The Royal Society of Medicine

Student Section A&E and Trauma Specialty Educational Booklet 2019

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Note from the Editors

The student section of the RSM is committed to producing relevant and informative content for medical undergraduates. Our aim is to educate, in the broader sense of the term – to remind ourselves of the career opportunities ahead of us; the opportunities to make a difference. It can be challenging to find the time to explore medicine in a non-academic way, understanding what different people find rewarding, knowing the realities of day-to-day life in various specialties. We have tried to gather some of this information for you.

This A&E and Trauma edition of our Educational Booklet series will hopefully give you insight into the specialty, from an academic perspective, of course –brush up on your ABCDE approach (p8.) – but also by offering you views from trainees and consultants, like Dr Robertson (p.9), who have chosen this as their career path. The student section is also a platform for medical students to be able to express their voices, and engage in current affairs, so you will find articles by students who want to share their experience - Jake Turner (p.7) and Julian Toh (p.5). We always welcome submissions, and are eager to hear ideas and suggestions for future issues from you, too.

We hope you will find this issue informative – how much do you know about hypothermia? (p.3), and that perhaps it will help you maintain perspective over the course of the next few years of study – it is so easy to lose sight of our broader goals when we are overwhelmed by placement, exams and the numerous commitments of university life. Tatiana Zhelezniakova (p.4) reminds us of the dreaded time we had to convince someone of our answer to this question: why do you want to be a doctor? Today we focus on the next step, what kind of doctor can I be to fulfil this?

Thank you to all those who have contributed to this issue, and we look forward to reading even more articles from you in the upcoming year!

On behalf of the RSM Student Section committee,

Mary Goble, University of Sheffield

Editor

Hypothermia in the Emergency Department: Friend or Foe?

Rob Wilmore

Humans have been subject to extremes of temperature for thousands of years. Hippocrates was the first to describe the effect the cold had upon the body and it ability to cause “fits” and “gangrene”[1]. During the Heroic Age of Arctic Exploration Shackleton briefly wrote of “subnormal” body temperatures on his first voyage[2]. Despite this there was no clinical definition of hypothermia until late in the 19th century when thermometers became more readily accessible[3].

Hypothermia is frequently defined as drop in the core temperature of the body below 35°C4-11. Hypothermia can be categorised into therapeutic hypothermia, where the core temperature is lowered for neuroprotection following cardiac arrest, or accidental hypothermia: an uncontrolled and unplanned involuntary process where there is net heat loss from the body[4,7,12-14 15].

The human body is adapted to function within a very tight temperature range whereby the rate of enzymatic reactions is optimised. Hypothermia’s damaging effects on the body is most notable in trauma and its role in ‘The trauma triad of death’[16]. Cooler temperatures have a severe impact upon coagulopathy as platelet function become impaired, clotting factors no longer function, and fibrinolysis is inappropriately activated17. Pre-hospital services and in-hospital trauma teams therefore aim to minimise heat loss to prevent coagulopathy in patients who are bleeding.

Outside the realms of trauma, the body’s protective physiological response to hypothermia has resulted in excellent neurological outcomes for patients following extreme core temperatures of 13.7oC and prolonged cardiac arrests of up to 8 hours 40mins[18,19,20]. Such remarkable reports of survival have led to continued research into the beneficial effects of suspended animation and other therapeutic uses of profound hypothermia in the human body[21-23]. The mechanism by which cells can survive prolonged periods of circulatory arrest is due the relationship between temperature and metabolic rate[22]. A 6 – 7% decrease in oxygen consumption per degree-Celsius fall in body temperature prevents the immediate hypoxic damage seen in normothermic arrests[24-28]. Cooling following cardiac arrest previously caused a wide degree of controversy but current evidence and NICE guidance recommends cooling to 32-34°C following return of spontaneous circulation for 12-24 hours.

Is there a future for therapeutic hypothermia for victims of trauma? Can we combine the neuroprotective benefits of core body cooling whilst avoiding the catastrophic effects on the coagulation system? The concept of cryo-protection and suspended animation may not be as far off as we think. ‘Emergency Preservation and Resuscitation for Cardiac Arrest from Trauma’ (EPR-TCA) Trial is underway in the USA and aims to preserve and stabilise patients who have suffered traumatic haemorrhagic cardiac arrest by cooling them to extreme temperatures[29]. Patients who meet inclusion criteria will be subject to cardio-pulmonary bypass and complete replacement of their circulating blood with 10oC sodium-chloride. Within 15 minutes virtually all metabolic reactions will have slowed to a level that the body survives in a “state of suspended animation” for up to 2-hours whilst surgeons repair sites of haemorrhage. Following surgery, the cold-saline is replaced with blood to slowly rewarm the patient29. Results from the trial may impact the future of trauma patient management and maybe therapeutic hypothermia will have significant role to play in years to come.

