset osteoarthritis (OA). The concept of Femoral-Aacetabular Impingement (FAI) is based on abnormal contact between a dysmorphic proximal femur and/or acetabulum. The diagnosis of FAI remains controversial as the radiographic measurements that have been suggested as objectively defining abnormal morphology are based predominantly on studies of small numbers of symptomatic individuals. This study aims to define these measurements in a high functioning, active, young, male population.

One hundred and ninety eight Computerised Tomography (CT) scans performed in Afghanistan on injured British servicemen in the 18 months between 1 May 2011 and 31 October 2012 were reviewed. 57 were excluded, because there was pelvic or lower limb disruption, they were technically inadequate or were performed on females, leaving 136 scans which formed the basis of this study. The mean age was 25 at time of injury (SD=5.0). Scans were reviewed by a single Consultant Radiologist with a musculoskeletal special interest.

The mean alpha angle was 50.7° (SD=6.0, range 38-72) and the mean centre-edge angle was 35.3° (SD=6.1, range 21-49). The femoral version was only measureable in 160 femurs due to incomplete scans or fractures; the mean was 10.5 (SD=10.4, range -15 to 36). In the 265 non-fractured acetabulae, the mean version was 16.0 (SD=3.8, range 5-25).

The results demonstrate that there is a wide variability in radiological values in asymptomatic previously active patients. These findings also indicate that some of these normal values would have been regarded as abnormal in previous research. Specifically, this study demonstrates that an alpha angle of 50 degrees is well within the normal distribution in an asymptomatic, active population. The authors believe that many of the previously reported normal and abnormal values were based on symptomatic or older populations and therefore should be used with caution.

ACL Injury in Royal Marine basic training: rehabilitation times and rates of completion of commando training.

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Previous Anterior Cruciate Ligament (ACL) reconstruction is currently a contraindication for entry to the Royal
Marines and Royal Navy. The British Army allows entry if potential entrants are asymptomatic 18 months post-ACL reconstruction. Current Royal Marines policy is to rehabilitate recruits who sustain an ACL disruption during training.

We identified all Royal Marine recruits who had sustained an ACL injury during their training between 2003 and 2011. We retrospectively analysed their rehabilitation and looked at their rates of completing Commando training.

Twelve recruits sustained an ACL injury during the study period representing an incidence of 0.15% per recruit per year. Nine of these recruits underwent ACL reconstruction during training, seven of whom went on to complete Commando training. All recruits who had their ACL injury managed non-operatively failed to complete Commando training.

ACL injury is uncommon in Royal Marine training. Whilst it is associated with a long rehabilitation time, it is not a barrier to successful completion of Commando training. Our results suggest that surgical reconstruction is associated with a greater rate of training completion compared conservative management.

Saving the NHS money: Pregabalin prescription in Glastonbury Surgery: a money saving audit.

IM Wood

1 Institute of Naval Medicine

Pregabalin is an expensive drug that is unusual in the fact that it costs the same amount irrespective of the strength of the tablet. Increasingly prescribed for generalised anxiety disorder, epilepsy control and neuropathic pain, it can have a significant impact on a practice’s prescribing budget. Although frequently prescribed three times daily (tds), its long half-life means that twice daily dosage (bd) can be equally as efficacious.

We conducted a retrospective electronic audit to identify patients who were prescribed Pregabalin tds rather than bd. Partners were then presented with the results and encouraged to change patients to a bd dosing regimen in accordance with National Institute of Clinical Excellence (NICE) guidelines.

40 patients were prescribed Pregabalin, with 12 being prescribed a tds regimen. Changing these to a bd regimen would represent a potential saving of £4636.80 for the