

# PIER CONFERENCE 2017

*Improving Care Through Collaboration*

27th September 2017, Winchester Guildhall

## Book of Abstracts



Paediatric Innovation, Education  
and Research Network

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# Innovation & Improvement

## **Ashley Towers**

ST5 Paediatrics

### **Title**

Review of the assessment of immobile infants presenting to the Emergency Department with an actual or suspected bruise

### **Background and Improvement Aim**

Immobile infants are vulnerable, facing an increased risk of abuse. Regional and national guidance helps practitioners manage these cases however the approach of different healthcare professionals varies.

This project reviewed the assessment of immobile infants presenting to the Emergency Department (ED) with a possible bruise.

### **How you carried out the project**

A retrospective case-note review was conducted including <7month infants presenting to ED with documentation of a visible bruise/mark. The cases were audited against the regional protocol for the management of bruising in immobile infants. "Expert" opinion from experienced clinicians in Paediatrics, Emergency Medicine and Safeguarding was used to ratify the results. Outcome data was captured using allied healthcare records.

### **Outcome**

24 cases were identified over 3 months. There was inadequate documentation of mandatory details; 63% included the full name of the presenting carer, only 8% the infant's mobility and 67% documented a full examination. The most senior clinician to see the patient was an ST3 or below in 63% of cases. There was no discussion with senior clinicians in 33% of cases. Inter-agency referrals placed by the ambulance call- handler prompted 2 cases to be referred for safeguarding medicals by Children's Social Care; neither of these referrals were shared with the transporting or ED teams. Both cases were closed with no safeguarding concerns. Two different patients were later placed on Child Protection Plans for neglect. There is no documentation of subsequent physical harm in any case. All three "experts" agreed with the patient outcome in only 46% of cases.

### **Lessons for Practice**

The variability in "expert" opinion reflects the complex nature of these cases making involvement of seniors and effective inter-agency communication essential; these data suggest that information sharing is problematic. Documentation is inadequate, particularly regarding social history. An abridged "ED version" of the existing safeguarding proforma is being presented to stakeholders to formulate a multi- disciplinary plan to improve the management pathway for this vulnerable population of children.

## **Cathy Hill**

Consultant

### **Title**

Home sleep studies - experience from research and clinical practice

### **Authors**

Johanna Gavlak<sup>1</sup>, Paula Lowe<sup>1</sup>, Florian Gahleitner<sup>1</sup>, Ruth Kingshot<sup>2</sup>, Heather Elphick<sup>2</sup>, Paul Gringras<sup>3</sup>, Michael Farquhar<sup>3</sup>, Jane Martin<sup>4</sup>, Janine Reynolds<sup>2</sup>, Anna Joyce<sup>3</sup>, Hazel Evans<sup>1</sup> and Catherine M Hill<sup>1, 5</sup>

1. Southampton Children's Hospital
2. Sheffield Children's NHS Foundation Trust
3. Evelina London Children's Hospital
4. Southampton NIHR Wellcome Trust Biomedical Research Unit
5. University of Southampton

### **Background**

Cardiorespiratory sleep studies are traditionally conducted in hospital, where children may sleep badly. The Children's NSF encouraged 'timely, high-quality and effective care as close to home as possible'. Based on our research experience in young children with Down syndrome we introduced an innovative home based sleep study service in Southampton. Here we report the acceptability and success rates of home sleep studies in both research and clinical settings.

### **Design**

Prospective observational research study and retrospective clinical service evaluation Setting: Sheffield, Evelina London and Southampton Children's Hospitals.  
Patients: Children investigated for sleep disordered breathing (SDB).

### **Results**

194 children with Down syndrome, aged 0.5-6 years in a multi-centre research study and 61 clinical patients, aged 0.4-19.5 years in Southampton had home sleep studies using a miniaturised device. A successful study was defined as  $\geq 4$  hours of artefact-free data. 169/194 (87.1%) research participants. A successful study was defined as  $\geq 4$  hours of artefact-free data. 169/194 (87.1%) research participants and 57/61 (93.4%) clinical patients had successful studies. In both settings, a mean of 1.2 studies per child were required for successful data acquisition. 84% of research and 89% of clinical parents were willing to repeat home studies in the future. 67% of research parents found the equipment 'easy or okay' to use, while 64% of clinical parents reported it as 'easy or very easy'.

### **Conclusions**

Home sleep studies offer an acceptable and potentially cost-effective approach to the assessment of SDB in children and could transform service delivery in the UK where sleep laboratory resources are sparse.

### **Lessons for practice**

Parents value the opportunity to manage diagnostic testing at home. Before disseminating more widely in the NHS, cost-effectiveness should be formally evaluated

### **Role in project**

Research chief investigator.

**Helen Ord**

PICU Senior Fellow

**Title**

Wessex Buddies: A Near-Peer Mentoring Scheme

**Authors**

Dr H Ord, Dr A Osman, Dr C Hollingsworth, Dr S Deamer, Dr C Wesley

**Background and Improvement Aim**

Current challenges in the NHS have led to many trainees feeling over-whelmed and under-valued and sadly some have left training programs.

We identified a need for paediatric trainees to be offered a consistent support throughout training to help address issues or questions outside the realm of educational supervision.

Our aim was to set up a trainee led, RCPCH accredited, buddying scheme for paediatric trainees in Wessex.

**How was the project carried out**

We received guidance from the RCPCH mentoring champions network, UHS Learning and Development team and Thames Valley and Wessex Leadership Academy (TVWLA).

Senior trainees (ST4-8s) who volunteered to become buddies provided a profile for our website. Junior buddies (ST1+2s) were then invited to send us their buddy preferences and matches were made.

Senior buddies have attended the first training session (led by TVWLA). We have created online written and video resources to supplement face-to-face training sessions.

**What was the outcome?**

The scheme is in its infancy but has received much interest from junior and senior trainees. The feedback from the training session was excellent and our first buddy meetings are being planned over the next months.

Steps to ensure sustainability and ongoing quality improvement include: Wessex Buddies

Committee to oversee running of scheme. 6 monthly evaluation forms submitted via dedicated website Trainee lead yearly refresher training for new and established senior buddies

**Lessons for Practice**

We hope that the ground work we have put into planning this scheme and ensuring buddies are appropriately trained and supported will allow it to flourish. We anticipate that our junior trainees who are buddied will in turn become senior buddies facilitating a sustainable scheme.

## **Fiona Hignett**

Doctor (ST5/Fellow)

### **Title**

Improving PICU Discharges

### **Authors**

Andrea Robson (PICU Senior Sister), Kelly Field (PICU Staff Nurse), Molly Pope (PICU Ward Clerk), Fiona Hignett (Paediatric Registrar), Iain Macintosh (PICU Consultant)

### **Background & Aim**

Staff are motivated to improve the experience for patients, their families and staff as it was felt too many of our patients are being discharged at sub-optimal times. This has implications on:

1. Patient Safety (reduced staffing levels on general paediatric wards, but busiest time for staff)
2. Patient Experience (Transfer to ward is stressful for families & patients – even more so out of hours)
3. Efficiency (lack of flow can cause delays or cancellations in elective/TCl work)

Our aim is for 50% of our patients to be discharged between the hours of 8 am and 3 pm, within a 6 month target. These timings were chosen to reflect greater availability of medical, nursing and support staff on general paediatric wards & on PICU.

### **Project Design**

- Created anonymous online database to store and collate patient discharge information – used this to create run chart & other graphs
- Utilised skills of ward clerk for data entry
- Process map of discharge process
- Patient journeys mapped and followed

### **Outcome**

- Discovered excessive bleeping of bed manager: standardised the points that they were bleeped to minimise interruption & improve communication
- Highlighted delays caused by waiting for bed space clean – escalated to management level to create an electronic triage system for bed space cleaning priority

Run chart has shown improved discharge with 6 points in a row above the median. We are 4 months into our project and are continuing to collect and share data. We have instigated monthly QI meetings to brainstorm ideas and keep momentum.

### **Lessons for practice**

1. Engage with and utilise experience of all staff members
2. Robust process map focuses efforts for improvement
3. Start small think BIG!

### **Project Role**

Data Analysis, facilitating change and acting as bridge between PICU & G-Floor

**Neeraj Bhangu**  
ST5 Paediatrics

## Title

Improving Management of Prolonged Seizures in Wessex

## Authors

Neeraj Bhangu<sup>1</sup> , Olivia Shields<sup>2</sup> , Kate Pryde<sup>3</sup>

## Background and Improvement Aim

Evidence suggests (1,2,3) high morbidity and mortality for children with prolonged seizures. A 6 month retrospective 2016 audit at Queen Alexandra Hospital provided the basis for a multiprofessional regional quality improvement project launched to run running December 2016-2017, aiming to improve morbidity and mortality of children as measured by:

1. Time to seizure termination
2. Percentage intubated, ventilated or admitted to level 3 care.

A secondary aim is to reduce numbers with respiratory, haemodynamic or metabolic compromise.

## How was the project carried out

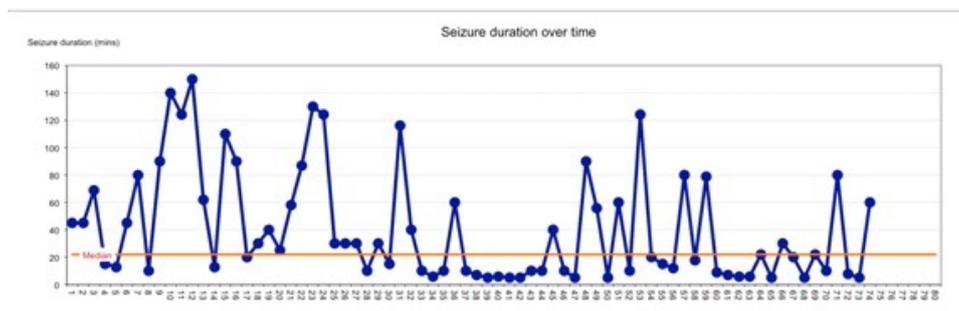
Data collection via paper and online forms and regional resources e.g. SORT have been utilised and local teams recruited at 7 hospitals in Wessex.

