The APAGBI Trainee Handbook

Guidance for those planning a career in Paediatric Anaesthesia

Editors
2nd Edition: Natasha Woodman and Deborshi Sinha
1st Edition: Robin Sunderland and Alyson Walker

2nd Edition (January 2018)

CONTENTS

President's Welcome

Welcome to the second edition of the APA Trainee Handbook.

The aims of the APAGBI include education and training. As the Association has developed over the years, we have encouraged and supported the training of anaesthetists both for specialist and DGH consultant posts. This, we believe, has contributed to a higher standard of care for the children we anaesthetise.

At our ASM, we have for many years awarded prizes for the best oral and poster presentations by trainees. These are of a very high quality, both in scientific content and oral and visual presentation. We have developed educational sessions in addition to the main meeting, which many of the consultants attend as well. We have had a trainee member on Council now for a number of years and these have become valuable and essential to our functioning as a Society. For instance, the development of PATRN, the audit/research/QI network, is a recent development driven by the trainees.

Dr. Alyson Walker developed the idea for this handbook. The first edition has been a great success and useful to many trainees and available to anaesthetic departments. This is the second edition of this handbook and we want to thank Dr. Natasha Woodman and Dr Deborshi Sinha for their hard work in coordinating the project. We would also like to thank all the experts who have contributed their time and knowledge to write their chapters. The book is mainly aimed at UK trainees but, via the website, we hope will be useful to many anaesthetists worldwide.

Charles Stack
APA President 2017-2019

Return to Contents

Foreword

5 years have passed since Alyson and Robin produced the first APAGBI Trainee Handbook and it has been an immense privilege to refresh their book. We have introduced three new pieces on burnout, balancing parenthood with a career and trainee-led collaborative work. Whereas previously everyone was expected to be a super-mum/dad or an inexhaustible high flyer, it is now acceptable to talk about the struggles we encounter. Additionally we have a new chapter on quality improvement and are very lucky to have a piece from POEMS for Children, on communication with anxious children. We also welcome new authors to the medical student, fellow, neuroanaesthesia, PICU and research pieces. We hope you find this useful in whetting your appetite for a career in paediatric anaesthesia. There are multiple resources linked in this book, which we have created as a digital only edition, so click away and you will hopefully find everything you need and more.

We have taken out the list of paediatric anaesthetic fellowships and courses from the first edition, as the most up to date list can be found on the APAGBI website.

Thank you to everyone who contributed to this book and helped bring the second edition to life. We always want to hear from trainees, so please get in touch if you have ideas you want to share.

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APAGBI Trainee Representative
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Return to Contents

1.1 The APAGBI

The Association of Paediatric Anaesthetists of Great Britain and Ireland (APAGBI) was founded in 1973. Our membership of over 1000 paediatric anaesthetists is drawn from every type of hospital in the UK and Ireland, Europe and further overseas. We aim to promote high standards in the specialty through education and research. We advise other professional bodies on anaesthesia for children and coordinate voluntary hospital peer reviews. The APA Council meets three times per year, one of these meetings is in conjunction with the Annual Scientific Meeting. Several sub committees exist within the APA and their responsibilities are outlined below:

Education and Training Committee

- Career planning for paediatric anaesthesia
- Advising on ways to optimise training in paediatric anaesthesia
- Development of web resources to support education and training for APA members

Professional Standards Committee

- Oversee development of clinical guidelines and quality improvement initiatives and support implementation for all areas of paediatric anaesthetic practice
- Oversee and support the APA Peer Review Scheme
- Oversee and support Patient Information projects
- Oversee and support the APA Linkman Scheme: maintains links with Clinical Leads for Paediatric Anaesthesia throughout the UK and Ireland. Annual Linkman Meeting held with trainee prize for best abstract / presentation
- Advise in association with the Education Committee on revalidation of members
- Produce position statements on Professional Standard issues for our members and the public

Scientific Committee

- Promote and facilitate research and education about research methodology in paediatric anaesthesia, intensive care and pain medicine
- Provide reviews on Research Grant applications and monitor progress of research projects funded by the APAGBI
- Provide expert advice on scientific issues relating to paediatric anaesthesia
- Provide a forum and resources for the development and co-ordination of multi-centre studies that relate to paediatric anaesthesia
- Oversee and coordinate national paediatric anaesthetic QI projects within the APAGBI membership

Return to Contents

Meetings Committee

- Establish the programme for the Annual Scientific Meeting (ASM) with the Scientific Committee
- Oversee and monitor the planning and development of the ASM
- The ASM includes trainee poster and oral presentations. These are reviewed by a scientific sub-committee with prizes awarded for the best entries.

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Return to Contents

1.2 APAGBI Trainee Membership

When you become a member of the APA you will enjoy several benefits:

- Online access to the journal *Pediatric Anesthesia*
- Receive a copy of our e-newsletter 'T-Piece' four times per year
- Opportunities for grants and awards for research
- Access to advice for the genesis of audits, QI and surveys
- Access to learning resources for examinations, continuous professional development and revalidation
- Discounted rate for attending the Annual Scientific Meeting (ASM)
- Access to apply for the APA Travel Grant
- Opportunities to network with national and international paediatric anaesthetists

The APA strives to create an association which trainees can be active members of. There are many ways that you can get involved:

- Write a newsletter article
- Carry out a project that you can present as a poster / orally at the APA ASM
- Join the Paediatric Anaesthesia Trainee Research Network (PATRN), supported by APA
- Become the next trainee representative

Your trainee representative provides a point of contact for trainee members. You can find their contact details and more information on becoming a member of the APA under the Trainee Section of the APAGBI website. If they are unable to help you directly, they will endeavour to find someone who can!

Return to Contents

2.1 Career Path to Paediatric Anaesthesia

Claudia Dulea
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Career Overview

Anaesthetists encounter a wide range of patients and specialties and are often one of the largest hospital departments. Paediatric anaesthetists work in a variety of settings from small district general hospitals to large specialist children's hospitals.

During the training programme anaesthetists must generate an in-depth understanding of basic science, physiology and pharmacology. These principles are then applied to a broad landscape of clinical practice within the hospital, spanning medical and surgical specialities. This knowledge is married to the development of expert practical skills and a patient centred approach, allowing the safe management of the full spectrum of patients requiring anaesthetic services.

A paediatric anaesthetist works with children before, during and after surgical procedures and must be able to put children at ease before the surgery as well as discuss all aspects of the procedure with the parents. Paediatric anaesthetists also work in paediatric intensive care and acute and chronic pain management. Many paediatric anaesthetists also have responsibilities for adult patients.

The paediatric anaesthetist is often the first surgical team member that interacts with the family immediately prior to the procedure. They must be good at communicating with children of all ages, reassuring them and their potentially stressed parents. The paediatric anaesthetist will usually provide a balanced anaesthetic of anaesthesia, analgesia and muscle relaxation. Often regional anaesthesia techniques are combined with the general anaesthetic to keep the child pain free. The paediatric anaesthetist monitors all vital signs during the surgery and keeps accurate records. The paediatric anaesthetist then oversees the child's recovery from anaesthesia and is responsible for the child's post-operative analgesia and fluid requirements.

The paediatric anaesthetist must be familiar with the various medications as well as their effect on children as compared to the effect they may have on adults. They are required to have a good understanding of the differences in anatomy, physiology and pharmacology of children and how these change with age. Paediatric anaesthetists must also ensure that all the equipment used during the procedure is appropriate for the age

Return to Contents

and weight of the child. They are specialists at obtaining intravenous access and performing complex regional anaesthetic techniques on small children.

Career Requirements

Paediatric anaesthetists do not need to have trained as paediatricians or passed exams set by the Royal College of Paediatrics and Child Health. Paediatric anaesthetists gather their skills and knowledge through specific placements during their generic anaesthetic training and in the UK all fully qualified anaesthetists with the Certificate of Completion of Training (CCT) or equivalent should be able to safely anaesthetise children of 3 years of age or older. Most hospitals will provide anaesthetic services for children to some extent but those under the age of one are normally treated in a specialist centre.

A consultant paediatric anaesthetist must be on the specialist registrar for anaesthesia and must also have completed their CCT. Those people aspiring to be the lead paediatric anaesthetist in a district general hospital (DGH) should obtain at least 6 months advanced training in a specialist paediatric centre. If you wish to work as a specialist paediatric anaesthetist you require at least 12 months training in a specialist centre. This training can take place in the UK or abroad. Within the UK all the major paediatric centres provide placements for 6-12 months for trainees within their region. Fellowships abroad are often taken in Australia, Canada, New Zealand, USA and within Europe.

The paediatric anaesthetist will be required to complete rotations as a core & specialist trainee in the various areas to complete training. Some hospitals and training centres are advocating the use of simulation to help paediatric anaesthetists learn how to work with very young children. All paediatric anaesthetists have to undergo regular update training in Paediatric Life Support and Child Protection. As consultants there is a requirement to continually maintain paediatric experience particularly in infant and neonatal anaesthesia.

In summary, paediatric anaesthesia can be a rewarding and stimulating branch of anaesthesia with children having a variety of congenital and acquired conditions over a wide range of ages.

Useful links for further information:

- Wessex Deanery Paedaitric Anaesthetic Training Page
- NHS Health Careers - Anaesthesia Section
- FRCA.co.uk - How to Get Started in Anaesthesia
- AAGBI "Who is the Anaesthetist" Booklet 2013
- RCOA Guidelines for the Provison of Anaesthesia (GPAS) - Chapter 10 Paediatric Anaesthesia 2017
- RCOA Guidelines for the Provison of Anaesthesia (GPAS) - Chapter 10 Paediatric Anaesthesia 2014

Return to Contents

2.2 Structure of Paediatric Anaesthesia Training in the UK

Alyson Walker
Consultant Paediatric Anaesthetist, Royal Hospital for Children, Glasgow

Although your exposure to paediatric anaesthetic cases will vary depending upon your deanery and base hospital, the Royal College of Anaesthetists (RCOA) outlines three essential levels of training for all trainees: basic, intermediate and higher training. Training in child protection is required at all stages.

Basic Level Training

Many of the competencies outlined in the RCOA Certificate of Completion of Training (CCT) guidelines will be gained during your CT1/2 years, but paediatric experience can be very variable between trainees at this stage due to working at a variety of hospitals. Simulators can help work towards competence in areas such as paediatric resuscitation. In reality, many trainees will work towards their basic skills during their St3 year. Competencies include paediatric airway management and knowledge of anaesthesia in patients down to the age of one.

Intermediate Level Training

This is best attained during 3 months of paediatric anaesthesia in an exclusively paediatric environment (with a minimum of one month), usually between St3 and St4 years. This may vary between deaneries, and depend upon local caseloads. During this time, you will build upon your basic knowledge and develop the ability to safely anaesthetise ASA 1 and 2 children aged 5 and over. You should also gain some knowledge of neonatal anaesthesia during this block.

Higher Level Training

A minimum of one month of paediatric anaesthesia should be completed, ideally as a dedicated block. The aim is for your paediatric anaesthetic practice to become more independent, requiring less consultant supervision. You should feel comfortable anaesthetising children down to the age of 3 with only distant supervision. Although some of these skills may be attained during your St3 and 4 years, at least one month of paediatric higher training should take place during St6 or St7.

Advanced Training

If you decide that you are interested in following a career in paediatric anaesthesia, either in a tertiary centre or as a district general anaesthetist with an interest in paediatric anaesthesia, then you should undergo advanced training. This should be carried out at a

Return to Contents

designated tertiary paediatric centre. This will allow you to gain experience in a variety of elective and emergency cases and critical care. If you are planning a career as a paediatric lead in a district general hospital, this block should last at least 6 months.
If your aim is to be a paediatric anaesthetist at a tertiary centre, then 12 months is required. Whether 6 or 12 months, you should gain experience in paediatric critical care.

Out of Programme Training

It is recommended that you practice paediatric anaesthesia in more than one centre during your overall training. The opportunity exists for you to do this training as Out Of Programme Training at a UK or International Centre (See Organising Out of Programme Training). This is known as a 'Pre-CCT' fellowship. You will find a Fellowship Database to help you plan an OOPT on the APA website.

Useful links

- The Stages of Training, Royal College of Anaesthetists
- Basic Level Training - Annex B
- Intermediate Level Training - Annex C
- Higher Level Training - Annex D
- Advanced Level Training - Annex E

Return to Contents

2.3 Preparation for Anaesthetic Exams

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Consultant Paediatric Anaesthetist, Royal Hospital for Children, Glasgow
Phil Hamilton
Anaesthetic Trainee, West of Scotland Rotation

Paediatric anaesthesia questions feature in anaesthetic exams not infrequently. Perhaps this is because there is much to be asked about anatomy, physiology, pharmacology and clinical scenarios. Paediatric questions allow you to demonstrate a theoretical knowledge whilst proving that you are a safe anaesthetist. Whilst much of the basic science relevant to paediatric anaesthesia can be read in books, it starts to make much more sense once you are using it in clinical practice.

Useful resources

- You must ensure that you are up to date with published guidelines, particularly those published recently. These can be found on websites for the AAGBI, APAGBI, RCoA, Obstetric Anaesthesia Association (OAA), NICE and Scottish Intercollegiate Guidelines Network (SIGN).
- Reading recent paediatric themed articles in the British Journal of Anaesthesia Education supplement is also helpful (for example, a recent question topic which had featured in BJA Education was autistic spectrum disorder, specifically the management of a child for anaesthesia with behavioural/communication issues). As a BJA subscriber, you will have (or can request) an electronic password to allow you access to all of these as PDF files online. Here you will also find links to BJA Education Podcasts to accompany many of the articles. Several phone apps also exist to help with your FRCA preparation (search 'FRCA' in the app store).
- The Trainee Section of the APAGBI website contains past exam questions, aids for group study and even anaesthesia-themed puzzles to help you study!
- E-learning developed by the RCOA is a good resource and includes past exam questions.

Exam courses

There are several exam courses available. Up to date links can be found on the Courses section of Anaesthesia UK. It is worthwhile speaking to fellow trainees who have sat the exam to ask which (if any) courses they found useful. It is of course entirely possible to pass the exam without attending a course, but they do help some trainees to focus their studying. If you are considering attending a course, ensure that you do so with enough time to spare between the course and the exam to employ any new techniques you learn.

Return to Contents

What to study

At least 1 final FRCA SAQ question will be paediatric based and it will also form part of the MCQs and SOE. You should refer to the Paediatric Anaesthesia sections of the CCT Curriculum published by the RCoA for subjects that may be assessed in the examination. These may overlap with subjects in other parts of the curriculum. Some examples may include:

- Paediatric airway
- Paediatric physiology
- Foetal circulation
- APLS guidelines
- Congenital heart disease
- Muscular disorders
- Anaesthetising for inhaled foreign body
- Paediatric resuscitation
- Management of laryngospasm
- Pyloric stenosis
- Tonsillectomy
- Acute epiglottitis vs. Croup
- Paediatric formulae
- Oesophageal atresia and tracheosophageal fistula
- Dental anaesthesia
- Status epilepticus
- PONV in children
- Down's Syndrome

Top tips from those who have passed the exam

I asked colleagues who had passed the exam what the best piece of advice they would offer to those currently preparing for the FRCA would be. My favourites are

- "The more you practice, the luckier you get"
- "Believe it is do-able. Just look at those who have passed it before you!"
- "Rationalise the number of books you are using"
- "Don't ignore anatomy and physics. There are a finite number of things they can ask you about these subjects. And when you study science subjects, practice applying them to clinical scenarios"
- "Any time spent studying, no matter how short, is not time wasted"
- "Study when you are studying and relax when you are not"
- "Form a study group"
- "When you get overwhelmed with how much there is to do, take a break and start with a small subject. i.e. study in 'bite sized' chunks"
- "Try to predict what might come up. Keep an eye on 'hot topics'"
- "Book some days off around the time of the exam. And book a holiday to have something to look forward to when you emerge from this hell"
- "You don't need luck, you need attitude"

Return to Contents

3.1 A Day in the Life of a Fellow

Natalie Forshaw
Paediatric Anaesthetic Fellow and Post-CCT Paediatric Cardiac Anaesthetic Fellow, Great Ormond Street Hospital

Why do a paediatric anaesthetic fellowship?

Whether you want to pursue a career as a full-time paediatric anaesthetist in a tertiary centre, or hope to be confident in meeting the occasional paediatric case at a district general hospital, a fellowship at a specialist paediatric centre is likely to be a highly rewarding experience. By fully immersing yourself in paediatric anaesthesia, one can quickly develop and cement the skills and attributes necessary to deliver high quality anaesthesia to patients of all ages.

There are many paediatric anaesthetic fellowships available both home and abroad, with additional opportunities to undertake sub-speciality paediatric fellowships, for example in pain, cardiothoracics and simulation. Fellowships can be undertaken as part of your rotational training, as an out-of-programme experience (OOPE), out-of-programme training (OOPT) or as post-CCT training. The optimum time to undertake a fellowship will vary with the specific job advertised (some will necessitate previous advanced paediatric experience, whilst others require only intermediate experience), your career aspirations and your personal situation.

For me the decision to do a paediatric fellowship came easily, having aspired to be a paediatric anaesthetist early in my training. I opted for the 12 month general paediatric fellowship at Great Ormond Street Hospital (GOSH) based on reputation with positive recommendations from colleagues and its central London location. I enjoyed my year and the experience so much that I returned a year later to undertake a further sub-specialty fellowship in paediatric cardiothoracic anaesthesia.

A typical day at Great Ormond Street Hospital

A typical day starts at 7:30. After collecting the morning theatre list, the next task is to locate the patients, most of whom are admitted on the day of surgery. This is often easier said than done, with non-geographically related wards named after animals and numerous playrooms to coerce children from. Fortunately the majority of patients can be found on the surgical admissions ward – Woodpecker. Patient admissions are staggered throughout the day, so even on a busy list there are usually only one or two patients to see first thing.

ASA 1 patients are a minority, and you will encounter many patients with rare and complex syndromes. Whilst initially daunting, a review of the web (useful sites include www.orphananesthesia.eu and www.omim.org) can quickly bring you up to speed, and

Return to Contents

the existence of a previous anaesthetic chart provides an invaluable resource. Patient (and parental) anxiety is common in paediatric practice and a number of courses such as POEMS For Children exist to suggest communication strategies that will help to alleviate some of their fears (For more information see Communication for the Anaesthetist Working with Children). Premedication can be prescribed for those who need it, but play specialists, bubbles, toys and plenty of sevoflurane(!) are also readily available to assist with induction.

Morning brief takes place at 08:15 after which the fun can begin. As a general fellow, you rotate through the full range of surgical specialties including neurosurgery, plastics, cranio-facial, cardiothoracics and ENT, usually in 2 to 4 week blocks. The majority of lists will have a consultant allocated to them, allowing an excellent opportunity for training and learning the anaesthetic techniques relevant to the surgery. You will have the opportunity to become competent in the insertion of invasive lines, the use of specialist airway equipment and in a range of central neuraxial and regional blocks, anaesthetising children of all ages - from preterm babies to young adults. Fellows are encouraged to plan and manage the anaesthesia, and as you become more competent, you will increasingly be allocated to solo paediatric lists.

Most lists tend to run as all-day lists, with no formal stop for lunch but plenty of opportunity to take breaks. Lists tend to finish around 17:30 (with the exception of certain specialties such as cardiac and planned overruns), with the official end of day for fellows being 18:30, allowing time to review patients post-op or look-up the next day's work.

On-call shifts are generally worked on a 1:12 rota, with shifts lasting 12 hours and handovers occurring at 07:30 and 19:30. Two registrars are on-call at any time, as well as two allocated consultants (general and cardiac) 24/7, so there is always plenty of support available. With no accident and emergency, out of hours responsibilities involve management of the emergency theatre list, providing emergency anaesthetic support around the hospital and delivering the acute pain service.

Many fellows will also rotate through the neonatal and paediatric intensive care units during a 3-month block, caring for acutely unwell or post-op patients. This is a great opportunity to develop general paediatric knowledge and is invaluable in informing future peri-operative practice.

Aside from direct clinical experience, there are weekly morning meetings which fellows are expected to present at, and monthly-protected teaching. There are also many opportunities to get involved in departmental research, teaching and clinical governance. GOSH has a well-established simulation programme which fellows can be involved with as participants or faculty. It also has strong links to the Institute of Child Health, located next-door, providing access to journals and support for research.

Return to Contents

The Best Bits

- I would strongly recommend a paediatric fellowship whatever your long-term ambitions. Sick children can pop up in any clinical setting and a good foundation in paediatric anaesthesia will stay with you and is likely to prove valuable.
- Working with children is both challenging and rewarding. Many patients and their families are enduring one of the most difficult experiences of their lives, dealing with serious illness in the family. As the anaesthetist, we are one of the first people from the surgical team to interact with the family and have a unique opportunity to allay fears, provide a high quality peri-operative service and hopefully bring a smile to the face of a child.
- Paediatric hospitals tend to attract likeminded staff with an affinity for working with children and a good sense of humour. It is not uncommon to encounter staff in fancy dress or a guest musician serenading babies on the intensive care unit. The presence of children and the shared staff ethos makes for a happy working environment.

Top Tips

- If you are considering a paediatric fellowship, start to plan early. Get involved in paediatric-related projects and attend relevant conferences and meetings to demonstrate your interest in the specialty and make you competitive at interviews.
- The APA website (and this manual) offer great advice on how to get started and about the hospitals offering specialist paediatric anaesthetic fellowships. Talk to paediatric anaesthetic consultants, and past paediatric fellows – they can offer you great insight into the job, and may have good advice and useful contacts.
- If successful in gaining a fellowship in a specialist centre, be sure to take full advantage of both the clinical experience and the non-clinical opportunities on offer such as involvement in teaching, research and clinical governance.
- And always keep a close eye on the floor – small children and toys make for surprising hazards!

Return to Contents

3.2 A Week in the Life of a Paediatric Anaesthetic Consultant

Robin Sunderland
Consultant Paediatric Anaesthetist, St George's Hospital, London

The first statement to make is that there are many different types of paediatric anaesthetist, those that work in children's hospitals, those who work in teaching hospitals with specialist children's services and those working in district general hospitals with an interest in paediatrics. To enable me to describe my week in context, allow me to set the scene of the hospital I work in. It is a large teaching hospital set in a big city and provides a mixture of both secondary and tertiary care to a mixed adult and paediatric population both locally and from around the region. As a group of 12 paediatric anaesthetists, with a significant amount of help from our adult anaesthetic colleagues, we provide over 5500 anaesthetic episodes a year for children for a variety of surgical, medical and diagnostic procedures. This work is closely supported by our paediatric and neonatal intensive care units. Most of the paediatric anaesthetists have a mixed adult and paediatric practice. As I am sure the majority of readers will be aware, the daily tasks of the anaesthetist, pre-operative assessment, working in theatre and managing postoperative patients are not the only roles we adopt and in this article I hope to describe my typical working week.

Monday's lottery

My job plan includes some flexible sessions which allow the department more flexibility in provision of paediatric anaesthesia. My work cycles over 2 weeks, starting on Mondays with my flexible or adult sessions. During these sessions I either cover one of the paediatric lists if any of my colleagues are away or the uncovered adult sessions. This means Mondays can be a bit of a lottery, with anything from working with children in the MRI suite, to covering theatre for the paediatric surgery, ENT or gastroenterology. Alternatively I may be anaesthetising adults for what in theory could be anything apart from cardiac and neurosurgery and in practice often includes the adult emergency list, plastics, ENT or general surgery. Fortunately these flexible sessions regularly include less daunting work in the day surgery unit. I find the variety that these flexible sessions offer both interesting and a challenge and an excellent way to build relationships with the more "adult world" of surgical and anaesthetic staff alike. The downside can be the feeling of being slightly outside of one's comfort zone and perhaps being a bit slower in the anaesthetic room than you would like. However working with surgeons and theatre teams infrequently reinforces the progress the WHO checklist has made in improving communications and working in the theatre environment. It's good to get what can be one of the more stressful days of my week out of the way early on.

