

How to set up a Paediatric Ambulatory Unit

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I. Abstract

This dissertation looks at the evolution of ambulatory paediatrics within this country and across other continents. Then the focus is more specifically on how and why paediatric ambulatory units (PAU) came into being, the literature surrounding them and their benefits.

Some of the key literature is critically appraised, highlighting the different studies and their impact on the topic of setting up a paediatric ambulatory unit. Medline and Cochrane database were used to search the literature.

The emergency clinic at a busy London teaching hospital is then the subject of an audit. I look at who is referred, by whom and what is the outcome of that referral. This is used as a springboard to form a guideline to aid in the setting up a PAU, which is what, in fact, is currently occurring at the hospital in which the audit was undertaken.

II. Acknowledgements

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1 . Aims and Objectives

1.1 Aim

- To look at the function and usefulness of an emergency clinic in a busy London teaching hospital.
- to review the evidence around paediatric ambulatory units (PAUs)
- to propose a PAU as an alternative to the emergency clinic.

1.2 Objectives

Study

This is in the form of an audit of the referrals to the emergency clinic and their outcomes.

Setting

The audit was based in UCHL, a teaching hospital in London. The hospital has an accident and emergency (A+E) department on site, with a bay of three cubicles for children and one to two designated nurses, who may, or may not, be paediatrically trained.

Subjects

Children referred to the emergency clinic by general practitioners (GPs), health visitors or from accident and emergency.

Results

Large proportions were referred by GPs and this indicates some need for instant access to paediatric services from primary care.

Future

This hospital is planning a paediatric ambulatory unit with a designated consultant. I

shall look at how this could be done. A review of the current literature surrounding PAUs, will help to formulate a guideline for setting up a PAU. I shall also look specifically at the logistics of establishing a PAU in the hospital where the audit was carried out.

2 . Introduction

Ambulatory Paediatrics has been defined as 'non inpatient hospital services and provision of care to sick children at home or in a local environment'.¹ The Royal College of Paediatrics and Child Health (RCPCH) has issued a position statement on ambulatory paediatrics - "to provide care without hospital admission whenever possible and aim, when admission is needed, to reduce its duration to a minimum".²

The RCPCH felt, in 1998, that ambulatory paediatrics is a philosophy which underpins the provision of service for children at home.²

There has been an increase, year on year, in the number of children attending A+E and being admitted as inpatients. The Court Report in 1976 suggested that over 20% of children in Britain attend an A&E department every year and 10-30% of those attendances are for non traumatic conditions.³ More recent data indicates that children account for about 25% of A&E attendees.⁴ Boyle et al found that there was a 1.8-fold increase in the number of children attending A&E in the twelve years between 1986 and 1998. They were unsure as to the reasons for this but suggested that the changes in primary care services may have contributed.⁵ The out of hours GP service is now centralised and this may have affected public perception of accessibility. They suggest that the public may feel GPs are less accessible and therefore they use the A&E department more readily. They found the children attending A&E were less likely to need admission. They conclude that the future paediatrician will have to be comfortable dealing with problems that were traditionally those of primary care.

It was felt by Taylor, as early as 1994, that things were changing in the world of Paediatrics and that training and quality of service were in danger of being sacrificed. He felt that too much emphasis was being put on hospital care and that, in fact, care should be devolved as much as possible to primary care, which is, in fact, the opposite of what Boyle, suggests is happening. Even at that time, the boundary between primary and secondary care was merging. He advocated the centralisation of hospital care so that those who were providing it were more practiced at delivering the care. The

argument was that the medical staff, working in quiet units, were going to be deskilled if they did not see acutely unwell children often enough and that this could be detrimental to quality of care.⁶

He also wanted to see a close working relationship between specialist hospitals and the district general hospitals (now 'shared care'). This would mean that a district general hospital (DGH) paediatrician would not feel like a 'jack of all trades and master of none'. Taylor felt that the DGH paediatrician, who may see a handful of children with a certain disease a year, would be able to have a close liaison with the specialist paediatrician, who would see a large number of children with that disease a year. Joint protocols and a joint goal of trying to keep the child as close to home as her illness would allow is what Taylor felt the aim should be.