## What was the outcome?

Results have been collated regionally for time to seizure termination and time to phenytoin load. Other factors investigated are number of benzodiazepine doses given, proportion intubated and ventilated, duration of intubation and place of highest acuity of care.

Over 5 months, 81 cases have been captured. Initial data collection was slow and strategies to help including electronic forms, local leads championing the project and local targeted strategies such as posters and paper lists have been successful.

A run chart of the times to seizure termination:



The first improvement is a focus on 'thinking ahead' in the algorithm. Regionally planned via the SORT guideline and locally centres are considering how to best achieve this.

Moving forwards, identifying and implementing further improvements locally and regionally will be facilitated utilising a healthcare professional via PIER. For all interventions, the PDSA cycles with continuous monitoring of outcomes will track effects. Where local changes lead to improvement in outcomes, the regional nature of the project will enable other centres to benefit.

## **Robert Scott-Jupp**

Consultant

### **Title**

Running an adolescent clinic in a district general hospital

### **Aims**

Adolescents are poorly served by the NHS, often falling between paediatric and adult services. To address this need, an Adolescent Clinic was set up in a small District General Hospital (DGH) in 2011. It occurs fortnightly from 3 to 6 p.m. and is run by a consultant paediatrician. Young people aged from their 11th to their 18th birthday are seen, with a wide variety of problems. This study aimed to assess the effectiveness of the clinic.

### **Methods**

Ages, sources of referral, follow-up and diagnostic data were obtained from hospital information systems. Patient feedback was obtained from questionnaires completed by a random sample.

### **Results**

From 2011 to 2016 there were 815 attendances by 441 young people. 68% were female. Ages at first attendance were: 17 (6%), 16 (14%), 15 (22%), 14 (22%), 13 (16%), 12 (13%), 11 or below (7%). Referrals were predominantly through 'choose and book' (69%), directly from GP (23%), or other consultants (5%). 34% were discharged after first appointment. Follow-up to new ratio was 1.3:1. Non-attendance rate was 14%.

23 questionnaire responses were received, indicating high levels of satisfaction with: general atmosphere ('good' 48%, 'excellent' 30%); after-school appointment times (52%); age-appropriate communication (100%) and explanations (100%).

Primary diagnoses were varied. Amongst new referrals the most common complaints were musculoskeletal (13%), respiratory (7%) and gastrointestinal (7%); amongst follow-ups most were fatigue or chronic fatigue syndrome (26%), musculoskeletal (5%) and epilepsy (5%). Many had a psychological, behavioural or eating disorder problem as a secondary diagnosis. 15% were referred on to either a tertiary paediatric or secondary adult specialist service.

### **Conclusion**

A non-specialist adolescent clinic in a small DGH is feasible, effective and popular.

**Sarah West**

Paediatric Practice Development Nurse

**Title**

Design and Implementation of a Development Programme for Paediatric Nursery Nurses - a new role in Acute Paediatrics

**To be presented by Sarah West and Susan Nicholls (Paediatric Matron)****Background and Aim**

The issue of workforce sustainability is gathering support in the NHS, a challenge acknowledged in the Willis Report - the Shape of Caring review (2015). The report examined the future of the workforce and, acknowledging the increase in long term conditions, recommended the ups killing of unregistered staff such as Healthcare Assistants (HCA). Those employed as HCA's (Band 2 AFC) on the acute paediatric wards were qualified nursery nurses (Level 3 Apprenticeship equivalent) who could not progress beyond the constraints of their HCA role despite extensive clinical experience. Analysis of local ward activity showed a 24.82% increase over a two year period and, in line with the national picture, there have been difficulties recruiting registered children's nurses. Following a period of consultation, it was agreed that the staffing model would change with the addition of the Paediatric Nursery Nurse (PNN) role (Band 4 AFC). The role of the PNN is to care for a caseload of lower acuity patients (within a defined patient caseload description agreed at senior level) with the indirect supervision of a Registered Nurse.

**Implementation of the project**

The PNN's commenced in post in May 2017. A curriculum was designed to support the education and practice development of the PNN's. This incorporates theoretical education sessions and supervised practice. Assessment of learning outcomes consists of skills and competency assessments combined with reflective accounts of care to allow examination of more abstract practice concepts. Supervisors of PNN's were identified and provided with guidance and support.

**Outcome**

The programme is in progress at the moment and PNN's have now finished their supervised practice period and are working in their role on the wards. The programme has not been without it's challenges and embedding a new role into the nursing hierarchy has been an ongoing challenge for the senior nursing team. Managing expectations of the PNN's has also presented difficulties at times as the ward areas adjust to the change.

## **Charlotte Holland**

Doctor (ST6)

### **Title**

Oxford Paediatrics Hub - a networking platform for trainees, by trainees

### **Abstract Authors & Affiliations**

Charlotte Holland (1,2) Alice Lelliott (1,2) Ella Ambrose (1,2)

Oxford University Hospitals NHS Foundation Trust Oxford School of Paediatrics ST4-8 Trainee Committee

### **Background & improvement aim**

Until now, the Oxford School of Paediatrics has communicated with trainees by ad hoc emails sent by either the trainee committee or administrative staff, or through an outdated school website that 94% of trainees reported accessing 'never', 'once a year', or 'a few times a year'.

Furthermore, networking between trainees is limited by time constraints and geographic distance. The main communication channel has been a Facebook group, which half of trainees viewed no more than once per month. Indeed, 67% of trainees responded to Facebook posts 'less than once a year' or 'never'. Many thought that Facebook was insecure and unprofessional, and information was too easily missed.

To improve communication both from the School and between trainees, we implemented a free, secure, easy-to-use and professional networking platform.

### **How you carried out your project?**

We used the open-source system 'Trello' to create a dedicated interactive platform, the Oxford Paediatrics Hub. The Hub consists of boards with general information about the School, information specific to different trainee levels, and special interest groups.

The Hub's initial launch content was developed and tested by a sub-committee, but the platform is designed to be continually accessed, adapted and updated by all users. Sessions to support access and usage were held at regional training days.

### **What was the outcome?**

The Hub is now online and in frequent use, and trainees have begun to share content. We will conduct a follow-up survey of trainees in 6 months to assess the platform's impact on intra-deanery communication and networking, and will improve the system as needed.

### **Lessons for practice?**

Implementing new communication tools is difficult but worth the effort. With morale among junior doctors at an all-time low and training programmes increasingly inflexible, platforms such as The Hub will improve peer-to-peer networking, enhance communication and collaboration, and help trainees develop their sub-specialty interests.

**Lambri Yianni**  
ST5 Paediatrics

**Title**

PACE model - 'Probe, Alert, Challenge, Escalate'

Clear communication within a resuscitation team is paramount. This can break down when one team member recognises that the team leader may be making a poor decision, but is unsure how to address this. A number of models of 'graded assertiveness communication' are advocated, of which is the "PACE" system. Four escalating levels of intervention are used sequentially.

We present a case of how graded assertiveness was used to redirect the management of a patient.

A four year old with known Marfan's syndrome was admitted under Paediatrics at a district general hospital, with acute onset breathlessness and cough. He was seen on the assessment unit by a consultant paediatrician, who found severe respiratory distress, hypoxia and no chest sounds on the right chest. The patient was moved to the resuscitation bay, and additional support was summoned. An urgent chest x-ray was requested, and excluded a tension pneumothorax. Based on the clinical findings and the short history of symptoms, the consultant explored the possibility of foreign body inhalation and proceeded to make contact with ENT and PICU at a tertiary hospital. At the same time a junior member of the team reviewed the history, re-examined the patient and found that although there were unequal breath sounds, there was also wheeze, and suggested that the patient would benefit from bronchodilators. The patient was reviewed by the consultant, who felt that bronchodilators would not help, and the picture was not one of small airways disease. The junior proceeded to use graded assertiveness communication – Probe, Alert, Challenge and Escalate to redirect the management of this patient. The patient received bronchodilators and responded. He remained in the DGH over night and was discharged the following day.

On reflection the team members recognised that this is an area of medicine that is potentially difficult and dangerous. Sharing such experiences and approaches widely would help all staff to feel empowered to use their skills and knowledge to avoid medical error that could have been predicted.

**Laura Bengree**

Paediatric Palliative Care Clinical Nurse Specialist - Band 7

**Title**

Establishing a care pathway for perinatal Palliative Care

**Abstract Authors & Affiliations**

Laura Bengree, Colette Cochran, Dr Mark Johnson, Dr David Black, Emma Davies, Dr Tim Malpas, Dr Penny Mancais, Mr David Howe, Dr Karen Brackley, Sally Boxall

**Background & improvement aim**

The fetal medicine service in Southampton sees pregnancies affected by complex congenital abnormalities, some of which are incompatible with long term survival, or require interventions which are not felt to be in the infant's best interests. Over recent years it has become apparent that there is a need for clearer pathways for palliative care for this group of infants that can begin prior to delivery. This includes consideration of location and timing of delivery, where care will be provided after birth, clear advanced care plans (ACPs) and symptom management plans (SMPs), education and support for staff in local hospitals, and support for parents.

