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Evaluation of skills in emergency pediatrics: An examiner's perspective

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ABSTRACT

This article looks at current methods of assessment of competence and performance of pediatric trainees that are available in the field of emergency pediatric medicine. It describes how currently used assessment tools (including examinations and workplace based assessments) have developed in the United Kingdom and elsewhere, and illustrates how they can be applied to assist trainees.

Key Words: assessment, competence, performance, emergency pediatric medicine, examinations, workplace based assessment.

The training of pediatricians in countries where there is a developed health care service increasingly relies on structuring postgraduate medical education around the mastery of core competencies and their evaluation. Competencies in emergency pediatrics are clearly an important part of this, but their evaluation can present practical difficulties for a number of reasons:

*emergency room pediatrics forms a large part of the service commitment of junior paediatricians in training;

*on a day to day basis, there is relatively poor supervision of the level of care and decision making (much of it is retrospective) of the junior doctor by a senior supervisor;

*much of the work undertaken by seniors relates to chronic conditions and disability in an outpatient setting (unless the senior is involved in critical care/A&E/PICU settings).

Clearly, this can lead to difficulties in providing on-going work-based evaluation of the trainee, and resultant problems in ensuring mastery of the required competencies by the end of the trainee's training programme. This is a problem that has exercised the minds of medical educators and assessors in many countries including the USA, Canada, United Kingdom, The European Union and Australia, and has led to the development of ever more complex lists of competencies expected, means of assessment including sophisticated and expensive simulators (Ref 1) and a gap between the expectation of the regulatory organisations and the trainees who may see the desired competencies as being unrelated to the intricacies of daily patient care (Ref 2).

In the United Kingdom, assessment of the postgraduate trainee paediatrician occurs at two levels:

The "hurdles" of postgraduate examinations which test a trainees competence (what doctors do in controlled representations of practice such as examinations)

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-APLS (Advanced Paediatric Life Support)/ NLS (Neonatal Life Support)

-DCH (Diploma of Child Health)/ MRCPCH (Membership of the Royal College of Paediatrics & Child Health)

-ST7a – the Exit assessment in paediatrics (Ref 3)

And/or if a career in Paediatric Emergency Medicine is planned:

-MCEM and at end of training FCEM awarded by the UK College of Emergency Medicine

Workplace-based assessments: assessments carried out periodically with the trainee by consultants, more senior trainees, and specialist nurses, and linked to a regular appraisal process and e-based learning and recording through the ePortfolio (Ref 4)

These are designed to test a trainee's *performance* (what doctors do in real life). They should only be used as assessments for learning and as feedback opportunities to help identify areas requiring attention in order that the trainee progresses and develops.

Postgraduate Examinations

Courses leading to a diploma or certificate such as the APLS are structured around simulated scenarios, and use manikins, and increasingly sophisticated simulators. Resuscitation of the acutely ill child is a necessary skill for all trainee pediatricians, and with an obligatory re-evaluation every 4 years the APLS is excellent at achieving a basic level of competence in the management of acute life threatening illness in children in both trainees and career pediatricians. Much of the training syllabus for Pediatric Advanced Life Support (PALS) (in the USA/Canada) and the APLS (UK) is now being assimilated into pediatric emergency medicine fellowship programmes (Refs 1,5) and the specialist training curriculum for paediatrics in the UK (Refs 6,7). A higher level of knowledge and skill of emergency medicine is required for MCEM (Membership of the College of Emergency Medicine in the UK), and for the end of training FCEM, where evaluation of competency is carried out by a combination of OSCE stations using role players and high level simulation scenarios, together with clinical real (adult but not pediatric) patient examination of more chronic emergency conditions and critical appraisal of journal publications. However, evaluation of a trainee's competency by simulation scenarios in acute emergency pediatric care only tests limited areas of knowledge, and doesn't test many of the skills needed in day to day acute pediatric medicine related to the care of children in the emergency assessment area, such as:

*the child with recurrent seizures and management issues beyond stabilisation of the airway and acute control of the seizures.

*the child with severe bilious vomiting and dehydration who needs assessment and management not only of the dehydration, but also of the investigations to ascertain the aetiology of his bowel obstruction, and subsequent shared management with the surgical team.