A lot of what Taylor envisaged has become routine, such as shared care and more centralisation of paediatric services so that professionals are not becoming deskilled in acute care. Also the basic structure of paediatric care has had an overhaul. This is, in part, due to the Bristol Inquiry in 2001, that found paediatric services severely lacking. Nowadays, only paediatrically trained staff can look after children. This has meant a shift away from small hospitals with children's inpatient services being staffed by adult physicians. In a lot of these cases, either a recruitment drive has meant the relevant staff being employed, or that alternatives have been found in the best interests of the patients. There are now hospitals that have only paediatric A+Es, some with a PAU, in order to overcome some of these problems.

In a climate of increasing numbers of A+E attendees, admissions and shorter lengths of stay, there is a need to find ways of averting admission, where possible, as there is a finite capacity within the National Health Service (NHS).^{2;6-9} It is also true that, with the 'four hour wait' Government initiative,¹⁰ there is a need to look at how to ensure children are adequately and safely observed and treated, whilst still not being in the A&E department for too long. The 'four hour wait' means that patients must be seen within four hours of booking into A+E and a decision made as to whether they can go home or need to be admitted to hospital.¹⁰ The British Association of Accident and Emergency Medicine has recommended that every department should have a short stay

bed for every 5000 attendances.¹¹

Furthermore, the Court Report, in 1976, recommended that "whenever the illness and circumstances allow a child will be cared for at home".³ This is where ambulatory care comes in.

Nowadays, there are several types of ambulatory care;

1. Primary Care - given by GPs
2. Hospital at home - encompassing the home care nursing team. This has been established for some time and is a successful way of treating children in the safety and comfort of their own home.
3. Non inpatient hospital services - which include acute assessment units in A+E departments or paediatric departments, acute assessment clinics (also known as 'emergency clinics') and day case surgery. Day case surgery has become more and more widely available for tonsillectomies and other such minor surgery.

There is a discrepancy in the labelling of the non inpatient hospital services; emergency observation unit, admission unit and assessment unit are often used interchangeably.

The Royal College of Paediatrics and Child Health² identified two types of alternative in the hospital setting:

1. Acute assessment clinics - these provide emergency out-patient consultations
2. Acute assessment units (also known as emergency assessment, observation or short stay units) - these can work in conjunction with the acute assessment clinics, but equally can work independently. They are integral to a paediatric inpatient ward or emergency department. They provide admission facilities for periods measured in hours rather than days. They perform two main functions; firstly, they can work as observation areas for short-term admissions and secondly, they can form active filters where investigation, including blood tests and imaging, and urgent treatment, are undertaken. This can be scheduled or unscheduled.

Within the UK, PAUs vary in their set up. Some are established within A&E, some

outside of it. Some are within hospitals with a full paediatric department, others would have to transfer to another hospital to admit and others can admit, but only for a short time (usually twenty four to forty eight hours). If any longer is needed the child would have to be transferred to a hospital with an inpatient unit. Ogilvie divided the units into two categories; paediatric assessment units, which are the equivalent to acute assessment units, based in the paediatric department and A+E assessment units, which are acute assessment units based in A+E.¹² They performed a literature search of the evidence behind these units and found that 40% of children referred to the PAU were discharged without requiring inpatient admission and 62-99% of children referred to an A+E unit were discharged. Many of these would have been admitted had the PAU not existed. It also means that fewer diagnoses are missed as there is time to assess the child. Wiley felt that there is a 'worry rule' and that one to two of the patients he would send home in a shift would worry him as he had not had time to adequately assess them. He suggested that a PAU would extinguish this worry.¹³ Levett, described their unit, in which there was which had a maximum stay of eight hours, and found that only 8% of children stayed longer than that, 54% of whom were admitted. Those that were not admitted were kept on the PAU, in part, because the decision to discharge could not be made in the middle of the night.¹⁴

In America, ambulatory paediatrics is based in private practices (primary care paediatricians), in emergency rooms of hospitals or in outpatient clinics. This is the same as including GP primary care in the UK. PAUs are known as Paediatric Observation units. In a study Mace found that PAUs improved patient care, facilitated emergency department patient flow and also decreased missed diagnoses, medico-legal risk and healthcare costs.¹⁵ A recent survey of 522 hospitals in America showed that 19% had observation units, 64% of which treated children,^{13;16} found that the admission rate to the 23-hour clinical decision unit was between 4% to 6% of the emergency department attendees, as compared with an inpatient admission rate of approximately 7%. He felt that 'properly configured clinical decision units have tremendous potential for improving overall emergency care'.