**How you carried out your project?**

In recognition of the above issues, we have begun to establish clearer links between our fetal medicine team, paediatric palliative care team, neonatal team and specialist services such as cardiology in order to develop plans for infants needing perinatal palliative care. We have then worked with the wider multidisciplinary teams in district general hospitals in the region in order to facilitate local delivery of palliative care.

**What was the outcome?**

We have now supported palliative care for two cases after delivery. One case had Hypoplastic left heart with poor prognosis and a parental choice palliative care in their local hospital. The other case had significant renal dysplasia with oligohydramnios and pulmonary hypoplasia, whose parents wanted them to be born locally. In both cases we were able to support the local teams to use an agreed ACP and SMP to ensure things went smoothly.

**Lessons for practice?**

These cases have demonstrated the value of palliative care for parents and that it is something that can be delivered locally by having clear communication between teams. It has also highlighted the need for more formal pathways and protocols, to ensure it continues to work well and is used more often in cases where it is appropriate.

**Trudie Pestell**

Doctor - ST4 Emergency Medicine

**Title**

Buckle up and Splint it, don't POP it! Splints for wrist buckle fractures in children

**Abstract Authors & Affiliations**

Dr Trudie Pestell – Registrar Dr Chris Vorwerk – Consultant

**Background & improvement aim**

Splint use for buckle fractures is common, with high satisfaction levels and low complication rates. A previous attempt had failed in our Department. Potentially due to lack of 'buy-in' and use of a multidisciplinary approach.

The improvement aim was to develop a pathway for the management of appropriate wrist buckle fractures with splints.

**How you carried out your project?**

A literature review and review of national/local practice. The model for change quality improvement model used.

Driver diagrams and process mapping was used to determine outcomes, balancing measures and explore the patient journey.

Stake holder analysis and change matrix identified members of the multi-disciplinary team. PDSA cycles were used to assess the pathway.

Patient/parent questionnaires were undertaken.

**What was the outcome?**

Five measures to cover the six domains of quality were assessed over the first year of implementation.

Patient satisfaction, convenience and preference: All contacted were satisfied, felt splints were more convenient and would prefer a splint if a similar injury occurred again.

Mean time in the department: Splinted patients were discharged on average 17 minutes sooner.

Pathway use and balancing measures: Of the 92 patients suitable for splinting 88 (96%) were managed on the pathway. There were two inappropriately managed volar buckle fractures, both identified with our safety net system. There were 5 versus 8 returns in our splint and back slab group.

Nursing time saved: An estimated 26 hours of nursing time was saved.

Financial impact: Our pathway resulted in £7,920 of savings.

**Lessons for practice?**

The key to success and sustainability was thorough preparation and a multidisciplinary approach.

**Your role in the project**

Team leader.

## **Sarah Wright**

Doctor

### **Title**

Safer Prescribing: Aligning ADHD Medication Prescriptions with NICE Guidelines

### **Authors & Affiliations**

Auditor: Dr Sarah Wright

Supervisor: Dr Jo Renshaw

### **Background & improvement aim**

NICE provide evidence-based guidance for the prescription of medication used to treat school-aged children diagnosed with severe ADHD. An audit undertaken in 2014 evidenced that prescribing standards were not recorded fully or clearly in the patient's notes. As part of the changes to practice, a new ADHD prescribing proforma was introduced throughout the department to improve the quality and clarity of documentation and ensure it was brought in line with NICE guidelines.

### **How was your project carried out?**

As part of a PDSA cycle, a re-audit was undertaken using pharmacy records to identify children commencing ADHD medication in 2016 at Poole Hospital. Retrospective analysis of medical notes was carried out to review documentation of the medication prescriptions. NICE CG72 was used as the gold standard.

### **What was the outcome?**

48 cases were identified with 10 excluded. Following an in-depth analysis of medical notes, the results were not dissimilar to the 2014 findings. Whilst highlighting many positives in prescribing practice, other standards of documentation remained poor, particularly in areas such as mental health and social assessments including the potential risk of drug diversion. Documented history of cardiac problems could also be significantly improved. Interestingly the prescribing proforma was not in regular use with only 8% of notes containing a copy.

### **Lessons for Practice?**

Through talking to clinicians, I learnt that some were not aware of the prescribing proforma or did not have access to it. Some were resistant to using something that was felt to be time-consuming or dictatorial to their practice after years of experience.

### **Your Role in the Project**

Following the audit, a teaching session was set up to highlight the ongoing findings and encourage prescribing clinicians to reconsider use of the prescribing proforma to improve compliance with NICE guidelines, as well as suggest program adaptations and discuss its barriers, as part of a PDSA Cycle.

## **Jenny Bull**

Outreach Nursing Lead

### **Title**

HUDDLES – enhancing safety & flow through collaboration and communication

### **Authors:**

Jenny Bull, June Gallagher, Fiona Hignett, Kate Pryde (all UHS)

### **Background & Aim:**

Participating in the RCPCH SAFE project is part of our aim to reduce avoidable harm through the development of a proactive safety culture. One of our initial focuses was establishing a safety HUDDLE, initially on the medical unit this has expanded to each in-patient area. With each ward level HUDDLE feeding into a 'hub HUDDLE' ultimately facilitating:

- Effective communication resulting in improved situational awareness within ward teams and ultimately at operational level
- Improved flow and reduction in length of stay
- Reduced unplanned PICU admissions
- Reduced adverse events

### **Methods:**

We utilised continuous improvement methodology with multiple PDSA cycles including:

- Key stakeholders identified and engaged
- Instigated lunch time huddle for all wards – representative for each ward area attends in conjunction with outreach, bleep holder, paediatric consultant of the week and duty manager or matron
- Further huddles developed including morning high-dependency huddle and night-time huddle
- Regular small changes to location, timing and facilitation of huddles to improve engagement and outcomes
- Run chart of attendance, duration & delay to starting huddle
- Bar charts to look at issues raised and outcomes of huddle

### **Outcomes to date:**

Steady increased attendance by ward staff. Addition of manager/matron attendance has enabled more complex issues to be escalated & dealt with in a more timely manner. Greater collaboration with staff solving each other's problems proactively. Flow across Children's hospital being reviewed regularly in real time. Fewer 'just to let you know bleeps' to bed managers.

### **Lessons for practice**

- HUDDLES give staff an opportunity to gain greater situational awareness and appreciation for the needs of patients and colleagues.
- Keep the huddle short and succinct (ideally no more than 10 minutes)
- Review outcomes of huddles to assess the impact on patient experience
- Crucially change has been instigated by staff on the shop floor rather than 'top down'

**Caroline Fawcett**

Lead Play Specialist, Registered Health Play Specialist, MA in Play Therapy Member of NAHPS (National Association of Health Play Specialists)

**Title**

Play preparation to reduce the need for general anaesthetic in children undergoing MRI scans

**Author**

Caroline Fawcett, Lead Play Specialist Registered Health Play Specialist, MA in Play Therapy Member of NAHPS (National Association of Health Play Specialists)

**Background & Improvement Aim**

Until recently, pre-cooperative, anxious and children with additional needs have been referred for MRI scans under general anaesthetic (GA). With play preparation, children are able to develop coping strategies to undergo scans while awake. Thus the child can avoid day case admission, while also reducing service costs and waiting times. Drawing on best practice based on safety and patient experience, the project aimed to reduce the number of children requiring MRI scans under GA.

**Project**

With the set-up of a MRI referral pathway, a play specialist prepared each child for scan taking into account a range of factors including: cognitive development; emotional maturity, previous medical/hospital experiences, coping techniques, child and family anxieties and medical history. Other preparation techniques incorporated the viewing of a preparation video and visits to the MRI department to familiarise the child/parent/carer with the sights, sounds and movement of the scanner.

**Outcomes**

A total of 42 patients, aged between 2 and 11 years, were referred to the play specialist over period of 12 months. The preparation intervention resulted in 31 children (74%) undergoing successful MRI scans without general anaesthetic or sedation. The youngest of these were 2 children aged 2 years, and 6 children aged 3 years. Other outcomes include:

- Reduced waiting list
- Improved patient experience
- Child and parent/carer individual needs supported
- Reduced risk associated with general anaesthetic (equipment & patient)
- Reduced costs

**Play Specialist Role**

Collaborating with the MRI department, I set up and delivered the play preparation intervention, preparing and supporting the child and their family through their MRI scan. I am now working with a company to create and deliver virtual reality software for preparation of children and young people having MRIs. This incorporates a wide range of interactive preparation experiences, developed through work with a child psychologist, and other hospital play teams.

## **Rebekah Kemp**

Doctor ST7

### **Title**

To move or not to move: Improving patient safety on Inter-hospital transfers.

### **Abstract Authors & Affiliations**

Dr Rebekah Kemp and Dr Sarah Brown, Paediatric Trainees in Wessex University Hospital Southampton

### **Background & improvement aim**

Children need to be moved between hospitals for a number of reasons; it is essential this is done safely. The sickest children, usually those needing ventilatory support, are transferred by dedicated paediatric transport teams. Others are transferred in a variety of ways including family members, standard ambulance, with or without medical escort. The Paediatric Critical Care Network (PCCN) created a regional non-PICU transfer tool a number of years ago (available at [www.sort.nhs.uk](http://www.sort.nhs.uk)) to prompt appropriate pre-transfer assessment. Anecdotal evidence suggested a number of patients were being transferred in a sub optimal manner; we sought to identify what the practice was with regard to the form utilisation and explore how improvements in the process could be made.

### **How you carried out your project?**

We retrospectively identified all children referred to UHS G-level in January 2017. Notes were reviewed, the inter-hospital transfer form identified, and subsequently reviewed for completeness.