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Volunteering opportunities in Emergency Medicine

Tatiana Zhelezniakova

At a medical interview, when you are nauseous and transiently unable to understand human speech, you are inevitably asked the dreaded 'why medicine?' question. So, in a half-shout, you throw out interview prep book terms like 'versatility' and 'continued learning'. But these are little more than vague concepts you think the interviewer would like mentioned. To me,' versatility' meant the choice between medicine and surgery. 'Continued learning' meant having to learn more unpronounceable drug names as they were licensed.

What I didn't think it would mean was standing on a wrecked Volvo, cutting off its doors with power tools lent to me by the fire service. I should probably mention that this was part of an extrication exercise at a Pre-Hospital Trauma Course run in the West Midlands, rather than an act of vandalism (as a side note, this is an excellent stress management technique – 10/10, would recommend – with adequate supervision). The reason I was lucky enough to get a place on this course was due to my previous volunteering with the police service.

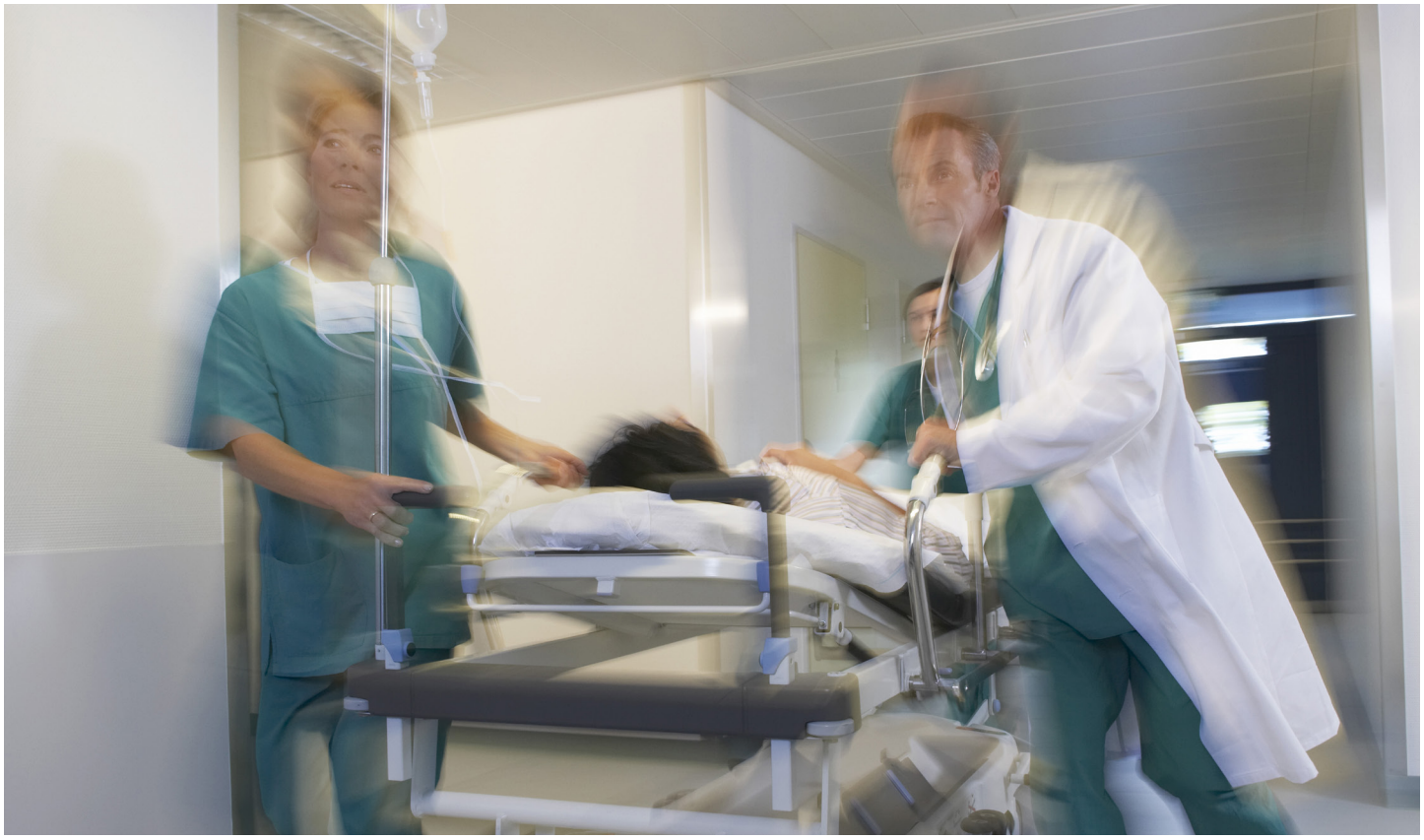
All firearms police officers in the UK are required to be trained in first aid, and multiple courses are organised across the country. Where do medical students come in? We're the practice dummies, stooges, if you like. Generally, volunteers are from clinical years, the rationale being that students would have sufficient clinical knowledge to emulate trauma victims, while simultaneously assessing the competency of the trainees. We often participate in several scenarios ranging from basic life support and AED use to multiple trauma casualty scenarios.