Return to Contents

Tuesday's moveable feast

This is a day for a relaxed time in the day surgery unit. The surgeons I work with are usually ENT or plastics however it is not unusual for me to be moved to anaesthetise children elsewhere in the hospital. This can result in a calm peaceful morning becoming an unexpected adventure with the neurosurgeons. On alternate weeks, Tuesday consists of an ENT list in our paediatric theatre suite. As a tertiary referral centre this list often consists of "difficult" tonsillectomy patients and airway cases referred in from our network of district generals or more straightforward cases from our local population. One of the advantages of working in paediatric anaesthesia is the continuous supply of trainees (both ST3-4 and ST5-7) who need to complete their paediatric modules and assessments. In our hospital this means that most of the paediatric lists have trainees attached to them, which as a consultant is very refreshing. The opportunities for teaching are self-evident and as someone who enjoys this aspect of the job it is rewarding to be involved in the training of both the novice paediatric anaesthetist and supervision of the more experienced trainee.

Big Wednesday

One of the clinical high points of my week is Wednesday, as this is my main day for paediatric anaesthesia. I normally have an all-day paediatric general surgical list which consists of a mixture of day-case hernias, lumps and bumps and in-patients for major surgery. Working in our paediatric theatre suite means that between the 3 theatres we can work together to accommodate as much of the paediatric urgent and emergency work as possible. Some of the advantages of being a consultant really become obvious as you get to work with the same surgeon and theatre team regularly. This enables you to work more efficiently and collaborate with your team to improve the service you provide your patients. An "occupational hazard" of paediatric anaesthesia is the cancellation of elective patients for common childhood illnesses, such as URTIs and eating chocolates, so it can result in your planned operating list at the beginning of the day, looking very different from your log book at the end of the day.

Approximately one weekday night every 2 weeks I am on call for paediatric anaesthesia. On those days we swap out of our normal commitments to cover the paediatric emergency list during the day. Generally this involves plastic surgery cut lips and fingers to start with followed by the other emergency work including lines, fractures and the occasional neonatal emergency. In my hospital the on call is non-resident so at the end of the day, once all the paediatric emergency work is finished, I am free to go home. As the surgeons we have are generally quite sensible and most children are tucked up in bed at night (instead of joy-riding or night clubbing) it is unusual for us to get called back in. However it does happen for the occasional emergency such as an inhaled foreign body or post tonsillectomy bleed! The weekend on call work follows a similar pattern of being busy during the day but usually not too bad at night. This currently allows us to work a 3 day weekend when on call which makes the rota less onerous in terms of frequency.

Return to Contents

Thursday down the SPA

This is my nominal day for supporting professional activities (SPA). As you would expect this would include continuing professional development (CPD) such as mandatory training, audit and keeping up with current practise. It is also time for audit, research and service development. I tend to organise meetings and teaching sessions for these days to avoid taking time off from clinical work although we are allowed 10 days per year of professional leave. Being in a teaching hospital with a large medical school attached means we organise teaching and project supervision for medical students as well as our anaesthetic trainees. I am also involved in the teaching programme for our recovery and anaesthetic staff as well as resuscitation training on the more formal courses for adult and paediatric life support.

Thank goodness it's Friday

If I am not on call then Fridays are my own – most of the time. The anaesthetic department rotates the departmental weekly morning meeting which means for 3 months of the year it is on a Friday. However as I am allowed to use my SPA time (and to some extent my clinical time) flexibly I will sometimes displace some activities to do on a Friday. This may include joint planning meetings with the paediatric surgeons to discuss the difficult cases listed for the following week or meeting with the nursing staff from the wards to discuss audit and potential improvements in the service. Strangely enough I do not find too many meetings scheduled for 4 o'clock on Friday afternoon.

Summary

I really enjoy my job as a paediatric anaesthetist in the hospital where I work. Nothing is perfect, but the benefits far outweigh the problems in my opinion. The advantage of being in a large teaching hospital with a mixed adult and paediatric practice means that my patients vary between 650g and 160kg plus, or 26 weeks and 94 years (post conceptual age). As a paediatric anaesthetist I interact with all surgical specialties that operate on children in our institution as well as our medical and radiological colleagues and let's not forget the wonderful patients and their families that make our efforts so worthwhile.

Return to Contents

3.3 A Medical Student's Experience

Varthani Kirupanandan

3rd Year Medical Student, University of Glasgow, Great Ormond Street Hospital

Anaesthesia, particularly paediatric anaesthesia, has always been of interest to me. It encompasses all the reasons why I applied to medical school: an interest in pharmacology, emphasis on communicating with patients, a variety of clinical skills and an important understanding of applied anatomy and physiology.

Although it is the single largest hospital speciality in the UK, anaesthesia is hardly touched upon in most medical schools and exposure is generally very limited. Therefore, gaining experience in paediatric anaesthesia does entail looking outside the formal curriculum. There are plenty of different ways to get this exposure depending on the medical school; through student selected components (SSC), special study units and electives. In addition, attending anaesthetic conferences whilst at university (which are usually heavily subsidised for students) and joining university anaesthetic societies gives greater exposure to the speciality.

I decided to self propose a five week placement in Paediatric Anaesthesia at Great Ormond Street Hospital, one of the world's leading children's hospitals.

As a medical student, it is easy to assume the role of an anaesthetist begins and ends in an operating theatre. However, during my placement there were multiple opportunities to gain exposure to the full field of anaesthesia, both on wards and in theatres as well as in research and meetings. Anaesthetists are essential for surgical procedures to take place, and I had exposure to Craniofacial, Cardiothoracic, ENT, General, Interventional Radiology, Neurosurgery, Orthopaedics and Plastics (most of the fields of surgery I could think of!).

Anaesthetists must be proficient in a broad skill mix. Throughout my placement I observed a variety of complex clinical procedures; insertion of lines using ultrasound, and advanced intubation techniques to name a couple. I was also able to expand my own clinical skills, such as airway management.

The variety in what I saw day to day showed me the diversity within anaesthesia. Observing the pre-assessment process prior to surgery demonstrated the unique opportunity anaesthetists have, as peri-operative physicians, to take care of surgical patients as a whole.

Research is a cornerstone of medicine and an important part of any specialty so it is beneficial to be involved in research projects if possible. During my SSC I had the

Return to Contents

opportunity to work on two research projects. The first was a Global Health Directive based at GOSH with trial centres in Malawi and Bangladesh, trialling a new pulse oximeter on wards and in outpatients. My second project was an evaluation of the use of the Paediatric Emergence Delirium (PAED) Score in recovery to assess post-operative patients. It was interesting to learn about these different aspects of anaesthesia, particularly in the case of emergence delirium, which I had never heard of before.

There were also multiple opportunities to join and observe a variety of meetings and lecture presentations, demonstrating the teamwork, continual learning and sharing of reflections in anaesthesia. For example I had the opportunity to observe a video meeting of paediatric anaesthetists from around the world including Boston, Cape Town and Uganda.

Although it is underrepresented in medical school, anaesthesia is a rewarding, diverse and challenging field of medicine. What really made my placement amazing was the friendliness and encouragement of staff in theatre and the wards. My Student Selected Component taught me about the variety, level of skill, and both the complex and rewarding nature of paediatric anaesthesia. It was a thoroughly enjoyable and worthwhile experience. It goes without saying that there are some challenges in paediatric anaesthesia. Children are vulnerable, and can often be afraid and upset when confronted with the unknown anaesthetic room. The ability to calm a scared child and their even more frightened parent, calls upon communication skills and compassion, which are essential to being a paediatric anaesthetist.

Resources for medical students interested in anaesthetics

- NHS Health Careers - Anaesthesia
- NHS Health Careers - Anaesthesia - Training and Development
- RCOA - Considering a Career in Anaesthesia
- FRCA.co.uk - How to Get Started in Anaesthesia

Return to Contents

3.4 The Tertiary Paediatric Hospital

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Most paediatric surgery and anaesthesia is carried out in district general hospitals despite the centralisation of services that has occurred over the past decade. The more difficult and high-risk cases are referred to tertiary centres. So, why would you choose to work in a stressful environment with high risk complicated cases?

- If you enjoy working with children then clearly you are going to see more in a specialist centre. The era of the occasional paediatric anaesthetist is on the wane.
- The whole system and ethos of the hospital is child-focused. You don't have to ask for the 'paeds trolley' or wait in line for the 'paeds theatre'. All the trolleys and theatres are for kids!
- There is ample opportunity to discuss cases with highly experienced colleagues.
- You can become a world leader in terms of experience and research (if that is your wish) within a sub-specialist area of your choice.
- What you consider stressful becomes less; the more you grow in experience and you gain experience quickly when you see challenging cases so frequently. In fact, seeing the occasional paediatric case in a general setting may end up being more stressful than dealing with tiny sick neonates in a tertiary centre.
- Bigger departments means less frequent on call and a better work-life balance.

What are the downsides of this wonderful life?

- You will probably have to live in a big city (within 30 minutes for on call)
- Parents and families can sometimes be more challenging to manage than the kids
- You will rub shoulders with some large egos with type A personalities; however paediatrics is better at weeding these out since kids see straight through them!

If this sounds like the life for you, then you will need at least one year's training in a tertiary centre. Many trainees now supplement this with another year that is often abroad. Some peer review publications will help you get short-listed for the above posts and will almost always be expected if it's a tertiary Consultant job that you aspire to.

Return to Contents

3.5 The District General Hospital

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Introduction

Infants, children and young adults require specialised anaesthesia skills. In particular there are marked anatomical and physiological differences in neonates and infants that evolve throughout childhood. The Royal College of Anaesthetists has recently published "Guidelines for the Provision of Paediatric Anaesthesia Services 2017". Following the NCEPOD 1999 report, there has been a shift in practice to concentrate children's surgical services centrally with the view to increase expertise and reduce 'occasional' paediatric anaesthesia practice. Small children, those with significant medical conditions needing surgery, and critically ill children are usually transferred to specialist paediatric centres.

District General Hospitals (DGHs) should generally have arrangements for managing and treating simple surgical ASA 1 & 2 children, emergencies in children and be able to resuscitate and stabilise critically ill infants and children of all ages prior to transfer to a specialist centre for surgery and/or intensive care. Consequently, paediatric anaesthetists in the DGH face the challenge of maintaining an adequate caseload in order to retain their skills in managing sick children. Anaesthetists who care for children should have received appropriate training and must ensure that their competency in anaesthesia and resuscitation is adequate for the management of the children in their care. Resuscitation courses include Advanced Paediatric Life Support (APLS) or European Paediatric Advanced Life Support (EPALS).

There should be an identified lead paediatric consultant anaesthetist with overall responsibility for the provision, safety & quality of the service. There must be locally agreed policies on the level of consultant supervision required for anaesthesia trainees, based on the age, complexity and co-morbidities of the patient. Arguably paediatric anaesthetists in the DGH need to have equivalent training to those working in a children's hospital. Although cases may, in general, be less complex they do not have the same support services or continuous exposure of cases. This entails specialist training of 6-12 months in a paediatric centre. As a paediatric anaesthetist in the DGH, there will be ample opportunities to take on a lead role in the development and maintenance of paediatric anaesthetic services.

Return to Contents

Roles of a Paediatric Consultant Anaesthetist in a DGH

Coordinating and overseeing anaesthetic services for children

- Ensuring that the standards of facilities are adequate (equipment, separate ward from adults)
- Ideally children should be anaesthetised on children only lists to allow optimisation of senior surgical and anaesthetic cover
- Up-to-date anaesthetic guidelines / protocols (e.g. pre-operative fasting)
- Acute pain service for children
- Information leaflets / consent forms for parents
- Teaching / training junior doctors and other medical staff
- Regional networking and maintaining good partnership with specialist centres to ensure high quality care of critically ill children
- Upkeep of on-going clinical experience – at least one paediatric list per week
- Maintain a high level of skills in resuscitation and management of a critically ill child (APLS instructor, regular lists at specialist centres etc.)
- Providing in-house paediatric resuscitation updates and running simulator courses for anaesthetic colleagues, ODPs and nurses
- Running local audit projects to enhance quality assurance and patient safety
- Being part of a regional network to ensure safe transfer of those neonates or infants that need transferring to the regional children's hospital for their specialist surgery, both elective and emergency.
- To develop regional protocols and guidelines.
- Liaising with managers, paediatric nurses, surgeons and paediatricians within a hospital to provide a comprehensive paediatric service

Paediatric Anaesthesia in a DGH

- DGHs continue to provide the majority of paediatric anaesthetic services despite centralisation of the subspecialty
- Paediatric anaesthetic services have to be consultant-led at all times
- The majority of surgical procedures on the paediatric population will be elective, relatively straightforward and usually ASA 1 & 2 patients
- Anaesthetic services can be provided to a wide range of specialties in the DGH; ENT, Dental, Urology, General, Ophthalmology, Orthopaedics, Radiology (CT/MRI), Acute pain management

- Examples of common operations:
    - Dental
    - Max-fax procedure (closure of lacerations)
    - Surgery for testicular torsion
    - Appendectomy
    - Herniotomy
    - Orchidopexy
    - Circumcision

Return to Contents

- Grommets
- Tonsillectomy
- Adenoidectomy
- Squint
- Fracture

Day surgery is particularly appropriate for children provided the operation is not complex or prolonged, and the child is well. Even children with relatively complex needs, e.g. those with cerebral palsy can be managed as day cases, provided they are stable and the proposed surgery is unlikely to preclude same-day discharge.

Sick children may require short-term admission to a DGH, e.g. while awaiting the arrival of the paediatric intensive care unit (PICU) retrieval team. This is acceptable, provided there is a suitable facility within the hospital, there are staff with the appropriate competencies and the episode will last only a few hours.

The Linkman scheme provides an opportunity for anyone with a passion for children's services to 'link, learn, connect and collaborate'. Registered Link persons in your DGH will be the liaison between the APA and the personnel delivering anaesthesia for children, promoting two-way communication. The annual Linkman Meeting provides the opportunity to share learning and receive paediatric anaesthetic updates from colleagues around the country.

Further information can be obtained from

- RCOA, Guidelines for the Provision of Anaesthesia Services (GPAS) 2017
- Extremes of Age. The report of the National Confidential Enquiry into Perioperative Deaths (1997-1998) London: NCEPOD; 1999
- NHS Executive. Paediatric Intensive Care. A framework for the Future.UK: National Coordinating Group on Paediatric Intensive Care/ NHS Executive. 1997
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- The acutely or critically sick or injured child in the district general hospital. A team response. Department of Health 2006

Return to Contents

3.6 Communication for the Anaesthetist Working with Children

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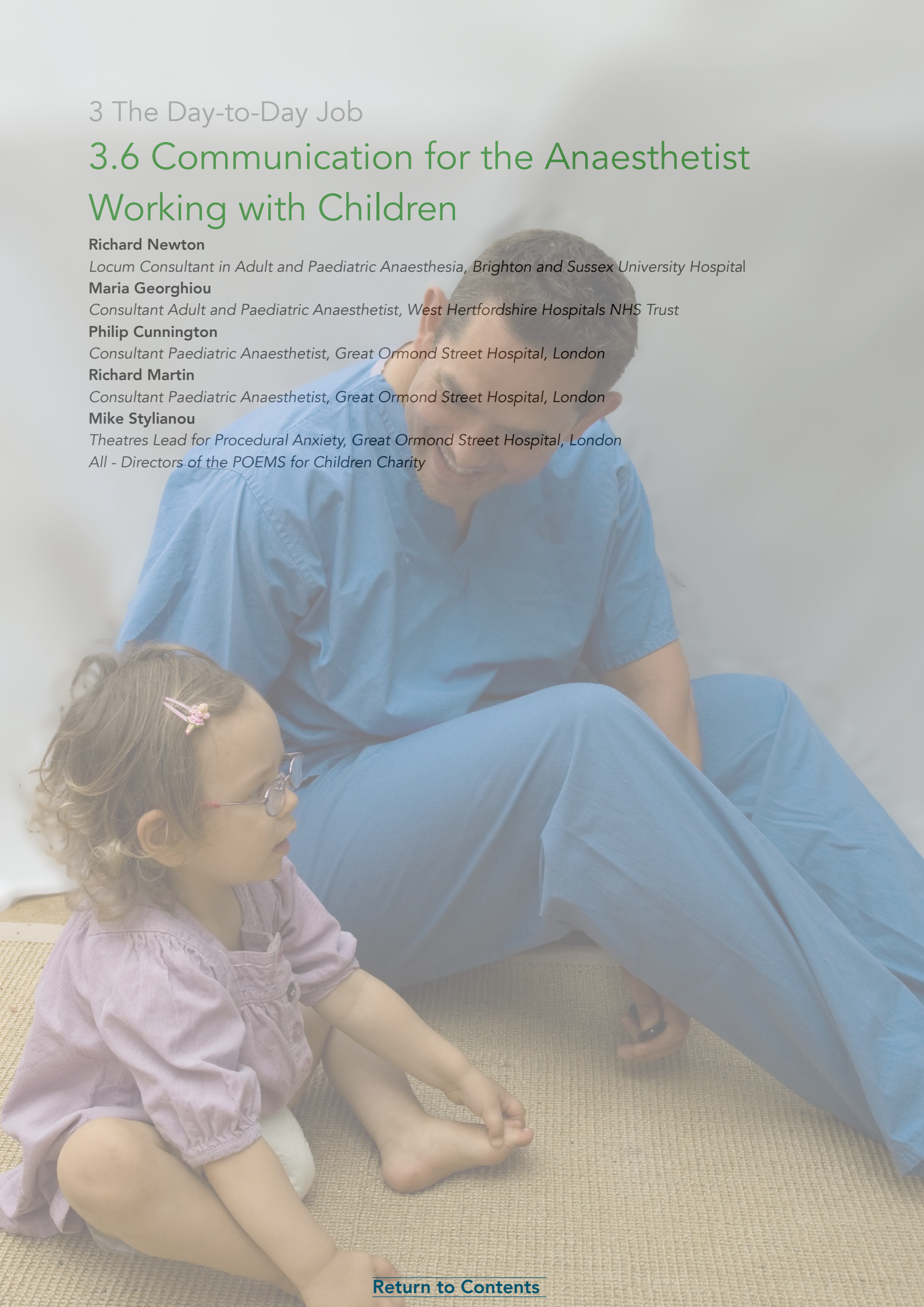

Return to Contents

Introduction

Effective communication skills are an essential element of modern clinical practice[1]. Working with children poses many challenges, as different strategies must be employed to communicate effectively with not only children of different ages and development but parents and staff.

Anaesthesia and surgical intervention has the potential to cause significant distress and anxiety. Effective communication that is flexible, age appropriate, culturally sensitive and responsive to the needs of the child, has the potential to relieve or reduce anxiety experienced at the time of surgery. It can also help the child develop coping strategies they can utilise in the future.

Children are receptive, curious and eager to try new things[2]. These innate qualities should be utilised to engage, build trust and develop rapport. Communication must convey a message of "non-threat' at a time when the child may feel vulnerable, frightened and unable to cope. Good communication is fundamental to a positive experience and outcome for the child.

Anxiety

Childhood anxiety can have adverse short and long-term physical and psychological consequences. Elevated preoperative anxiety (see table 1) is associated with increased postoperative pain, slower recovery and maladaptive behavioural changes[3, 4]. Post-operative dysfunctional behaviour occurs in up to 60% of children within the first two weeks. Nearly one fifth of children continue to demonstrate maladaptive behaviours six months postoperatively and up to 12% at one year[5]. Some of the symptoms and signs are listed in table 2.

Development of coping strategies is considered the most effective preoperative preparation intervention, followed by behaviour modelling, which consists of demonstrating behaviour e.g. by video. The child learns the new behaviour through imitation, with or without conscious direction. Other coping strategies include; play therapy, operating room tour and printed material.[6] Psychological preparation programs should be patient centred, individualised and delivered at the right time in order to have the desired impact.[7]

Pre-operative anxiety: risk factors
Children 1-5 year
Shy or inhibited
High intelligence
Lack good adaptive abilities
Parental anxiety
Previous bad experience

Table 1: Risk factors for preoperative anxiety.

Return to Contents

Post-operative maladaptive behaviours
Increased separation anxiety / general anxiety
Temper tantrums
Aggression towards authority
Attention issues – difficulty concentrating
Increased Pain / analgesic consumption
Problems falling and/or staying asleep
Bed wetting
Nightmares
Internalising / depression
Regression of developmental milestones

Table 2: Post-operative dysfunctional behaviours

Communication Strategies

Communication involves both verbal and non-verbal elements. Understanding and learning to adjust body language, tone and cadence of speech, will facilitate more effective communication.

A child's innate resources in the form of memories, interests, imagination, and creativity make them incredibly receptive to suggestion, guided imagery, metaphors and stories. These can offer them a coping strategy by changing the focus of attention. They can help the child reframe the situation by facilitating a connection with positive memories, thoughts and feelings. This in turn leads to positive behaviour, which will support the child to manage anxiety more effectively during their peri-operative journey.

Carefully selected words with a positive tone can be therapeutic, relieve anxiety and improve pain.[8] Positive therapeutic verbal or non-verbal communications, known as suggestions, can elicit a subconscious response resulting in positive behaviour and mood, thereby improving the patient experience and outcome.[9] For example you could suggest the following, "when you wake up you will be relaxed, hungry and looking forward to going home". The suggestion of hunger is an example of reciprocal inhibition as you can't be hungry and nauseated.

Hypnosis has been advocated as a useful adjunct to paediatric clinical practice[10]. Other uses of hypnotic communication include the management of phobias (including needle

phobia), pain management, performance anxiety, negative habits or experiences and many more.

Pre-operative visit

The goal is to evaluate the levels of anxiety of both the family and child whilst assessing the medical condition of the child. An anaesthetist has limited time to achieve this, while simultaneously building rapport and gaining the confidence of both the child and parents. To be time efficient, utilise all resources including parents. Parents are a useful source of information on what the child likes and dislikes, but they can also provide important clues on coping strategies that are already in place, at school and beyond. This information can be used to achieve accelerated rapport.

Meet at eye level, entering into their world. Play is very important to the younger child. Find out about their favourite things so it gives you something to talk about immediately when they come to the anaesthetic room. Talk to the child, not about them, using age appropriate language that they can understand. While explaining what is going to happen, give control back to the child by using what appears to be a fair choice, "do you want to have the magic cream and butterfly or do you want the magic gas." The implication in choosing is that they accept that one or the other is going to happen and by empowering them to make their own choices resistance is reduced. Give the child "a voice"; give them a platform to express their fears and anxieties. If the child appears anxious, recognise it, address it and attempt to deliver a coping strategy. Using technology such as tablets and smart phones to watch cartoons or distract the child has been shown to be of benefit. In some circumstances, an anxiolytic such as midazolam may be an appropriate coping strategy.

In an ideal world the anxious child and parent would be brought to the attention of the anaesthetist in advance of the surgical procedure. An anxious parent can make the anxiety of their child significantly worse. If time allows, an individualised program can be set up in order help the child and family develop effective coping strategies. Stories and patient information leaflets developed by the APA and RCoA provide information for children and young people about anaesthesia and are available on their websites.[11, 12]

Induction

Be aware that some equipment might be frightening in context with the child's reality at this time. Ensure all preparation is complete before the child arrives, i.e. that all drugs are drawn up. Engage them in order to maintain an external focus and deliver any distraction or coping strategies based on their interests. Using humour, watching cartoons, music, story-telling and hypnotic therapeutic suggestion have all shown to benefit. If you are undertaking a gas induction, nitrous oxide is useful. It is odourless and increases patient susceptibility to suggestion. Using a cupped hand rather than a mask, or if using a mask, scenting it with aromatherapy oil or lip balm of their choice, may increase acceptance. Whether using an intravenous or gas induction communication should be positive. There should be no surprises. An abstract alternative or story to

Return to Contents

describe what is happening pre-empts and lessens any negative experience. I.e. when injecting propofol rather than say "may sting a bit," if you say, "you may feel a bit of a sparkle, fizz, chocolate flavour or pink feeling in the back of your hand." By the time the brain has processed this information, trying to make sense of what makes no sense, the deed is done.

Postoperative Phase

The recovery room can also be a stressful environment for children and all staff should be trained to look for distress and anxiety. A parent should be invited to be with their child as soon as it is safe. Certain children may suffer from sensory overload and it may be helpful to have a quiet recovery area where the lights can be dimmed. Parents should be given written information covering all they need to know including whom to contact for advice in order to try and minimise stress and anxiety in the home.

Special Circumstances

There are groups of children who do not communicate in the expected ways and process the world differently eg. Autistic, blind, deaf, Attention deficit hyperactive disorder (ADHD). The same approach to communicating still applies; it must be patient centred, dynamic and responsive. Augmentative and alternative communication (AAC) is an umbrella term that encompasses communication methods used to supplement or replace speech and writing for those with impairments. There is a wealth of information on the Internet.