### **What was the outcome?**

We identified 44 patient transfer episodes; of these, 38 sets of notes were reviewed. Only 6 inter-hospital transfer forms were found, of which none were fully completed.

### **Lessons for practice?**

The forms are not being used as intended, we suspect as a result of lack of awareness. As a potential risk to patient safety during transfer, increasing the profile and utilisation of the form, to ensure adequate assessment of risk, is essential.

Alongside our project, a group from the PCCN have reviewed the form's content and updated this with a new version and name: STOPP. This needs to be well communicated with all parties – both medical and nursing staff in both referring and accepting hospitals. The bed manager has also been approached to suggest the form upon receiving bed requests.

### **Your role in the project**

Reviewed notes; wrote report.

## **Lorraine Major**

PANP band 8a

### **Title**

DGH huddles

### **Authors and Affiliations**

L. Major PANP, Dr J. Edelman (HHFT)

### **Background**

Implementing team huddles can be a powerful tool to enhance care co ordination and improve patient and staff experience in clinical practice as well as maximizing safety and efficiency.

Team huddles provide an opportunity for everyone from doctors, nurses, physio's pharmacists, ward clerks and domestic staff to check in at selected times of each shift to ensure that the whole team is on the same page and focused on the same goals throughout the day.

Huddles have been introduced into many aspects of health care. This is about the introduction of huddle into a small DGH paediatric department.

### **How was your project carried out?**

We started with three steps to an effective huddle

1. Establish the Routine
2. Improve patient safety, improve communication, develop relationships
3. Evolve and improve over time

To do this we collect information related to when most multi-disciplinary professionals were on the unit in two areas. We selected two times of 12.30 (inpatient ward) and 16.30 (paediatric assessment unit). We collected data via a questionnaire of what people thought of huddles and how they sought patient safety information on a daily basis prior to implementation.

We then developed a checklist to keep the conversation concise and focused to the allocated 5-10 mins. We are hoping the huddle becomes more organic, however recognise that it would benefit from initially having a set structure.

### **What was the outcome?**

To date the huddles have been introduced over the past three weeks. There have been a few changes and set backs, however there is already an establish routine in one area, with some small evidence of culture change. We recognise successful huddles need time and space and constructive feedback to become truly effective. We are planning to collect more data of the huddles in the next week to provide us with sufficient information to assess their effectiveness.

**Kate Steel**

Nurse band 7

**Title**

Paediatric Outreach Team Staff Satisfaction Survey

**Authors**

Jenny Bull, Kate Steel, Amy Withers, Naomi Haynes, Hannah Taylor.

**Background and Improvement Aims**

To gain feedback on current team performance and guide future service provision.

**How you carried out your project**

A staff satisfaction survey was sent to all members of the MDT including medics and consultants. The participants were given the option to remain anonymous. All were given a 6 week window to reply. The results were collated and current themes identified. This survey is repeated yearly.

**Outcome**

The feedback was favourably reassuring. The team appear to be exceeding expectations. There was strong feeling amongst the participants that the paediatric outreach team should consider expanding their core working hours to include nightshifts making it a 24/7 service.

**Lessons for practice**

The survey confirms that the Outreach team continues to provide a much needed valued service. Senior nurses with acute clinical nursing experience are essential to ensure another layer of support for health care professionals in relation to the management of sick children.

**Your role in the project**

Lead on designing, launching and collating the Survey.

**Anna Wykes**

Nurse Educator (band 7)

**Title**

The Wessex Paediatric Nurse Preceptorship Programme

**Author**

Anna Wykes: Lead Nurse Educator for the Wessex Paediatric Nurse Preceptorship Programme, University Hospital Southampton

**Background and Improvement Aim**

From scoping exercises that compared current national and regional practice against national preceptorship recommendations, it was demonstrated that in Wessex, while teams were achieving more of the recommended preceptorship standards in comparison to other UK centres, improvements could be made.

In a climate of financial adversity, improvements to current delivery necessitate a cost effective approach. This confirmed that the development of a regional programme, that shares the delivery of preceptorship training between employers of paediatric Newly Qualified Nurses (NQNs), could be a means of achieving this.

**How was the project carried out**

The development of a regional programme has relied upon the support of NHS teams in Wessex and the involvement of nurse educators whose participation has been in addition to their existing roles and responsibilities

**What was the outcome?**

To date, the programme development has been achieved through regular meetings with representatives of key Wessex paediatric nurse educator teams. Each team have agreed to take turns to “host” different study days so to ensure the regions expertise is used and shared. This includes identifying interprofessional learning opportunities such as the integration of NQNs within PREP simulations.

A pilot of the regional paediatric nurse preceptorship programme has been planned to commence in October 2017. It intends to establish a structure of training and support that meets not only meet recommended standards but fundamentally the needs of the developing paediatric NQN workforce.

Short term aims of the programme includes the:

1. provision of a standardised training and clinical competency framework
2. improved transition and socialisation of the NQN in Wessex

In the long term, the programme hopes to:

1. Improve NQN staff retention and improving attrition rates
2. reduce NQN staff sickness levels
3. reduce NQN related Adverse Event Reporting (AER)
4. improve patient experience/care
5. develop shared learning pathways within paediatric teams



# Education

**Helen Ord**

Paediatric ST4 Doctor

**Title**

A review of the presenting symptoms, demographics, prediagnostic symptom interval (PSI) and tumour type of paediatric patients presenting to Queen Alexandra Hospital with primary brain tumours

**Authors**

Dr H Ord<sup>1</sup>

**Affiliations**

Queen Alexandra Hospital NHS Trust (QAH) Paediatric Department<sup>1</sup>, HeadSmart The Brain Tumour Charity<sup>2</sup>

**Background and Educational aims**

Primary brain tumours are the most common solid malignancy of childhood and it is well understood that early diagnosis can improve mortality and morbidity.

The aim of this audit was to review the Prediagnostic Symptom Interval (PSI) of paediatric patients presenting with primary brain tumour. The PSI is the time between symptom onset and diagnosis. Further secondary aims were data on presence of 'red flag' symptoms, demographics, time to first presentation and number of presentations pre-diagnosis amongst others.

I believe this will help to further understand the multiple factors impacting delayed diagnosis and the areas we can target with education.

**How you carried out your project**

Retrospective notes review of all paediatric patients presenting to QAH between January 2013-January 2016 with primary brain tumours.

Breadth of data collected as described above.

**Results**

Patients ranged between 2 months and 8 years, 75% of patients were male and 100% had 'red flag' symptoms according to HeadSmart guidelines at presentation. The average PSI was 44 days, the greatest being 120 days. The average interval between presentation to a healthcare professional and diagnosis was 27 days, the greatest being 90 days.

**Lessons for practice**

The greatest delay to diagnosis remains the PSI and when the first presentation did not prompt referral to secondary care.

This highlights key areas for education being caregivers and young people, and within primary care.

Action plan includes promotion of HeadSmart education material and to construct a regional education programme for schools.

**Your role in the project**

Designed and lead, performed all data collection, analysis and write up.

## **Helen Ord**

Doctor ST4 Paediatrics

### **Title**

Audit of practice and attitudes towards measuring gastric residual volumes in the critically ill child

### **Abstract authors & affiliations**

Dr Luise V. Marino, Kim Novell, Dr Helen Ord, Dr Kim Sykes, Dr John Pappachan.

Department of Nutrition and Dietetics<sup>1</sup>, Paediatric Intensive Care Unit 2, UHS NHS Foundation Trust

### **Background & educational aim**

Gastrointestinal motility can be impeded in critically ill children. As a result, there is often delayed gastric emptying (GE) and reduced enteral nutrition (EN) tolerance. Measuring gastric residual volumes (GRVs) is common practice for assessing feed intolerance, and preventing pulmonary aspiration. The aims of this audit were to assess the practice of measuring GRVs and how this compares to our current guideline, and to understand attitudes of staff carrying out this procedure.

### **How you carried out your project**

Part 1: A prospective chart review of all unit patients over 21 days.

Part 2: Anonymous questionnaire to evaluate staff attitudes towards measuring and evaluating GRVs.

### **Results:**

Part 1: Current feeding protocol is to measure GRVs 4 hourly. This was achieved in 13% of patients. However, 82% of GRVs were replaced.

Part 2: 81% felt a GRV > 4 hour feed volume indicated feed intolerance. Variety of factors used to assess GRVs were identified. Participant responses to how frequently to measure GRVs GRVs ranged from: 1 hourly after surgery (10%), to 4-6 hourly (23%).

### **Lessons for practice**

Wide variation in practice despite the presence of a guideline – Identification of an education need

Inconsistency in practice may lead to EN being withheld which may impact negatively on nutritional status and potentially unnecessary parenteral nutrition

Using GRV as a measure to advance feeds may be more appropriately reserved for the most at risk patients – how can we investigate this?

### **Your role in the project**

1. Publicising project on unit
2. Data collection and write up

**Ahmed Osman**  
Doctor (Registrar)

**Title**  
Parental Experiences of Medical Education

**Authors**  
A Osman, B Cambers, S Potter, K Sykes (all University Hospital Southampton)

**Background and aims**  
Education is continuously occurring in hospitals, both formally and informally. Patients and relatives are often involved in medical education, but there is little data on their opinions of this, particularly in PICM. This study explored parental experiences and perceptions of their children being involved in education while admitted to PICU.

**Methods**  
Twenty parents whose children were involved in an educational video project on our unit were asked to anonymously complete a mixed qualitative and quantitative questionnaire about their experiences and perceptions of their children being involved in education on PICU. Thematic analysis was used to analyse the qualitative elements.