From our side, this provides a brilliant insight into police work; emergency services don't operate in isolation, and knowing your colleagues' aims and competencies is crucial to cohesive and efficient team work.

Occupational hazards include: committing too much to the art of theatre and actually hyperventilating to the point of peripheral paraesthesia, getting swatted by swinging guns (the weapon, not policemen's biceps), having a part of your shirt cut when your borrowed top layer is being disposed of.

Occupational perks: brushing up on acting skills, using night vision goggles and free coffee.

While our main aim as volunteers is to assist the police service, the benefit to us is astronomical. Not only do we get a revision of old skills and the receipt of new ones, we also enjoy a completely different side to clinical medicine. In some cases, it can even aid to revive a forgotten interest: in those middle medical school years of little responsibility and much memorisation, motivation can get stagnant, and this is the perfect break in the quotidian. To me, this work has demonstrated the excitement of working in a less controlled environment, and the extensive skillset and knowledge required to do so. If you ever get the opportunity to volunteer with emergency services in any capacity, I would strongly urge you to do so. Just remember to bring a spare shirt.



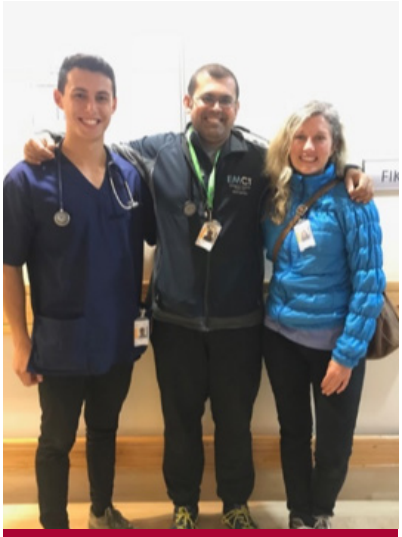
My Elective in A&E

Julien Toh, University of Sheffield

Every medical student will tell you that their elective is one of their most exciting times at university. It is a period that many doctors look back to throughout their lives as an invaluable and fantastic experience. As my interest in acute medicine has grown over the years, I pursued an elective in a South African emergency department, renowned for high trauma and infectious disease presentations.

As I began my elective at the Khayelitsha hospital Emergency Department (ED) in Cape Town, prepared only by Reggie Yates' *Extreme* documentary recounting his own visit to this same department, I was naïve about the extent to which my time here would be challenging, and eye-opening. The hospital itself is located in a long-standing township 30km outside of Cape Town. In the predominant local language of Xhosa, Khayelitsha means 'Our New Home' and was created under the principle of racial segregation. It became home to thousands of black families who were forcibly displaced from townships within Cape Town itself, living in overcrowded shacks; many without toilets, water or electricity. In 2014, the public hospital opened its doors to a local population estimated at 900,000, handling over 3000 trauma cases a month.

Khayelitsha is thought to be the fastest growing township in South Africa, and tackles huge issues of disease, violence and crime. Being in this area allowed me to experience first-hand, the direct and indirect effects of poverty, racism and inequality that many South Africans still face every day. Over the last few years, Khayelitsha has increasingly seen 'random acts' of violence associated with robberies, accidents and alcohol-related incidents including gunshot injuries and domestic violence.



