formula. To date no studies have assessed the crucial human factors affecting ease of use or rates of error. This project aimed to pilot a technique for testing accuracy, speed and user preference (usability) of different methods.

Methods We developed a website (www.pemresearch.org) where participants applied four common weight estimation methods (table 1) to a range of ages. Orders of methods and ages were randomised between each entry. To reflect a real resuscitation scenario, participants were instructed to complete the test as quickly and accurately as possible. Psychological pressure was generated by a visible running timer combined with a leaderboard competition. Subject inter-method variability of speed and accuracy were analysed using one way ANOVA and pairwise t-tests with adjusted p-values.

Results 34 acute paediatric staff completed the test. 74% routinely used the single formula APLS method. Post-test 77% reported the reference table method easiest to use. Both single formula APLS and reference table were significantly quicker to use than other methods ($p < 0.001$ and < 0.001). There was no significant difference detected in accuracy between methods. (table 2)

Conclusions This is a feasible technique of assessing usability. Although in our pilot there was no significant difference in accuracy detected, the time taken to apply each method and preference to use appear related to complexity. This novel method of assessing usability has potential advantages over other such as in-situ real-time simulation, including rapid turnaround and distribution via the internet. We plan to expand this study to a larger sample size and validate against in-situ simulation. After refining the technique we will extend its application to other everyday tools such as clinical decision rules.

Abstract G241(P) Table 1

	Method	
	Age range	Formula
Single formula APLS	1–10 years	weight = (age + 4) x 2
Three formulae APLS	<12 months	weight = (0.5 x age in months) + 4
	1–5 years	weight = (2 x age) + 8
	6–12 years	weight = (3 x age) + 7
Modified Best Guess Method	<12 months	weight = (age in months + 9)/2
	1–9 years	weight = (2 x age) + 10
	10–14 years	weight = (4 x age)
Reference table Derived from UK growth data	0–16 years	weight = 50th centile for age and sex

Abstract G241(P) Table 2

	Old APLS	New APLS	BGM	Table
Mean time taken (seconds)	49.55	57.76	55.17	33.68
Accuracy of answers (%)	90.5	94.4	95.8	95.5
Pre quiz normal method n (%)	25 (73.5)	7 (20.6)	1 (2.9)	1 (2.9)
Post quiz preferred method n (%)	4 (11.8)	2 (5.9)	2 (5.9)	26 (76.5)

G242(P) REGULAR EDUCATION AND AUDIT IMPROVES THE MANAGEMENT OF PAIN IN CHILDREN

doi:10.1136/archdischild-2013-304107.254

T Waterfield, A Anpananthar, G Gandhi, J Thomson. *Paediatrics, Whipps Cross Hospital, London, UK*

Aims All children have the right to appropriate prevention, assessment and control of pain yet the assessment and management of pain in children is often inadequate^{1,2}. We therefore set out to assess

and address problems within our own Paediatric Emergency department (ED) relating to pain management in children because it has been shown that unrecognised and poorly managed pain can become established, severe and difficult to control^{3,4,5}.

Methods We retrospectively audited 100 ED patient records to assess:

1. The proportion of patients that had their pain assessed at triage
2. The use of analgesia against the department's pain protocol

We also conducted a parallel audit to assess the confidence of all ED staff in assessing pain in verbal and pre-verbal children.

The above audits were then repeated following an intervention involving the dissemination of audit data as well as the delivery of teaching sessions that had been designed around our hospital's pain protocol. The sessions were provided for all ED staff and focussed on using the Face, Legs, Arms, Cry, Consolability (FLACC) score and the Wong and Baker (smiley faces) score used in our hospital^{6,7}. In addition laminated score cards were placed in the ED to be used as an aide memoire.

Results 16% of patients in the initial audit had their pain recorded at triage with this rising to 72% following our interventions. In those patients with documented pain scores the use of analgesia was as per the guideline in 100% of cases. We also found that prior to our interventions ED staff were only confident 28% and 84% of the time when assessing pain in pre-verbal and verbal children respectively. Following our educational sessions confidence with regards to pain scoring had risen to 96% and 100% for pre-verbal and verbal children respectively.

Conclusion Our experience suggests that the assessment process is the most important step towards good pain management in children within the ED setting. A programme of regular audit and education is vital for raising awareness and confidence amongst healthcare professionals.