**Results**  
Parents were universally positive about their experiences, particularly about the potential for their child to help future patients. Parents felt that participating in education was a nice way of “giving a little something back” and “something for [their child] to be proud of when [they] are older”.

Their decision to participate was mainly influenced by the perceived positive effect of the resulting educational material and the feeling that their child was “making a difference”. All parents reported that their child being critically ill had no effect on their decision. They appreciated being approached to participate “in a professional manner”, and being provided with information about what the educational material would be used for.

Although only a quarter of parents reported that their children had previously been involved in education, all respondents said that they would ‘definitely’ or ‘probably’ allow their child to be involved again in the future.

**Discussion and Conclusions**  
Parents’ experiences of education on PICU are overwhelmingly positive. The main factor affecting their decision is the perceived positive benefit for future patients, and despite their child’s critical condition, parents are happy to be involved in education provided they are approached professionally and given appropriate information.

## **Clare Hollingsworth**

ST7 Paediatrics

### **Title**

Does the use of high flow nasal cannula (HFNC) oxygen therapy safely improve outcomes in infants with bronchiolitis?

### **Background and Educational Aim**

Bronchiolitis is a common, viral illness affecting the lower respiratory tract of infants typically under one year of age. A third of children are estimated to develop bronchiolitis in the first year of life.

High flow nasal cannula (HFNC) therapy is a method of delivering humidified gas (+/- oxygen) and is being used more frequently in the management of bronchiolitis. However, neither the National Institute for Health and Care Excellence nor a 2014 Cochrane review recommend the use of HFNC therapy in bronchiolitis.

This review aimed to summarise current available evidence for the use of HFNC therapy in bronchiolitis with particular focus on clinical outcomes and safety. The objective was to inform clinical practice and potentially utilise the results in bronchiolitis guideline formation.

### **Methods and Findings**

A literature review was undertaken using Medline, Embase and the Cochrane Database. Further literature was sourced following manual review of bibliographies.

HFNC has been shown to be effective at reducing intubation rates and escalation of treatment in bronchiolitis. Good quality evidence has shown that HFNC therapy could be used as an effective intermediate therapy in infants with bronchiolitis on paediatric wards who have treatment failure on standard nasal oxygen, as opposed to as an initial therapy for all babies with bronchiolitis. This would limit overuse and the associated cost implications.

This review included 10 studies involving HFNC therapy in infants with bronchiolitis and there were no adverse events reported.

HFNC therapy is a safe, well-tolerated potential treatment option in bronchiolitis.

### **Lessons for Practice**

This review will be useful in the preparation of the PIER guideline for bronchiolitis which is currently underway.

### **Role in the Project**

I undertook this review as part of my Post Graduate Certificate in Child Health and Paediatrics at Imperial College London.

**Kate Riley**

Clinical Facillitator PHDU Band 6

**Title**

Developing Level 2 Critical Care skills within the Paediatric High Dependency Unit at Southampton's Childrens Hospital

**Authors**

K.Riley

**Background**

In response to the RCPCH document "Time to Move On"; driving standards for improved delivery of safe, high quality critical care outside the PICU environment, a comprehensive, systems based, education program for nurses in the Paediatric High Dependency unit (PHDU) at Southampton Children's Hospital has been developed. This PHDU currently functions as a 'level 1' critical care unit; however due to regional analysis of increased patient acuity and care demands, the requisite for a 'level 2' functioning PHDU has been urgently identified. The aim therefore is to provide an augmented training and skill development program to enable 'level 2' critical care to be provided.

**Method**

The program utilises a multi-disciplinary team approach and incorporates a mixture of lectures, interactive learning and practical, skills-based sessions. The framework takes a systems-based approach and the content has been assessed using the competency framework outlined for 'level 2' critical care units and developed in accordance to the enhanced standards.

Crucially, a critical skills competency document has been developed alongside the study program. This document will provide evidence of skill development moreover ensure safe implementation and required level of clinical competence.

**Results**

This program remains in the pilot phase. It is undergoing continual evaluation to develop the content and delivery to meet the development of nursing competence and patient care needs.

**Conclusion**

Once the pilot phase has been completed and the program fully evaluated, we intend to provide it as a rolling program and made accessible to all areas within the children's hospital providing 'level 2' critical care. Through the implementation of such a comprehensive education program we hope to empower and motivate the nursing workforce, improving retention of experienced clinical staff and most importantly, significantly improve the patient care and patient flow for all critically ill patients across the children's hospital.

**Elli Rushton**

Nurse Band 7 Lead Practice Educator

**Title**

Breathing, Bathing and Ball pools: Every child has the right to play.

**Authors**

Elli Rushton

(Lead Practice Educator) Huw Bromage (Play & Activities Team Leader)

**Background and Educational Aim**

Every child has the right to play, but some need to play in a different way. Children are born complete with imagination, dreams, and a desire to interact with the world around them. They explore all these things through play. The nursing care of children with life limiting conditions has become increasingly medicalised with a high level of technological interventions. We focus so much on learning how to use the range of complex equipment, we forget about the child in the centre of it. Practice Educator & Play Teams have developed our Breathing, Bathing and Ball pool programme for Nurses, and Carers so that they can recapture lost childhood using a range of play activities, swim sessions and outings.

**How the Project was carried out**

Provision of experiential and interactive training to all Nurses and Carers, including activities in blindfolds, with headphones on, or restricted movement

Friday Fun Time, an interactive session exploring the importance of play and childhood development  
Creation of a Toolkit to enable Nurses and Carers to facilitate sessions independently, anytime, anywhere. 55 staff participated with 168 children over a 3 month period.  
Evaluation forms completed by parents and staff identified their month period. Evaluation forms completed by parents and staff identified their understanding that play is crucial to both the physical and mental health of all children. Although majority of children had no verbal communication, photographic evidence indicated how brilliant the experience was for them

**Lessons for Practice**

We hope that the test of our innovative programme will facilitate Nurses, and Carers to incorporate play into all aspects of their care. The new toolkit and materials could be tested and duplicated in other settings such as hospitals, hospices and respite centres.

**Kate Pryde**

Consultant Paediatrician

**Title**

Combining human factor and quality improvement training to effect sustainable change - report of a pilot initiative on PICU

**Authors**

Andrea Robson (PICU Senior sister), Kim Sykes (PICU Consultant) & Kate Pryde (HEEW Child Health QI lead)

**Background & Educational Aim**

There is evidence to suggest that safety interventions combining teamwork and quality improvement (systems) training are more effective than those adopting either approach alone<sup>1</sup>. This has important implications for safety and quality improvement (QI) strategies in hospitals. We piloted an educational initiative combining these factors as a potential model for training across the region. We chose the PICU team who already have an annual programme of team training days.

**Methods**

A one day programme was designed consisting of an introduction to human factors and an overview of basic QI methods followed by an interactive team treasure hunt with a final session discussing ideas for improvement on PICU. All staff members from domestic to clinical lead, including visiting teams such as psychology & pharmacy were invited to attend.

After the days (which trained ~ 100 staff) all the ideas for improvement were displayed in the staff coffee-room, through 'dot-voting' the staff agreed 4 projects to pursue.

The projects had a nursing and clinical lead. They were supported using a combination of mentoring and facilitated learning sessions on improvement methodologies specific to the projects needs. Details of projects are provided in other submissions.

**Lessons for practice**

This pilot has shown that it is possible to deliver both training in human factors and QI methods as well as specific improvements through a dedicated project. This has been achieved with no additional time other than the first team training day which was already part of the education programme. The human factor and improvement methodology skills are transferable and have increased the capability of the units' staff to approach future improvement work.

We propose this is a cost effective method of training in both human factors and quality improvement methods that should be rolled out regionally.

**Role**

All designed and delivered the initial team days. KP provided QI support to projects on going.

## **Karen Lock**

Band 7 Paediatric Physiotherapist

### **Title**

A paediatric scenario in on call physiotherapy simulation training can improve self reported competency

### **Abstract authors and affiliations**

Lock K., Clarke H., Burrell F., Berry M.

### **Background and educational aim**

Qualified physiotherapists are expected to participate in respiratory on call services. This can involve treating patients who are acutely unwell with respiratory problems throughout the hospital setting including paediatrics. Berry et al (2017) concluded that simulation based training is associated with improved clinical reasoning and self reported competency in the ability of physiotherapists to manage adult on call situations. As a result it was decided that all future annual training within Hampshire Hospitals NHS Foundation Trust would include both adult and paediatric scenarios.

### **How you carried out your project**

Physiotherapists attended a day of respiratory on call simulation based training which included a paediatric scenario. The ACPRC on call competency questionnaire was completed pre and post training, as well as the satisfaction with simulation experience scale (SSES). All the post training scores on the ACPRC questionnaire for the paediatric specific questions had improved. This indicates that the training had achieved its aim of an improvement in self reported competency in the ability to manage paediatric on call situations. Participants reported high levels of satisfaction with the use of simulation training.

### **Lessons for practice**

There was a 23 point improvement between pre and post scores on the question relating to assessing and treating babies and children with acute medical disease. This related to the scenario used and therefore shows it is important to use a variety of relevant scenarios. It is important that a range of paediatric scenarios likely to present on HHFT wards are included in future annual training.

### **Your role in the project**

My role in the project was to develop the scenario, facilitate the simulation and the debrief that followed, providing any additional clinical training required. It continues with developing future scenarios and ongoing annual training.

**Clare Smith**

Doctor Paediatric ST3

**Title**

Implementation of a Care Bundle to decrease the incidence of UVC extravasation from Umbilical Venous Catheter (UVC) Insertion

**Abstract authors and affiliations**

Dr Clare Smith (ST3 Paediatric trainee), Dr Alok Sharma (Neonatal Consultant) University Hospital Southampton.