In Australia, ambulatory paediatrics is seen as the care of children who are not in hospital beds and of children who are not admitted but who attend as outpatients.

Zebrack felt that children with certain diagnoses should be admitted as inpatients, on the basis of The College of Emergency Physicians advice, "Patients who subsequently are admitted to the hospital (from the PAU) should be examined to identify if their period of observation was appropriate.¹⁷ If the number of admitted patients is high (>30%), the department has to question the validity of the unit's guidelines".¹⁸ They have therefore decided to admit problems of bloody stool, viral pneumonia, bronchiolitis and ventriculoperitoneal shunt.

The reasons for hospitalisation were also considered by Frederick North in 1976. He commented that "the need to hospitalise a child is dependent on the special services which the child requires rather than upon the diagnosis".¹⁹ In his paper, he listed nine admission criteria. I shall look at these as they still hold true today, with some minor alteration.²⁰ It also helps decide who should not be admitted and therefore would be best suited to ambulatory care. I shall look later, in detail, at who exactly should be admitted to a PAU.

1. General Anaesthesia

"Safe general anaesthesia requires intensive observation and access to specialized equipment in general only available in a hospital or a closely related facility." This is still the case except that the anaesthetics available nowadays, with outpatient preoperative preparation and postoperative monitoring, mean that many admissions for operations can be avoided.¹⁹ At the Montreal Children's Hospital in 1993 to 1994, >70% of operative procedures were not associated with an inpatient stay.²¹ Diagnostic procedures were associated with an even higher level of day case work. Cardiac catheterisation, gastrointestinal endoscopy and other such diagnostic work were, in 99% of the patients performed as day cases.

2. Intensive Observation and Monitoring

This was "in conditions in which a sudden change in status would be likely to cause a need for immediate treatment" and "where parents could not provide such observation

at home and/or would have difficulty accessing medical aid in a timely fashion". He also suggested that children who had problems, but in whom a diagnosis had not been made, should also be admitted.¹⁹

Today, this is tempered by the fact that there is the option of a day unit where a child can stay and, in the time she is there, the disease may make itself known and, therefore, a decision whether or not to admit overnight can be made.

3. Intravenous and other parenteral treatment

North felt that this was a reason to admit children.¹⁹ However, more recently it is considered unnecessary to admit children for these treatments. Many children who are diagnosed with serious bacterial infections can receive intravenous antibiotics at home, providing they have the first few doses in hospital, to ensure a response.²² Children can also have blood transfusions, iron chelation and chemotherapy as a day cases

4. Respiratory Treatment Involving Oxygen Tents, Ventilators or Similar Equipment

Since 1976, there has been a huge advance in the technology available to medicine. There are now home ventilators, oxygen concentrators, humidification and nebulisation equipment. For example, cystic fibrosis patients can have home nebulised antibiotics and home oxygen so that they are not admitted to hospital and, thereby, avoid exposure to a host of potentially infectious bacteria. Also oxygen-dependant ex-premature babies can now go home earlier with home oxygen.²³

5. Special Therapeutic Modalities Requiring Frequent Application of Special Nursing or Technical Skills

Due to the changing perception of the parental role in the child's care, it is felt that parents are now prepared to undergo training and are often the best people to administer regular injections, do blood sugar monitoring and suction tracheostomies. As a result, parents feel more in control of their child's well-being and feel they are benefiting their child. Of course, these procedures can be carried out by home care nursing teams if parents cannot, or choose not to, be involved.

6. Observation under Controlled Environmental Situations

In general, this would optimally be done on a day case basis. There are, however, some situations that may necessitate an admission, such as investigation for failure to thrive, where all other investigations have not revealed a cause.

7. Suicidal Attempt or Threat

There are a minority of children that would need in-patient observation because of suicidal ideation and these would be best identified by an expert in the field.

8. To Establish Maternal-Infant Attachment in the Neonatal Period

In fact, nowadays, the opposite is true and most women are better off at home with their babies to bond. This is part of the ethos around postnatal care.