When Things Don't Go To Plan

Try to avoid restraint at all cost. Post hospital behaviour problems increase from 60 to 80% when a child is retrained. Be mindful of the child and how they are coping. No one likes to cancel a patient but by stopping and re-assessing the situation it could have far greater benefit for the child in the longer term. If a bad experience has occurred, it is important to not only debrief the child and parent but also the medical team. Debriefing can be thought of as psychological first aid. After a stressful or negative experience, debrief can reduce the impact of the negative event, reinforce good behaviour, provide learning and offer the opportunity to share experiences aiming to ensure the negative experience does not happen again.

Conclusion

The interests and activities of children represent the most effective means to connect with them. Listen to children you are caring for. Discover what excites them and what their favourite things are. This allows you to use individualised, child-centred communication for a positive experience and outcome.

We hope this article will stimulate and encourage the readers to further their knowledge in order to deliver the best communication approach for each individual child.

Return to Contents

Further learning / resources

For health care professionals there are programs such as POEMS for Children[13]. This is a one-day course that "introduces management strategies that allow practitioners to effectively reduce anxiety in children and achieve a positive outcome and experience for the child affected." It is approved by the Royal College of Anaesthetists for 6 CPD points.

- Makaton language Programme
- National Autistic Society

Conflicts of interest

The authors of this article are all directors of the POEMS for Children course.

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Return to Contents

3.7 Safeguarding and Child Protection

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Key points

- **Child maltreatment has important long term consequences for health and wellbeing**
- **Children who are being abused present with signs and symptoms which may not relate to their immediate health care needs**
- **All doctors must have and maintain level 2 safeguarding competences as defined within UK intercollegiate guidance[1]**
- **Some anaesthetists need to have competences at "Core" level 3 as part of their role as leads for Safeguarding in their department**
- **Training should be relevant to the particular role of the anaesthetist and relate to levels of responsibility**
- **Competences are embedded at all levels of the anaesthetic curriculum, and thereafter in the CPD matrix for Consultants/SAS grades**
- **Specific additional training resources are available via the APAGBI and RCoA websites**

Return to Contents

There is good evidence that child maltreatment has important effects on neuro-development[2], and that abuse and neglect have potentially damaging long-term consequences for physical as well as mental health[3].

In all parts of the UK there is statutory advice that obliges health organisations to make arrangements to safeguard i.e. protect and promote the welfare of children. The GMC has also issued guidance for all doctors[4].

The role of the anaesthetists

Anaesthetists care for children in many situations e.g. resuscitation of a critically ill child in the accident and emergency department, peri-operatively or within the context of an acute or chronic pain consultation. Anaesthetic trainees are advised to discuss concerns they may have about child maltreatment with a consultant anaesthetist in the first place, but should also have ready access to support by consultant paediatricians, and nominated Safeguarding/Child Protection professionals. If concern is felt to be justified or when uncertainty exists, a senior paediatrician may take the lead in a discussion with the child or young person and parent/carer with the anaesthetist or surgeon present. However it is possible that an anaesthetist will need to begin such discussions, and whilst this is a daunting prospect, it is important to remain as "matter of fact" as possible, think of this like the need for a second opinion, and always do so with an additional trained member of staff present. A basic level of knowledge of what constitutes possible or definite maltreatment, the need to work closely with relevant additional groups and clear communication both verbal and written, are the basic messages provided by level 2 training. If child sexual abuse is suspected, paediatricians with expertise in this field often work alongside a gynaecologist or paediatric surgeon, and may carry out further examinations which rarely need to be under general anaesthesia. Advice on what to do if a safeguarding issue is suspected in theatre is contained within specific joint intercollegiate guidance[5]. A recently produced training film aims to prepare anaesthetists for how they might conduct an initial parent interview when a paediatrician is not immediately available[6].

There are situations when the case is far from clear as to whether there is a Child Protection/Safeguarding issue. Examples might include what appears to be a lack of empathy between child and parent, or possible neglect based on physical appearance or the parent's attitude towards their child's care. In most instances the anaesthetist only has a very basic picture of the family, which may or may not reflect typical of child/parent/family behaviour or appearance. Judgement is bound to be subjective and sometimes a clinical sign alone can be ambiguous, and might have a straightforward explanation. In these instances it can be useful to discuss or raise the concern first with another member of the team, and often taking the time to get more information will be important. Even if ultimately this discussion does not trigger a need for specific action to be taken, those with on going responsibilities for the medical or social care of the family e.g. a Paediatrician, GP, Health visitor or social worker may need to be informed in case behaviour forms part of a pattern. Such discussions might be classified within NICE

Return to Contents

guidance as a need to "consider" child maltreatment as a possibility[7]. **If in doubt it is better to find out more and if necessary seek advice.**

The process thereafter

Following referral to the Child protection team, an initial assessment will generally confirm what immediate arrangements need to be in place to prevent further harm to the child and any siblings. There will usually be a need for an assessment by other agencies (typically police and social care) and detail may well also be also sought from other health professionals e.g. in primary care, and from schools when appropriate. This process may be led by the lead doctor or nurse for Child Protection/Safeguarding in an acute secondary care setting or by a consultant paediatrician. An initial interagency meeting or conference will be convened and if there is felt to be substantial concern this may take the form of a Serious Case review. Thereafter a decision about what needs to be put in place to safeguard the child/children will generally be made and a Child Protection plan produced and implemented. Further review will be needed at some point.

Guidance across the UK varies - different terms are used and named agencies involved in different parts of the UK but a great deal of commonality exists.

Confidentiality

This can cause confusion! The GMC (0-18) guidance for Children and Young People states that doctors should always act in the best interest of the child and the primary concern should be the child's safety and well-being. This is re-enforced in excellent and more specific GMC guidance on protecting children and young people from maltreatment[8]. More recently GMC guidance on Confidentiality[9] has further emphasised the need to put the patient at the centre, and as always maintain trust and promote dignity. However it does allow for the need by professionals to disclose information to both support direct care and protect patients. When there is genuine concern about sharing information (and this may be particularly with an external agency outside Health), advice should be sought from an experienced colleague e.g. named professional for child protection, Safeguarding lead, your defence organisation or the GMC. Documentation of such discussions and decisions is useful.

Knowledge and Training

The National Institute for Health and Clinical Excellence (NICE) in 2010 published helpful guidance describing when to 'consider' and when to 'suspect' child abuse. NICE stresses the need for a thorough history from the parents/carers and a detailed examination of the child as being important. An inadequate or inconsistent history from the parents or child which does not seem compatible with the clinical examination or findings is in essence what should raise suspicion of some sort of child maltreatment. A revision of this guidance is underway and expected in 2018.

Return to Contents

A full revision of the UK Intercollegiate Training recommendations was published in 2014[1] and again is likely to be revised in 2018. Currently most anaesthetists need to maintain level 2 competencies, with a suggested time commitment of around 1 PA (4 hours) per 3 years i.e. about an hour a year. There is also a relatively new leadership role in Safeguarding issues for some paediatric anaesthetists to take on which requires level 3 (core) training. Many paediatric anaesthetists will elect to have these competences and some hospitals will mandate this occurs notwithstanding the current national guidance.

In practice both Level 2 and 3 training and annual updates are variable in duration and quality, but ideally sessions should be multidisciplinary and include scenarios which are relevant to the audience, with an opportunity to discuss difficult cases and reflect on practice. NHS England have produced several e-learning modules accessible to all the UK via. E-learning for Health (eLf) and the RCoA website (eLA).

Anaesthetic Lead for Safeguarding

Broadly, the lead is expected to act as a source of knowledge about training within the department, and assist in organisation of training sessions, acting as a link with Trust Safeguarding professionals. There is no requirement for them to act as an expert and provide on the spot advice in individual cases. A full description of this role is available on both RCoA and APA websites[10].

Child Death Review Process

This process varies across the UK but involves the principle of routine external review by a multidisciplinary team of all child deaths (wherever they occur) looking for preventable elements. In England the CDOP (Child Death Overview Panel) is under the auspices of the Local Safeguarding Children Board (LSCB)[11] and it is recommended that anaesthetists with a level 3 Safeguarding role attend as an observer from time to time. A proportion of these may have a Safeguarding focus and the panel typically includes the lead safeguarding professionals as well as lay and relevant secondary care professional (e.g. a pathologist). Typically the panel is chaired by a consultant paediatrician and clinicians will have been asked to provide a summary of events which are then peer reviewed by the panel.

- RCOA - When a Child Dies

There is not as yet a formal death review process for children in Scotland. The Scottish Government commissioned a Child Death Review in 2014[12]. Following this report, and a recent implementation review, there is a plan to pilot a system in Scotland in early 2018.

SUDI

Sudden unexplained infant death (SUDI) will invoke particular processes which anaesthetists should be aware of and include obtaining various samples from the infant after death at which point the anaesthetist may be asked to assist (e.g. blood for metabolic screen). Anaesthetists should be aware of their local processes and relevant national guidance all of which emphasise the need for multidisciplinary working.

Return to Contents

Useful additional sources of information

- RCoA webpages Safeguardingplus which cover child and adult Safeguarding, Consent and Ethics.
- RCPCH Child Protection Page
- RCPCH Child Protection Evidence base for UK Safeguarding - formally known as "Core-info"

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Return to Contents

4.1 Developing your CV for a Career in Paediatric Anaesthesia

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For people who are planning a career in paediatric anaesthesia there many considerations. This section is not a definitive guide to guarantee a job as a consultant but hopefully will offer additional and helpful information for those wishing to have a significant paediatric practice in their future. The first hurdle is to try and decide whether you wish to practice in a district general, a teaching hospital or a specialist children's hospital. This will impact on how you develop your curriculum vitae (CV) and specialist interests. However, you still need to fulfil all the requirements of training as set out by the Royal College of Anaesthetists (RCoA) to be eligible for entry to the specialist register.[1,2,3]

The basis of this article was a search in the archive of the careers section of the British Medical Journal looking at British consultant jobs advertised in recent years that featured an interest in paediatric anaesthesia. Where possible, the job descriptions and person specifications were obtained and compared to attempt to collate any unifying factors in these jobs and any unique points that certain institutions and departments appeared to be looking for. The advertisements included both substantive and locum jobs with a significant paediatric practice, whether in large district general or teaching hospitals or those with exclusive paediatric practice in specialist children's hospitals. Twenty jobs were selected (largely based on the readiness of the human resources departments to reply to the authors enquiries) to look at the person specifications in more detail. The job descriptions came from hospitals in England, Scotland and Wales. Several institutions advertised more than one post in this period, however only one person specification from each institution was selected. Advertisements for international posts and recruitment agencies were not chosen for further scrutiny. The person specifications were then amalgamated to produce an ideal list from those institutions who had been seeking anaesthetists with an interest in paediatrics.

The basis for any appointment as a consultant anaesthetist includes some mandatory or essential criteria common to all posts and some specific to paediatric ones. These are often gleaned from the General Medical Council (GMC) document "Good Medical Practice".[4]

Return to Contents

curriculum vitae

Mandatory Criteria Common to Consultant Posts in Anaesthesia

- Full registration with General Medical Council and licence to practice
- Basic medical degree (e.g. MBBS)
- Fellow of the Royal College of Anaesthetists or equivalent
- Eligibility for entry on the specialist register for anaesthesia (or within 6 months)
- Occupational health clearance
- Disclosure and Barring Service (DBS) clearance

In addition there are likely to be some desirable criteria which some institutions may include in the person specification depending on the role the new appointee is due to fill or the structure and interests of the department. Table 1 contains a summary of the combined person specifications of the 20 jobs examined in further detail.

Table 1: Ideal person specification

	Essential criteria	Desirable criteria	Comments
Professional qualifications		Higher degree or additional qualification e.g. MD, PhD or MRCP 60%	
Clinical experience	Higher training in paediatric anaesthesia 10%[a] Advanced training in paediatric anaesthesia 80% PICU experience 15%	 Post CCT/ additional/ overseas paediatric fellowship 15% PICU experience 10%	Advanced training in paediatric anaesthesia 12 months duration, often includes 3 months of PICU
Clinical knowledge and skills	Competent in range of techniques for paediatric and neonatal anaesthesia and pain management 85% Ability to manage smooth running of paediatric operating lists 5% Evidence of recent training in advanced paediatric life support techniques e.g. APLS/EPLS 40%[b]	Special skills training relevant to paediatric anaesthesia e.g. sub-specialty interest, TIVA, fibre-optic airway management 30% Evidence of recent training in advanced paediatric life support techniques e.g. APLS/EPLS 50%	 Instructor status desirable in 15%
Audit	Experience or demonstrable interest in audit 80%	Preparation and design of audit and relevant programmes 20% Audit published or presented 20%	Usually appears as separate section on most person specifications

Return to Contents

Clinical governance	Understanding and experience of clinical governance 30%		Is expected under terms of Good Clinical Practice guidelines
Teaching	Experience of teaching : Undergraduates 50% Post-graduates 60% Active participation in teaching 35%	Training in teaching 50% Qualification in teaching 30%	Training in simulation desirable in one post
Research	Understanding / interest in clinical research 50% Active involvement in research 35%	Understanding / interest in clinical research 20% Active involvement in research 55% Evidence of generating funding 5%	
Academic achievements	Publications 5% Presentations 5% Commitment to continuing medical education 20%	Publications 65% Presentations 30%	Not all specifications required publications but they are obviously advantageous
Management	Interest and understanding of management 45% Management course 15%	Proven management or administrative ability 25% Management course 40% Qualification 10%	Attendance at management course is a requirement of most schools of anaesthesia to attain CCT
Leadership skills	Leadership skills and experience 40%	Leadership skills and experience 10% Leadership course 5%	
Organisation skills	Ability to organise 60% Effective time management 15%		
Communication skills	Demonstrates excellent communication skills 75%		
Team working	Ability to work as part of a multidisciplinary team 90%		
Information technology	Computing skills 20%	Computing skills 15%	

Return to Contents

Other skills	Motivates self and others 20% Ability to build rapport and negotiate with others 20% Demonstrates flexible approach to working 40%		

Table 1: Percentages given refer to the proportion of the 20 jobs which included the specification. Non-inclusion does not mean that a particular item is not important, for example, not all institutions specified a GMC licence to practice although this is a mandatory requirement for the UK.
CCT - Certificate of Completion of Training, PICU - Paediatric Intensive Care Unit, APLS - Advanced Paediatric Life Support, EPLS - European Paediatric Life Support. [a] Teaching hospital job with paediatric plastic list in job plan. [b] ATLS specified as essential for one post with commitment to adult trauma service

Essential Criteria for Posts with Paediatric Interest

The amount of paediatric experience required for a consultant post will depend on the nature of the post. All of the 20 posts reviewed expected a period of higher or advanced training in paediatric anaesthesia. The description of the duration of this training varied between posts with some describing "appropriate training in paediatric anaesthesia" and others specifying at least 12 months experience. The expectation appeared to be for the paediatric training to be carried out in a specialist paediatric centre or hospital with a significant paediatric workload, including neonates.

3 posts listed paediatric intensive care experience of 3 months duration as essential and 2 as desirable. Although this may seem obvious to those planning on working in specialist children's hospitals it is particularly important for those planning on working in district general hospitals accepting paediatric patients in their Emergency Departments. Those who take on the lead paediatric role in such hospitals may need to plan services for emergency treatment of children and infants under the recommendations of the 2006 Department of Health report " The acutely or critically sick or injured child in the District General Hospital: A Team Response".[5]

How to demonstrate an Interest in Paediatric Anaesthesia

No matter how keen you are that a career in paediatric anaesthesia is for you, it is important that it is not at the expense of your core training for the CCT in anaesthesia. However, as participation in audit, quality improvement projects and teaching are expected of all trainees, maximise the benefit you get out of them by using topics related to paediatric anaesthesia. One quality improvement project every 12 months is better than smaller less powerful audits every 6. Maximise the use of your audit data by submitting abstracts to the various regional, national and international paediatric anaesthesia meetings for poster or oral presentation.

Return to Contents

Membership of specialist societies such as the Association of Paediatric Anaesthetists (APA) and the European Society for Paediatric Anaesthesiology (ESPA) demonstrates your commitment to the specialty and usually provides preferential rates for meetings. Closer to home, there are paediatric anaesthetic networks which cover most of the UK. Contact your local paediatric anaesthetic lead or the Paediatric Anaesthesia Trainee Research Network (PATRN)[7] for details but getting involved in your local network will raise your profile and hopefully provide you with opportunities for further projects. Attendance at paediatric anaesthetic meetings and courses also demonstrates commitment to the specialty. There are a number of these available in the UK including the APA Annual Scientific Meeting, the Manchester Core Topics day, the Oxford Paediatric Difficult Airway Course, the Bart's and the London Education Day in Paediatric Anaesthesia. There are also international meetings focusing on paediatric anaesthesia such as the ESPA annual congress. The details of many of these meetings can be found on the APA website.[6]

The most efficient way to keep your paediatric resuscitation skills up to date and give you training and experience in different teaching techniques is to become an instructor on one of the many life-support and resuscitation courses. The process for this, usually, is to pass the course and be invited to train as an instructor. However, if you are not invited don't dismay as there are other teaching opportunities to be explored in your hospital (such as teaching recovery and theatre staff on topics related to paediatric anaesthesia). Contact your local resuscitation service to express an interest as they are often short of faculty for paediatric courses, and may be able to advise you further about potentially becoming an instructor.

In summary, although the core skills of the consultant anaesthetist are often generic to both adult and paediatric practice, it is up to you to demonstrate, to your potential employers, you have the skills and experience to excel as a children's anaesthetist and provide a safe and quality service.

References and further information

1. Training programme for a CCT in Anaesthetics
2. Curriculum for a CCT in Anaesthetics 2010
3. Annex E – Advanced level training, August 2010
4. Good Medical Practice – General Medical Council 2013
5. The acutely or critically sick or injured child in the District General Hospital: A Team Response Department of Health 2006
6. Meetings page of the APA website.
7. Paediatric Anaesthesia Trainee Research Network (PATRN)

Return to Contents

4.2 Organising Out of Programme Training

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Spending a year working in a different area or country is an invaluable experience, in both a professional and personal level. It provides you with the opportunity to develop your clinical skills and develop your CV, often in ways that your current training programme would not offer. There are several ways to spend time in a different training centre: as Out of Programme Training (OOPT) or as Out of Programme Experience (OOPE). To count towards training, you should undertake an OOPT, but only one year between St5 and St7 can be OOPT. An OOPE does not count towards your Certificate of Completion of Training (CCT).

When?

One of the advantages of going away for an OOPT period is that it allows you to grow and become more confident in your own clinical, management and leadership abilities. For this reason, I believe that it is best to go later on in your training. This would be during St6/St7 (or, at a push, St5). Think about it as an opportunity to move up a gear in terms of responsibility.

Where?

It will depend upon your personal circumstances and just how far afield you are able or willing to go. Don't forget that there are excellent fellowships available here in the UK. For a list of currently available national and international paediatric anaesthesia fellowships and contact details, see the Fellowship Database at the APA Trainee Section. This database is kept up to date with fellowship and contact details.

Rather than simply looking for the nicest beach or ski resort, consider your educational goals. Do you have a sub-specialist interest that a particular centre has a strong training programme in? Perhaps they offer training in an area which you are unable to gain experience in at your current deanery. Of course, if it is possible to find a fellowship which combines the perfect beach life and fulfils your educational goals at the same time, then that is ideal!

It depends which country you plan to work in as to the process you will have to undergo to organise your time away. It is worth giving yourself as much time as possible since it is rarely completely straightforward: there are usually a few steps involved in the process! At times, the organisation may seem slightly laborious: you are unable to get one form signed before you have another signed, but you can't get the second form completed

Return to Contents

until a third one is complete… Be persistent and it will all come together in the end. Also, be aware that you may receive bills at each step as you pay for visas, document verification, registration with the foreign medical council, and medical examinations.

During your OOPT

Keep a logbook of clinical cases, courses, teaching during your time away. This will be required to ensure that the training committee and RCoA understand that you didn't simply spend a year on a beach, but learned some useful skills which will benefit your future NHS practice. The RCoA will require a report detailing the experience you gained during your OOPT. It is a good idea to start writing this during your time away, since it is easier to keep a list of all the things you have learned as you go along than trying to remember them on your return. It isn't uncommon for departments to ask you to deliver a presentation on your return. Bear this in mind during your year away, if there is opportunity for interesting photos/case reports. Or if the hospital you were in used a particular technique new to your UK hospital, it may be worth obtaining local protocols before you leave.

On return

One thing that people often don't warn you about is readjusting to life back in the UK and the NHS when you return. Whilst you will have learned valuable lessons that you are brimming with excitement to share, be wary of using phrases such as "in Australia, they do it like this…." too often! If you are going to somewhere sunny and have the option to return during the British Summer, I believe that this is preferable to returning in Winter if you are prone to Seasonal Affective Disorder!

Where to start with organising your OOPT

Step 1

In the first instance, contact the paediatric centres which you are interested in attending. If you have a particular subspecialty interest, find out how much they do of this (e.g. cardiac, regional). Find out when they advertise and interview for posts and how many years ahead they do this. Also be aware of your deanery rules, for example they may need applications at least 6 months in advance.

Step 2

After you have formed an idea of where you would like to visit, speak to your local college tutor and training program director (TPD) to check whether they support the idea and would approve the time off.

Step 3

If the institution you intend to visit already has GMC approval, then you do not require RCOA approval if you have local approval. To find out if your chosen institution has GMC approval, email quality@gmc-uk.org or look at the GMC-approved institutions datatbase.

Return to Contents

Step 4
If there is no prior GMC approval, you need to complete the OOPT form from the RCoA website. This form contains a checklist of information required for your application. It requires signatures from your TPD and Regional Advisor.

Step 5
Once the RCoA Training committee email confirmation of approval for the post, you will need to use this in application to the GMC for approval.

Step 6
Give 3 months formal written notice to your NHS employer prior to the date of your planned OOPT

Further resources

- Detailed information on the OOPT/OOPE application process can be found of the Royal College of Anaesthetists website
- The GAT Handbook also contains useful information on all aspects of career development.
- Organising a year abroad: Out of Programme advice from the GAT Committee 3rd Edition

Return to Contents

4.3 The Job Interview: Fellowships

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Preparation for a paediatric anaesthesia fellowship interview is no more than an extension of previous interview skills, and a honing of specific questions likely to be asked in relation to the job. As with other interviews, to a great extent the broad topics are likely to be predictable; therefore preparation is possible and practice makes perfect.

With the ever-increasing specialisation of anaesthesia, pre or post-CCT fellowships are valued for general jobs, mandatory for specialist children's anaesthesia jobs, and offer a host of transferable skills for registrars.

Paediatric anaesthesia fellowships are available both within the UK and abroad, and the detail here necessarily refers to the United Kingdom. It is acknowledged when applying for positions abroad that you will not be as familiar with the hospital or the healthcare system as candidates from that country, and also that it is unlikely to be practical for you to visit the hospital prior to the interview. However, it is possible to glean a lot of information about the training system, healthcare and the specific hospital you are applying to from the Internet, through e-mail or telephone conversations with the fellowship program directors, and through anaesthetists within your own deanery that have worked in these centres. Within the consultant body of a tertiary paediatric hospital, it is likely that a number of the anaesthetists will have worked at other centres worldwide, or will certainly know someone you could contact. Other resources may be the speakers and delegates at a paediatric anaesthesia conference, such as the APAGBI ASM, which usually has a worldwide representation.

The Interview

Interviews range from informal telephone conversations, particularly for foreign fellowships, to structured interview committees. It will usually be possible in advance to get a feel for the type of interview to expect.

It is important to remember that Fellows will often be expected to provide a senior level of clinical service. As such try to ensure your Higher Paediatric training is completed as early as possible (new Royal College rules also mean that Higher and Advanced modules must be distinct units of training) and emphasise your paediatric experience and logbook numbers. Conversely you are applying for specialist training so demonstrate that you are aware of your own limitations.

Return to Contents

By the nature of the people applying for a position of this level, everyone will have been successful in at least one interview process, and the best advice for any face-to-face interview is to be dressed for, and ready to appear in a formal way.

Telephone interviews are different; this will be the first experience for many of a telephone interview, and it may happen in the middle of the night in the UK. There may be one or more interviewers (I had three), and this can lead to its own problems of hearing questions if a speakerphone is being used, or if there is background noise. You are divorced from the ability to read body language, but so are the interviewers. Aim to have a quiet place where you are unlikely to be disturbed, and preferably use a landline.