**Background and educational aim**

Umbilical venous catheter related extravasation (UVCE) is an under recognised yet potentially catastrophic complication which can result in neonatal death. Significant risk factors include using a UVC in a low position and infusing hypertonic fluids. A series of near fatal UVCE in 2012 prompted implementation of a care bundle consisting of a simulated training workshop for trainees, posters and videos to standardise UVC insertion. A retrospective study of all UVCE's has been performed annually since 2012 to assess the impact of these interventions.

**How you carried out your project**

Retrospective data collection of all cases of ultrasound diagnosed UVCE, detected both clinically and incidentally. In addition, data was also collected regarding total number of UVC's inserted and total line days. The incidence and severity of UVCE has decreased over the time from a peak of 4% in 2011 to 1% in 2016. In 2015 there was a rise in UVC extravasations after which guidelines were formalised and implemented with standardised videos for insertion which can be reviewed by trainees at any time. Procedural skill training is now part of induction.

**Lessons for practice**

The education package introduced in 2012 has resulted in a decrease in the incidence and severity of UVCE. This reduction in UVCE coincides with implementation of significant educational interventions. This training package is simple, reproducible and is being formalised into an educational bundle that can be shared nationally.

**Your role in the project**

I collected all the data from 2016, this involved going through every admission to the neonatal unit and identifying which patients had a UVC inserted (by looking at abdominal xrays). Of those patients, I identified factors increasing risk of UVCE and identified cases of extravasation diagnosed by ultrasound. I then analysed these results and amended educational resources to improve practice.

**Nicola Smith**

Paediatric ST4 Trainee

**Title**

Transition to Teamwork

**Authors**

Dr Nicola Smith and Dr Rufaro Ndokera – Paediatric trainees within the Oxford School of Paediatrics.

**Background**

Within Health Education Thames Valley, there was no management and leadership training provided to junior paediatric doctors imminently becoming registrars. The aim was to produce a course to better prepare trainees with these non-clinical skills.

**How you carried out your project**

The London School had been running a successful 'Transition to Leadership' course for several years. With good support from the London faculty, we were able to transpose and adapt this for the Oxford region. Within just two years this has become a successful and well-received course, integrated into the Oxford paediatric educational programme.

**Lessons for practice**

A course of this nature typically takes a considerable amount of time, energy, and expertise to initiate and develop. The sharing of educational resources that we employed allowed a greater number of learners to benefit without unnecessary duplication of work. Further to this, the entire collective benefited from increased participation, feedback, and diversity of ideas for improvement. increased participation, feedback, and diversity of ideas for improvement.

Medical education is taking place throughout the UK training system, with independent projects occurring in respective deaneries and specialties. Within this system there are many innovative and beneficial ideas, but unfortunately these often remain as local successes. We propose that a culture of 'ideas sharing' will allow enhanced development of educational resources, along with increased inter-deanery and disciplinary team-working, while reducing the burden on educators.

**Your role in the project**

Our role in this project incorporated recognition of the educational need; conceiving the idea of an Oxford 'Transition to Leadership' course; developing and maintaining the relationship between London and Oxford educational teams; and in adapting and coordinating the course locally.

## **Benjamin Cambers**

Doctor ST5

### **Title**

EPPIC: A Video Library of Procedures on PICU

### **Authors**

Dr Benjamin Cambers, Dr Kim Sykes, Dr S Potter, Dr Ahmed Osman, Aim: To create a video library of Essential Procedures on PICU

### **Background and Educational Aim**

To enable doctors and nurses rotating through PICU to become familiar with common intensive care procedures and how to perform them based on our local practice.

For many junior doctors and new nurses PICU is a foreign environment in which they are confronted with a variety of new and unfamiliar procedures. By producing a series of videos of common PICU procedures we intended to overcome this unfamiliarity and introduce trainees to our methods using visual learning. We also intend to provide standardisation of practice when performing each procedure.

### **How you carried out your project**

Each video has a voice over, detailing the steps required to perform the procedure. In conjunction with the need for pre and post procedure checks we have drawn the watcher's attention to the National guidelines of NatSSIPs (National Safety Standards for Invasive Procedures) in order to integrate them into our current practice.

We discussed which procedures should be included with a multidisciplinary team of Consultants, nurses and trainees. We could find no similar resources for trainees, and therefore saw this as an ideal opportunity to enhance PICU training. Consent was obtained from parents and each was provided with written information about the project and its aims. All procedures were performed by senior members of staff and full consent was obtained prior to filming.

A video library was formed and was given to new trainees starting their PICU rotation. Dr Osman and I created the project, gained consent from parents, created individual scripts for each procedure and filmed and edited the videos. We envisage this being an essential tool for PICU trainees and one that will hopefully improve good practice and continue to put Wessex at the forefront of innovative medical projects.

The future of the project is taking shape with the development of a website and an App.

## **Jennie Rowley**

Doctor ST6

### **Title**

CPR and music: teaching children to save lives.

### **Authors and Affiliations**

1.Jennifer Rowley, Clare Morden, Ben Houlford, Victoria Ivison.

### **Background**

In England, the ambulance service attends approximately 30,000 cases of cardiac arrest every year<sup>1</sup>. The survival to discharge rate for these patients is less than 8%<sup>1</sup>. Survival rates vary across the world from 0.6% to 25%, the highest of which occur in countries where bystander cardiopulmonary resuscitation (CPR) is commonly performed, and where CPR is taught to children<sup>2,3</sup>.

At present CPR does not feature on the UK National Curriculum. A pilot programme teaching CPR to children aged 7-11 has been performed. This programme is unique as it uses music as an adjunct to aid learning and knowledge retention. It is hoped that teaching these skills to children at a young age will increase the rates of bystander CPR in the future<sup>4</sup>.

### **How you carried out your project**

Songs explaining CPR and defibrillator use were written and taught in schools by the regional Music Hub. Subsequently, medics attended each school to teach the pupils and staff CPR skills. Teaching incorporated an assembly, demonstrations, small group teaching and assessment of skills. Feedback has been obtained from pupils and teachers, and the programme modified accordingly.

To date, teaching has occurred in 15 primary schools. Each school will be revisited every two years. To support this a charity (Heartbeatz UK) has been established and corporate sponsorship obtained.

### **Lessons for practice**

Children are very receptive to learning CPR and defibrillation skills, and the use of music enhances pupil engagement and learning. Feedback from pupils, teachers and parents has been very positive to date. Our next major challenge is to recruit further medical teaching volunteers, both locally and nationally, in order that the programme can be rolled out across the UK.

### **Your role in the project**

Trustee and treasurer of Heartbeatz UK.

## **Roxanne Magdalena**

ST6 Child Psychiatry

### **Title**

Teaching Self Awareness for F1s in CAMHS

### **Author**

Dr Roxanne Magdalena, Wessex Child Psychiatry Higher Training Scheme.

### **Background**

How do F1s based in CAMHS develop awareness of and insight into their own values and assumptions? Fish and Coles describe a metaphor for professional practice as an iceberg, with observed practice being the “tip” above the surface. Underlying that are supporting factors, including knowledge, assumptions, attitudes and beliefs. They place “values” at the base of the iceberg, influencing all of the above. I wanted to support the F1s in a process of looking below the surface.

### **How I carried out the project**

I carried out an interactive teaching session with the F1s comprising:

Thinking about reflection and self awareness, its important in clinical settings. Thinking about the wider context: the systems around us in which we operate. Thinking about your background/ experiences/ culture, how this might impact upon interactions with families. Clinical case discussion, to demonstrate an open reflective process.

### **Themes arising**

Polarised views and hugely different exposure/attitudes to reflection. Split between informal reflection i.e. thinking and formal written reflection. Resistance and resentment towards formal assessment. Focus on processes and admin systems rather than looking further afield, no discussion of subtle/hidden systemic influences. Concrete external pressures only. Opposing views on the hospital hierarchy and its importance. Theoretical discussion of connections to patients; possibly not safe enough to discuss their own backgrounds and experiences.

### **Lessons for practice**

Personal experiences were not explored in the teaching session: were they too difficult to think about/ not safe to raise/ unable to relate this to clinical work? Is “values” an alien concept for a new doctor? Self awareness is difficult to teach in this way but is essential for F1s to begin to gain an understanding of their own thoughts and feelings when it comes to families/ the workplace. The power imbalance needs to be considered when asking F1s to discuss personal and sensitive topics.

### **My role in the project**

Part of an MA in Medical Education.

**Lucy Everitt**  
ST5 Paediatrics

### **Title**

Delivering education to a multidisciplinary workforce to improve the quality of care delivered to children and young people across Wessex.

### **Background**

Training days focusing on common illnesses in children were developed by paediatricians for health visitors and allied healthcare professionals (HCP). Education was delivered through interactive workshops co-facilitated by paediatricians and senior health visitors. These training days focused on common childhood illnesses and were developed as part of 'Healthier Together,' a regional initiative to improve the health and care of children and young people.

### **Aim and objectives**

To improve the quality of care and delivery of consistent messages to parents through local training days for HCP on common illnesses in children using regional clinical pathways, safety netting materials and parental health literacy resources.

### **Methods**

4 training days were delivered to 228 HCP over a 7 month period at 4 locations across Wessex- Hampshire, Solent (Portsmouth) and IOW. Attendees included health visitors, community paediatric nurses, general practice nurse practitioners and pharmacists.

### **Measures and outcomes**

Audience participation tools polled HCP experience and confidence levels in the management of common childhood illnesses, provision of safety net advice and teaching to parents in accident/illness prevention. The accessibility of resources to share with parents regarding minor childhood illnesses and accident/illness prevention was also determined. Audience participation tools polled pre and post training and feedback was invited.