G243(P) A QUALITATIVE STUDY OF THE BARRIERS TO THE PRE-HOSPITAL MANAGEMENT OF ACUTE PAIN IN CHILDREN

doi:10.1136/archdischild-2013-304107.255

¹A Murphy, ¹M Barrett, ¹J Cronin, ¹S McCoy, ²P Larkin, ²M Brenner, ³A Wakai, ¹R O'Sullivan. ¹Paediatric Emergency Research Unit, National Children's Research Centre, Dublin, Ireland; ²School of Nursing, Midwifery, and Health Sciences, University College Dublin, Ireland; ³Emergency Care Research Unit, Division of Population Health Sciences, Royal College of Surgeons, Dublin, Ireland; ⁴Department of Paediatrics, University College Dublin, Ireland

Aims Effective pain management in the pre-hospital setting is gaining traction as a potential key performance indicator by many EMS systems, but historically has been shown to be inadequate, particularly in the paediatric population. This study aimed to identify the barriers, as perceived by a representative national cohort of Advanced Paramedics (APs), to achieving optimal prehospital management of acute pain in children.

Methods A qualitative approach was employed to capture data through two focus group interviews. 16 APs were invited to participate in this study. Both interviews were audio-recorded, transcribed, and analysed using Attridge-Stirling's framework for thematic network analysis. Ethical approval was granted for this study.

Results The global theme "Barriers to the Prehospital Management of Acute Pain in Children" emerged from three organising themes as follows: AP education and training, Current clinical practise guidelines for paediatric pain management, and Realities of pre-hospital practise. Limited exposure to children in the pre-hospital setting, difficulty assessing pain intensity in small children, and challenges in administering oral or inhaled analgesic agents to distressed and uncooperative children were highlighted by participants. Short transfer times to the ED and a "medical" cause of pain

were also implicated as examples of when children are less likely to receive analgesia from practitioners.

Conclusion The pathway to improving care must be paved with an emphasis on improvements in practitioner education and training, offering alternatives to assessing pain in pre-verbal children, exploring the intranasal route of drug delivery in managing acute severe pain, and through robustly developing evidence-based guidelines that are practitioner friendly and patient-focused.

G244(P) YOUNG PEOPLE GET ACTIVE! FOCUS GROUP INVOLVEMENT TO IMPROVE THE EXPERIENCE OF ADOLESCENT PAEDIATRIC PATIENTS IN EMERGENCY DEPARTMENTS

doi:10.1136/archdischild-2013-304107.256

¹K Sexton, ²P Heinz, ²K Lothian. ¹Clinical School, Cambridge University, Cambridge, UK; ²Department of Paediatrics, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Recent publication of 'Standards for Children and Young People in Emergency Care Settings' has brought involvement of young people in service design into the spotlight. Whilst many studies have focussed on parental opinion, our project aimed to involve ACTIVE, a young peoples' focus group. This group of young people aged 8–18 years was set up 4 years ago with the aim to improve services for children at our hospital, especially for adolescents.

Methods The group defined their priorities for emergency department (ED) care in a brainstorming session followed by a visit to the ED in the form of a simulated patient journey.

Results ACTIVE identified speed of assessment, clear communication, prompt pain relief and attention to their comfort needs as well as privacy as their main priorities. On visiting the ED they pointed out areas for improvement as follows: paediatric nursing staff at pre-triage, decoration or lack thereof in certain areas of the department (but also positive comments on where this was done well), lack of privacy in defined areas and ways to communicate waiting times effectively and accurately. Whilst a dedicated 'teenage room' was not felt to be important, the need for a quiet waiting and clinical area was stressed.

Outcome and conclusion Studies have shown that adolescent satisfaction in the ED is often lower than that of adult patients. Young peoples' focus groups are an effective resource in the design of services and in the case of our centre have led to direct input into the re-design of our paediatric ED area (the proposed plans will be available for inspection). Feedback to young service users is important to encourage further participation and to ensure that they are aware of how their suggestions will be used.

G245(P) PITFALLS IN WEIGHT ESTIMATION

doi:10.1136/archdischild-2013-304107.257

G Harlow, R Jayatunga. Department of Paediatrics, Sandwell Hospital, Sandwell and West Birmingham NHS Trust, West Bromwich, UK

Children and infants of different age and weight respond differently to drugs. Special care is needed in the calculation of drug doses to reduce and prevent the risk of toxicity. The 2011 Advanced Paediatric Life Support (APLS) guideline, 5th edition, includes an updated method for weight estimation for emergency situations[1].

