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**Paediatric ED re-attendance rates: Comparing Nurse Practitioners and other clinicians.**

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## **Abstract**

**Objective:** The aim of this project is to establish the unplanned re-attendance rate for Paediatric Emergency Nurse Practitioners (PENPs) working in a designated Paediatric Emergency Department (PED) whilst identifying the case mix of patients seen by PENPs compared with their medical counterparts.

**Design:** Quantitative data regarding patient characteristics and re-attendance were collected during retrospective review of case notes across two representative two-week periods.

**Setting:** The study site is a tertiary urban Paediatric Emergency Department with an annual attendance of 32000 patients aged from birth to 15 years.

**Main outcome measures:** Re-attendance rates, patient characteristics, triage scores, presenting complaint and numbers of patients discussed with a Paediatric Emergency Medicine consultant were evaluated.

**Results:** The results showed that PENPs have a lower re-attendance rate (1.75%), when compared to senior and junior doctors in training (4.29%, 5.76%); however PENPs treat a different population of children. When the odds of PENP re-attendance are adjusted for this, the significance of the difference becomes less certain.

**Conclusions:** We conclude that PENPs work autonomously when seeing children presenting with minor trauma, and make a positive contribution in achieving the re-attendance Clinical Quality Indicator.

## **Introduction**

In April 2011 the Department of Health replaced the single four hour waiting time standard with eight Clinical Quality Indicators (CQI) to give a more balanced approach to care delivery in Emergency Departments (EDs).<sup>1</sup> Unplanned re-attendance to the ED is used to reflect the quality of care on initial presentation in terms of correct diagnosis, treatment and advice.<sup>2</sup> Yet this CQI arguably presents unique challenges in Paediatric EDs (PED) as a family's decision to re-attend may be based on other factors including parental anxiety, quality of the "safety-netting" advice given during the first attendance and/or a lack of paediatric focused community services.<sup>2-3</sup>

The target for unplanned re-attendances within seven days of initial presentation is between 1% and 5%.<sup>2</sup> Research is beginning to suggest variables which could correlate to an increased likelihood of paediatric reattendance such as age, presenting problem and grade of clinician seeing the child.<sup>3-4</sup> The only papers which have investigated re-attendance rates of patients seen by Emergency Nurse Practitioners (ENPs) to date have been undertaken in adult or generic EDs; the results indicate that ENPs have a lower re-attendance rate compared with middle grade and junior doctors (senior house officers, SHOs).<sup>5-6</sup>

Although Paediatric Emergency Nurse Practitioner (PENP) and Advanced Nurse Practitioner (ANP) roles have developed more recently than equivalent adult ENP positions,<sup>7-8</sup> they have been established for similar reasons. Namely, to provide a solution to the reduction in junior doctor hours, addressing unacceptable waiting times whilst increasing job satisfaction for experienced Paediatric Emergency Medicine (PEM) nurses.<sup>9-11</sup> Whilst there is limited literature reflecting the PENP role, one service evaluation demonstrated a high level of patient and parent satisfaction in the PENP management of minor injury and illness,

although this paper highlighted a bias towards PENPs delivering care to children with minor injury presentations.<sup>12</sup> Contemporary anecdotal evidence suggests both highly developed roles and service provision nationwide with PEM nurse practitioners being part of medical rotas whilst managing complex paediatric medical and trauma presentations. In a review of paediatric services,<sup>13</sup> the Royal College of Paediatrics and Child Health suggested an increase in Paediatric ANPs as a means to providing robust clinical care for children in the context of a changing workforce. It is therefore essential to analyse the remit and quality of care delivered by Paediatric Nurse Practitioners already working in EDs in order to understand performance and roles.

The primary aim of this project was to explore how Paediatric Emergency Nurse Practitioners in an inner city PED perform in relation to the CQI of unplanned re-attendance. The secondary aim was to gain further insight into the scope of the PENP team through comparison between patient populations seen by PENPs and by medical colleagues. The following questions underpin the project:

1. How do PENP re-attendance rates compare with those of the medical team?
2. Do PENPs see a similar patient population to their medical counterparts?