Results demonstrated a difference pre and post training in HCP confidence; providing advice to parents with common childhood illnesses 80% versus 98%; signposting parents to appropriate healthcare services for unwell child 87% versus 99%; and illness/accident prevention 93% versus 99%.



# Research

## **Diane Gbesemete**

Clinical Research Fellow (Post CCT)

### **Title**

A human controlled infection study to assess colonisation and immunogenicity following nasal inoculation with *Neisseria lactamica* with eradication on Day 4 or 14

### **Authors and affiliations**

Diane Gbesemete<sup>1,3</sup>, Hans de Graaf<sup>1,3</sup>, Jay Laver<sup>3</sup>, Muktar Ibrahim<sup>3</sup>, Andrew Gorringe<sup>4</sup>, Saul Faust<sup>1,3</sup>, Robert Read<sup>2,3</sup>

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3. Clinical & Experimental Sciences, Faculty of Medicine, University of Southampton
4. Public Health England, Porton Down, Salisbury

### **Background**

*Neisseria lactamica* (Nlac) is a non-virulent nasopharyngeal commensal, common in young children. It is closely related to *Neisseria meningitidis* (Nmen), which often colonises asymptotically, but occasionally causes invasive disease. Meningococcal colonisation is a necessary precursor to invasive disease.

There is an inverse relationship between nasopharyngeal colonisation with Nmen and Nlac. Longstanding colonisation with Nlac can be induced by nasal inoculation in healthy volunteers and prevents or displaces colonisation with Nmen. It also induces some cross-reactive antibodies against Nmen although not bactericidal antibodies required for protection against invasive meningococcal disease.

Future research studies will aim to improve the rate and duration of colonisation following challenge with Nlac, and the induction of Nmen specific serum bactericidal activity. This pilot study will provide information necessary for the design of these future studies.

### **Aims**

Comparison of short (4 days) versus longer (14 days) Nlac colonisation on systemic and mucosal immunogenicity. Assessment of efficacy of oral Ciprofloxacin in eradicating Nlac colonisation by 24 hours after treatment.

### **Methods**

Nasal inoculation of healthy adult volunteers with  $10^5$  cfu Nlac with eradication therapy at D4 or D14. Colonisation, efficacy of eradication and immunogenicity will be assessed up to 28 days post eradication.

### **Results and conclusions**

This study is ongoing so no results are available yet.

### **Your role in the project**

Lead Clinical Research Fellow.

## **Cathy Hill**

Consultant and Associate Professor

### **Title**

Risk taking in Junior Doctors working night shifts in intensive care Research

### **Authors**

Maria Vittoria Capanna<sup>1</sup>, Ruihua Hou<sup>1</sup>, Matthew Garner<sup>2</sup>, Ho Ming Yuen<sup>1</sup> and Catherine M Hill<sup>1&2</sup>

### **Affiliations**

[1] Faculty of Medicine; 2Department of Psychology University of Southampton. 3Southampton Children's Hospital

### **Background**

Sleep deprivation impairs executive function, information processing, visual-spatial perception, psychomotor skills and, importantly, affects clinical performance. Alternating day and night shifts causes circadian misalignment, compounding these deficits. Risk taking, although causally linked to sleep deprivation, has not previously been reported in doctors working night shifts.

### **Aims**

To determine if night shift working in intensive care environments affects attention and risk taking behaviours in junior doctors

### **Methods**

We studied 12 healthy junior doctors working 3-4 consecutive 13h night shifts in neurological and paediatric ICUs in UHS. Testing was at lunchtime before the first night shift and between 8:30-10:00 am after the last shift. Randomised testing order controlled for practice effects. Eleven participants (9 male); aged 26-36y, completed two computerised tasks at each time point: the

Balloon Analogue Risk Task(BART) and the Attention network task(ANT).

### **Results**

Participants showed a significant increase in risk taking on the BART (pre-shift median=38.5, post-shift median=45.0;  $p=0.021$ ). There was no significant change in ANT scores, noteworthy as attention is usually sensitive to sleep deprivation, indicating that risk taking may be particularly vulnerable to night shift exposure.

### **Conclusion**

Higher levels of risk-taking, without increase the likelihood of clinical error, particularly in an ICU where rapid decisions are necessary. What of the personal consequences? Of 1,135 UK doctors surveyed online, 41% of reported falling asleep whilst driving home after a night shift. Junior doctors may suffer double jeopardy on the roads as risk taking behaviours increase vulnerability to road traffic accidents.

### **Your role in the project**

This was Maria Capanna's BMedSc thesis which I co-supervised.

**Clare Hollingsworth**

Paediatric ST7

**Title**

The Impact of Child Death on Paediatric Trainees

**Authors**

Clare Hollingsworth, Carla Wesley, Jaymie Huckridge, Gabrielle Finn, Michael J Griksaitis

**Background**

Post traumatic stress disorder (PTSD) is known to develop after exposure to an extremely traumatic event. There is currently no evidence to show how prevalent PTSD is in paediatric trainees following the death of a child.

**Aims**

To assess the prevalence of symptoms of PTSD in paediatric trainees following their involvement in child death.

**Methods**

A survey designed to identify trainees' previous experiences of child death combined with questions assessing features of PTSD was distributed to 604 UK paediatric trainees.

**Results**

303/604 (50%) completed surveys and 251/280 (90%) had been involved with the death of a child. 190/284 (67%) had no training in child death. 118/248 (48%) attended a formal debrief session. 203/251 (81%) of trainees reported one or more symptoms or behaviours that could contribute to a diagnosis of PTSD. 13/251 (5%) of trainees met the complete criteria for PTSD. Attending a formal debrief and reporting feelings of guilt were associated with an increase in diagnostic criteria for PTSD ( $p=0.036$ ,  $p < 0.001$  respectively).

**Conclusions**

Paediatric trainees are at risk of developing PTSD following the death of a child. Feeling guilty may be associated with increased PTSD. Clear recommendations need to be made about the safety of debriefing sessions as, in keeping with existing evidence, our data suggests that debrief after the death of a child may be associated with the development of symptoms suggestive of PTSD.

**Your role in the project**

## **Becky Beamish**

Doctor

### **Title**

Tropical Myositis - Maybe not so Tropical?

### **Authors**

R.E. Beamish<sup>1</sup>, M Thiart<sup>1</sup>, M Tebruegge<sup>2</sup>, S Patel<sup>2</sup>, A Aarvold<sup>1</sup>

1 – Orthopaedic Department Southampton Children's Hospital, Southampton, UK

2 – Paediatric Infectious Diseases Department, Southampton Children's Hospital, Southampton

### **Background**

Retrospective analysis of paediatric pyomyositis cases presenting to a tertiary referral children's hospital in the South of England.

### **Aims**

Elucidate patterns in pyomyositis cases, improving our understanding and management of this rare condition.

### **Method**

Paediatric cases of pyomyositis from July 2008 to July 2016 included. Season of admission, presenting symptoms, laboratory results, imaging, antibiotic regimens and surgical management were recorded.

### **Results**

27 cases were identified, with even seasonal distribution. Commonest presenting symptoms were pain and non-weight bearing. Diagnosis was confirmed by magnetic resonance imaging in the majority (89%).

Staphylococcus aureus was responsible for 88% (15/17) of positive cultures, four of these showed Panton-Valentine leukocidin (PVL) positivity. PVL-positivity was associated with higher inflammatory markers ( $p=0.043$ ), more than one surgical procedure ( $p<0.001$ ) and longer antibiotic durations ( $p=0.017$ ).

In total thirteen patients (48%) had surgery, however, only four had surgery for isolated pyomyositis (15%). The mean antibiotic duration was 45.9 days.

### **Conclusions**

This is the largest UK series in the literature, suggesting 'tropical pyomyositis' is not an uncommon condition in temperate climates such as England. Co-existing osteomyelitis and septic arthritis occurred frequently and should be suspected.

Early diagnosis facilitated by MRI can enable treatment to commence prior to significant abscess formation, thereby potentially reducing subsequent surgical management.

Microbiology samples should be sent and, where PVL-positive *S. aureus* is present, a more virulent disease process should be anticipated.

### **Your role in the project**

Involved principally in the data analysis, and write up and some data collection.

**Jill Thistlethwaite**

Lead Nurse, Education, Recruitment, Practice development. Southampton Children's Hospital

**Title**

How does Multi-professional, in-situ, high fidelity simulation benefit and enhance the learning experience for the PICU nurse?

**Authors and affiliations**

Jill Thistlethwaite

**Background**

The current simulation programme is designed primarily to suit the needs of the rotational middle grade medical team within a Paediatric Intensive Care Unit (PICU) and as such I was concerned that the needs of the more permanent nursing workforce may be overlooked.

**Aims**

This is a qualitative, educational enquiry, involving insider practitioner research, approached through a case study, through which I explore the learning experience of PICU nursing staff during multi professional team, in-situ, high fidelity simulation.

**Methods**

Questionnaires, semi structured interviews and some personal reflections.

**Results**

The opportunities for learning are multiple and diverse in their nature and learning occurs at different stages of the process, dependent on the nature of the participant's involvement within the simulation together with their level of clinical experience.

**Conclusions**

Through this enquiry I have determined that although not currently designed particularly around their learning needs, this form of educational practice does provide extremely valuable learning to nurses of all levels of clinical experience within the PICU.

This enquiry presents an opportunity for any health care professional involved in multi professional clinical education to reflect on the experience detailed within this study and consider how they may use valuable this form of educational practice within their health care setting. It also provides an opportunity to those who already use simulation regularly within their educational practice to consider its multiple components in more depth and guide them in their future use of this form of educational practice, optimising its usefulness to their learners, with the ultimate goal of improving clinical practice and optimising patient care delivery.