Evaluation of the multiple skills required to work and succeed as a junior pediatrician in the emergency room is difficult in an examination setting. The assessment of knowledge – pathophysiology, science of medicine, ethics, clinical decision making etc. can be assessed fairly adequately by written examinations, and questions set by examination boards can be mapped to a training curriculum and can be adequately standardised to provide a reasonable assessment of a trainee's abilities. Such examinations are unable to properly assess the trainee's clinical examination skills and real-life ability to interpret and act appropriately on clinical signs. They also do not assess a candidate's history taking skills. 90% of diagnoses can be made on a well taken history, and it is self evident that the proper and correct evaluation of clinical signs in a sick child is paramount if the correct management is to be undertaken. Training and evaluation in an examination setting with simulators and role players can never properly replicate the

real-life evaluation of the sick child. It is here that many examinations (such as the Board examinations in many countries) are unable to provide evaluation of all the candidate's abilities. The RCPCH, with its clinical MRCPCH examination* (Ref 8) taken after knowledge assessments in three separate written papers, has attempted to correct this problem by continuing to use real children with clinical signs in stations covering the main clinico-pathological areas of cardiac, respiratory, abdominal, musculoskeletal and neurological problems, as well as child development, and station based assessments of history taking, management planning and communication skills – all very important skills for a junior doctor to attain in emergency pediatrics. As it is not possible to have acutely ill children on an examination circuit, a further evaluation station – the "Video Station" shows the candidate short audio-visual clips of children with problems such as acute airway obstruction, circulatory failure and shock, gait or movement disturbance, or seizures etc, and asks for candidate evaluation.

I believe that evaluation of a candidate's skills in examining and assessing real live children with clinical signs, and, if possible, with acute problems, together with history taking is vital in producing good all round paediatricians, and the MRCPCH examination (with its three written examinations, and a clinical examination) is to my knowledge the only internationally recognised examination that does this.

Workplace-based assessments

Workplace-based assessment is still an evolving process. In the 1980's and 1990's, United States residency training programmes were developed with a regular evaluation of trainee performance, together with feedback and where necessary remediation. In time, these programmes became standardised and required annual evaluation to maintain accreditation with the Accreditation Council for Graduate Medical Education (ACGME). Pediatric Residency training in the USA developed a level of standardisation of the curriculum in 1996 with the Academic Pediatric Association publication of a paper and disc document (Educational Guidelines for Residency Training in General Pediatrics), which was replaced by a web-based version in 2005. This allowed the trainee to build a competency based curriculum, and provided regular evaluation of skills such as clinical examination, history taking and practical skills with peer and supervisor evaluation (Ref 9).

In the United Kingdom, evaluation of a doctor's performance has become an increasingly important issue. The combination of high profile cases of malpractice, and the re-design of medical training partly as a result of a reduction in hours of training driven by the European Working Time Directive (EWTD) regulations had led to service work dominating training in a way that was educationally unacceptable (Refs 10,11). This situation drove the development of a new postgraduate paediatric curriculum introduced to the UK in 2007 (Ref 11) and the need to develop a new method of evaluating a trainee's learning and abilities. Assessing *competence* does not reliably predict *performance* (Ref 12). This has led to the implementation of workplace-based assessments across all the medical specialities in the UK following verification of the validity of the various assessment tools used in these evaluations (Ref 10). In UK paediatrics, this has led to the development of the RCPCH assessment road map (fig 1) which links a structured curriculum based training programme to both assessments of *competence* (through examinations) with assessments of *performance* on a regular basis within a training programme by using not only the College examinations but a series of tools including the mini-clinical evaluation exercise (mini-CeX), case based discussion (CBD), directly observed procedural skills (DOPS), Sheffield Assessment Instrument of Letters (SAIL) and a multi-source feedback assessment (MSF). Three years since their introduction some concerns remain about the delivery and validity of these assessments, despite reassurance from initial validation studies (Ref 10). Their success depends on training the trainers in the application of these assessment tools, adequate time being allocated for the

assessments, and a lack of bias on the part of the assessor, who may be a consultant, educational supervisor, senior trainee, peer trainee or specialist nurse. The use of these tools in a pediatric emergency medicine setting can however provide on the spot evaluation and feedback in a number of critical areas of patient care including history taking, initial critical care assessment, procedural skills and organisational skills. Properly applied they can provide a good assessment of performance of a trainee over a period of training, and should also allow for opportunities for remedial training where necessary (see example of a Mini-Cex, **Table 1**).