## **Methods**

The study site is a tertiary urban PED with an annual census of 32000 patients aged from birth to 15 years. We completed a retrospective review of medical notes from a convenience sample across a two week period in November 2011, and a further two week period in June 2012. These months were purposively selected to account for the seasonal variation usually seen in the study setting such as higher attendance rates and differences in presenting disease both which may have influenced re-attendance rates. Notes were included for review if the patient was seen between 1100 and 2300, the times during which

PENPs are on clinical duty. They were excluded if the emergency care episode was completed by a clinician external to the PED team, such as children referred to or admitted under specialty teams.

The PED team at the Bristol Royal Hospital for Children is made up of PENPs, Foundation Paediatric trainees (junior trainees), and Middle Grade Emergency Medicine and Paediatric trainees (senior trainees) overseen by PEM Consultants. The PENP team consists of four practitioners with a variety of urgent and emergency care clinical backgrounds and between four and sixteen years of nurse practitioner experience. All have undertaken a generic rather than paediatric ENP qualification whilst having adult, child or dual nursing registration. All are non-medical prescribers. For the purpose of the study medical roles were categorised into senior (ST) and junior (JT) trainee groups. Inclusion for the ST group comprised doctors at CT3 or ST4 grades and above to reflect the senior decision makers within the PED team as defined by the College of Emergency Medicine.<sup>14</sup>

Using the existing departmental unplanned re-attendance alert system, all cases during and for one week after the study periods were screened for eligibility. Full notes review was undertaken if the re-attendance was within seven days of initial attendance and the inclusion criteria were met at the time of the initial attendance. Data were abstracted by two members of the team (JF, ML). These included demographic details, grade of treating clinician, triage category, diagnosis and whether the case was discussed with the duty consultant or a senior trainee. Where required consensus was reached by discussion.

Data were collected and analysed using Stata 10 (Stata Corp, TX, USA). The association between the demographic factors and clinical status of the attending child, and the grade of professional who saw them were analysed. Comparisons were made using Analysis of

Variance (ANOVA) or Chi Square statistic as appropriate. We then examined the re-attendance rate according to the grade of healthcare professional. We initially considered univariable associations (using the Chi-Square test) and then developed a logistic regression model for the odds of re-attendance by grade of professional. We went on to adjust this estimate for trauma, triage category and age of the child by adding the appropriate variable to the model. The study was discussed with the local research design service and it was agreed that ethics committee approval and patient consent were not required since the work constituted a service evaluation of routine practice.

## Results

1150 initial attendances were included, the baseline characteristics of which are shown in Table 1. In accordance with the Manchester Triage system,[15] 18.3% were assessed as being of high acuity (P1 or P2), whilst 81.7% were classified of lesser urgency (P3 or P4). Overall the re-attendance rate was 3.7%, but there was both a higher attendance figure and re-attendance rate (4.8%) for November 2011 compared with June 2012 (2.3%).

*Table 1. Baseline characteristics of the patient population.*

Total study size	1150	
Male	652	57%
Female	498	43%
<i>Age:</i>		
<1 year	182	16%
1-5 years	457	40%
6-15 years	511	44%
<i>Presenting Complaint:</i>		
Medical	615	53%
Trauma	535	47%

Re-attendance figures for the study period including seasonal variation and comparison of professional groups is shown in Table 2. Across each 12 hour study period time (1100 and

2300) the normal staffing pattern consisted of: 12 hours of ENP time Monday to Friday (M-F) and on Saturday and Sunday (S/S), Consultant time; 13 hours M-F and 6 hours S/S, ST time; 28 hours M-F and 27 hours S/S, JT time; 32 hours M-F and 20 hours S/S. ENPs saw an average of 10 patients per 12 hour period, Consultants 5 patients, STs 10 patients and JTs 16 patients. PENP re-attendance rates compared favourably with those of the JTs and STs, but were higher than the consultant rate. Overall there was a statistically significant difference in re-attendance rate between the four professional groups (p=0.038).