Aims We aim to study our population of patients to determine whether their actual weights are congruent with the updated APLS weight estimation. We also compare with the 2005 APLS weight estimate calculation[2].

Method Prospective audit at a large two-site NHS trust with a 23-hour paediatric assessment unit and two in-patient wards. The catchment population for our study has a higher proportion of population in lower socioeconomic groups than the national average[3]. The age, basic diagnosis and weight of consecutive presenting

Abstract G245(P) Table 1

Age (years)	Number of patients	Mean weight (kg)	Mean (95% CI) percentage weight difference 2005 APLS formula	Mean (95% CI) percentage weight difference 2011 APLS formulae
Less than 1	33	6.55	n/a	-8% (-2 - -15)
1	17	10.65	-6% (-16 - 3)	-6% (-16 - 3)
2	7	15.23	-27% (-49 - -5)	-27% (-49 - -5)
3	11	17.44	-25% (-38 - -11)	-25% (-38 - -11)
4	8	18.36	-15% (-41 - 12)	-15% (-41 - 12)
5	10	21.58	-20% (-40 - 0)	-20% (-40 - 0)
6	13	22.97	-15% (-26 - -4)	8% (-1 - 17)
7	20	27.65	-26% (-43 - -8)	1% (-13 - 15)
8	5	34.98	-46% (-62 - -29)	-13% (-26 - 0)
9	11	37.17	-43% (-68 - -18)	-9% (-28 - 10)
10	5	36.26	-30% (-45 - -14)	2% (-9 - 13)
11	12	37.77	n/a	6% (-17 - 28)
12	14	42.14	n/a	2% (-16 - 20)

A negative sign denotes a mean weight underestimate by the formula; no sign indicates an overestimate.

children between 1 month and 12 years were collected for 166 patients in December 2012. We aim to collect data to March 2013 with an estimated sample size of 500. Children were weighed on Seca baby/standing/chair scales (Seca, Hamburg, Germany) with children under two naked and over two wearing minimum clothing without shoes. Percentage weight difference between child's actual weight and their expected weight was calculated using both the 2005 APLS formula, $\text{weight(kg)} = (\text{age} + 4) \times 2$ and the 2011 formulae: 1–12 months: $\text{weight(kg)} = (0.5 \times \text{age in months}) + 4$; 1–5 years: $\text{weight(kg)} = (2 \times \text{age in years}) + 8$; 6–12 years: $\text{weight(kg)} = (3 \times \text{age in years}) + 7$

Results Table 1: Mean weight differences by age

Preliminary results outlined in Table 1 demonstrate that although the 2011 APLS calculation is better for weight estimation in our 6–12 years age group than the 2005 calculation, there is still the potential for significant underestimation of weight in all ages.

Conclusion Weight estimation is extremely important for paediatric resuscitation and emergency treatment. However, across all age groups weight estimation is no substitute for establishing the child's actual weight at the earliest opportunity.

REFERENCES

1. Advanced Life Support Group. APLS, Fifth Edition. Blackwell 2011.
2. Advanced Life Support Group. APLS, Fourth Edition. Blackwell 2005.
3. 2011 Census: Key Statistics for local authorities in England and Wales. Office for National Statistics; December 2012.

G246(P) CHILDREN WITH CHEST PAIN – A CAUSE FOR ANXIETY BUT IS IT AN EMERGENCY?

doi:10.1136/archdischild-2013-304107.258

G Mujtaba, J Awan, C Martin. Paediatric Emergency Department, Tallaght Hospital, Dublin, Ireland

Background Chest pain (CP) in children is a common complaint in emergency departments, general paediatric clinics, and paediatric cardiology clinics. It can be a source of anxiety for parents, patient and physicians and can lead to a school and sports absenteeism. A thorough history and physical examination usually can determine the cause and differentiate patients who require acute intervention from those who can be managed with advice and reassurance.

Aim To review the presentation, and management of children presenting with chest pain to a tertiary level teaching hospital over a 12 month period. To assess diagnosis, investigations, treatment and follow up.