**Your role in the project**

Researcher and lead nurse for simulation on PICU.

## **Michelle Fernandes**

Doctor - ACF ST-1 Paediatrics

### **Title**

The INTERGROWTH-21st Neurodevelopment Package: Assessing Early Child Development in children from 8 countries

### **Author Affiliations**

Michelle Fernandes<sup>1,3</sup>, Alan Stein<sup>2</sup>, Stephen Kennedy<sup>3</sup>, and Jose Villar<sup>3</sup>

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### **Background**

Globally, 250 million children younger than 5 years are at risk of not achieving their developmental potential. One of the rate-limiting steps to the scalability of early childhood assessment is its dependence on specialist healthcare professionals. The INTERGROWTH- 21st Project has developed a neurodevelopment Package for rapid, holistic, robust assessment of young children.

### **Objectives**

- (i) To describe the INTERGROWTH-21st Neurodevelopment Package
- (ii) To explore whether field workers from Brazil, India, Italy, Kenya and the UK can (a) administer and (b) score the INTER-NDA component of the Package comparably with healthcare professionals.

### **Methods**

The INTERGROWTH-21st Neurodevelopment Package measures (i) visual acuity and contrast sensitivity (using the Cardiff Cards) (ii) cortical auditory processing with gel-free, wireless electroencephalography (iii) cognition, language skills, motor skills, behavior, attention and social-emotional reactivity using the INTER-NDA and (iv) sleep using actigraphy in 22 to 26 month olds.

To determine whether non-specialists can implement the INTER-NDA, protocol adherence and INTER-NDA domain scores were compared between field workers and healthcare professionals.

### **Results**

The Package takes 45 minutes to administer. To date, more than 2500 children in Brazil, India, Italy, Kenya, Pakistan, South Africa, Thailand and the UK have been assessed with the Package.

INTER-NDA protocol adherence is 92.9% and 89.8% for healthcare professionals and field workers respectively. There are no significant differences in INTER-NDA scores between the groups.

### **Conclusions**

The INTERGROWTH-21st Neurodevelopment Package is a multi-dimensional ECD instrument. Its INTER-NDA component can be administered effectively by non-specialists.

## **Hans de Graaf**

Consultant

### **Title**

Bordetella Pertussis colonisation: design of a B. pertussis human challenge colonisation model for biomarker identification and vaccine development.

### **Affiliations**

Hans de Graaf, University Hospital Southampton NHS Foundation Trust Diane Gbesemete, University Hospital Southampton NHS Foundation Trust Andrew Gorringer, Public Health England

Dimitri Diavatopoulos, Radboud University Medical Centre, The Netherlands

Kent E. Kester, Sanofi Pasteur, USA

Saul N. Faust, NIHR Clinical Research Facility, University Hospital Southampton NHS Foundation Trust

Robert C. Read, University of Southampton

### **Introduction**

Globally B. pertussis is one of the leading causes of vaccine preventable death. Many countries have replaced whole cell vaccines with acellular vaccines over the last 20 years during which pertussis appears to be resurgent in a number of countries in the developed world that boast high immunization coverage. The acellular vaccine provides relatively short-lived immunity and, in contrast to whole cell vaccines, may be less effective against colonisation and subsequent transmission. To improve vaccine strategies, a greater understanding of human B. pertussis colonisation is required.

### **Methods and Analysis**

A controlled human colonisation model will be developed over two phases. In phase A, a low dose of the B. pertussis inoculum will be given intranasally to healthy participants. This dose will be escalated or de-escalated until a colonisation rate of approximately 70% is reached without causing disease. The colonisation period, shedding and exploratory immunology will be assessed during a 17 day inpatient stay and follow-up over one year. The dose of inoculum which achieves 70% colonisation will then be confirmed in phase B, comparing healthy participants exposed to B. pertussis with a control group receiving a sham inoculum.

### **Results**

This study is recruiting at the moment, no data are available yet.

### **Ethics and Considerations**

REC reference: 17/SC/0006, 24 February 2017. Findings will be published in peer reviewed open access journals as soon as possible.

## **Roxanne Magdalena**

ST6 Child Psychiatry

### **Title**

Goal Attainment Scores Survey at Bursledon House

### **Authors**

Roxanne Magdalena, ST6, CAMHS, Sally Wicks, Consultant Child Psychiatrist

### **Background**

Bursledon House is a 12 bedded residential highly specialised paediatric/psychiatric unit within the grounds of University Hospital Southampton, for children aged 0-16.

Goal Attainment Scores (known as GAS goals) are one of the main outcome measures for young people following their stay in the unit, alongside the CGAS (Children's Global Assessment of Functioning). This method of scoring is collaborative and involves the whole MDT. Goal templates are adapted to the individual presentation. Up to 4 goals are set on admission by the MDT and scored upon discharge to indicate progress made. Scores range from +2 to -2, on a 5 point scale. A score of zero indicates the expected/ desired level of outcome for the admission.

### **Aims**

To explore outcomes in patients discharged from the unit in 2016.

### **Methods**

The following information was obtained from patients who had been discharged from the unit in 2016:

- Diagnosis
- Number of GAS Goals set
- Specific goals  
Scores.

### **Results**

Complete data was available for 31 patients out of 35 discharged in 2016

Number of goals

- 1 goal: 3
- 2 goals: 11
- 3 goals: 15
- 4 goals: 5

Scores: 77/82 goals achieved scores of 0/+1/+2

### **Discussion**

- Good or excellent outcomes achieved in 95%
- 91% of cases had two or more goals, indicating their complexity
- The cases with 3 or 4 goals were the only ones to achieve negative scores, again demonstrating complexity
- Even where patients had goals which scored negatively, other domains scored 0/+1/+2, indicating a successful admission in certain areas.

### **Your role in the project**

Data collection and analysis.

**Kate Benham**

Clinical Psychologist

**Title**

Using Positive Behavioural Support (PBS) workshops with parents of children with complex needs to reduce Challenging Behaviour

**Abstract**

Using Positive Behavioural Support (PBS) workshops with parents of children with complex needs to reduce challenging behaviour.

Dr K Benham (Clinical Psychologist) and M Hughes (Assistant Psychologist).

The Positive Behavioural Support (PBS) approach is a NICE recommended approach for managing behaviour that challenges (Gore et al., 2013; NICE, 2015). The CAMHS Learning Disability (LD) team implemented a 5 week workshop for parents of children with a LD and complex needs who display challenging behaviour.

Twelve parents completed the course and completed pre and post measures on their understanding of their child's difficulties, knowledge of strategies for challenging behaviour and confidence in implementing these strategies.

There was a statistically significant difference between pre and post scores for parents increasing their understanding of their child's difficulties ( $t(11) = -4.48, p = 0.001$ ). We can conclude that there was a significant improvement in understanding their children's difficulties. There was a statistically significant difference between pre and post scores for parents increasing their knowledge of strategies and interventions for challenging behaviour ( $t(11) = -3.62, p = 0.004$ ). We can conclude that there was a significant improvement in knowledge of strategies and interventions for challenging behaviour.

There was no statistically significant difference for parents increasing their confidence in implementing strategies to manage challenging behaviour ( $t(11) = -3.17, ns$ ). However, qualitative feedback from parents was overwhelming positive with parents recommending the course to others and rating it as valuable.

In sum, this shows that the PBS workshop for parents of children with LD was successful in improving parents understanding of their children's difficulties and increasing their knowledge of strategies for managing challenging behaviour. The group format delivered a NICE recommended intervention by a multidisciplinary team in a cost-effective manner.

Our roles were content moderators, facilitators and research authors.

## **Fiona Rawat**

Medical Student

### **Title**

Abbreviations: The future of electronic documentation is here and now

### **Author Affiliations**

Authors: Rawat F<sup>1</sup>, Al Qabandy S<sup>1</sup>, Fyzul Z<sup>1</sup>, Nasibov, T<sup>1</sup>, Shankar A<sup>2</sup>, Nicholson A<sup>3</sup>, Keelan S<sup>3</sup>, Tan J<sup>4</sup>.

### **Introduction**

Protocols for documentation have been said to improve communication between healthcare professionals, and therefore patient outcomes. However, inconsistencies in reporting by use of abbreviations have been shown to impact both interpersonal communication and patient outcomes<sup>1</sup>. This study evaluates the use of abbreviations taking into account those that adhere to the HSE guidelines.

### **Objectives**

The main objective of this study is to evaluate the use of abbreviations in patient notes pertaining to the HSE guidelines. A secondary objective is to highlight error rates associated with their use, in order to improve the accurate transfer of information between health care staff.

### **Methods**

A prospective chart review was conducted in Temple Street Children's University Hospital. In this single blinded audit, 28 charts were selected from each hospital ward at random. They were then assessed based on the patient's most recent hospital admission. Each chart was anonymised and assessed for four abbreviation errors. These abbreviations included; left or right, up or down, < or > and + or -. We examined the appropriateness of the abbreviations in addition to the frequency of their use.

Appropriate abbreviation use was defined using the HSE guidelines<sup>2</sup>.

### **Results**

Review of 28 charts in the Temple Street Children's Hospital showed that all charts contained abbreviations, of which only 7% were used appropriately according to the HSE guidelines on abbreviation use. This 7% was confined to the use of '+' or '-' which related only to biochemical results of urine and blood analyses. All others were inappropriate.

### **Conclusion**

Abbreviation use was evident in patient documents. These abbreviations were deemed ambiguous, and electronic pediatric medical records are recommended.

# Notes

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# Notes

# Notes



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