Figure 1

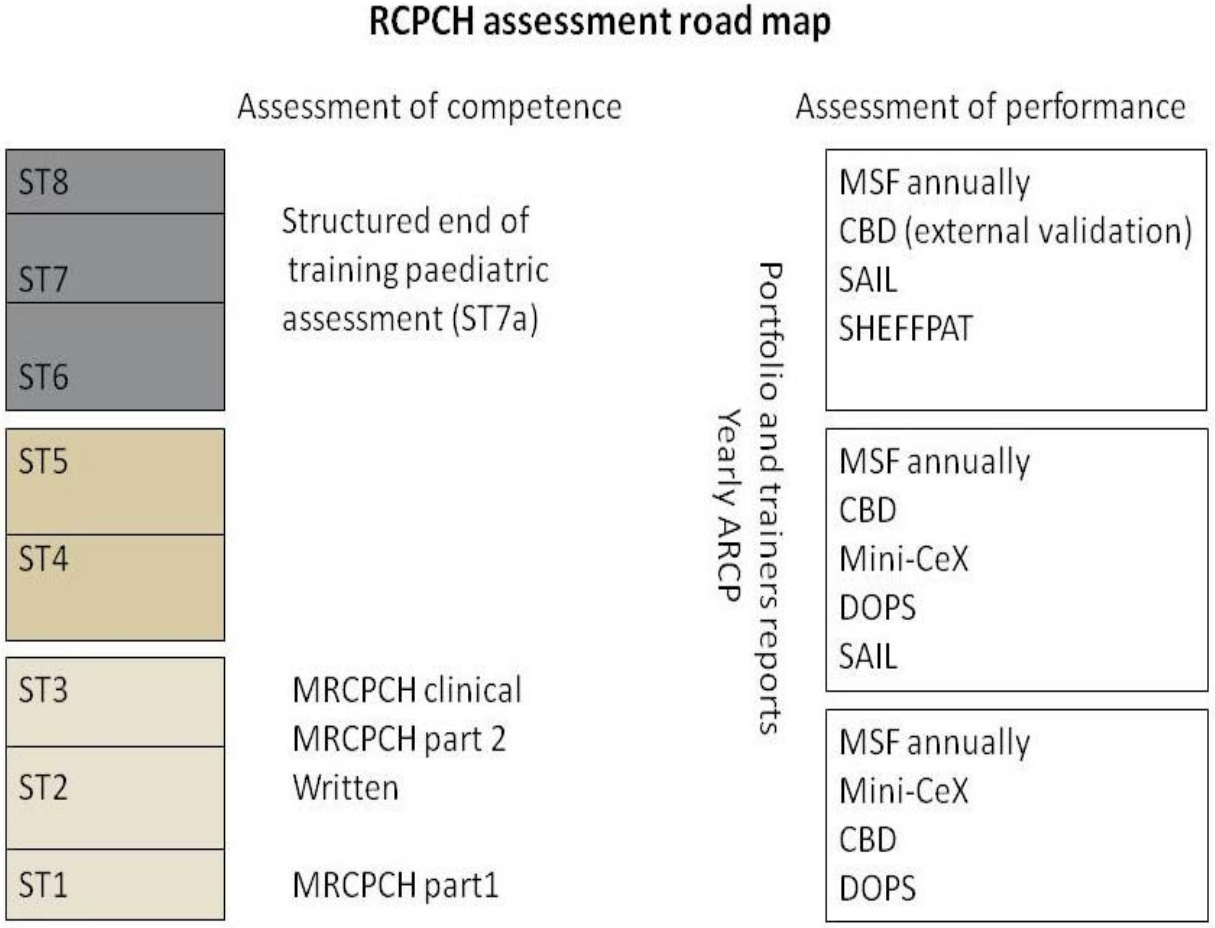

Figure 1

MSF : Multi-source feedback; CBD: case based discussion; SAIL: Sheffield Assessment Instrument of letters; SHEFFPAT: Sheffield Patient Assessment Tool; Mini-Cex: mini-clinical evaluation exercise; DOPS:directly observed procedural skills; *ARCP* :Annual Review of Competence Progression

Summary

Evaluation of a trainee should encompass assessment of competence and performance throughout a training programme, and this requires workplace-based assessment as well as examinations with both being matched to a national curriculum. There is no one tool for evaluation that has superiority over others, but in emergency pediatric medicine, although the use of scenario based learning and assessment and simulators are of proven value in evaluating competence in acute emergency situations, there also has to be a means of evaluating performance and competence in real-life situations, and with real-life children.

*The Indian Academy of Pediatrics now has a joint initiative with the Royal College of Paediatrics and Child Health. The first diet of the MRCPCH *Clinical* Examination will be held in India in November 2011.

What is expected of the trainee.

This trainee completed her basic (level 1) training last year, and after attaining her MRCPCH diploma, continues in run-through

Table 1

UK Workplace-based assessment:

An example of how it is done:

A 2 yr 4 month old child was brought into the ER by a para-medical ambulance crew at 20.23hrs. She had been fit and well until that morning, when she had become febrile, had passed green loose stools every hour, had become progressively more irritable and had refused drink for the preceding 5 hours. She became unresponsive then had a firstly tonic then clonic generalised seizure at 19.50hrs. The attending ambulance crew administered 5mg rectal diazepam at 20.04 hrs, and a further dose at 20.14 hrs because of a continued clinical seizure.