For interviews during working hours, this may require planning ahead to find a phone you will be able to use, and to let the interview committee know this number. I couldn't do these things, as the interview fell in the middle of a conference I was helping at – I had to take the call on a mobile in a hotel foyer, and one colleague came up to ask me if I wanted a drink halfway through. The final advice I would give is that if your interview is in the middle of the night in the UK, get up in time beforehand to feel awake and clear your voice so you don't sound sleepy. Lastly, pyjamas and dressing gowns don't put you in the right mindset for an interview.

Interview questions

Interview questions are likely to fall into the categories of generic and paediatric-specific. This chapter does not have the scope to produce a wide range of questions, but these

Return to Contents

are widely available, and arguably more up to date, on innumerable websites. Anaesthesia UK has a large bank of StR and Consultant questions. ISC Medical has a large selection of interview questions, as well as summary papers on key NHS policies and papers.

Broadly speaking, generic questions in the UK are based around knowledge of the NHS, topical political changes, training and supervision issues and clinical questions. There will almost certainly be a number of questions about yourself – know your CV well, and be able to expand on any aspect. Questions may well expect you to expand on audits, quality improvement, research, education or management sections of your CV, and you should plan how to steer the answers towards paediatrics and demonstrate the learning and reflection you have made, that you can bring to this fellowship.

What about the job you're going for? It is not unreasonable for the interview panel to expect you to know what you are applying for. Is it pure anaesthetics, or is there time in ITU? If so, how will you answer when they ask you what you hope to gain from that? What are the on-calls like, and who will you be responsible for when you are on-call? Is the job purely clinical, or is there some research time built in? If so, what are the department interests, and could you make contact before the interview to discuss a possible project? A year is a long time in one hospital, and you will be expected to produce a good quality project alongside the clinical work, so try to find out what this might be before the interview – it could be audit, research or increasingly a service development project. Make a visit to the department or get in touch with a current fellow. Remember, they have just been through the process! What are your ultimate aims for a career, and how will the paediatric anaesthesia fellowship fit in with these? For positions outside the UK, have an idea of the professional registration requirements as well.

Questions specific to paediatric anaesthesia may be clinical (though, certainly for pre-CCT jobs, the panel know you are not a specialist paediatric anaesthetist yet), or may be related to some of the recent publications and guidance relating to the subject. You are not expected to know the detail of these, but knowing they exist, and a couple of sentences about what they contain can impress if you have the chance to use them. The best resource I have found for these is the APAGBI website, which has a huge amount of information in the 'Latest News', 'Guidelines' and 'Article Watch' sections. These have links to pertinent articles, including those in the list below. The RCOA also has a number of documents relating to paediatrics, and the GMC guidance and training documents are regularly updated.

- Child Protection and the Anaesthetist: Safeguarding Children in the Operating Theatre (Quick Reference)
- The Acutely or Critically Sick or Injured Child in The District General Hospital
- Child protection and the Anaesthetist – safeguarding children in the operating theatre 2014 (RCOA)

Return to Contents

Publications specific to Paediatric Anaesthesia

- Child Protection and the Anaesthetist: Safeguarding Children in the Operating Theatre (Quick Reference)
- Children's Surgery - A First Class Service (RCS)
- Getting it right for every child (Scottish Executive)
- Good Practice in Postoperative and Procedural Pain (APAGBI)
- Guidelines on the Prevention of Postoperative Vomiting in Children (APAGBI)
- Paediatric Resuscitation Training for Non Training Grade Anaesthetists
- Safe sedation of children undergoing diagnostic and therapeutic procedures (SIGN)
- Sedation in children and young people (NICE), and the RCOA / APAGBI response
- 0 – 18 years: Guidance for all doctors (GMC)
- Surgery for Children: Delivering a First Class Service (CSF)
- The Acutely or Critically Sick or Injured Child in The District General Hospital
- Why Children Die: A Pilot Study 2006 (CEMACH)
- Surgery in Children: Are we there yet? 2011 (NCEPOD)
- Child protection and the Anaesthetist – safeguarding children in the operating theatre 2014 (RCOA)
- Standards for Children's Surgery 2013 (RCS)
- Standards for non-specialist emergency surgical care of children 2015 (RCS)
- Facing the Future – standards for acute general paediatric services 2015 (RCPCH)
- Guidelines for the Provision of Paediatric Anaesthesia Services 2017 (RCOA)

Publications specific to training

- Promoting excellence: standards for medical education and training 2016 (GMC)
- Temple report: Time for training. A review of the impact of the EWTD on the quality of training
- Tooke Report: Aspiring to Excellence

Publications about the NHS

- NHS Five Year Forward View (2014)
- NHS Sustainability and Transformation Plans
- NHS 2010 – 2015: From Good to Great
- Equity and Excellence – Liberating the NHS (2010 White Paper)
- High quality care for all. NHS Next Stage Review Final Report (2008)
- The Francis Report

Summary

I hope this will help in your interview preparation. Though it seems a lot to go through, if you have it to hand now, it will be ready for a consultant interview in a year or two. Finally, don't underestimate your abilities – whilst it can be hard to feel appreciated whilst training in the NHS, you come to a fellowship like this with extensive skills already, will be a vital member of the clinical team where you are working, and by the end of the fellowship will have the skills required of a consultant paediatric anaesthetist.

Return to Contents

4.4 Making the Most of Your Fellowship Year

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The aim of a fellowship year in paediatric anaesthesia is to equip you with the clinical and non-technical skills to pursue a career in paediatric anaesthesia.

Considering paediatric anaesthesia as your specialist area of interest means that you would have already engaged with the subject in a deeper manner than the other specialities and this should be demonstrable at the interview stage. Subsequently some pre-planning is important in making sure that you are competitive when applying for fellowship posts.

Deciding at which institution to spend your fellowship year is also an important consideration. Questions that may be relevant include areas of excellence in that institution, clinical case mix or academic opportunities. Your own personal circumstances will also play an important role in the decision making process, for example whether to apply to a UK or International institution. The right time to apply will again depend on your personal situation. Your fellowship is time limited and so you should aim to apply when you can get the most from the training opportunities available. These discussions must involve your local school of anaesthesia to make sure that if offered a post you will be able to accept it.

The most reliable source of information will be the past fellows of each institution; you should talk to as many as possible to get an idea of what the job is really like. Once you have decided where and when you would like to go, get in touch with the college tutors (or equivalent) of the hospital and they can guide you through the application process. Many hospitals around the world can offer fellowship training in paediatric anaesthesia and these should be approached individually.

Information on international fellowships can be found at the following sites:

- APAGBI
- Society for Pediatric Anesthesia (SPA)
- Society for Paediatric Anaesthesia in New Zealand and Australia (SPANZA)

Return to Contents

Preparation

To make the most of your training opportunities you need to make sure that you are spending your time wisely. Simply pre-planning the logistics of where you will live, your commute on long days, the language and of course the paperwork before you arrive will allow you to make the most of every day at the institution. A good knowledge of all that is on offer will allow you to make the most of other opportunities. Reading up beforehand will be of benefit. This reading should include some revision of basic paediatric and neonatal anatomy, physiology and pathology. In addition the hospital website will contain information about the academic activities available that you could engage in during your time to enhance your CV.

During your time

Reflective learning is the best way to make the most of your clinical experience. Most fellowships will rotate you through modules. If you are planning annual leave make sure you avoid missing important modules and actively search out cases that are of particular interest to you.

Use work placed based assessments (WBA) to your advantage. Focusing on key elements on the list allows you to ask questions, be assessed and get feedback from which you can learn and improve. Anaesthetic list management tools should be used to provide you with feedback relating to your non-technical skills so that by the end of your fellowship you will be able to confidently manage lists with more distant supervision.

Arriving promptly and having read up on cases beforehand gives consultants the opportunity to assess your organisation skills, pre-operative preparation and planning of cases.

In addition to the valuable online resources provided by the APAGBI website, other websites are useful for some quick revision of syndromes, procedures and analgesic techniques pre operatively. Some examples of useful peer reviewed websites are:

- Orphan Anesthesia
- Online Mendelian Inheritance in Man (OMIM)

Make the most of locally organised teaching sessions, the speakers at these sessions often present the same talks internationally so it make sense to attend even if it is on your own time.

Journals and Clinical Governance

Good medical practice throughout your career requires a commitment to clinical governance and keeping up to date by reading journals and critically appraising original articles. In addition, before and during the fellowship, reading articles, involvement in audit, quality improvement and M&M will help to inspire presentations, case reports and

Return to Contents

original research. The APAGBI Article Watch provides succinct summaries of recent and important articles

Courses

Courses can be expensive and time consuming therefore choosing wisely for your own individual career aims is essential. Take advantage of courses organised by your local postgraduate medical education centre as they are often subsidised for internal candidates.

Other useful courses will include resuscitation and simulation based training. An advanced Paediatric Life Support provider qualification should be obtained prior to applying for a fellowship. These skills will be built upon during a fellowship and you should aim to become an instructor. Simulation experience can be gained at courses such as Managing Emergencies in Paediatric Anaesthesia (MEPA).

Conferences (check abstract deadlines)

There are both national and international paediatric conferences that you may wish to attend to facilitate your learning. The Association of Paediatric Anaesthetists (APA), the European Society for Paediatric Anaesthesiology (ESPA) and the Society for Pediatric Anesthesia have annual conferences. The American Society of Anethesiologists annual conference and the World Congress of Anaesthesia often have a day dedicated to paediatric anaesthesia. Make sure you look up the websites early, note the abstract deadlines and apply for study leave well in advance. Take advantage of the trade exhibitions to learn about latest technological advances in the field and the social aspect of meeting colleagues from different backgrounds.

Research

As a fellow in a post for a year it will be difficult to complete any original paediatric research. However, being part of the process may be possible. Identifying an interest in research to the college tutors before starting may mean that projects can be passed on from fellows that are leaving.

Networking

Finally, it is important to enjoy your fellowship year both clinically and socially. The colleagues that you meet and work with will probably be your paediatric anaesthetic colleagues worldwide in the future.

Return to Contents

4.5 The Job Interview: Consultant Posts

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Natasha Woodman
APA Trainee Representative, St George's Hospital, London

The majority of the following advice relates to substantive consultant posts rather than locum positions. However, I would suggest treating any job interview as if it was the substantive post of your dreams as it provides the opportunity to practice your interview skills. There is a great deal of variability in levels of formality during locum job interviews, with some being "cosy chats" and others being almost replications of the substantive interview.

The traditional format for consultant interviews is changing as more trusts are gaining foundation status. Foundation trusts are not bound by the same requirements which have historically been applied in substantive job interviews, for example, having an external college representative on the appointment advisory committee. This means foundation trusts have more flexibility in terms of who they may appoint and the contract and conditions that person will be working under.

The format of interview is ultimately dependent on the institution to which you are applying. There are reports of some interviews involving different stations and including aspects of role-play, team working assessments or other psychometric testing. These are as yet not commonplace.

The key to successful interview technique is thorough preparation and understanding how the appointment advisory committee is made up and how the process works. Although you would be wise to address the entire panel when you answer questions your focus will naturally be on the interviewer who asked you the specific question. This is important as the way you answer the question should be tailored to the role that particular interviewer represents on the panel. To clarify this let us look at who typically sits on the interview panel, there may be several anaesthetists interviewing, but they are likely to all have slightly different roles and so this should factor into your answers.

A typical panel will consist of:

Title	Role	Typical question
External College representative	Verify adequate clinical training and experience to meet person specification for post	Talk us through your CV
University representative	Identify what you could bring to undergraduate teaching and/or research for the medical school	What would you do with a million pound grant from the university?

Return to Contents

Head of anaesthetic department	Determine what you can bring to the department and knowledge of clinical governance	Can you give me examples of good and bad practice that you have witnessed in other anaesthetic consultants?
Paediatric anaesthesia lead	Ensure that you will fit into the team to develop the service or complement existing members including post-graduate training	How would you improve paediatric anaesthetic networks in this region in the future?
Medical director representative	Probe your understanding of the wider NHS and dealing with management type roles	How would you deal with a difficult or dangerous colleague?
Chief executive representative	Explore your understanding of the hospital's vision of the future and your potential role in this	Where do you see yourself in 5 years from now?
Nursing representative	Discover how you view and interact with the multidisciplinary team	How would you implement a change in guidelines for nurses on the ward?
Lay chair	Personal qualities and other interests	What are your weaknesses? How would your colleagues describe you?

This list is not exhaustive and different hospitals may vary the exact membership of their interview panel and who asks which specific questions.

A typical interview may well start with a presentation to the panel on a topic provided prior to the interview or on the day. Although the presentation may be a daunting prospect remember you will have more time to think about what you are going to say than if a question had just been fired over the table at you. The duration of any presentation is likely to be 5-10 minutes so if you are using slides try to limit the number to around 8-10. Make them clear and interesting, visual aids and diagrams will hold the attention of your audience better than endless lines of text and bullet points. Use your slides as an aid to help your audience understand your message and not as a repetition of what you are saying - this is not an exercise in reading aloud. Irrespective of what sort of visual aids you are required to use you should prepare and practice your presentation enough to enable you to give it without slides, notes or other aids, well within the time allocated to allow for any verbal stumbling on the day. Any notes you bring would be better off transcribed onto 4 by 6 inch cards rather than large sheets of paper. At the end of your talk remember to thank the panel and be prepared for some questions on the topic you have covered. Practising your presentation under time pressure and to a "mock panel" is essential in preparing yourself and getting a second opinion that what you are saying is not going to dig a hole so deep you will never be able to claw your way out.

The next stage of the interview is likely to proceed with each member of the panel asking you 2-3 questions in turn, which will result in an interview likely to last around 45 minutes in total, depending on the exact size of the panel. Although the potential list of interview questions is theoretically endless the key to answering a question is in identifying what lies beneath the surface. Although the specifics will vary most questions will be asked to cover a relatively small handful of topics, skills and competencies. If you prepare some bullet points on these subjects in broad terms prior to the interview you will be able to use this as the basis for your answers on the day without being inflexible and at risk of not having covered the area. Your answer should be around 90 to 120 seconds in length and consist of a clear structure which you initially outline and then expand on to deliver

Return to Contents

your answer accordingly. Many of the questions asked at interview will ask you for an example such as "Have you ever had an adverse incident and how did you manage it?". The key is to remember that the example is really only to provide context to your answer and the important points to emphasise are what skills you used to address the situation and what you learnt from it thus demonstrating appropriate aptitudes and reflective practice. In order to minimise the amount you need to retain, and the panic when asked to recall a time when….., think of a couple of scenarios you have been involved in and practice adapting them to address a communication, teamwork, adverse incident, or leadership question.

There are numerous sources available to you to prepare for your interview and you should aim to gather as much information as possible. Colleagues recently appointed to similar posts (especially in the same hospital) can offer details of the current selection process. You need to be aware of "hot topics" within your specialty and subspecialty and the wider NHS as a whole and any current developments which may be at the forefront of the chief executive's mind. Much of this information can be gleaned from the NHS and department of Health websites, as well as the RCoA, APAGBI and AAGBI websites. The hospital website and annual reports are a vital source of trust specific information. However, these documents can be hundreds of pages long and you could spend months reading about the complexities of the NHS. Leadership and management courses often offer a succinct overview of the NHS[1,2]. The King's Fund also offers some beginners guide tutorials to the structure of the NHS[3]. More important than understanding the NHS, is time spent thinking about what you will offer that interview panel and Trust.

One of the most useful bits of preparation for your inquisition is the pre-interview visit. Here you will find out what they want from their new colleague, and often they might share the questions they intend to ask you. As soon as you are able to, you should try and visit the hospital, this is after all, somewhere you may be working for the next 20 years of your life. You should try to see all the members of the interview panel if possible. If certain interviewers will not see you do not despair it is unlikely to be personal (unless you have left it too late) and will be the same for all short-listed candidates. They may make a note of who tried to meet them, even if they are declining everyone. Make sure you are not the odd one out. Even if you are the locum in post you should treat this as if you have never worked at the hospital before and take nothing for granted. Use this opportunity to create a good impression, gather information about their current challenges and vision, and demonstrate an interest in why you want *this* job at *this* institution. I would personally recommend attending an interview skills course. There are several available but what I found helpful was working in small groups answering questions in the "hot seat" then receiving feedback and listening to others being quizzed and judging their replies. Combining this with as much practice as possible talking about yourself and what you can uniquely offer them should hopefully set you on the right path.

Resources

1. Great Ormond Street Hospital - Politics, Power and Persuasion Course
2. The King's Fund - How does the NHS work in England

Return to Contents

5 Developing a Subspecialty Interest

5.1 Paediatric Neuroanaesthesia

Amber E R Young
Natasha Clark
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Paediatric Neuroanaesthesia is a subspecialty of paediatric anaesthesia and neuroanaesthesia. The training route depends on the parent specialty chosen. It is more common in the UK to have training in paediatric anaesthesia before sub-specialising in paediatric neuroanaesthesia.

Safe and Sustainable Paediatric Neurosurgery Standards 2012 Anaesthetic Competency Requirements

All neonates, infants and children requiring elective or emergency neurosurgery, should receive the highest standard of anaesthetic and peri-operative care, delivered (or supervised by) consultant anaesthetists demonstrating training, continuing clinical experience and professional development in this specialised area of practice. Every child should have care delivered by an anaesthetist or anaesthetists who possess the relevant competencies as demanded by the patient's age, disease and co-morbidities.

Within Paediatric Neurosurgical Centres, the necessary competencies will be held by consultant anaesthetists with a regular commitment to elective paediatric neuroanaesthesia and who have trained to the equivalent level identified in the CCT in Anaesthesia. Consultant anaesthetists who provide emergency neuroanaesthesia in these centres should possess the necessary competencies required to provide high quality and safe anaesthesia for such surgery. New appointees to consultant posts with a significant or whole time interest in paediatric neuroanaesthesia should have successfully completed 'Advanced Level' training in paediatric anaesthesia as defined in the CCT in Anaesthesia (August 2010), or equivalent, and an additional six months training in adult and paediatric neuroanaesthesia in a recognised neurosurgical centre. It is recognised that this training will need to be individually tailored after discussion with the RCoA Training Department and local School of Anaesthesia[1].

For highly specialised or complex procedures, it will be in the best interests of the patient to bring the expertise of two consultant paediatric neuroanaesthetists together. In adult neurosurgical services admitting less complex elective and emergency paediatric cases, relevant anaesthetic competencies may be provided by neuroanaesthetists who can demonstrate that they undertake regular paediatric anaesthetic practice and CPD in paediatric anaesthesia, resuscitation and perioperative care. Emergency cases may require the combined efforts of an adult neuroanaesthetist working with a paediatric

Return to Contents

anaesthetist to ensure that the required competencies are assembled for any particular patient. The RCoA will provide advice on the relevant competencies required for revalidation purposes in conjunction with the specialist societies. It should be noted that all qualified anaesthetists are competent to undertake life-saving care for children in an emergency situation.

Scope: Paediatric neurosurgery is a wide-ranging subspecialty with cross-over into paediatric craniofacial surgery, trauma, maxillo-facial surgery, ENT, neuroradiology and PICU sub-specialties. The clinical caseload includes: CSF diversion surgery, cerebral oncology (spinal, posterior fossa or cortically sited), spinal dysraphism, spasticity management, epilepsy surgery, craniofacial surgery, trauma (spinal and cranial), chiari malformations, skull base surgery, cerebrovascular lesions, management of the premature brain and specific techniques such as neuroendoscopy. A number of these areas, including epilepsy and spasticity surgery, are rapidly expanding. Children may present acutely with newly diagnosed neurosurgical conditions or have long-standing conditions such as cerebral palsy or hydrocephalus. Patient ages range from extremely premature neonates weighing under a kilogram with hydrocephalus (which may be secondary to intraventricular haemorrhage), term neonates with myelomeningocole, birth trauma or the very rare tumour, to young people of 16-18 years with head trauma or tumours for example.

Skills required: An up to date knowledge of cerebral physiology and pathophysiology are essential, along with knowledge regarding the interaction between anaesthetic agents and cerebral physiology. Detailed knowledge is also required of pharmacology of drugs used in neurosurgery including antiepileptics, steroids and mannitol or hypertonic saline. Other aspects of paediatric neuroanaesthesia include the challenges of patient positioning. Spinal surgery and posterior fossa surgery are undertaken with the patient in the prone position. The sitting position is used rarely across the UK although still has a place for pineal tumours for example. Venous air embolism is the main concern and an understanding of its' diagnosis and management of such is vital. Invasive monitoring is routinely used for major procedures and competencies in the use of arterial and central venous line placement in infants and children is essential. The use of ultrasound placement techniques has facilitated this and made it quicker.

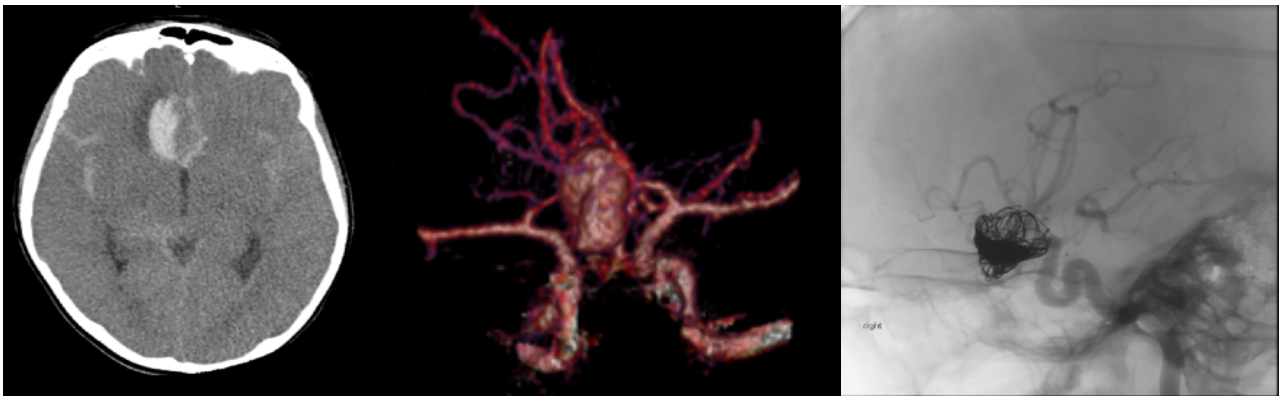
Increasingly commonly, intraoperative neurophysiological monitoring (sensory and motor evoked potential monitoring) is used during paediatric spinal and cranial surgery. This will influence anaesthetic management and drugs used.

A key part of paediatric neuroanaesthesia is perioperative care including high-dependency care for the post-operative paediatric neurosurgical child. Issues include meticulous fluid and electrolyte monitoring with an understanding of endocrine conditions including the syndrome of inappropriate ADH, diabetes insipidus and cerebral salt-wasting. Management of raised intracranial pressure and diagnosis of intracerebral bleeding or CSF infection (two common post-operative complications) must also be

Return to Contents

understood and diagnosed early. Pain management including how the side-effects of analgesics affect post-operative neurosurgery recovery is also important.

New technology is particularly important for this specialty especially neuroimaging (including the development of intraoperative MR), the use of robot assisted surgery and interventional radiology.



With permission, scans of 11 year old showing (L-R): CT head of an intracranial aneurysmal bleed, CT Angiogram reconstruction, CT Angiogram coiled aneurysm.

Team working: Undertaking neurosurgery requires the paediatric neuroanaesthetist to work as a key part of the team. The team approach is never more necessary than when a young child presents with a massive intracranial tumour for urgent surgery. This requires an understanding of the management of massive transfusion. It requires two consultant paediatric neuro-anaesthetists along with a close liaison with the supporting laboratory services. With good close communication within the surgical and transfusion teams, on-table and peri-operative survival is becoming the norm for these extremely compromised children.

Time Critical Interhospital Transfer of a Paediatric Neurosurgical Patient:
It should be recognised that these can be very stressful, high-risk transfers and should be undertaken by the most senior anaesthetist available in the referring centre. Commonly in the UK this is an intensive care consultant. Timely communication between neurosurgeons, trauma team leader and the referring hospital should occur through a conference call system if possible. Most children with life threatening neurosurgical conditions will come to more harm from the delay in waiting for a specialist paediatric critical care transfer team to travel to the referring hospital than from the relative risks of a direct transfer by a non specialist transfer team. All anaesthetists have been trained in transport medicine. Robust protocols for these cases must be in place.