Myself, Dr Sa'ad Lahri (ED consultant) and Dr Erica Maher (elective doctor)

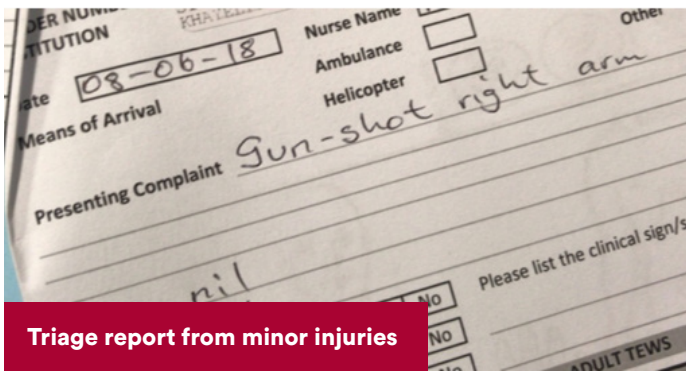
Tygerberg Hospital ambulance depo

In being part of a team of 5 doctors, with whom I would carry out all of my shifts, I was immediately immersed into the South African healthcare system. In my first week, my learning curve within the new hospital dynamic was exponential; not only was I seeing a large volume of new clinical presentations that I had not seen before, but I was also given a higher degree of responsibility while working in a short-staffed and under-resourced setting. I had invaluable exposure to a vast array of symptoms and diseases that every junior in a UK hospital would rush to see.

To my uninitiated eyes, what initially seemed to be a very chaotic ED rapidly unravelled itself as extremely organised and controlled department with ritual *fika* breaks (a Swedish concept for slowed-down coffee breaks) to keep everyone sane. Despite the understaffed and under-resourced setting, doctors worked extremely efficiently and got on with the job at hand. Students often see trauma cases as opportunities to observe without getting involved. I quickly realised that this was not the case in Khayelitsha and would take every opportunity to fully immerse myself as a necessary extra pair of hands in even the most serious of cases. Subconsciously, I desensitised very quickly to the traumatic cases that I was seeing. Seeing gunshot wounds, stabbings, overdoses, severe tuberculosis and HIV all became part of the daily routine.

As a student, I was naturally limited in my responsibilities, but I wanted to offer more without being a burden. Without previous exposure, there is little that can prepare you for seeing certain types of patients with life-threatening injuries and such high mortality rates associated. Despite this, my time at Khayelitsha was an eye-opening experience which not only gave me an invaluable clinical experience, but also gave me insight into life in a township through interactions with the local population coming into the ED.

On my return to the UK, I expected my A&E rotation to be a walk in the park compared to what I'd seen at Khayelitsha. However, the truth is that although there are many similarities and differences between the two emergency departments, both have their individual challenges that face the staff every single day; being able to value, learn and reflect on each of these experiences is part of what will hopefully make me a well-rounded doctor in the future.



Triage report from minor injuries

Considerations in paediatric emergency medicine

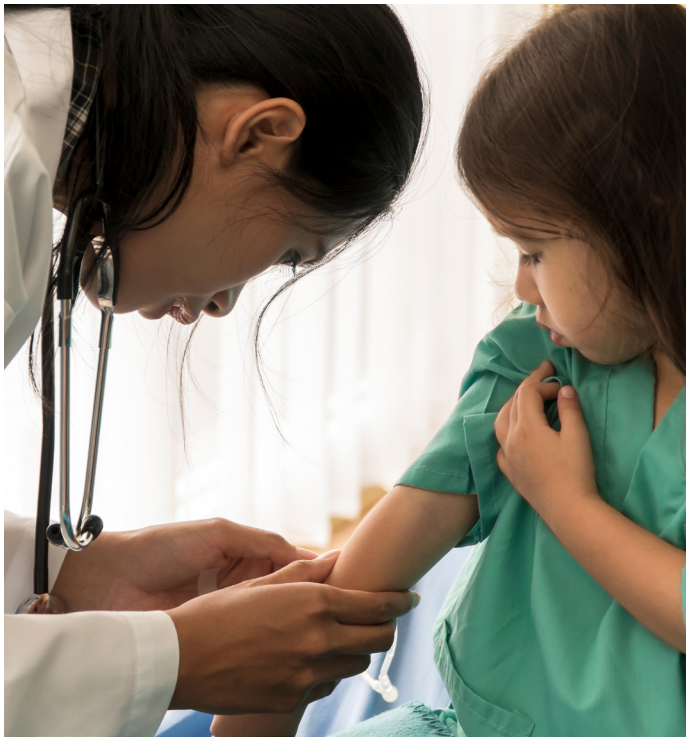
Razan Nour, Queen's University Belfast

The management of ill children constitutes 25-30% of the caseload in emergency departments (EDs), which equates to 4 million attendances by children each year[1]. It is expected that this figure will rise across the UK[2]. It is therefore crucial for anyone who is involved with providing emergency services to be aware of the key differences between adult and paediatric emergency medicine. It is important to understand the anatomical, physiological and psychological differences between children and adults, as these factors impact the nature of emergency presentations and bear legal implications on the practice of paediatric emergency medicine.