*Table 2. Summary re-attendance figures for the study period.*

<b>Overall re-attendance rate</b>	40/1150	3.5%
<b>Seasonal Variation:</b>		
November Re-attendance/attendance	30/627	4.8%
June Re-attendance/attendance	10/523	1.9%
<b>Re-attendance rate across clinical Grades (p=0.038)</b>		
ENP	5/285	1.75%
JT	19/443	4.29%
ST	15/295	5.76%
CONS	1/127	0.79%
<u>Medical V's Trauma re-attendance across clinical Grades</u>	<u>Medical</u>	<u>Trauma</u>
<u>ENP</u>	<u>0/5</u>	<u>5/5</u>
<u>JT</u>	<u>15/19</u>	<u>4/19</u>
<u>ST</u>	<u>12/15</u>	<u>5/15</u>
<u>Cons</u>	<u>1/1</u>	<u>0/1</u>

A breakdown of the patient categories seen in the PED by professional group is shown in Table 3. PENPs saw a different patient population to their medical counterparts; predominantly managing older children with trauma presentations in the P4 triage category. The PENP team achieve a high degree of autonomy, discussing only 14.3% of cases with a doctor. This is less than the JTs but higher than the STs, though again the PENP case mix must be taken into account. PENPs discuss more medical than trauma presentations.



Table 3. Breakdown of patient categories by professional group.

Grade	PENP	JT	ST	CONS
Number seen	285 (24.8%)	443 (38.5%)	295 (25.7%)	127 (11%)
Mean Age (yrs & SD) ( $p < 0.01$ )*	7.2 (4.9)	5.3 (4.9)	5.4 (4.7)	6.2 (4.9)
<i>Triage Category (% of total seen by clinician type)(<math>p &lt; 0.01</math>)*</i>				
1	0 (0%)	2 (0.5%)	3 (1.0%)	1 (0.8%)
2	11 (3.9%)	111 (25.1%)	66 (22.4%)	16 (12.6%)
3	39 (13.7%)	91 (21%)	53 (18.0%)	23 (18.1%)
4	235 (82.5%)	239 (54.0%)	173 (58.6%)	87 (68.5%)
<i>Presenting Complaint seen (% of total seen by clinician type) (<math>p &lt; 0.01</math>)*</i>				
Trauma	217 (76.1%)	145 (32.7%)	107 (36.2%)	65 (51.1%)
Medical	68 (23.9%)	298 (67.3%)	188 (63.8%)	62 (48.9%)
<i>Discussed with Consultant (% of patients seen by clinician type, split by condition)</i>				
Total ( $p < 0.01$ )	41 (14.3%)	148 (33.4%)	17 (5.8%)	
Trauma ( $P < 0.001$ )	24/217 (11.1%)	32/145 (22.0%)	10/107 (9.3%)	
Medical ( $P < 0.001$ )	17/68 (25.0%)	116/298 (38.9%)	7/188 (3.7%)	

\*P value is for the differences in frequencies between professional groups.

Table 4 shows the results of the logistic regression models, presenting the odds of re-attendance for patients seen by a PENP, unadjusted and adjusted for the differences in patient population seen (trauma, triage category and age) compared to the other professional groups. In the unadjusted model there was weak evidence that both JTs and STs had a higher risk of re-attendance than children seen by PENPs, and these associations weakened further in the adjusted model.

Table 4: Unadjusted and adjusted odds of re-attendance by professional (doctor) group, compared to PENP).

Grade	Unadjusted			Adjusted*		
	OR	95% CI	p	OR	95% CI	p
JT	2.51	(0.93-6.80)	0.07	2.26	(0.79-6.45)	0.128
ST	3.00	(1.08-8.37)	0.036	2.74	(0.94-7.97)	0.065
CONS	0.44	(0.05-3.84)	0.461	0.42	(0.05-3.66)	0.432

\*Adjusted for trauma, triage category and age

## Discussion

We have described the characteristics of patients seen by PENPs in a single PED, and shown that the seven day unplanned re-attendance rate for PENPs is similar to consultant medical staff and lower than that for doctors in training. Compared to a PENP the odds of re-attending were higher if seen by junior (OR=2.26) or senior (OR=2.74) medical trainee, even when corrected for presenting complaint, triage category and age, although confidence intervals were wide and did not achieve conventional levels of statistical significance.