Caseload: Approximately 4,500 paediatric neurosurgical procedures take place in England each year, within the confines of 15 neurosurgical services. Of these, seven units undertake more than 300 cases per year, four between 200 and 300 cases, whilst the remainder operate on fewer than 200 cases per year[2].

Return to Contents

In 2009, Professor Sir Bruce Keogh, Medical Director of the NHS, asked the National Specialised Commissioning Group to conduct a review of neurosurgical services for children in England: the 'Safe and Sustainable' review[3]. The aim of this review was to develop a safe, sustainable, and world-class service for children requiring neurosurgery. In order to achieve this it was deemed important to develop a set of standards alongside a strategy to determine how to deliver these standards consistently in a low volume, low cost service. The 'Safe and Sustainable' review has largely been overtaken by Clinical Reference Groups now (2013) who develop standards for commissioning based on the Safe and Sustainable guidance, supported by Operational Delivery Networks.

Paediatric neurosurgery is a hugely rewarding sub-specialty. It requires meticulous attention to detail and the cases are often many hours in length and complex in nature. The age range of the patients is wide with significant exposure to neonatal surgery. The cases are often acute with a large proportion of emergency workload. The involvement and interest of the paediatric neuro-anaesthetist in pre-operative assessment and peri-operative care is important. Ability to work as a team and communicate well is absolutely key to good outcomes and cannot be stressed highly enough. Communicating well and empathically with parents and families is also vital. This ranges from families who know their own child's complex disabilities and medical issues in every detail, to families who have a child with a new onset headache that is subsequently diagnosed as a brain tumour and who requires complex, life-threatening surgery sometimes within hours of presentation.

References

1. RCOA CCT in Anaesthesia - Annex E Advanced Training
2. British Paediatric Neurology Association Discussion Document
3. Joint Statement from SBNS and RCoA regarding the provision of emergency paediatric neurosurgical services

Useful Resources

- Neuro Anaesthesia and Critical Care Society of Great Britain and Ireland
- The Society of British Neurological Surgeons
- Guidelines for the Provision of Anaesthesia Services (GPAS) - Guidelines for the Provision of Paediatric Anaesthesia Services 2017
  - 3.23 – 3.27 Transfer of critically ill children
  - 4.1 – Additional training required in specialised areas such as neurosurgery
- Chumas P, Pople I, Mallucci C, Steers J, Crimmins D. British Paediatric Neurosurgery – a time for change? *Br J Neurosurg* 2008; **22**:719–728.
- Young AER, Wright EJ. Paediatric neuroanaesthesia: the current position. *RCoA BJA Bulletin* 2010; **62**:45-47
- Young AE. Designing a safe and sustainable pediatric neurosurgical practice: the English experience. *Paediatr Anaesth*. 2014 Jul;**24(7)**:649-56. doi:10.1111/pan.12453.
- Furray C, Howell Y. Paediatric Neuroanaesthesia *BJA CEACCP* 2010; **10**: No 6

Return to Contents

5.2 Developing an Interest in Paediatric Cardiothoracic Anaesthesia

Lucy Hepburn
Consultant Paediatric Cardiac Anaesthetist, Great Ormond Street Hospital

If you love working in a multi-disciplinary team, enjoy high pressure cases, are fascinated by altering physiology with the very things that you do everyday, and can handle strong personalities and complex abbreviations then you may already be developing an interest in paediatric cardiothoracic anaesthesia. Read on.

Pros

- The speciality is totally reliant upon good team working and collaboration.
- The opportunity to work with world experts in the field presents itself every day.
- Many anaesthetists travel with teams to overseas projects for treatment of cardiac disease locally and teaching local medics.
- Tracheal surgery and thoracic/mediastinal tumours test your anaesthesia skills to the limits, always with a supporting team around you.
- You will gain skills in performing trans-oesophageal echocardiography (TOE).
- You will see and learn new things throughout your career – this never ends.
- Management of a child with concurrent congenital or acquired heart disease is commonplace in specialist paediatric anaesthetic practice, therefore will be a valuable life-skill in any paediatric anaesthetic post.
- You will work in a centre where the huge amounts of experience between yourself and your colleagues will enrich your career daily.

Cons

- The perioperative data is examined under a microscope and your management will be included in that.
- There will not always be a good outcome for the child.
- The days can be longer as the complexity of the surgery required cannot always be predicted in advance
- Transplantation continues to be mainly performed at night!

How to train

All paediatric cardiothoracic anaesthetists will require a certificate of completion of training (CCT) in anaesthesia, or equivalence, in order to allow entry to the GMC specialist register. There are no published absolute requirements for appointment to a consultant post with a subspeciality interest in cardiothoracic anaesthesia. Historically, cardiothoracic anaesthetists have developed their subspeciality interest following

Return to Contents

consultant appointment to a general paediatric post and this continues to be a route in to the speciality.

Training is however, developing. Fellowships, OOPE's and peri- CCT training programmes in paediatric cardiothoracic anaesthesia are being developed and pursued by interested parties, and increasingly expected by appointing departments.

A ballpark figure would expect at least 18 months training in paediatric anaesthesia with at least 6 months, preferably more, specifically in cardiothoracic anaesthesia. Training in paediatric cardiac intensive care is encouraged.

Posts including anaesthesia for adult congenital cardiac surgery would require additional training in adult practice.

The importance of mentorship cannot be over-emphasised as a new consultant takes up their post.

Return to Contents

Training should include

- Anaesthesia for paediatric cardiac and thoracic surgery
- Anaesthesia for diagnostic and interventional paediatric cardiac imaging (angiography, MRI)
- Paediatric cardiac intensive care and postoperative care.
- Additional expertise in areas such as ECMO, ventricular assist devices and transplantation is probably not possible in all trainees as these are undertaken in fewer centres, but understanding of such procedures and their limitations would be required.

Quality of training is more important than time spent in a training post and should therefore be undertaken in large units, recognised as training centres and with a team approach to the perioperative care of children requiring those services.

This level of training is not feasible to undertake in the standard CCT programme and additional out-of-programme training will be required either pre- or post CCT, or once a general paediatric anaesthetic consultant post has been commenced.

Skills required

- A thorough understanding of anatomy and physiology of the abnormal heart. (Courses are available to teach advanced understanding of the morphology of the congenitally abnormal heart)
- Technical skills will include those in common with general paediatric anaesthesia – management of children across all age ranges, insertion and management of invasive monitoring lines, use of ultrasound in doing so.
- An understanding of the principles of cardio-pulmonary bypass and management of the child pre- and post.
- Development of skills in interpreting data from imaging modalities (echo, catheterisation, magnetic resonance imaging)
- Development of echocardiography skills – mental 3D vision and hand-eye coordination. (Courses in adult TOE and paediatric trans thoracic echocardiography are currently the options available in the UK, a combination of these will cover basic training).
- Thoracic surgery encompasses surgery on the lung tissue itself, the trachea and the chest wall and will require skills in difficult airway management, regional anaesthesia and, in larger children, one lung anaesthesia techniques.
- Situational awareness, team working and communication are paramount.

The speciality continues to embrace new techniques – hybrid surgical/catheter procedures, more complex tracheal surgery, bridge-to-transplant ventricular assist devices to name a few- so the specialist paediatric cardiothoracic anaesthetist will continue to be to challenged to keep these extremely fragile patients safe whilst streamlining the enhanced recovery programmes of the well established procedures.

Return to Contents

5.3 Paediatric Regional Anaesthesia (PRA)

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ST6, Alder Hey Children's Hospital
Dr Peter C Murphy (EDRA)
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Introduction

Paediatric regional anaesthesia can be traced back to when Bier first performed spinal anaesthesia (two of his first six patients were children). Over a century later regional anaesthesia (RA) plays a pivotal role in modern paediatric anaesthetic practice and is used across the age spectrum from premature neonates to adult-sized children, both in DGH and tertiary centres. (See Fig 1)

The beneficial aspects of regional techniques in children include superior pain relief, reduced opioid requirements, limitation of the neuro-endocrine stress response and a decrease in the intra-operative general anaesthetic requirements. Greater patient / parent satisfaction and earlier discharge with regional techniques make the role extremely fulfilling and integral for both day case procedures and inpatient work.

Ultrasound (US) guided techniques are becoming especially popular as children are generally slimmer, have a higher percentage water content and bones are less ossified, making them suited to high frequency (high resolution) ultrasound scanning. Evidence is accumulating showing increased safety, speed of onset, reduced doses and longer block durations with ultrasound use. A large and growing body of evidence is being produced especially by the American Pediatric Regional Anesthesia Network. As familiarity with US increases, its use in blocks is becoming more common, however the use of landmark techniques for certain blocks in children is still used by many.

The majority of regional techniques seen in adults from central to peripheral blocks (as single shot or catheter techniques) are practiced in children. Caudal blocks are especially popular and technically easier than in adults.

The key differences from adult practice are

Most regional techniques are performed after induction of general anaesthesia. The reasons relate to the reduced likelihood of injury when placing a needle in an immobile child as opposed to a struggling patient who may move unpredictably, as well as the obvious psychological differences of children.

The volume and concentration of local anaesthetics to be administered needs careful calculation. Paediatric patients, particularly neonates are at greater risk of toxicity.

Return to Contents

The absolute size of the patient, target and equipment can be technically challenging (especially infants <6 months).

Autonomic side effects (such as hypotension) are generally less pronounced.

Fig.1 TAP block being performed on a 2.5Kg neonate pre laparotomy

Training in PRA

"Regional" and "Paediatrics" are both intermediate, higher and advanced training modules within the 2010 CCT curriculum. Specific reference is made in the Intermediate and Higher Paediatric training curriculums on the ability to manage acute pain with regional techniques, including caudal (unsupervised in the Higher curriculum). It makes sense for a well-rounded paediatric anaesthetist to be competent in RA and an anaesthetist with a significant interest in RA to be competent and practiced in both adult and paediatric blocks. Currently there is no formal UK curriculum for training in PRA

In practice, most PRA will begin during the higher paediatric anaesthesia training period and initially will be an extension of the skills, anatomical and pharmacological knowledge gained from earlier adult practice. There is usually an overwhelming period at the start of a paediatric anaesthetic module where airways / cannulations / unusual syndromes etc. pre-occupy the trainee's mind and it is not until this initial "shock" subsides do trainees generally start to enjoy and truly study PRA (often too late in their attachment to develop

Return to Contents

it further). Most current PRA enthusiasts either developed their interest whilst working in their current role or took a significant interest during a period of advanced paediatric anaesthetic experience during OOPE/T or post CCT.

OOPT/E and Post CCT Fellowships

Within tertiary paediatric centres there will be consultants with significant interest and commitment to RA and significant opportunities can be gained from befriending them and directing yourself towards their lists during an advanced training year in paediatric anaesthesia or fellowship year

The RCOA advanced Regional training module recommends that a period of six months be spent dedicated to this area. The authors are unaware of any paediatric units within the UK that are currently offering such a specific module of training. Adult regional fellowships in the UK may have links to the local paediatric hospital and opportunity for part of the training to be undertaken there.

Worldwide there are more specific opportunities. International regional fellow posts (especially in the USA) often spend significant time in paediatric centres and some offer year long posts split into 6 month adult and 6 months paediatric. Recent changes in CCT mean that it is likely that these will need to be done post CCT.

Tips to building your training and CV

Logbook	As well as numbers and types of blocks performed it is more educational and impressive if you can collect data on outcome of blocks as well as recording US images for review.
Audit	Required in all training posts, make it relevant and have an impact!
Research	Difficult to start unless well planned and motivated.
Courses	Attend early and towards the end of training volunteer to help out as faculty. Most are listed on RA-UK website, none are paediatric specific but some have significant faculty paediatric expertise.
RA-UK	Becoming a member not only enables access to a host of resources but also shows intent.
ESRA Diploma	Very popular with British trainees and gives a recognised higher certificate in RA. The ESRA diploma requires certain pre-requisites and attendance at 2 annual conferences (making it expensive overall). Paediatrics is only a small part of the diploma. See website for full details.

Return to Contents

ESRA / ASRA	Training syllabus recommendations for training in ultrasound guided regional anaesthesia and other blocks. It looks very impressive if you take the time to map your training and assessments to these guidelines although not formally recognised and again not paediatric specific.
MSc in RA	Run by the University of East Anglia. This is the highest European qualification in Regional Anaesthesia, it is mostly an online course but there are some attendance sessions for UK/EU students. It is the most comprehensive option and costs £9000 (from 2018) for the full course (UK/EU candidates).

Useful Resources

- **Regional Anaesthesia, Stimulation, and Ultrasound Techniques** Oxford Specialist Handbooks in Anaesthesia, Nov 2014 P Warman, D Conn, B Nicholls, D Wilkinson.
- **Sonoanatomy for Anaesthetists** Cambridge Medicine, Nov 2012 , E Lin, A Gaur, M Jones, A Ahmed.
- **YouTube Videos** – particularly New York School of Regional Anesthesia (NYSORA)

References and further information

- The 2010 CCT in Anaesthesia, Royal College of Anaesthetists, London 2010.
- GAT handbook 2016-2017
  - Regional Anaesthesia section (page 50-51)
  - Paediatric Anaesthesia section (page 45-46)
- Association of Paediatric Anaesthetists Great Britain and Ireland – Fellow opportunities
- Regional Anaesthesia UK – Details of national courses, fellowships etc.
- European Society of Regional Anaesthesia
- American Society of Regional Anesthesia
- American Paediatric Regional Anesthesia Network

Return to Contents

5.4 Paediatric Intensive Care Medicine: the Anaesthetist's Perspective

Steve Cray
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Paediatric intensive care medicine (PICM) is a young specialty. Much has changed during the course of my career in medicine. Like adult ICM, PICM developed from the need to translate techniques developed to support patients during major surgery into the care of critically ill children. Inevitably anaesthetists were very much involved. Since the mid-1990's in the UK we have seen the appointment of consultants in PICM and the centralisation of services. A training programme has been developed in PICM and it is now recognised as a sub-specialty of paediatrics. Retrieval services have also developed to manage the safe transfer of critically ill babies and children. The majority of medical staff working in PICM now come from a base specialty of paediatrics. The scope of nursing practice has expanded to support the use of complex technology such as extra corporeal life support (ECLS) and to provide staffing for middle grade rotas.

PICM is an area of medicine that will test you intellectually and technically. Patients vary in size from tiny premature babies to adult size teenagers. The list of rare diseases and eponymous syndromes is seemingly endless. The physiology of some of the cardiac patients will require you to reconsider what you know about the interactions between the systemic and pulmonary circulations. Infectious diseases such as epiglottitis or meningococcal septicaemia have become very rare since specific programmes of immunisation. Increasingly we find that we are caring for children with very complex and ultimately life-limiting conditions who may have repeated and protracted admissions to PICU. Some of these children will become dependant on technology such as long-term ventilation and this makes discharging them home or to the ward a complex process. Families are now able to access a wealth of information about their child's condition and may disagree with medical staff about the appropriateness of interventions. Very occasionally such disagreements are played out in the courts or the media. Despite an expansion of bed numbers over the years, the demand for PIC often exceeds capacity and, as a result, elective surgery may be delayed or patients transferred further away. As a PICM consultant your skills of diplomacy, prioritisation and negotiation are regularly tested. It goes without saying that a lot of the action takes place at night and weekends. If this all sounds rather gloomy, it isn't meant to be. PICM is a very rewarding area in which to work. You will interact positively with pretty much everyone in the hospital and will be rewarded by the propensity of children to recover from the most severe of illness. There are many opportunities to develop other aspects of your career such as teaching,

Return to Contents

research or medical management. You can lead service development, quality improvement and team working.

As an anaesthetist in training you may be exposed to PICM in a number of ways. Some people choose to work in a fellow type post in a PICU or paediatric retrieval service. Others may have a short PICM attachment during a module of training in paediatric anaesthesia or as part of adult ICM training. These experiences are likely to prove valuable in the future as many anaesthetists will find themselves called upon to assist with the resuscitation and stabilisation of a critically unwell child presenting to an emergency department or on the paediatric ward of a general hospital.

If you decide that you wish to pursue a consultant career in PICM, you will need to consider whether this is with a continuing paediatric anaesthetic practise or solely as a paediatric intensivist. Many paediatric retrieval services have their own consultant staffing, and this is another area to explore. An individual would need to plan their training so that they were able to meet the requirements of a desired consultant appointment, for example 2 years' training in PICM, 1 year's specialist training in paediatric anaesthesia or training in retrieval medicine. Some time working in neonatal intensive care will also be very valuable.

Training in PICM is overseen by the Paediatric Intensive Care Medicine Intercollegiate Specialty Advisory Committee (PICMISAC), a joint committee of the following organisations:

- Royal College of Paediatrics and Child Health (RCPCH).
- Paediatric Intensive Care Society (PICS), including trainee and retrieval service representation.
- Faculty of Intensive Care Medicine (FICM).
- Royal College of Anaesthetists (RCoA).

The PICMISAC, encourages trainees from an anaesthetic background to pursue a career in PICM. It believes that a PICU benefits from the mixture of skills and experience brought by having consultants from both a paediatric and an anaesthetic background. There is a relative paucity of anaesthetists in PICM training and it is likely that anaesthetists trained in PICM will continue to be in demand.

Return to Contents

The RCPCH administer a higher training scheme in PICM (Grid Training), which is open to trainee anaesthetists holding a National Training Number by competitive interview. Details of training sites and posts may be found on the RCPCH website. As there is no specific CCT in PICM, trainees must fulfil the training requirements for a CCT in their parent specialty. Trainees appointed to the Grid Training scheme will spend an indicative period of two years in approved PICM training units in the UK. PICM training can be part of advanced level training in anaesthesia, however it remains necessary to complete the requirements for anaesthesia training as set out by the RCoA. PCIM is not recognised as a subspecialty of anaesthesia and it is not possible to obtain a dual CCT in anaesthesia and PICM at present, in contrast to adult ICM. The only way to complete approved training in PICM is through the Grid programme. Anaesthetists who do so will be issued with a statement to that effect by the PICMISAC.

To undertake Grid Training in PICM and achieve a CCT in Anaesthesia requires prior approval of a bespoke training programme and approval from the RCoA. It will require an extension to a trainee's predicted CCT date. Alternative options for anaesthetists pursuing a career in PICM are to undertake some of the training post CCT or as Out of Programme Experience. Anaesthetists may also wish to have advanced training in paediatric anaesthesia in addition to PICM training. This requires either an extension to CCT or a portion of the training occurring after CCT in Anaesthesia.

Early discussion and approval of individual training programmes is vital for trainees wishing to pursue a career in PICM whether applying for a Grid post or placing part of their training post CCT in Anaesthetics. Trainees seeking further advice should contact an Educational Supervisor or a member of the College Specialty Advisory Committee (CSAC) in PICM through the RCPCH.

The training programme in PICM continues to develop. The current curriculum, which runs to some 155 pages and includes a lengthy list of individual competencies, is likely to be replaced in the near future by one based on the achievement of five learning outcomes which are linked to key capabilities. In addition, training in PICM may become more easily incorporated into anaesthetic or ICM training than is currently the case. Anyone wishing to train in PICM is therefore strongly advised to check the up-to-date position on the PICMISAC area of the RCPCH website and obtain the appropriate advice before committing themselves.

Return to Contents

5.5 Paediatric Pain Management

Ewan Wallace
Consultant Anaesthetist, Royal Hospital for Sick Children, Glasgow

As an anaesthetic trainee being competitive is the key to getting the consultant job you want. The earlier in training you decide on a sub-specialty the better, as this will give you an angle on shaping your CV and will also give you the time to seek out and complete any appropriate audits/surveys and publications. Every trainee has to complete their core and higher training as part of their specialty training towards a CCT in Anaesthetics,[1] but to be competitive at the end of your training you will need something extra that makes your CV stand out from the rest.

Paediatric Pain Management is an important subspecialty area. Clinically it poses a significant problem in the paediatric population. Studies have conservatively estimated this to be 15% to 20% of children.[2] Pain management involves a multidisciplinary approach and involves evidence based practice.[3,4] As a Paediatric Anaesthetist primarily, having a subspecialty interest makes my professional life more diverse and fulfilling. I enjoy the further patient contact it gives me, as well as a job plan with a mix of theatre sessions, clinics and interventional procedures. The spectrum of patients with paediatric chronic pain is different from the adult chronic pain service, although some may progress to the adult service later in life. The paediatric pain service offers children a chance to improve their quality of life, school attendances, social interactions and sport. Services have historically involved established consultants with paediatric, anaesthetic or a chronic pain background subsequently then developing an interest in paediatric pain management. As a trainee however you do have an opportunity to maximise your exposure to paediatric chronic pain.

Some important paths to tread as a Trainee

- Maximise your experience of Paediatric Anaesthetics. Try to get a Paediatric Anaesthetic clinical fellowship post. This you should try to do as a Specialist Trainee, as part of your higher training. You could still do a post-CCT fellowship later but this may be harder to achieve if you have not already got a fair amount of experience under your belt. From a pain management point of view this is the perfect way to start to develop your interest and experience.
- Get involved in specific audit, QI and research. Sit in on clinics with your local paediatric pain service, this not only shows them that you are interested but gives the consultants running the service the chance to get to know you!
- Get as much adult chronic pain experience as you can as a trainee. There is probably not enough time as a trainee however to do a fellowship job in both Chronic Pain and Paediatric Anaesthetics.

Return to Contents

- For most consultant appointments with Chronic Pain as part of the sessional commitment, you will now have to sit an exam (FFPMRCA) and be a Fellow of Faculty of Pain Medicine.
- There may be scope to give you a protected half-day a week specifically for a research/audit project at your local paediatric pain clinic? You can but ask!
- You should also be attending any relevant courses, these should include; Regional Anaesthesia, Acute and Chronic pain, Psychology/Cognitive Behavioural Therapy and don't forget Paediatric Anaesthesia!
- Don't forget e-learning. There is a mass of information for both Paediatric Anaesthesia and Pain at the e-Learning for Healthcare website. There is also a multitude of information to be obtained from various websites, some examples are included below but this list is by no means exhaustive:

- The British Pain Society
- Chronic Pain Policy Coalition
- RCOA
- North British Pain Association
- British Medical Acupuncture Society
- AAGBI
- doctors.net
- American Society for Pain Management Nursing
- World Institute of Pain
- American Academy of Pain Medicine
- European Pain Federation
- Bandolier
- American Society of Regional Anesthesia and Pain Management
- Australian Psychological Society

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6. E-Learning for Health

Return to Contents

5.6 Paediatric Anaesthesia in the Military

Lt Colonel Richard Allan
Royal Army Medical Corps
Surgeon Captain Steve Bree
Royal Navy

The DMS (Defence Medical Services) contain anaesthetists from the Army, Royal Navy (RN) and Royal Air Force (RAF). They are recruited at all stages from cadets at university through to accredited consultants and include both Reservist and Regular service personnel.

What the job involves

DMS anaesthetists and critical care consultants fulfil a variety of roles on operational deployments that include pre-hospital care via the MERT-E (Medical Emergency Response Team - Enhanced), trauma teams, operating theatres, critical care and the transfer of critically ill patients.

Operations in Iraq and Afghanistan have given military anaesthetists a great deal of exposure to trauma casualties. The nature of these conflicts means that the casualties have been both military and civilian. The UK DMS has a well-established policy of providing medical support to civilians whilst on operations[1] and this is consistent with both UK Civil-Military Co-operation Defence Policy[2] and International Humanitarian Law. Recent publications have shown that children have made up to 10% of the surgical workload and 30% of the critical care bed occupancy. The severity of the injuries is often greater than UK civilian trauma, with injuries predominantly due to explosive incidents or gunshot wounds. These account for nearly 60% and 20% respectively of all paediatric trauma in a recent paper based on the experience in Afghanistan and Iraq[3]. It is expected that all DMS consultants should be able to provide trauma anaesthesia for paediatric patients.

Training in the Military

Anaesthesia training for DMS doctors follows the same path as for civilian trainees as laid out by the RCoA with a small number of exceptions. It is expected that DMS trainees will need to continue to develop core military skills, such as teamwork and leadership, and be able to provide military trauma anaesthesia using military protocols. All trainees undergo annual mandatory military training to compliment their clinical skills, including fitness tests and basic military skills such as weapons handling. There are also mandatory annual academic meetings of the Tri-Service Anaesthetic Society (TSAS) and Society of Anaesthetists in Training (STAT), which allow for military updates.