The most notable difference between paediatric and adult emergency medicine is the caseload. Some presentations that are commonly encountered in the adult population, such as substance misuse, are less frequent in children due to differences in social behaviour. It is estimated that 10-18% of adult ED presentations are attributed to alcohol intoxication3, thus the impact of children not presenting regularly for such reasons has a significant impact on the character of the paediatric ED. The workload of a paediatric ED is decreased by the fact that the children who visit the ED are more likely to present with injury rather than illness, reducing the number of presentations that could have been dealt with by alternative services such as GPs[4]. Other presentations, like chest pain, are more prevalent in adults than children because of differences in anatomy and physiology, although increasing age and social behaviours, particularly smoking and alcohol, also play a role. Nevertheless, a study found that the most common emergency presentations in children aged 0-15 are breathing difficulties (20.1%), febrile illness (14.1%), diarrhoea (14.0%), rash (8.6%) and cough (6.7%)[5]. It is unsurprising that children are brought to the ED with breathing difficulties, because they are more susceptible to respiratory compromise based on anatomical and physiological factors. Children have a greater oxygen consumption, which coupled with a smaller functional residual capacity, greater airway resistance and an obstruction-prone airway, render children more vulnerable to respiratory complications[6].

Additionally, the small size of children influences their pharmacodynamics and pharmacokinetics, requiring specific dosing regimens for children. A study found that prescribing errors occur more frequently in the paediatric ED and such errors are more likely to affect patients that are seriously ill[7].

It is difficult to find statistics on the most common ED presentations for adults because there is such a wide spectrum of presenting complaints, however a study that focuses on the ED presentations of 13-17 year olds emphasizes the differences



between the presentations of children and teenagers. The most common ED presentation in this age group was injury (71.8%), followed by abdominal pain (16.3%), fits, faints and funny turns (10.6%), self-harm (10.4%), breathing difficulties (7.2%). Intoxication was reported in 6% of cases[8]. These figures support the statement that epidemiology varies between different age groups attending the ED.

Moreover, research findings indicate that there are trends in what conditions present to ED and this has external influences. It has been noted that there is a significant reduction in sudden infant deaths and serious childhood infections compared to the past, fewer children attend with traffic-related injuries and the mortality of trauma is lower[9].

It is worth noting that a child is classified as someone aged 17 or under according to British law, however emotional development varies greatly within this spectrum. It is also important to remember that children can prove themselves competent enough to give consent at younger ages provided certain criteria are met. This can cause conflicts with the wishes of the child's parents. Although the principle that applies when treating children is that the doctor must act in the child's best interests, it is a great accomplishment when the doctor, the child and the child's parents are all in agreement over what needs to be done to manage the child. A lot of patience can be required to achieve such outcomes. This article illustrates some of the complexities of managing children in an emergency setting, but it is not exhaustive.

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Why do I want to be an A&E doctor?

Jake Turner

Why do I want to be an A&E doctor? I could start with why I don't want to be a (insert other medical specialty here) doctor, but that would neither be fair to other specialties nor representative of why I do want to do A&E.

My love of emergency medicine started with my first on call shift in hospital, when I witnessed my first cardiac arrest in a patient that I had met only an hour before. That patient unfortunately passed away, but my experiences of that heart pumping, emotionally charged atmosphere showed me the excitement and rewards of emergency medicine.

My favourite moments in medicine are those where investigations, diagnosis and management all need to happen NOW. Whether this is in the case of the elderly patient with a new onset sepsis, the young trauma patient or the acutely psychotic patient, every one of these patients thrills me.