She was still convulsing at admission. Her airway was stabilised, she was given oxygen, and venous access was established. She was then given 200ug/Kg Midazolam by the ER team as she continued to convulse, and 10ml/Kg 0.9% saline IV stat. A blood sugar was checked and found to be satisfactory. Electrolytes, calcium magnesium, CRP, CBC and blood culture were requested from a venous sample.

The paediatric trainee was asked to attend urgently, and attended at 20.45hrs with the paediatric consultant, who was requested by the paediatric trainee to supervise, and undertake a Mini-CeX.

The child remained hypertonic, with conjugate deviation of the eyes to the right, and persistent rhythmical jerking of the eyes and eye lids. She was pyrexial (39.6 C), saturations 98% in O_2, Capillary refill < 2secs, tachycardia 180/min with some decorticate posturing.

The trainee inferred that she was still convulsing. She requested the following:-

- IV phenytoin 20mg/Kg by infusion over 20 minutes with cardiac monitoring
- 10ml/Kg 0.9% saline over 10 minutes
- IV ceftriaxone 80mg/Kg stat
- IV Aciclovir 10mg/Kg stat
- Capillary blood gas

Within 5 minutes of commencing the phenytoin, seizures ceased clinically and the patient's condition improved. She became responsive but drowsy, and after a management plan was discussed by the trainee with the parents, she was transferred to the ward for observation at 21.43hrs. The clinical notes on the patient were completed by the trainee, and read by the assessor, before feedback was undertaken.

The **ePeadMini-Cex** (Ref 13) is designed to provide feedback on skills essential to the provision of good clinical care in a UK paediatric setting. Strengths, areas for development and agreed action points should be identified at each encounter, which should sample one of the areas outlined within the RCPCH assessment standards stated.

training at ST4 level. She should thus be achieving Level 2 RCPCH assessment standards (Ref 14). The trainee thus is expected:

*to undertake a minimum of 4 observed (and satisfactory) Mini-Cex encounters per year

*to use a different assessor for each encounter, and from a number of different clinical areas depending on her current training needs and opportunities.

*to choose her own assessor, but her educational supervisor must carry out at least one assessment annually.

What is expected of the assessor

The assessor may be part of the care team, but may have the opportunity to stand back and observe while the trainee leads on decision making and clinical management, although where necessary, clinical care will take precedent. The assessor will be expected to:

*directly observe the encounter he is assessing

*be a higher level trainee or consultant familiar with the assessment process and the standards expected (but does not need to be a paediatric consultant – an Emergency Medicine consultant familiar with paediatric emergency care may be just as appropriate in this case)

*have registered with the College assessment programme and be familiar with the assessment process (Ref 14)

The assessment

The assessor observes all or part of a clinical encounter and rates the trainee in aspects of the encounter that are observed. Marking is graded:

1 = unsafe

2 = below expectations

3 = borderline

4 = meets expectations

5 = above expectations

6 = well above expectations

U/C = unable to comment

Marking can be undertaken in all or some of the following headings, depending on what has been observed by the assessor and the clinical emphasis of the encounter:

**History taking*

**Communication skills with child/young person*

**Communication skills with parent/carer*

**Examination*

**Clinical judgement*

**Initial management*

**Professionalism*

**Organisation/efficiency*

**Overall clinical care*

The feedback

Immediate feedback after each encounter is preferred, and is undertaken along with marking on–line, as soon as is practical.

The feedback should focus on the aspects which were undertaken by the trainee especially well, and trainees and assessors should identify agreed strengths but also areas for development, and formulate an action plan for each encounter.

In this case, it was agreed that the trainee adopted a good methodical assessment of ABC, and considered important conditions in the differential diagnosis. Her management of epileptic status and the use and understanding of the potential side effects of IV phenytoin were found on discussion to be good, and were commended.

The trainee was asked to justify the second bolus of 10ml/Kg 0.9% saline when capillary refill and circulation appeared adequate, especially with the co-existing clinical finding of decorticate posturing. The causes of decorticate posturing were discussed and the trainee reminded that in a child presenting with a possible encephalopathy, brain swelling and raised ICP should be considered. Fluid limitation may therefore have been

indicated. Fundoscopy should have been undertaken by the trainee, and interpretation and value of blood pressure monitoring in a child with continuing seizure activity discussed. It was agreed with the trainee that further reading around the acute and PICU management and care of children presenting with acute encephalopathies should be undertaken, and the case recorded as a reflective learning exercise in her e-Portfolio (Ref 4).

The time taken for the observation of the Mini-Cex was 27 minutes. 16 minutes was necessary to provide the feedback to the trainee.

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