Return to Contents

Post FRCA trainees may have the opportunity, under the supervision of a defence anaesthesia consultant, to deploy on operations. The nature of the deployments can vary according to service but often trainees come together under a Tri-service umbrella and work together in field units. The RCoA have approved a military module[4] for senior trainees that will usually be completed during operational deployments but has also been designed to allow many of the competencies to be achieved in the UK.

There are a number of useful pre-deployments courses that are mandatory prior to deployment. These include HOSPEX training, which is simulation training for the field hospital. It takes place a in a mock field hospital and includes amputee casualty actors for added realism.

The Military Operational Surgical Training (MOST) Course is another pre-deployment course. It takes place at the Royal College of Surgeons and training includes joint anaesthetic and surgical sessions, simulating complicated trauma scenarios that have been previously seen on operations. It emphasises both technical and non-technical skills that are necessary for deployment.

The opportunity for off-rotation training in advanced paediatrics also exists, although you should expect that this will happen predominantly within a UK setting. There are Overseas Fellowships available, but they are few and the competition is strong versus other areas more directly relevant to military medicine.

Further information on general training in the armed forces is available in the GAT handbook[5].

Other militarily relevant complimentary sub-specialty interests could include:

Pre-Hospital Emergency Medicine

The MERT-E is the helicopter borne retrieval team that was developed to support operations in Afghanistan and is now integral to UK military medical planning. It provides pre-hospital resuscitation to casualties on their way to hospital facilities. Future DMS Consultants serving with the MERT-E will have training along the pre-hospital emergency medicine sub-specialty pathway as laid out by the Inter Collegiate Board for Training in Pre-hospital Emergency Medicine[6] and pre-hospital care as part of their Consultant job plan.

Regional Anaesthesia

In recent conflicts, the predominance of limb injuries in the military trauma population has made the pain management of these injuries challenging. Peripheral continuous nerve catheters and central neuraxial blockade have been particularly helpful in the management of these complex injuries. Pre-deployment training includes training in ultrasound-guided nerve blocks.

Massive Haemorrhage

Incidences of serious exanguinating injuries in the UK population are thankfully rare. Therefore exposure to elective surgical specialties involved with massive haemorrhage and coagulopathy are useful for DMS anaesthetists. In a paediatric setting this might include elective operations for scoliosis, cranio-facial surgery, liver transplant, etc.

Return to Contents

Within the DMS it is the Department of Military Anaesthesia, Pain and Critical Care (DMAP&CC) that is responsible for anaesthesia training; it also takes the lead for operational deployments, research and all innovations in equipment and techniques related to anaesthesia, pain management and intensive care medicine. A number of specialist interest groups have been formed. Since 2009 there has been a Defence Paediatric Specialist Interest Group (DEPSIG), which arose from the Anaesthesia and Intensive Care Special Interest Group (PAICSIG) [7]. This aims to advise the chain of Command of the DMS to ensure the continuing development of best practice.

Military paediatric anaesthetists continue maintaining competencies in both paediatric and adult anaesthesia; it is a career choice that can be both exciting and challenging but is one that is ultimately extremely rewarding.

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Return to Contents

5.7 Paediatric Anaesthesia in Developing Countries

Sarah Hodges
Consultant Anaesthetist, Founder and Trustee, Interface Uganda
Isabeau Walker
Consultant Paediatric Anaesthetist, Great Ormond Street Hospital, London

You are nearing your completion of training, you are a skilled anaesthetist, your knowledge is extensive, and you are about to reach your final ARCP - but you feel you need a challenge, you need to gain additional clinical and managerial experience that will stretch you as an individual and help you gain a broader view of the world - before you settle down to look for a consultant post.

Paediatric anaesthesia in the developing world can fill that gap.

Time out in a developing country will provide you with an opportunity to gain unparalleled clinical experience with a wide variety of cases. You will learn to rely on your clinical acumen, and to decide on the appropriate anaesthetic without a multitude of investigations or different specialties to refer to. Management experience in an unfamiliar setting will enhance your leadership and organisational skills. You will need to be resourceful and often be expected to take charge. You will learn what it is like to be responsible, a worthwhile experience prior to starting a consultant job, and one that will mark you out as different from your competitors! Most important, you will be able to make a difference, either through clinical work or training and support for colleagues working in a challenging environment with limited educational opportunities. You will use a different spectrum of drugs and equipment and you will learn to be inventive and ingenious when you find some vital piece of equipment has gone missing. In many countries, the mainstay induction agents are ketamine and thiopentone, there are no short acting opiates and suxamethonium may be the only muscle relaxant. The teaching hospital in the capital city may have modern anaesthetic machines, piped gases and isoflurane, but if you have the opportunity to accompany your supervisor to a more rural hospital, you will find out about draw-over and the OMV or PAC or EMO vaporisers, and the importance of resource management. As for a trained anaesthetic assistant – you will realise how important they are, as you will rarely find one.

You will be exposed to advanced pathology and you will have the opportunity to see a spectrum of diseases you have not seen before - malaria in all its forms, snake bites, severe hydrocephalus, advanced cancers, malnutrition and many others. The surgical procedures may be unfamiliar, and will reflect the lives of a population living in poverty, with burn contractures, fungating tumours, sigmoid volvulus, delayed presentation of Hirschprung's and destruction of the face by noma, to mention just a few.

Return to Contents

As well as a stimulating and challenging clinical experience, you will also be faced with many ethical dilemmas, which will hone your decision making skills and help you to have a broader understanding of the world and its inequalities. You will develop an understanding of international politics and will inevitably become involved in resource management and the realities of budgetary constraints. You will understand the meaning of the phrase "surgical burden of disease" and the impact poverty has on delivery of healthcare. Emotionally you will swing from extreme highs when your creativity and resourcefulness unexpectedly save a child's life, and extreme lows when you fail, possibly due to the lack of the most basic resources such as oxygen or blood, or due to excessively late presentation in the disease process.

Thanks to Dr Tim Cooper: Main Theatre, Nyahururu Hospital, Kenya

Return to Contents

You must also learn to look after yourself! This is an opportunity to experience life in a new culture, totally different from a holiday experience. You will be privileged to see some beautiful sights and meet some amazing people and it will change your perspective on life forever. It is important to keep healthy and take regular breaks, as just living in a different culture can be exhausting. You should resist the temptation to work all hours of the day and night! Probably the most dangerous element of working overseas will be the roads- it is essential to take sensible precautions, to heed advice in areas when it says not to travel at night, and to find out the latest information from the Foreign and Commonwealth Office. Medical insurance including repatriation cover is essential. There are a wide variety of opportunities to work overseas. You may want to do some short term clinical work with organisations such as Operation Smile, Mercy Ships, MSF, or through your local hospital link; you may want to be involved in teaching, either short term through the Association of Anaesthetists of Great Britain and Ireland (AAGBI) / World Federation of Societies of Anaesthesiologists (WFSA) SAFE courses or Health Volunteers Overseas, or longer term with the UK-Zambia Health link, the Uganda Hub, or VSO (see useful links below). It is possible to work overseas and to take time out from training as an OOPE, but if you want your time to count towards your CCT then you should follow the guidelines for out of programme training (OOPT) outlined in the Royal College of Anaesthetists Handbook, which includes the need to identify a supervisor both in the UK and the country where you intend to work.

The AAGBI has a long history of supporting overseas work through the International Relations Committee, and of supporting training programmes and book donations in developing countries. Travel grants are available for trainees, both for short term visits, and also for longer term attachments as an OOPE or OOPT.

There are a number of courses to attend so that you can find out more about work overseas. The World Anaesthesia Society organises an annual seminar, and the Anaesthesia for Developing Countries Course or Developing World Anaesthesia Course are excellent value. The WFSA publishes educational materials including the journal Update in Anaesthesia, which is an excellent resource for personal use, as well as for training students overseas. You will be able to find great accounts of trainee experiences overseas in Anaesthesia News and the RCoA Bulletin. This type of experience needs to be organised well in advance. It is essential to be registered with the local Medical Council and to sort out your medical defence cover before you leave, as well as to arrange adequate travel insurance. As it is unlikely you will be paid during your time in a developing country then you will probably not require a work permit. It is essential to have a reliable contact in your country of destination who can help to ensure that your work will be effective and will help with all the paperwork and administrative issues, as well as a supervisor who will be responsible for teaching you.

Return to Contents

Resources

- Association of Anaesthetists of Great Britain and Ireland
    - Useful resources and links
    - Travel grants
    - Volunteer opportunities
    - Reports from anaesthetists by country
- Royal College of Anaesthetists: Unit of Training in a developing country:
    - 'Curriculum for CCT in Anaesthetics'
    - 'Annex D: Higher level training' page
- World Anaesthesia Society
- World Federation Of Societies of Anaesthesiologists:

Courses

- Anaesthesia for Developing Countries
  Course directors:
    - Hilary Edgcombe
    - Jeanne Frossard
- Developing World Anaesthesia
  Course director: Dr Ben Gupta
- Real World Anaesthesia (Australian course)
- Primary Trauma Care Foundation

Useful websites

- International Committee of the Red Cross
- Medicins Sans Frontieres
- Medicins du Monde
- Health Volunteers Overseas
- Mercy Ships
- Lamb project, Bangladesh
- Christian Medical Fellowship
- International Nepal Fellowship
- Merlin
- Orbis Flying Hospital
- Operation Smile
- VSO
- Chain of Hope
- Smile Train
- Health Books International (formerly Teaching At Low Cost (TALC))
- Mercy flyers
- Doctors without Holidays (Belgium)
- UAM
- Diamedica
- THET
- MedAid Internationa
- Foreign and Commonwealth Office

Return to Contents

5.8 Education and Training

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Consultant Paediatric Anaesthetist, Hamad Medical Corporation, Doha, Qatar
Former Chair, Education & Training Committee, APAGBI

Introduction

Teaching and training is great fun. Some of the opportunities I have taken greatest pleasure from over the last fifteen years have been due to my involvement in teaching and training: teaching a trainee a new skill, tutoring a doctor in difficulty and watching them achieve, presenting to school leavers on why they should consider medicine as a career, helping a medical student make his first poster for an education meeting, developing a curriculum for the clinical years in a new medical school, setting up specialty training in a new deanery and getting involved with education and training policy at the Department of Health. The opportunities to get involved in education and training are endless. Broadly speaking, most of your roles as a Consultant fall into the face-to-face delivery of education & training and leading & managing education and training…

Face-to-Face Delivery of Education and Training

Most anaesthetists start a career in education and training by delivering it. As a trainee in anaesthesia there are usually quite a few opportunities to get involved with teaching. For example, teaching and giving viva practice to more junior trainees, teaching foundation doctors, helping out in the simulator, helping deliver special study units to medical students, designing and organising study days for trainees and providing lectures for other health professionals. If you are interested in education get in touch with your College Tutor and other educators in your department and let them know you are interested. Your help will be welcome and you may find opportunities to work alongside more senior colleagues in designing, organising and delivering educational programmes and courses. These supplemental roles are always a great addition to your CV.

Simulation is a very important area to be involved in. There is usually a lead in each hospital and a group of anaesthetists in the department you can approach, who provide simulation training either to colleagues or on a regional or national basis via simulation courses. The University of Plymouth runs the first Masters in Simulation and Patient Safety in the UK which is open to applicants from the UK and beyond. Many simulation centres in the UK are led by anaesthetists, so If you are interested in simulation then make contact with consultants involved. (See Simulation for more information)

As a consultant it is usual for you to become an educational supervisor and if you are interested, a mentor to trainees or consultants.

Return to Contents

There are many opportunities as a consultant to become more involved in education and training and actually be responsible for a group of trainees.Your first educational management role will usually be as a Foundation Programme Director, Clinical Tutor or a College Tutor. If you progress in roles within a specialty you may apply from College Tutor to be Training Programme Director, Regional Adviser and/or Head of School. In Trust management, Foundation Programme Directors or Clinical Tutors may move on to apply for Director of Medical Education roles, reporting on education and training to the Medical Director.

In posts associated with the medical school there are often opportunities to lead clinical skills teaching or be responsible for the delivery of a year of the undergraduate programme as Year Lead. Should you wish to apply for a larger role, there are opportunities to lead an area of the programme or even to eventually be a medical school Dean. To be considered for the larger roles in the University it is usually necessary to have a higher degree such as a Masters in Clinical Education or a PhD.

There are also opportunities in the postgraduate deanery within your regional Health Education office to work as Associate Deans and many of these roles give you experience of working across specialties. In these organisations, Associate Deans are responsible for the management of groups of trainees such as in the Foundation Programme or Specialty Training. Some deaneries also allocate specific areas to these roles such as "Less than full time working" or "Supporting doctors in difficulty". There is usually a Quality lead, an Associate Dean for Faculty Development and often a Simulation Lead.

It is also possible to get involved in working for the College on educational matters, though these roles are often given to doctors elected to Council. Doctors are asked to join College Committees where they have experience particularly relevant to the task so it is always worth letting the College know if you develop a particular area of expertise.

Within the APAGBI there is an education and training committee which regularly appoints new trainee and consultant members. Trainees are elected to council and the education and trainee committee by trainee members of the APA, for a tenure of 2 years with 2 years renewable. Consultants submit their CV and a short statement for review by the council and the appointment is annually renewable by the education and training Chair.

How can I become a good educator?

To deliver education and training it is beneficial to undertake some formal instruction. A common way to do this is by being invited to become an instructor at resuscitation courses and consequently being offered the short generic instructors course (GIC). Faculty look for competent, enthusiastic trainees who are supportive of their team and it is often helpful to make them aware that you are interested in becoming an instructor at the start of your course. GIC will provide you with a good basic overview of education theory. The RCoA also provides a varied portfolio of short courses in how to teach.

Return to Contents

If you take on a specific role such as educational supervisor or medical student tutor, the Deanery or University provide core training appropriate for the role you are taking on. A number of universities offer Masters (M) courses in medical education. These courses are usually completed part-time over three years to a maximum of 5 years. The first year of the course (60 M credits) gives you a Certificate, another 60 M credits the diploma and a further 60 M credits of dissertation gives you a master's degree. The benefits of masters level work is that you take a scholarly approach to education and usually get the opportunity even at the certificate stage of reading all the literature on a particular area of your choice. Some certificate programmes are more practically based than others. Masters courses differ in the course content, times of delivery and mode of delivery so it is important you look carefully at the options available to you and apply for a course that fits in with your working and studying patterns.

Later on it is useful to go on a leadership course to develop further skills for senior education roles. There are now several leadership courses run specifically for those interested in leading education and training, for example, residential courses run by the Association for the Study of Medical Education or Harvard Macy in Boston, USA.

Practice will help you to improve your teaching skills: Remember always to ask for feedback on what you do as this will accelerate your development of teaching skills and once you are in the habit of doing so it becomes easy to request. Feedback will allow you to reflect on your performance as a teacher and to revise your teaching and learning session for subsequent renditions.

Summary

In summary, education and training is great fun to deliver and also to lead or manage. All consultants are expected to be involved in training so it is important to develop your knowledge and skills in preparation as a trainee. Gaining a major commitment in education and training is often achieved by taking on roles of increasing size and complexity but well worth the effort involved.

Useful websites

- Generic Instructor Course
- Educational Supervisor Course
  - Courses are held nationwide. Contact your local deanery for your local course.
- Postgraduate Certificate in Medical Education (for Anaesthetists)
  - Run by the University of Dundee, can be carried out online.
- Royal College of Anaesthetists
  - Run several courses and training days (e.g. Workplace Based Assessment: Training for Assessors, Anaesthetists as Educators: Teaching and Training in the Workplace).
- Society for Education in Anaesthesia
- Plymouth University MSc in Simulation & Patient Safety

Return to Contents

5.9 Leadership and Management

Mark Thomas
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In today's healthcare climate the development of management and leadership skills are coming to the forefront of the training agenda. Of course, these skills are generic to all specialty areas within anaesthesia, not just paediatrics. However, paediatric anaesthetists become very adept at dealing with families in stressful circumstances and many of the more subtle skills thus learnt are highly transposable into the wider sphere of departmental and hospital managerial roles.

A respected colleague once remarked to me, after they had served as a successful clinical lead for a number of years, how managing many of his more challenging colleagues was highly akin to managing his children. Whilst I am sure that he said this to get a laugh, there is an element of truth in it!

As departments grow, it is clear that not everyone has to enter a higher managerial role during their career. For those that do, there are many good courses that are available. In London, many consultants attend the King's Fund Management course. This is spread over several months in clumps of 3-4 days and involves a significant amount of self and colleague analysis and feedback. It is an extremely valuable stepping stone (albeit an expensive one) that I would recommend. It also allows aspiring managers to meet those in less familiar areas of medicine than their own who wrestle with surprisingly familiar themes. Most hospitals will fund a senior clinician to go on this course. They also run courses for specialist trainees. You learn a lot about yourself and the way that you are perceived by entering the world of management and I would commend it to those who would like to influence and shape the future of their department. In the current climate of the NHS, if you have a good head for figures, this will stand you in good stead.

If there are down sides, it is that the responsibilities follow you home in the evening and on the weekends. You also need to develop a slightly thickened skin, since you will sometimes have to tell people things that they don't want to hear. Successful leaders are rarely universally admired. It is vital that clinicians remain not only engaged but at the forefront of the hospital managerial system. We are what merges the interface between the clinical providers and the policy makers. Get involved or risk becoming devolved.

Return to Contents

Useful resources for the aspiring manager

The Keele Clinical Management Course

3-day residential course on clinical management held at Keele University on the leafy campus with its own pub on site. Generally well reviewed and has become the staple management addition of many an SpR's CV.

Clinical Management in Anaesthesia

An AAGBI pamphlet describing the various management roles and NHS structures as well as signposting various other useful resources. A good starting point to some definitions of commonly used management terms and concepts.

The King's Fund

The King's fund, based in London run well-tested courses for both SpRs and Consultants. These provide excellent quality training although they are quite expensive, starting at more than £1,500 per course. A particular strength of this course is that it attracts Doctors form many different specialties and gives a wide perspective on the challenges faced in modern NHS leadership.

iscMEDICAL Leadership and Management for Doctors

Provided in London and Manchester, this organisation offers a two-day course that is externally validated and CPD accredited.

The above are examples of the more widely known resources although there are many more available.

NHS Leadership Academy

If you are serious about going into a management role then there is now a national fellowship course, details of which can be found at the link above. This is a 9-month programme requiring 48 days of committed time and is run by Leeds.

Return to Contents

5.10 Simulation Based Education and Research

Ralph MacKinnon
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This article aims to provide an overview of recent developments, to those interested in simulation based education and research, in the context of anaesthetising children. The objective is to highlight the array of educational and research opportunities for anaesthetists interested in utilising simulation to improve the quality of care that we provide to children.

Simulation & Anaesthesia

Anaesthesia, particularly paediatric anaesthesia, with high stakes situations, limited margin for error and infrequent presentation of life-threatening events is well suited to simulation based education and research, as both a training and quality improvement modality. Anaesthetists utilising simulation concepts, have strategically targeted training to provide repeated practice of uncommon clinical scenarios, including difficult airway management and causes of cardiac arrest, prior to encountering them in their daily work. This early adoption of technology, reflective educational frameworks and research methodology has yielded todays' highly advanced fully-body patient manikins,[1-3] understanding of non-technical skills (including decision-making, situational awareness, communication, cooperation and monitoring)[4-6] and training methodologies from outside of healthcare, for example Crew Resource Management[7] or debriefing approaches.[8] The first computerised paediatric simulation manikin was produced in 1999,[9] since then the field of paediatric simulation has evolved rapidly, as has how we describe it. Simulation based education has referred to the recreation of a real-life task, event or experience that is recreated with the aim of providing a safe learning environment, for the acquisition of knowledge, skills, attitudes and behaviours of individuals or teams of personnel. The phrase "Technology Enhanced Learning" (TEL) has recently been coined to describe "simulation".[10]

Return to Contents

A wide range of technologies are currently under the umbrella of simulation based education and research. These include virtual reality screen based simulators, part task trainers (eg. simulators to learn central axial blockade), full body manikins, spatial awareness simulators (eg. fibre-optic intubation simulators), standardised patients (actors acting as patients), human patient simulators and immersive environments. Such environments can either be in a simulation education centre or in the actual clinical area. Simulations in clinical areas are currently termed in-situ or point-of-care simulations. Such simulations often focus upon both training and/or quality improvement, for example detecting latent patient safety threats within an organisation.[11] Following the use of simulation-based education to reduce catheter related bloodstream infections, improve the quality of central line placements and reduce complications, there is considerable current focus on simulation based education as a quality improvement modality.[12-14] There is particular attention upon the translation of learning from simulators to directly positively impact patient care in terms of patient safety, cost-reduction and increasing team based performances, in the clinical arena.

Paediatric Anaesthesia & Simulation Based Education

The general components of simulation education sessions are pre-briefed learners, educational material and equipment targeted to key learning outcomes, debriefing techniques relevant to adult learners and a reporting mechanism to sustain learning.

Pre-brief: The objective is two-fold, to create the bubble of safety to promote reflective learning and to highlight the expectations in terms of the performance of learners relating to the key learning outcomes for the session.

Key learning outcomes: these are normally evidence based, peer reviewed and mapped to an educational curriculum.

The international Managing Emergencies in Paediatric Anaesthesia (MEPA) collaborative course was based upon the Royal College of Anaesthetists of UK curriculum. [15-17] The MEPA course is an ideal starting point for anaesthetists with an interest in simulation education. MEPA aims to give all anaesthetic trainees in the UK the opportunity to develop management strategies for emergencies in paediatric anaesthesia using high fidelity simulation. The course is run throughout the United Kingdom, and has grown rapidly in North America, Australia and Africa. The same collaboration of simulation experts from children's hospitals also recently launched a version of the course for consultants (MEPAFC). This course is in the process of being rolled out across the UK to

Return to Contents

provide quality managed simulation based education and training for consultants that occasionally anaesthetise children. The aim is to provide a high-quality learning experience that both updates and refreshes key technical and non-technical skills, matched to the revalidation matrix. The MEPA website (https://mepa.org.uk/) is also a useful resource for both interested participants and faculty. There is a strong world-wide drive towards collaborative, evidence based, peer reviewed simulation scenarios targeted to key patient care outcomes. For those interested in simulation based education nationally then The Association for Simulated Practice in Healthcare (https://aspih.org.uk/) with special interest groups in anaesthesia and paediatrics is an excellent starting point. Those interested in an international perspective may also be interested in the International Pediatric Simulation Society (https://www.ipssglobal.org). In the USA, simulation has been integrally involved in the board certification to practice in anaesthesia[18] and simulation based education in anaesthesia has been incorporated in residency training programs.[19]

Simulation based Research

Simulation based research can be divided in to two broad concepts, utilising simulation based education as a tool to explore other research questions or to develop questions to explore the efficacy of simulation based anaesthesia in itself. There has been much focus on the latter, with a large series of meta-analyses or systematic reviews focussing upon peri-operative management[20] and the training of advanced airway techniques.[21,22] The debate as to whether there is the need for future 'proof of concept' research for simulation in anaesthesia, posing the question is simulation any better than other approaches, continues in the current literature. Much of the debate is hampered by the heterogeneous nature of pooled data in systematic review methodology. Future research, be it translational in terms of directly impacting patient outcome, or directed to understand the instructional design features of simulation education, will continue to struggle addressing such important questions unless we continue to develop large collaborative partnerships.[23] The International Network for Simulation-based Pediatric Innovation, Research, & Education (www.inspiresim.com) is an international collaborative research network that augments the overall impact individual investigators have on a field of research. The development of the Simulation-Specific Extensions for the Consolidated Standards of Reporting Trials (CONSORT) and Strengthening the Reporting

Return to Contents

of Observational Studies in Epidemiology (STROBE) Statements by the INSPIRE network have also been an important step to enhance research rigor and future communication of paediatric anaesthetic simulation based research.[24]

Useful Resources

- Debriefing in Healthcare

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Return to Contents

6.1 Research in Paediatric Anaesthesia

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Q: How do you get involved in research without really trying?

This is not possible. Good research requires training, time, support, and extra work. Even if you are not interested in doing research yourself, it is important to understand the research principles in order to enhance your ability to assess the literature.

Q: Where do you start?