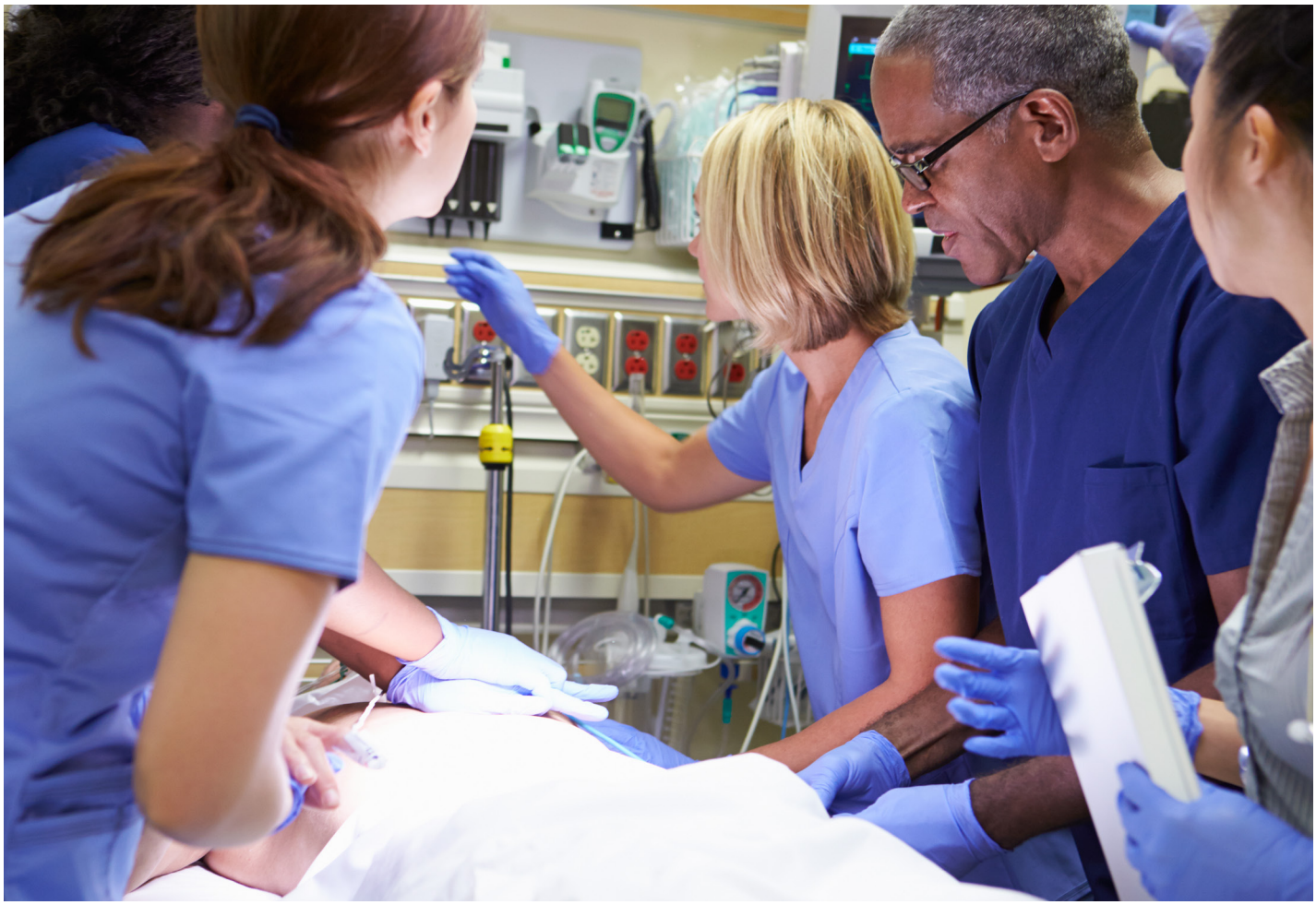
This is not to say that the only patients that I like seeing are ones that are severely unwell. Every patient that walks into A&E is just as important as all the others. Every patient has their own story, their own reasons for attending, and as the first or second line of the NHS, A&E doctors can make a massive difference.

A&E also presents a wonderful opportunity to practice medicine in most specialties. Do you love orthopaedics and cardio? No problem, A&E is where you can do the primary examination and treatment of fractures, dislocations and trauma, as well as dealing with angina, chest pain and ACS. The same can be said for almost every medical specialty.

A&E also represents the best place for perfecting diagnostic and problem-solving skills. Patients do not read textbooks, and most patients will not turn up with classic or straightforward symptoms. As the old saying goes, "classic presentations" only present about 15% of the time.

A&E is also the greatest place to hone your differential diagnosis skills. In all other specialties, the consultant's diagnosis is usually final, and unless something goes terribly wrong, management plans are rarely challenged to any significant degree. In A&E this is very much not the case. One of my local A&E consultants calls this "calibration", the constant adjusting and improving of your diagnostic skills, as the specialist consultants feed back to you about the final diagnosis of your patients.

In summary, if you love a challenge, constantly improving your skills, knowledge and management abilities, and making a huge and immediate difference to patient care, then A&E is the place for you.