The demographics of this population are as expected, with a high proportion of children presenting under the age of 5 years and an almost equal split between medical and trauma conditions. Our figures also demonstrate seasonal variation, with higher patient numbers in the November cohort, similar to reports from other centres.<sup>3,16</sup>

Our results show that PENPs more commonly see older children with less urgent triage categories and trauma presentations. PENPs work more autonomously when seeing children with trauma and this is likely to reflect the way the PENP service has developed. Historically the PENP role has been focused on minor injury in terms of educational preparation and service delivery.<sup>7-8</sup> The higher discussion rate of medical patients possibly reflects a cautious advancement in this area of practice.

The overall re-attendance rate of 3.7% is comparable to that found in similar UK based PED studies.<sup>1,16</sup> It has been hypothesised that increasing re-attendance rates could be attributed to the reduced clinical experience of junior trainees working in EDs.<sup>5</sup> These authors compared the rates of re-attendance between different grades of medical staff in the ED and found that the departmental ENP had lower re-attendance rates than both the senior and junior trainees,<sup>5</sup> which is similar to the findings of this study. Whilst our figures

demonstrate an encouragingly low reattendance rate for PENPs compared to doctors in training, this comparison is partially confounded by differences in the case mix seen, and once adjusted the PENP re-attendance rate is no longer statistically different to junior and senior doctors in training, though a trend toward reduced re-attendance persists.

There are several explanations for the patterns we have demonstrated. Comparison studies have shown that nurse practitioners can provide treatment that is equivalent to their medical colleagues, and that patients find the role acceptable.<sup>6,17-24</sup> In measuring this, patients have scored their Health Care Professional's (HCP) behaviours to evaluate their experience, thoroughness and knowledge.<sup>25</sup> The concept of interpersonal competence describes specific skills witnessed in a HCP's interactions with a patient,<sup>26</sup> and highly rated behaviours include listening, caring, concern and compassion. ENPs and GPs adopt consultation skills which include provision of more education and counselling to patients than their SHO and middle grade doctor counterparts'.<sup>27</sup> Finally, the paediatric nursing experience of PENPs invariably leads to participatory based consultations, resulting in a greater ability to engage with families in a confident manner.

### **Limitations**

This study is limited by the fact that it was conducted in a single PED, and therefore it may not be possible to generalise the results more widely. Similarly, although we have included two different sampling weeks, these are not representative of the entire year, and though we included more than 1000 patients, larger numbers would have improved the statistical precision. Similarly, the number of doctors and PENPs assessed is relatively small and we are unable to establish the extent to which our results reflect the performance of individuals, as

opposed to the entire professional group that they represent. The results in this study show variations in length of consultations between professionals and it is beyond the scope of this project to explore the impact this may have had on re-attendance. Our method of case identification was retrospective, but since the introduction of the CQIs we have had an electronic alert on our patient attendance system to detect all unplanned re-attendances within 7 days of initial visit and we are therefore confident we identified all eligible patients. Finally, the design of the study was not prospective or randomised, and it is possible that other confounding factors, aside from those identified in our analysis, will have influenced the comparison between medical and PENP staff.

## **Conclusion**

We have described the work of Paediatric Emergency Nurse Practitioners in a dedicated Paediatric Emergency Department, using a retrospective and representative sampling technique. The results show that PENPs have low rates of seven day PED unplanned re-attendance, which are similar to their consultant colleagues and lower than the rates of junior and senior doctors in training. However, once adjustments are made for case mix, with medical staff tending to see younger children with a higher degree of illness and urgency, the significance of this difference becomes less certain. Nevertheless, PENPs demonstrate a high standard of autonomous practice, and achieve low rates of seven day PED unplanned re-attendance, suggesting that they provide a consistent standard of high quality care in this setting.

## **What is already known about this topic?**

- PENP services are now well established in UK PEDs

- ENPs have lower re-attendance rates than junior doctors in adult EDs.
- Un-planned re-attendance to the PED can be avoided by giving unambiguous safety netting information and realistic advice on time course for recovery.

#### What this study adds?

- PENP re-attendance rates compare favourably with those of Junior and senior trainees.
- PENPs see a different case mix compared to their medical counterparts; managing older children with trauma presentations in lower triage categories.
- PENPs work autonomously in their role and make a positive contribution the CQI of unplanned re-attendance in the PED

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