Find an area of research that interests you sufficiently to make you want to pick up a journal and read about it. This may be based on an interesting case, findings from an audit, presentations at meetings, or your own reading:

- Ask colleagues to form/join a journal club so you have an opportunity to discuss and critically appraise journal articles.
- Read papers in full with the following questions in mind
    - What is the hypothesis? What question is being asked?
    - Is there a logical / scientific rationale?
    - Is the population appropriate? What are the inclusion/exclusion criteria?
    - What outcome is being assessed/measured? Is it sensitive enough to detect a significant degree of change? Is it specific enough to answer the question?
    - Is the study sufficiently powered?
    - Is the age-group appropriate for the question being asked and the outcome being assessed?
    - What is the effect size? Are the results statistically AND clinically significant?
    - What impact does this paper have on my knowledge, attitudes and clinical practice?

Return to Contents

Q: How do I go further?

Now think. What could you do better? Have the authors missed anything?

To understand the topic, do a further literature search:

- Google and Wikipedia may be a starting point but beware. References may not be suitable and what you find may not be adequate for finding peer reviewed publications.
- Learn how to effectively use PubMed or one of the major search engines that are available within your hospital. This will ensure you are not missing important publications.
- Learn how to create a "search strategy". All meta-analyses and systematic reviews require a search strategy in the Methods section of the paper, and increasingly in narrative reviews. The education facilities and specifically the library services within your hospital can provide invaluable help.
- Consider setting up a Reference Manager service at the outset (eg. RefMan, EndNote etc). This will help you be more organised and efficient when it comes to maintaining your own database of relevant articles, and is invaluable when writing manuscripts. Plan ahead. It is difficult to take a project from inception through to completion at the same time as completing your training.
- Courses and meetings that will help you appraise the literature and write papers eg. Research Methodology courses at the RCoA; sessions at Annual Meetings such as "How to get your paper published"

Return to Contents

Q: How do I get help?

Critical for success is to find a mentor or supervisor. Take time to find the right one. Ideally this is someone you can approach and someone with a track record in the field you are interested in.

- Go to meetings and speak to the presenters and talk to other trainees at poster sessions. Everyone will be happy to discuss his/her work.
- Get involved in one of the anaesthesia trainee regional research and audit networks (e.g. SWARM, RAFT) or a specialist network (e.g. PATRN)
- Links to Trainee Resources are available on the National Institute of Academic Anaesthesia (NIAA) website
- Find out who is involved in research in your department. Even if their work is not your particular field of interest, ask them about the process and local support systems.
- You may find an early discussion with the R&D department in your hospital helpful in learning what supporting facilities and internal resources are available to you.
- Contacting other non-anaesthetic groups (eg. respiratory medicine, cardiac groups) or basic scientists working in allied areas may give you new and interesting avenues for collaborative research. You will find them enthusiastic and supportive as there is currently enormous emphasis placed on translational research from basic science and collaboration across clinical disciplines.

- Check APAGBI website for up-to-date links and details.
- The NIAA website has a Researcher Database which may help you find anaesthesia researchers working in the UK.

Q: How do I get research training?

There are different levels of training available depending on your plans and how much time you plan to spend on research in the future.

- Online degrees / distance learning. Full-time or part-time Masters degrees. The advantage is that you have a postgraduate degree to add to your CV; the disadvantage is the associated time commitment and course fees.
- Links to post-graduate courses relevant to anaesthesia, pain medicine and intensive care are listed on the NIAA website
- Some overseas fellowships or out of program posts have a research component. When exploring these options, find out about potential projects in advance, clarify what your role will be, and ensure that you will have sufficient time and resources.
- Academic Training Fellowships. There are a limited number of specific academic training posts in anaesthesia. These commence at an earlier stage of training (ST3) and include dedicated time for research within the training program.

Return to Contents

Q: I have set my sights on a higher academic degree. What do I do?

This is full-time research with the aim to complete a MD or PhD. This will require significant advance planning and is likely to be associated with a decrease in salary!

- Find a supervisor working in your area of interest. Check if they have a sufficient track record, publications and funding to support a studentship. There are full-time fellowships available to support your research.
- There are some opportunities for research programs to be financially supported by 'moonlighting' (extra sessions in your own time) or by doing sessions in private hospital intensive care units. There is support within the London area (Academic Anaesthesia Training Advisory Group at Health Education England, Russell Square; previously London Deanery) for trainees undertaking academic degrees. Check with your local training supervisor.
- Check the NIAA website Funding and Opportunities sections for advertised Fellowships from the Health Services Research Centre; individual research groups; joint fellowships.

Nurture your curiosity not only in medicine. You live in exciting but also challenging times. Be prepared for and accept hard work, long hours and many setbacks. The rewards are great and cannot only be measured in career advancements or financial benefits. Knowing that you have and will continue to contribute to better the life and health of your patients outside your direct clinical work is immensely fulfilling and enhances your skills and job satisfaction.

Return to Contents

6.2 Writing and Submitting for Publication

Neil Morton
Retired Reader in Paediatric Anaesthesia and Pain Medicine, Royal Hospital for Children, Glasgow and University of Glasgow

As a trainee you may wish to write for a medical journal or textbook or may be invited to do so. There are several different formats for publications, from peer-reviewed research papers, to review articles. The first thing to establish is the purpose of the publication and the format it should take. What is the message you wish to portray? The key to good writing is good planning.

A useful starting point is to take advice from an experienced medical author or editor. You should familiarise yourself with the following texts, since they will answer many questions you may have and hopefully prevent you from making time consuming mistakes.

For generic advice on medical writing:

- Hall GM. How to write a paper. 3rd edition. BMJ Books, BMJ Publishing Group, 2003. ISBN 0-7279-1728-5
- Davidson AJ, Carlin JB. What a reviewer wants. *Pediatric Anesthesia* 2008; **18**:1149-1156.

Referring to the advice from the International Committee of Medical Journal Editors is very useful as this website details the requirements of most major medical journals. Once you select the journal you wish to submit your paper to, you should refer to the Authors Guidance Notes, which will provide advice on the desired format and how to submit. Most submissions are online these days and it is imperative that you follow the online instructions to reduce the risk of rejection on technical grounds.

Return to Contents

6.3 Research ethics

Neil Morton
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The legal and ethical framework for research in the UK has now been integrated and made consistent. If you undertake research, you need to read the overarching principles of medical research including those affecting children that are detailed in:

- The Declaration of Helsinki
- Committee on Publication Ethics (COPE)
- Morton NS. Publication ethics. *Pediatric Anesthesia* 2009; **19**: 1011-1013

All research involving NHS patients, staff or resources must be assessed by a research ethics committee. Furthermore, to comply with the Department of Health's Research Governance Framework research activities must be formally approved by Trust management; accountability for all research activity resides with the Chief Executive. Regulatory approval is needed for trials involving drugs or devices and the UK regulator is the Medicines and Healthcare Regulatory Agency (MHRA). Seeking Regulatory, Research & Development and Ethics Committee approval can be a relatively time consuming process regardless of the nature of the research proposed but the system is now integrated online via the Integrated Research Application System (IRAS).

Many other activities are not research even though they use similar methodologies. In that case, they do not require assessment by a research ethics committee or formal approval within the Research Governance Framework. The Research Governance Framework describes research in terms of generating new knowledge by systematic and rigorous methods; but in practice the boundaries between research and other activities may not always be clear. The other activities include: clinical audit, local developments of existing research, introducing clinical innovations, service evaluations, patient or staff surveys, and quality assurance or quality improvement programmes. When in doubt, seek advice from the Integrated Research Application System (IRAS) Helpline. The Health Research Authority decision tool may also be a useful starting point.

To undertake research in the NHS you must have training in Good Clinical Practice. This is free of charge to trainees online here.

Further reading

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Return to Contents

6.4 How to Complete a Useful Audit

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Natasha Woodman
APA Trainee Representative, St George's Hospital, London

There are 2 important reasons for doing audit in any field of medicine, one is to improve the quality, effectiveness and safety of the service that we provide our patients, (and the other is to have something on your CV that you can discuss at interview to help you secure your dream job!). Although there has been pressure on trainees to complete an audit annually (or even more frequently) the real purpose of audit should not be forgotten. There is increasing appreciation that it takes time to do meaningful audit, where you address clinical problems or deficiencies, measure them against recognised standards and implement change. Examining the effects of any such changes closes the audit cycle and demonstrates an understanding of the entire audit process.

Audit ideas

With the above in mind it should become clear that not all audits will be original ideas but often look at standards or benchmarks already in place. Many hospitals have clinical audit departments and it would be important to register your audit and see what help they can offer. Inspiration often comes from your observation of a particular problem in the clinical workplace. It may also be fruitful to talk to your consultants about the issues they see as needing to be addressed. Those projects that introduce changes, and especially the projects that re-audit the effects of those interventions, are the stuff of legend – or rather the stuff of abstracts and poster presentations. Therefore we would recommend attempting one ambitious project every year rather than lots of smaller audits.

Alternatively you could take part in a national audit. This way you are part of a valuable multi-centre project where all the hard work in methods and approvals has been done for you. You would also hope to be named as a collaborator in any publication. A good way to get involved is through trainee-led collaboratives, like PATRN.

Presenting your findings

Once you have collected the data the next job is presenting it, and it helps to think big. Whilst you will almost certainly be expected to discuss your results with your department, if you have chosen a general enough subject, it may well be of interest to other specialties or staff groups in your hospital. There will also be regional teaching or audit meetings where you will be able to present your work. The holy grail of

Return to Contents

presentations is of course the conference which may be national or international. When you are planning your audit project it is often useful to have one eye on the abstract deadlines of the conference you may be aiming to present at. This will help you set appropriate timeframes and encourage you to stick to them. Different meetings have different rules for submissions and may select some for poster presentation or alternatively you may be expected to give an oral presentation. If your work is accepted then you, or a member of the team, will be expected to attend the meeting and answer questions on the project. Although this may be a daunting prospect it is well worth the effort, as it is another line on your CV, or point on your application, especially if you receive a prize for your endeavours or have your abstract published. So you can see how one audit project can be used to tick several boxes. For more ideas see the Audit Recipe Book (3rd Edition) 2012, from the Royal College of Anaesthetists.

The following piece on quality improvement highlights the differences with audit. Whilst one has not superseded the other, QI definitely feels like the popular choice currently. Sometimes both are needed, where the audit confirms or establishes the baseline data, and QI work drives onwards and upwards from there.

Information on paediatric anaesthesia audits can be found here: http://www.apagbi.org.uk/professionals/science/audit

Return to Contents

6.5 Quality Improvement

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Key points

- Quality improvement (QI) is the use of specific methodologies to implement change in order to improve the standards of care.
- Quality in healthcare is defined along the dimensions of safety, effectiveness and patient experience.
- The 'Model for Improvement' is an approach to continuous improvement where changes are tested in small cycles that involve planning, doing, studying, acting (PDSA).
- Run charts and control charts are used to display improvement data.
- QI projects should be written for publication using the 'Standards of Quality Improvement Reporting Excellence' (SQUIRE).
- Quality Indicators are measures of aspects of our practice that allow us to continually improve the quality of care we deliver.

Introduction

QI methods were first developed to improve production in the manufacturing industry after the Second World War. In the 1980s QI approaches started to be applied to healthcare with the aim of moving beyond audit and towards the achievement of meaningful change.

QI vs. audit and research

Audit is a process that aims to assess if current practice complies with set quality standards. Actions are intended to bring practice in line with these standards rather than improving the way care is provided.

Research uses a scientific method to derive new knowledge in order to establish new standards of medical care. The gold standard methodology in research is a blinded randomised control trial where a one-off, large, fixed and homogenous sample of patients is selected in order to establish cause and effect. Changes are detected by using statistical tests and results are ideally generalisable to a wider population.

QI uses specific methodology to identify areas for improvement across the entire clinical pathway related to a particular aspect of care. Interventions at different stages of the pathway lead to improvement of the entire system. QI focuses on the change of processes and systems to improve the delivery of standards of care to a wide range of

Return to Contents

patients. The methodology is based on sequential observable tests where smaller samples are collected over time to establish the impact of the change on the system.

Defining Quality in Healthcare

In 1966 Avedis Donabedian defined three aspects of quality in healthcare:

- **Outcomes:** The results of care (i.e. survival, incidence of complications)
- **Process:** The delivery of care (i.e. administration of antibiotics/DVT prophylaxis)
- **Structure:** Resources (staff, equipment, funding).

In 2001, the American Institute of Medicine defined six domains of quality:

1. **Safety**: no harm.
2. **Effectiveness:** Evidence-based medicine.
3. **Patient experience:** Individualised care that respects patient's values and choices.
4. **Timeliness:** Reducing waits and unnecessary delays.
5. **Efficiency:** cost effective, avoiding waste.
6. **Equity**.

In the UK Lord Darzy in the 2008 "High Quality for All: The next stage review" focused on safety, effectiveness and patient experience.

Quality Improvement in Practise

1. Identify an area for improvement from:
   - Routine practice
   - Audits
   - Variation of practice across trusts
   - Local/national guidelines

2. The Model for Improvement

a. What are we trying to accomplish?
   Set a SMART aim (Specific, Measurable, Achievable, Relevant and Time-bound) *(i.e. reduction of the incidence of respiratory complications in recovery of 5% by March 2018).*

b. How will we know that a change is an improvement? Define a set of measures.
   i. Outcome measures *(i.e. incidence of respiratory complications in recovery)*
   ii. Process measures *(i.e. proportion of deep vs. awake extubations, use of opioids)*
   iii. Balancing measures of unintended consequences that might occur in other parts of the system as a result of improving one part *(i.e. theatre list turn over if we extubated all patients awake to reduce the incidence of respiratory complications, effect of reducing opioid use on pain scores)*

Return to Contents

c. What changes can we make that will result in an improvement? Develop ideas for change by:
   i. Looking at the system from different perspectives (patient, clinician, manager, commissioner…).
   ii. Process mapping the patient pathway (interconnected steps are identified and it allows involvement of key stakeholders).
   iii. Look at what other units with better outcomes do differently.
   iv. Research evidence/guidelines.

d. A **Driver Diagram** is a simple visual display of how the changes will help to achieve the aim. (Fig 1.)

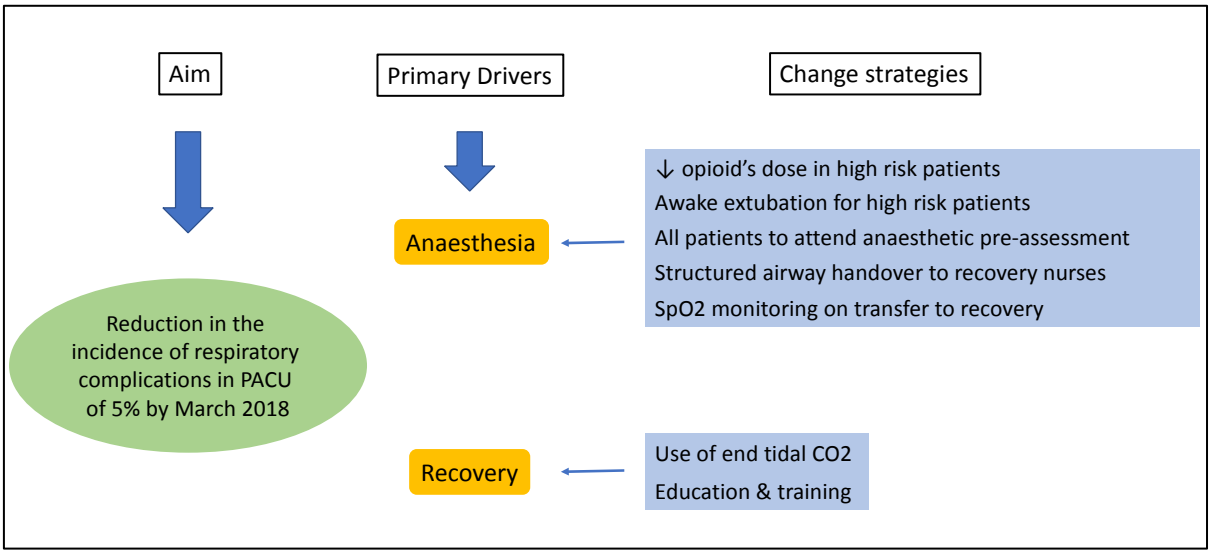

Fig. 1. Example of driver diagram.

e. Test the changes by doing **PDSA cycles**.
   Plan: to test the change
   Do: carry out the test
   Study: observe and learn from the consequences
   Act: determine what modifications should be made to the test

   Start small scale with teams that are enthusiastic about the change. Adapt the changes to local needs. Be prepared to end the test early if the test shows that a change is not leading to improvement.

3. Data for Improvement
   We have different expectations of data used for improvement than that used for research. In an improvement project, there is less concern regarding bias or control of confounding variables. It is more important to get samples across a wide range of conditions (locations, days of the week, shift, etc.) and sample size is a balance between resources and the precision required.

Return to Contents

Run charts and control charts are used to display improvement data. Data is plotted over time and it allows for easy visual observation of trends and patterns.

Run charts are easily constructed without the need for statistical calculations, they can be used with any process and any type of data and they are easy to understand. In a run chart the variable measured is on the y-axis and time is on the x-axis. The centreline is usually determined by the median (Figure 2).

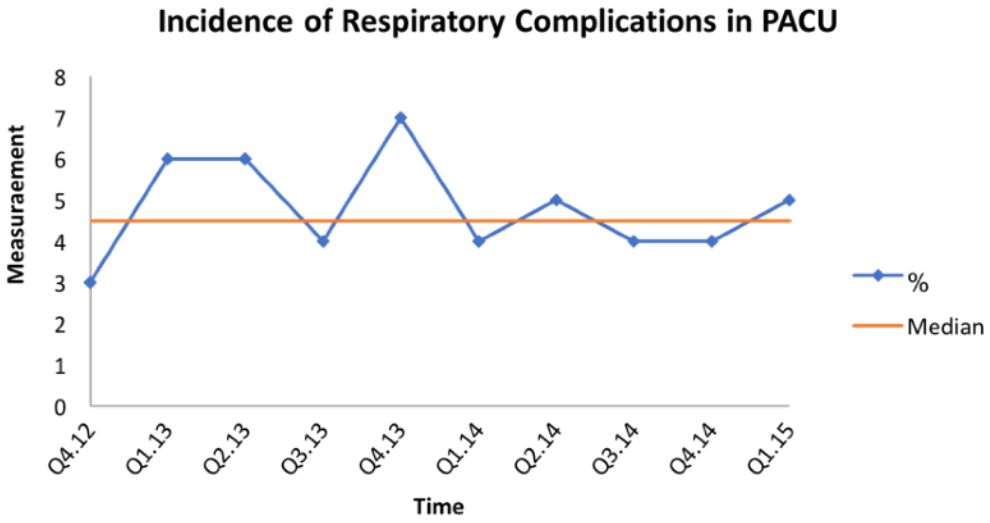

Figure 2. **Run chart.** The data points are plotted against time. The centreline is the median.

In **control charts** the centreline is the mean rather than the median and the upper and lower control limits are displayed and they correspond to ±3 standard deviations from the mean. They are easily created with basic Excel packages (Figure 3).

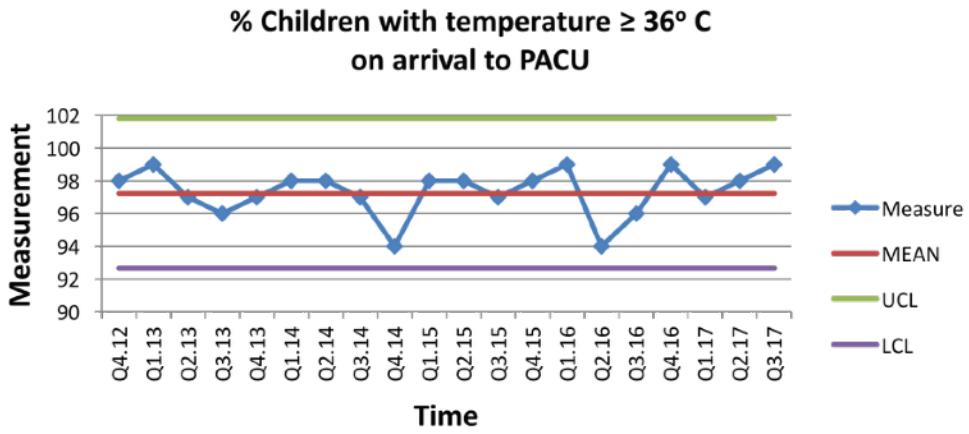

Figure 3. **Control chart**. The centerline is the mean. UCL: Upper Control Limit. LCL: Lower Control Limit

Return to Contents

Some degree of variation will naturally occur in any process. 'Common cause variation' is the natural or expected variation in a process. 'Special cause variation' is unexpected variation that results from unusual occurrences. Control charts are very sensitive at detecting 'special cause variation' which when discovered indicates that the process is unstable and needs further investigation. Out-of-control points and non-random patterns on a control chart indicate the presence of 'special cause variation'.

There are several rules to detect special cause variation in a control chart. Examples are shown in Figures 4 and 5.

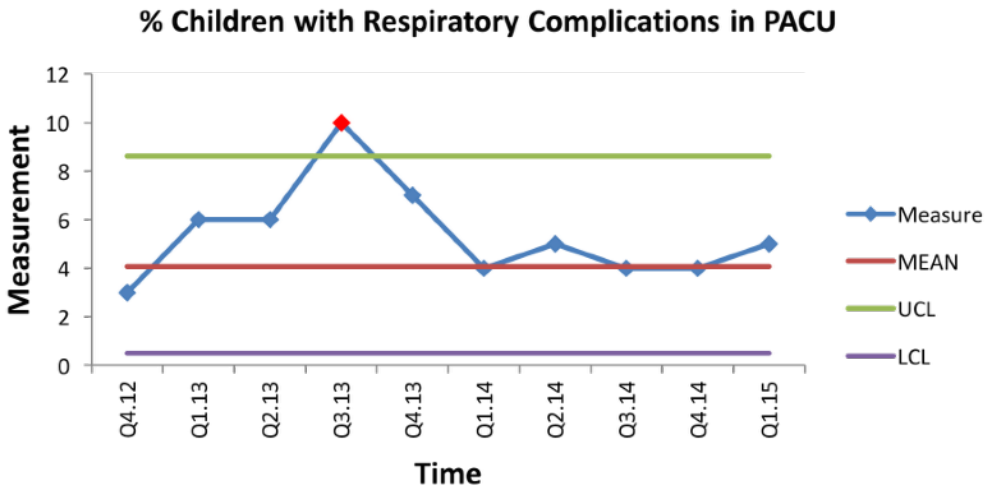

Figure 4. Control chart with '**special cause variation'**: a data point above or below the control limits.

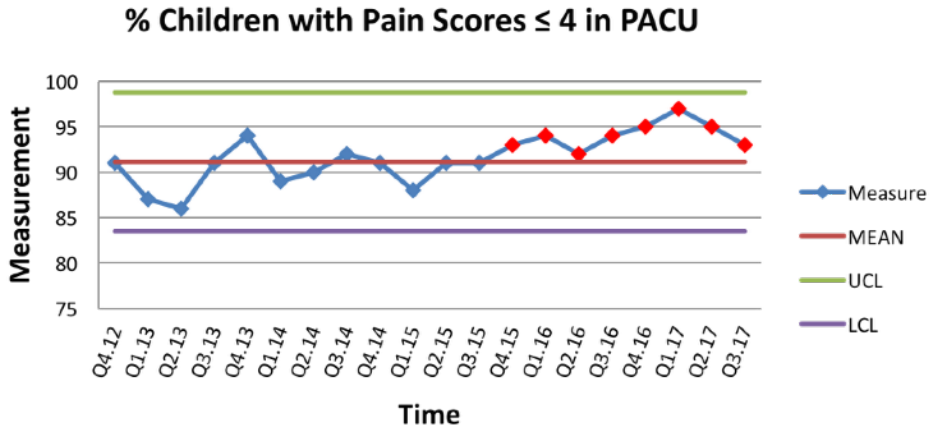

Figure 5. Control chart with 'special cause variation': seven data points or more all above or below the centreline it is called a '**shift'**.

Return to Contents

Dashboards are also useful to display results in relation to a target, baseline or benchmark.

4. Publishing QI projects
   In 2005, a standardised format to write QI papers was developed: the Standards of Quality Improvement Reporting Excellence (SQUIRE). It consists of a checklist of 19 items that authors need to consider when writing articles that describe formal studies of quality improvement. Most of the items in the checklist are common to all scientific reporting, but they have been modified to reflect the unique nature of medical improvement work.