The ABCDE Approach to Trauma Care

Daniel Creegan

The trauma patient presents many challenges to the physician and indeed the trainee physician. Complicated injuries are confounded by absence of a clear history, comorbidities and often a high-stress environment. With that in mind, an algorithm has been developed to aid both physicians and indeed lay-persons and first-on the scene civilians to focus on the most life-threatening, and therefore life-saving, aspects of the patient's injuries, in a logical and methodical manner. The great advantage of the ABCDE approach is that it can be used by individuals of varying skill and expertise. The same steps can be followed by a first-aider as by an Emergency Medicine physician with the only differences being the complexity of the procedures used to address each step of the approach.

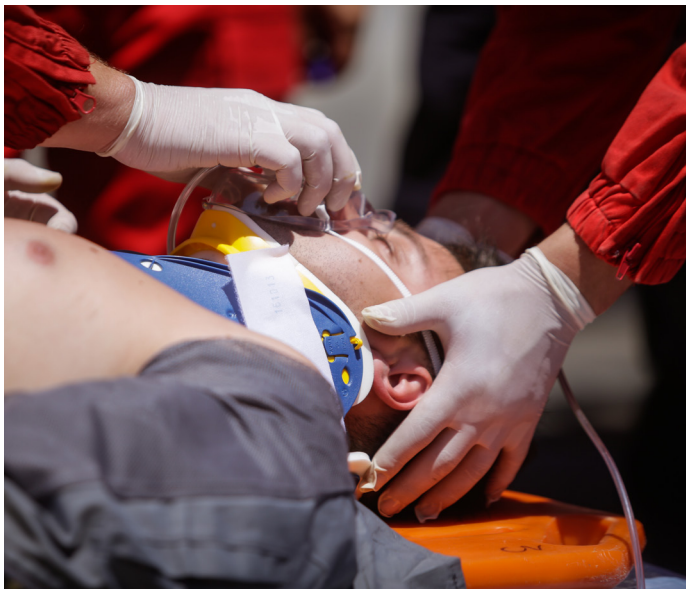
Here I will give an overview of this ABCDE approach and how it should be used most effectively in the emergency medical situation with reference to Troels, T. et al. (2012).

A: Airway

There is no point continuing with a primary survey or patient treatment unless a patent airway has been achieved. If the patient is talking to you and answers your questions with a normal voice a patent airway can be assumed and the next stage can be approached. While the absence of breathing is a clear sign of a totally obstructed airway, the signs of a partially obstructed airway are less noticeable. They include stridor, voice changes and increased work of breathing. In the unconscious patient snoring is a sign of a partially obstructed passage and must be treated accordingly. Head tilt and chin lift is the most widely used technique to open an obstructed or partially obstructed airway. Jaw thrusts may also be used by more competent professionals. If a foreign body is noticed as a cause of the obstruction, that foreign body should be removed. If the object is not accessible without danger of inserting the object further down the airway, back-blows and the Heimlich manoeuvre should be initiated without delay. It is paramount to remember that once the patient loses consciousness, CPR should be commenced immediately.

B: Breathing

Once a patent airway has been secured, the breathing status of the patient should be considered. Distended neck veins, use of accessory muscles, stridor, wheezing and cyanosis are all signs of impaired breathing. Respiratory rate is also a good indicator of the efficiency of the patient's work of breathing. If available, pulse oximetry can be used to acquire an indication of oxygen saturation. If oxygen saturation is dangerously low or life-threatening abnormalities are noted treatment should now be commenced. Of note, evidence of a tension pneumothorax should be treated immediately. According to Ramrakha, P.S and Moore, K.P (1997) in The Oxford Handbook of Acute Medicine the largest cannula available should be inserted into the 2nd intercostal space, mid-clavicular line. If bronchospasm is suspected, fast-acting bronchodilators such as albuterol can be used. If available, supplementary oxygen should be administered.



C: Circulation

The attention of the physician/first-aider can now be turned to the circulatory system. Capillary refill, pulse rate, blood pressure and, if available, ECG should all be performed. If there is an absence of pulse at this stage CPR should be commenced immediately. Hypovolemia should be treated once diagnosed. If possible, fluids should be administered and the patient should be placed in a supine position with the legs elevated. Any noticeable haemorrhage should also be treated at this stage. The next stage should be approached only when the patient is haemodynamically stable and breathing, and has a pulse.

D: Disability

At this stage, the level of consciousness of the patient should be assessed. The Glasgow Coma Scale is a useful scale for this purpose. The patient should be placed in the recovery position until more senior help arrives.

E: Exposure

With the patient stable, a cause for the trauma can now be investigated. The rescuer should search for hidden signs of bleeding, needle marks etc. Patient temperature should also be assessed. Attempts should be made to decrease the degree of heat loss, particularly if the patient is lying on cold concrete.