Quality Indicators

Quality indicators are measures of aspects of our practice that allow us to continually improve the quality of care we deliver to our patients. They allow the assessment of performance against locally or centrally set standards, the identification of areas for improvement (gaps between evidence and practice), benchmarking and assessment of the impact of change. They can also be used to inform patients about the quality of services and in some cases to offer them choice. Evidence of clinical outcome data is required for GMC appraisal and revalidation for all doctors.

Some approaches include measuring indicators that reflect the domains of healthcare quality. Examples of paediatric anaesthesia quality indicators:
Safety: Critical incidents, respiratory complications.
Effectiveness: Temperature, pain scores.
Patient experience: Parent/patient satisfaction.

In order to improve outcomes and professional practice, quality indicator data should be cascaded up and down the organisation and integrated within a broader quality improvement strategy.

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Return to Contents

6.6 Preparing a Poster Presentation

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Poster presentations are an easy way to share information at meetings. They are also relatively simple to prepare, if you have a project/case report/audit/survey to share. Choose a meeting which is relevant and of interest to you to submit your abstract to. A good poster will be concise and focused, allowing the reader to understand your message in less than a minute. In a conference hall full of posters, it is likely that the majority of readers will spend only a short amount of time skim-reading your poster. For this reason, preparing a poster is very different to writing a manuscript and it should not simply be a copy of your abstract in larger font. Although it may initially be heartbreaking to cut out any words from the abstract you have worked so hard on, you must include only the words that are absolutely necessary to convey your message. Displaying information in graphical form often helps you do this. Your poster is a snapshot of your work, which should convey a clear message and entice the reader to learn more. Your title should be easy to understand and not too lengthy. Posing a question may be a good way to draw readers in. Once drawn in, the poster should be easy to follow and well laid out. Your local medical illustrations department may be able to assist with the layout and printing of your poster. It is, however, quiet simple to produce your own poster (which medical illustrations could then 'fine tune').

How to adapt a PowerPoint slide to become a poster

- Find out what size your poster should be (A1/A2/A3/A4) and the orientation (portrait/landscape)
- Go to 'page setup' and select portrait/landscape
- Alter the width and height of your PowerPoint slide according to the final poster size.
    - A1 841 x 594 mm
    - A2 594 x 420 mm
    - A3 420 x 297 mm
    - A4 297 x 210 mm
- For an A1 poster, suggested font sizes would be:
    - Headings 80pt
    - Subheadings 54pt
    - Main text 36pt
- Avoid using dark backgrounds or distracting templates
- Avoid using difficult-to-read decorative fonts. Instead stick with sans-serif fonts like Arial/Helvetica that are easier to read from a distance
- Print out your poster onto an A4 sheet to get a feel for how it will look, select 'scale to fit paper' in the print menu

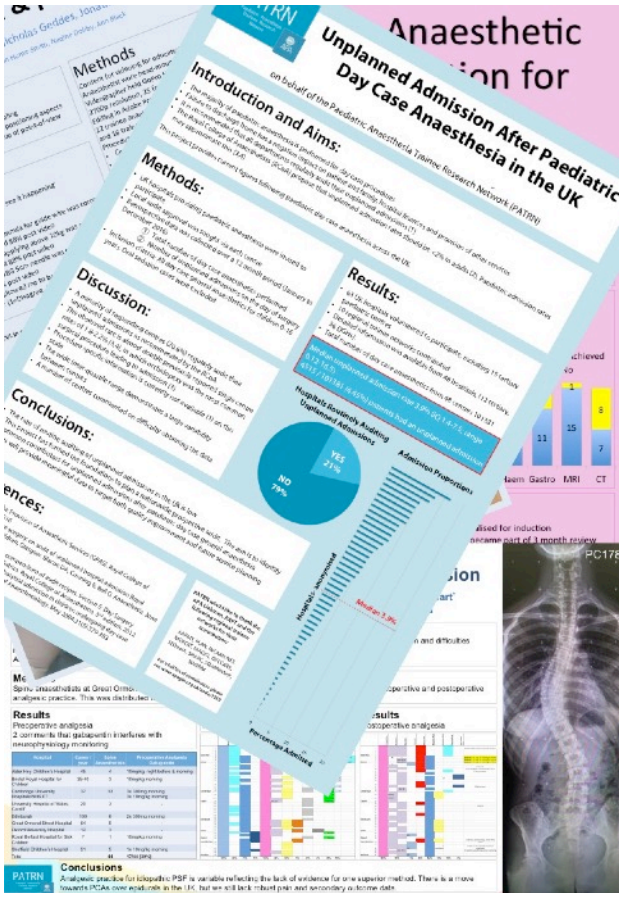
Return to Contents

Poster prizes

Some meetings award prizes to the best poster(s). The judging criteria may be available on the website. Find out when your poster may be judged (which may be during coffee/ lunch breaks) and stand next to your poster to answer any questions the judges may have. This is an opportunity to enthuse about the message you have to share!

How to present your poster

During coffee and lunch breaks, presenters will often stand next to their poster in order to discuss it with interested readers. Conference organisers may inform you that judges will be judging the posters and ask you to be next to your poster at a certain time. If so, it is worthwhile doing this rather than spending your time in the coffee or lunch queue. The smart way to do things is to ask a friend to bring you your coffee instead! Make sure you understand your poster, and its relevance to clinical practice. Ensure that you can give interested parties (including judges) a 'bite sized' summary (in 1, at most 2, minutes) of your project and it's findings. Sound interested! Ensure that you have read around the subject and your references.



What judges may look for

- Clear purpose of the poster
- Methods
- Interpretation of the results
- Relevance
- Overall presentation
- Ability to answer questions

Tips

- Don't be the one presenter who has printed out your poster in the wrong orientation
- Assume that the reader will spend less than a minute looking at your poster. Ensure your poster is easy to read, easy on the eye, doesn't contain too much information and leaves the reader with one or two 'take home' messages.
- Consider using a table, chart or diagram to present your information in order to portray your message and avoid excessive text
- Stand a metre and a half/two metres back from your poster and ensure that you can read all of it
- Avoid UPPER CASE and underlining text.

Return to Contents

6.7 Trainee-led Collaborative Work

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Natasha Woodman
APA Trainee Representative, St George's Hospital, London

What is a network?

A network is a group of motivated trainees across multiple hospital centres, pooling their ideas, manpower and patient populations. Members work as a virtual community, with a common purpose, to make research/audit/quality improvement projects accessible and successful. Projects recruit large numbers across multiple sites and robustly answer valid questions, improving the safety and quality of anaesthetic care.

How did trainee networks develop?

In 2012 a survey reported that anaesthetic trainees were not afforded opportunities to be involved in research, had not received adequate training in clinical research and did not feel competent in critical appraisal and data interpretation[1]. Contributing factors were likely to include the rotational nature of training with short-term residencies at multiple sites, and international drive for well-designed, large-scale, multi centre clinical research.

SWARM (South West Anaesthesia Research Matrix) was the first trainee led research network to be set up within anaesthesia in 2012[2]. However, the concept of a trainee model for clinical research was not novel and surgical trainees had already pioneered the idea. The West Midlands Research Collaborative is a surgical trainee group that successfully published a randomised controlled trial that recruited 760 patients and used 420 investigators in more than 20 centres[3]. Trainee led research networks are common to many clinical specialties in 2018 and trainee participation in audit, research and quality improvement projects has soared.

Within anaesthesia, there are currently 19 regional trainee led networks covering most corners of the UK. These are supported by the trainee-led, national umbrella group RAFT (Research and Audit Federation of Trainees)[4], which is in turn supported by the National Institute of Academic Anaesthesia (NIAA) and Royal College of Anaesthetists (RCoA). RAFT facilitates communication between the regional groups and organises national collaborative projects for everyone to participate in.

Return to Contents

What is available in paediatric anaesthesia?

Paediatric Anaesthesia Trainee Research Network (PATRN) was the first subspecialty, trainee-led, national network, recently joined by the Pain-Train and Tri-STAR (military). Originally founded in 2015 by two senior anaesthetic trainees, PATRN is a network of anaesthetic trainees with an interest in paediatric anaesthesia across Great Britain and Ireland, supported by APAGBI. Thanks to RAFT and their access to the regional networks, PATRN reaches far and wide.

Each centre has a named consultant and this is important for several reasons. As a nomadic group of people, trainees will complete a national PATRN project and move on. Consultants must ensure local data drives quality improvement projects with the next set of trainees that join their hospital. They also have an important role in protecting the trainees if the collected data reveals any poor practices or outcomes.

PATRN activity

Within its first year PATRN carried out two surveys that provided useful information on discharge analgesic practice for paediatric tonsillectomy and analgesic practice for posterior idiopathic spinal fusion surgery. With these short surveys PATRN launched. The projects taught PATRN the basics of running a national network and were the springboard for subsequent ventures.

PATRN has since completed a retrospective audit identifying the prevalence of unplanned admissions for paediatric day case procedures. This fed into the design of a prospective phase, PAediatric unPlanned dAYcase Admissions (PAPAYA), the largest trainee-led, national, paediatric anaesthetic audit to date. Through this process PATRN gained expertise in grant applications, documentation, statistical input and safe data storage. Communication is paramount and must be unashamedly basic to convey instructions on a large scale. The manpower to generate the documentation and answer regular queries should not be underestimated and everything must be sent via multiple platforms to reach the Facebook and Twitter hungry audiences.

In 2017 PATRN conducted a tablet based 'Swift Survey' at the APAGBI ASM looking at drug errors in paediatric anaesthesia. Hopefully the APAGBI ASM will provide an annual opportunity to collect data via a 'Swift Survey'.

Return to Contents

Use the database

PATRN has a fan base over 400 strong and will happily advertise meetings, conferences, and projects on your behalf. Any surveys that you wish to distribute would be peer reviewed with input from the APA Scientific Committee.

The majority of paediatric anaesthesia occurs in non-specialist centres, which means we need representation in over 300 hospitals. If you would like to join this merry bandwagon, please get in touch via the links below.

References

1. South West Anaesthesia Research Matrix ("SWARM"). 151. A survey of trainee research experience within the south west peninsula deanery prior to the establishment of a trainee research collaborative. *Anaesthesia* 2013; **68**(S3): 101
2. Clark, T. Trainee's topics in anaesthesia. SWARM: a new model for trainee research. Bulletin 79. May 2013. Page 21
3. Pinkney TD, Calvert M, Bartlett DC et al. Impact of wound edge protection devices on surgical site infection after laparotomy: multicentre randomised controlled trial (ROSSINI Trial). *BMJ* 2013;**347**(Jul 31):f4305.
4. http://www.raftrainees.com

Other resources

- https://www.niaa.org.uk/article.php?newsid=925

Return to Contents

7 Wellbeing as an Anaesthetist

7.1 Stress and Burn-out

Ellen Rawlinson

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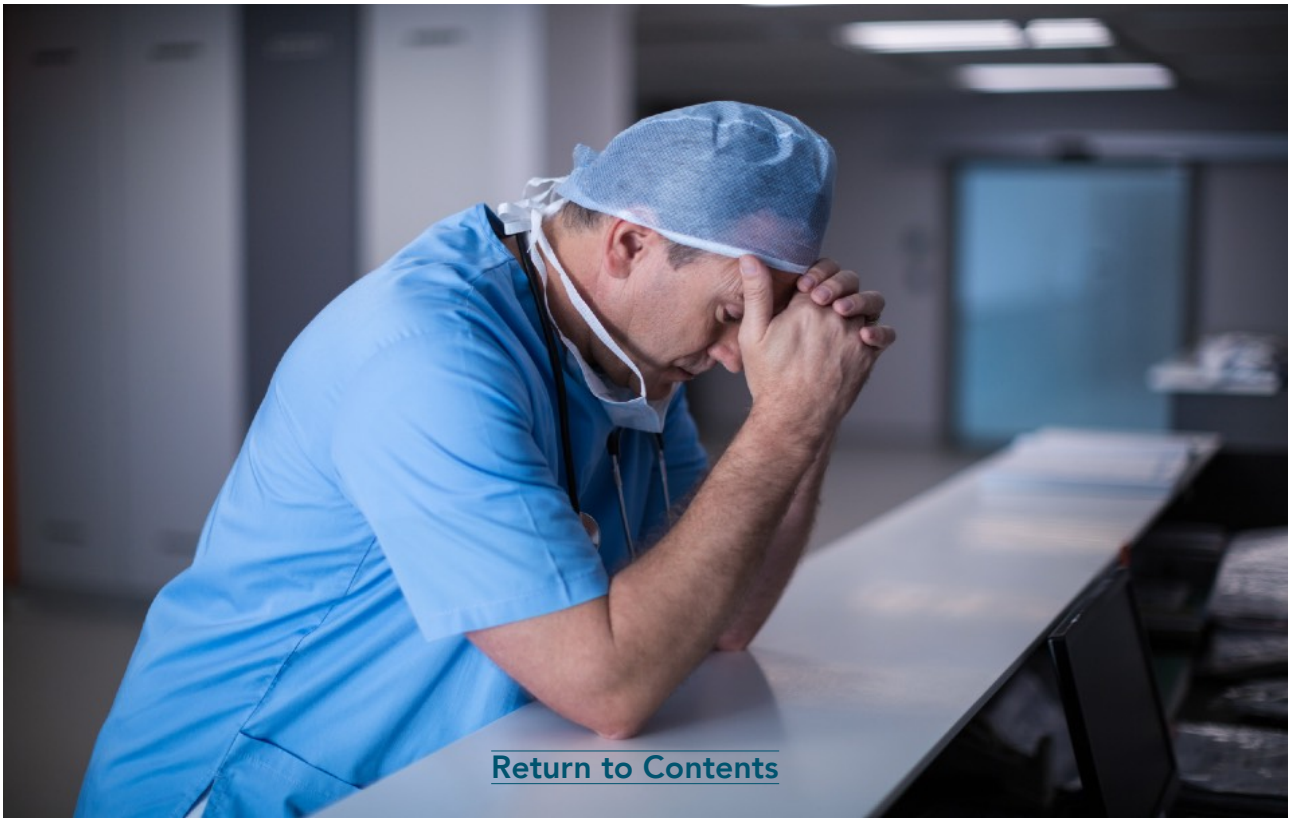
Burnout: an erosion of the soul caused by a deterioration of one's values, dignity, spirit and will. *Maslach's Burnout Inventory*[1]

Occupational burnout in a range of professionals doing 'people work' was first recognised in the 1970s. It represents a psychological response to chronic work-related stress of an interpersonal and emotional nature. A degree of stress is inherent to the life of an anaesthetist; caring for our patients can be a high stakes game with weighty consequences. However, with the right work-life balance it should be possible to recover from the stresses of one day before returning to deal with those of the next. Problems arise when the burden of stress becomes too great to allow this recovery to occur.

A survey by the Royal College of Anaesthetists published in early 2017 found that around two-thirds of anaesthetists in training felt their job had affected their physical or mental health; the survey concluded that many were at risk of burn-out[2]. The most important concerns related to maintaining an adequate work-life balance, with other factors including ongoing assessment, career uncertainty, the frequency of training rotations, terms and conditions of service and rota gaps. Additional stressors, perhaps not easily picked up by a survey of this nature, include ill-health and difficulties with interpersonal relationships, both at home and at work. These are pervasive issues; it is not difficult to see how such additional burdens to an inherently stressful job would provoke a more serious reaction.



Return to Contents

Diagnosing Burnout

Maslach's Burnout Inventory describes three components to burnout:

- Emotional exhaustion: reduced energy and job enthusiasm, emotional distancing from the job
- Depersonalisation: cynicism, lack of engagement and distancing from patients, treatment of patients as inanimate, unfeeling objects
- Personal accomplishment: missing a sense of efficacy and effectiveness, of involvement, commitment and engagement, of capacity to innovate, change and improve

If you recognise any of these elements developing in your practice, it may be time to consider if there are any adaptions that would be helpful.

Prevention & Management

The ultimate solution to burnout lies in fundamental changes to the structure of our work environment, but in the interim, there are several strategies that can be employed to buffer against the exigencies of current medical practice.

Change your response to work

- **Resilience Training:** Resilience is the ability to recover and bounce back from adversity and hardship. Many courses are available, but one excellent example is MedTRiM (Medical Trauma & Resilience Training) which has been developed by an obstetric anaesthetist from military trauma resilience techniques. The course views the whole medical working environment as potentially traumatic and aims to teach a variety of skills to identify stressors and deal with them effectively (www.walesdeanery.org/new-initiatives/resilience-medtrim).
- **Mindfulness:** Mindfulness is a personal meditation technique that aims to allow us to stand back from our thoughts and reduce their negative impact. A growing body of evidence supports active practice of mindfulness to reduce feelings of stress and anxiety, with mindfulness-based cognitive therapy (MBCT) as effective as medication in preventing recurrent depression. Techniques can be learnt through books, apps or online courses, or during sessions with a trained teacher (www.bemindful.co.uk).
- **Targeted Approaches:** We all vary in our vulnerability to the effects of a stressful job. One longitudinal study tested doctors for personality type, learning approach and stress / burnout before medical school then 3 times over 10 years[3]. They concluded that personality and learning style do not just correlate with responses to a working life, but cause them. Neuroticism was associated with greater stress, more emotional exhaustion and lower satisfaction with medicine as a career. Lower conscientiousness also predicted greater stress. What this means for anaesthetists in training is that examining your individual approach and response to your stressful job will allow you to identify the most effective way to manage issues for you. Specific courses such as time

Return to Contents

or anger management, dealing with conflict and improving your public speaking will be relevant for some but not all.

Change how much you work

One highly effective way to achieve an adequate work-life balance is to do less work. Working less-than-full-time can be temporary or part of a long-term approach to training. Taking a career break can bring relief during acutely stressful periods, or may allow space for reflecting on longer term aspirations. Communication with training bodies is key during these times to ensure that doors back into training remain open should they be wanted. The significance of leaving medicine altogether is perhaps not to be underestimated as the profession offers many advantages that may not be immediately apparent during times of significant stress[4]. However, it will be the right choice for some and further advice is increasingly available (www.blogs.ucl.ac.uk/ucl-careers/2015/03/30/want-to-leave-the-world-of-medicine/).

Change your source of support

Very few of us will navigate an entire career without needing some form of support. Colleagues, friends and family have much to offer, but at times an independent viewpoint can provide insight and assistance that those close to us cannot match. Many Trusts now offer confidential access to a variety of support services including telephone or in-person counselling through external organisations (details usually on local intranets). The BMA Counselling and Doctor Advisor Service provides telephone support with either a professional counsellor or directly with a doctor, several of whom are anaesthetists. They are available 24/7 on 0330 123 1245 and you do not need to be a BMA member. A comprehensive list of other agencies may be found in the Wellbeing and Support section of the AAGBI: www.aagbi.org/professionals/welfare

References

1. Maslach C, Jackson SE (1986) *Maslach Burnout Inventory Manual, 2nd Edition.* Palo Alto: Consulting Psychologists Press.
2. Royal College of Anaesthetists (2017) Health and Welfare Survey. Accessed 26th August 2017
3. McManus IC, Keeling A, Paice E. Stress, burnout and doctors' attitudes to work are determined by personality and learning style: A twelve year longitudinal study of UK medical graduates. *BMC Medicine* 2004;**2**:29-41
4. Oliver D. Leaving medicine – is the grass always greener? *BMJ* 2017;**358**:j3254

Return to Contents

7.2 Combining Parenthood and a Career

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Natasha Woodman
APA Trainee Representative, St George's Hospital, London

There are many reasons why anaesthetists find themselves starting a family towards the end of their training or around the time of CCT. This may be more common in paediatric anaesthesia, which tends to be a subspecialty interest developed later in a registrar's career. However, this isn't a problem and will provide a fresh prospective on one's work-life balance. Many consultants start their families around the time they acquired their substantive posts, so don't be afraid to ask them about their own experiences.

Pregnancy

You will inevitably have to share the news of your pregnancy with a select number of colleagues (including the rota coordinator) before your 12-week scan to reduce certain risks. The list you must avoid is nuclear medicine, and many choose not to work in interventional radiology. You may also feel anxious about the infections that some of your patients carry. Your department should be supportive and can hopefully allow a degree of flexibility around your lists.

Formally you also need to tell your educational supervisor, line manager, medical staffing department and training programme director (TPD) as soon as possible. Specific information can usually be found in your Trust's Maternity Leave Policy. The ability to work long days and night shifts in late pregnancy should be addressed on an individual basis, seeking advice from your GP and Occupational Health department where necessary.

Maternity and Parental Leave

This is a busy and exhausting time and it is advisable not to attempt too much other than enjoying your baby and resting where possible! Some admirably manage to continue projects, committee work or attend conferences during their maternity leave and this is likely to be easier with a good supportive network (you may need to step out for a feed or pump intermittently!). Occasionally an important job interview may fall during maternity leave but this should not put you at a disadvantage.

Shared parental leave may be something you and your partner consider. Trusts must honour this right although they may require a reminder of their duties towards all employees including trainees. For those who are adopting, the leave entitlements are essentially equivalent to maternity leave but it has its own specific paperwork.

Return to Contents

A decision will need to be made regarding when to go back to work. A period of up to 52 weeks is permitted and accrued annual leave may be taken at the end. Whether to return on a full time or LTFT basis will depend on personal circumstances and other factors such as previous working patterns, seniority, childcare arrangements and financial constraints. You will need to confirm your eligibility to work LTFT with your Deanery and complete the necessary paperwork. It is helpful to give the TPD and your employer as much notice as possible (particularly if you are changing Trusts) and inform them of any changes in your plans. If you chose to work LTFT, competence and confidence levels may take slightly longer to return to previous levels.

Childcare planning

Plans will need to be made regarding childcare arrangements on returning to work and there are pros and cons of every combination. Flexibility is important when covering early starts and late finishes so speak to colleagues and find out what works for them. Having a supportive partner and/or extended family nearby undoubtedly helps. This can be particularly valuable when children or nannies are ill or childcare facilities close for the holidays.

Returning to Work

Returning after maternity leave can be a daunting prospect but for many will be a welcome change from the demands of being a full time parent. Most Trusts allow up to 10 Keep in Touch (KIT) days that are paid in full time equivalents. These can be used for any work-related purpose, such as online e-learning, attending courses or for theatre lists. Some departments will support a short supernumerary period with doubled-up lists, ideally with a limited number of supervising consultants.

There are some excellent clinical courses to assist the return to work process, such as the RCoA Giving Anaesthesia Safely (GAS) Again course or Managing Emergencies in Paediatric Anaesthesia (MEPA).

All anaesthetic trainees should have an Educational Supervisor and a plan should be made regarding assessments of progress (E.g. ALMATs) and when out of hours work will be recommenced. Your Trust may also have a mentorship scheme that may be particularly helpful for more senior trainees or consultants.

Return to Contents

Post-CCT

The first few years as a new consultant are particularly challenging and there is a steep learning curve in one's clinical work. It is advisable initially to focus on settling into your job plan and to avoid taking on too many other roles. This phase often coincides with other life events such as starting or extending a family or moving house so try not to over stretch yourself.

Work-Life Balance

Being a parent is incredibly rewarding and instantly gives you a new level of empathy for parents bringing their children in for surgery. You will also have a better appreciation of the complexities involved in organising a trip to hospital and find it easier to build rapport with anxious children and their families. Many working parents describe being happier and more fulfilled in their home life and are better at managing quality time with their children.

Having young children is great fun and can be an excellent source of stress relief after a busy day at work. There is no denying that it can be exhausting at times, particularly when a teething toddler has been up through the night, however colleagues can be very understanding as they have often been through these situations themselves.

It is important to try to allocate some time for yourself, to continue hobbies or see friends in order to keep a healthy outlook. A career in paediatric anaesthesia is immensely fulfilling but can be stressful and tiring at times, so maintaining one's mental health and wellbeing is essential.

Resources

- https://www.nhs.uk/conditions/pregnancy-and-baby/pregnancy-infections/
- http://www.aagbi.org/sites/default/files/GAT%20Handbook%202016_2.pdf

Return to Contents

8.1 Paediatric Societies

- Association of Paediatric Anaesthetists of Great Britain and Ireland (AAGBI)
- European Society of Paediatric Anaesthesiology (ESPA)
- Society for Paediatric Anaesthesia in New Zealand and Australia (SPANZA)
- Canadian Paediatric Anaesthesia Society (CPAS)
- Society for Pediatric Anesthesia
- Asian Society of Paediatric Anaesthesiologists
- Paediatric Intensive Care Society (PICS)
- European Society of Paediatric and Neonatal Intensive Care (ESPNIC)
- Group of Anaesthetists in Training (GAT)

Return to Contents