It is important to note that each trauma patient and each situation is unique. The above guidelines are a guide to ensure the responder focuses their attention on life-threatening injuries/states however professional judgement must be employed at all times.

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A Career in Emergency Medicine

Interview conducted with Dr Georgina Robertson - Consultant Accident and Emergency Physician at the Royal Blackburn Hospital. Dr Robertson is a University of Manchester graduate and has been a consultant for 4 years.

Why did you choose to go into Emergency Medicine?

I had had a lot of experience of Emergency Medicine through chosen placements at medical school and really enjoyed them. I liked the fact there was an opportunity to do a lot of practical work and that you could see immediate results in patients. I also really enjoyed the team work aspect and the fact work is very fast-paced and diverse. I had undertaken other placements during medical school and found ward rounds and clinics very boring!

What would you say are the best and worst parts of your job?

I still find my job incredibly exciting and still get an adrenaline rush whenever an emergency comes through. The worst part is probably the impact on home life especially as I have three children. I'm definitely not at home as much as I would like to be.

What qualities does someone wanting to become an Emergency Medicine physician need to have?

They need to be level-headed, calm in a crisis and able to multi-task. They also need to be hard-working and a team-player. I think being diplomatic also helps as you need to deal with a variety of different people; from family members, to patients to fellow colleagues. Moreover, the ability to compartmentalise and 'switch-off' as soon as you go home is important as the hours are often very long and you will see a great number of patients, and you have to therefore be able to relax when you have the chance.

What should someone interested in a career in Emergency Medicine do to get ahead in the field?

As a medical student I would suggest you get as much exposure as you can through Student Selected Components (SSCs) of your respective programmes. Also, if you can try and organise your elective placement to be in an Emergency Medicine department. As a Foundation doctor try and get an Emergency Medicine placement or a General Medicine placement and do your ATLS and Paediatric Life Support training as soon as possible.

What is something (or things) you have found out having become a consultant that you wish you would have known earlier on in your career/ as a medical student?

I wish I had had more managerial training as a registrar or earlier in preparation for becoming a consultant. As a registrar we don't have to deal with some of the structural or bureaucratic aspects of the job, for example I had never been taught how to deal with patient complaints or fill out a complaints form. I also wish I had been taught how the structural and managerial aspects of the NHS work at a much earlier stage and how to affect change within the system. I also don't think junior doctors or medical students know how difficult it is to affect change within in the system.

What are some common misconceptions regarding Emergency Medicine which you have found to be unfounded?

I think that traditionally Emergency Medicine wasn't seen as a proper specialty and some doctors thought of it as a specialty for those who couldn't make it into surgery. Some snobbery does still exist due to the general nature of the specialty, but it is much less prevalent than when I was training.

What are the main ways the specialty has changed during the course of your career?

It used to be much more junior-doctor led, with mainly juniors on the ward seeing patients and undertaking procedures. For example, I had to insert my first chest-drain with no supervision or training, having been given some brief instructions from the consultant over the phone! Now, there is a lot more supervision of juniors and teaching and training has improved. This is generally a good thing, although I have noticed some skills are being lost, among junior doctors as juniors are relying much more on seniors to undertake them.

Is there room for sub-specialisation or undertaking research?

There are many opportunities to undertake research projects and audits, especially as the patients we see are so varied in their pathology.

The specialty itself is still very much general however, some doctors do hold dual-accreditation and work both in ICU and in the Emergency department. Furthermore, there is specialist training for those that want to specifically go into paediatric emergency medicine but even these doctors may have to treat adults and thus have to keep their skills and practice generalised.

Many consultants in Emergency Medicine do do a number of other things alongside their clinical work. Some work for universities or examine for the College, some work with the police in forensics or with the helicopter retrieval teams. Unlike other specialities you are not limited by having to do ward rounds or clinics or follow-up the patients you've seen which allows you to take-up other interests you may have. This is especially important from stopping you getting burnt out! The specialty also lends itself for those who would prefer to work part-time.

What have been your career highlights so far?

My biggest achievement has been passing the FCEM and becoming a consultant! More recently in March 2013 the East Lancashire Hospital NHS Trust awarded me an Outstanding Achievement Award for implementing a system by which nurses on the ward could receive specialty training. This has been greatly successful and has helped improve the service we offer to patients.

Do you have any final words?

I truly love my job. I've always wanted to be a doctor and I went into medicine with the sole aim of making people better, and I think Emergency Medicine affords you the opportunity to work to this simple premise.