In 1998, Wiley looked at who should be admitted to a PAU.²⁴ He concluded that the most favourable diagnoses, in rank order, would be;

1. Status Asthmaticus
2. Gastroenteritis/Dehydration
3. Seizure Disorder
4. Head Trauma
5. Ingestion

Other papers from Australia²⁵ and New Zealand²⁶ include similar diagnoses but ordered in a slightly different way as shown in Table 1.

Population Characteristics of OU Patients		
	Observation Patients (N = 4189)	Patients With Scheduled Procedure (N = 2288)
Median age, y	2.5	5.0
Median LOS, h	15.5	3.0
Percent who required subsequent IA	15	1
Evaluated first in ED, %	93	0
Attending physician responsible, %		
Pediatric emergency medicine	76	47
Orthopedic Surgery	9	3
General surgery	5	2
Hematology/oncology	3	1
Anesthesia		19
Gastroenterology		11
Nephrology		4
Other	7	13

IA indicates inpatient admission for care beyond 24 hours.

Table 1: Population Characteristics of OU Patients¹⁷

Browne gives a comprehensive list of patient categories that would be suitable for their emergency annexe (equivalent to a PAU) and these are shown in Table 2.²⁷

Table 1 Patient categories appropriate for admission to the children's emergency annexe

Respiratory
Asthma mild/moderate severity
Croup mild/moderate severity
Bronchiolitis mild/moderate severity
Infections
Observation for fever control or analgesia (otitis media)
Fever of unknown origin
Moderately severe infections (cellulitis, pneumonia, urinary tract infection, etc)
Occult bacteraemia
Gastroenterology
Gastroenteritis
Abdominal pain of uncertain origin
Constipation
Uncomplicated intussusception
Crying baby
Neurology
Headaches
Uncomplicated febrile seizures
Uncomplicated seizure
Minor closed head injury
Other
Minor illness that the admitting officer feels warrants observation (post vasovagal, fainting episodes, etc)
Accidental ingestions for observation
Injuries/trauma
Simple wounds/lacerations
Simple fractures
Injured child with several minor injuries
Minor/moderate head injury
Simple non-urgent foreign body
Patient for observation
Sedated child for procedure
Simple procedures (regional block, etc)
Endocrine/metabolic
Diabetic ketoacidosis mild/moderate severity
Transient hypoglycaemia
Transient temperature instability

Table 2: Patient Categories appropriate for admission²⁷

Zebrack found that the most common reason for admission for 'scheduled procedure patients' was sedation for procedures such as lumbar puncture and bone marrow biopsy, peripherally inserted central catheter placement, or auditory brainstem response studies.¹⁷ They also found that the median length of stay for these procedures was 1.3

hours and that 99% of them were discharged within 24 hours which verifies them as appropriate for admission to a PAU.¹⁷

Most Common Observation Admission Diagnoses in Different, Geographically Separated OUs				
Diagnosis Rank	Salt Lake City	New Zealand ¹⁹	Hartford, CT ²⁰	Australia ²¹
1	Gastroenteritis/dehydration	Respiratory infection	Asthma	Asthma
2	Orthopedic injury	Asthma	Gastroenteritis/dehydration	Ingestion
3	Asthma	Ingestion	Seizure	Nonrespiratory infection
4	Closed head injury	Gastroenteritis/dehydration	Closed head injury	Seizure
5	Urgent transfusion	Seizure	Ingestion	Respiratory infection

Adapted from Wiley.¹⁶

Table 3: Most common observed admission diagnoses¹⁷

This table depicts the most common observation diagnoses encountered at several geographically diverse PAUs. The overall successful discharge rate of the patients admitted to the PAU for observation in the Salt Lake City study was 85%, which was less than rates in the other studies from North America, Australia and Singapore. The authors felt this may be because their admission criteria were less conservative than the rest of the studies. They regularly admit patients with hyperbilirubinaemia of the newborn, aseptic meningitis and diabetic ketoacidosis in individuals with known diabetes. They also identified that age matters in two diagnoses in particular; bronchiolitis and abdominal pain. They found that almost two thirds of the patients less than one month of age, with bronchiolitis, required admission and 41% of children older than 12, with abdominal pain, needed inpatient admission.

So other than taking pressure off busy A+Es, what are the advantages of the PAU?

It has been shown that ambulatory paediatric care as a substitute for hospital inpatient facility is successful. This comes with a few caveats. Firstly, that there is a hospital with inpatient beds within a reasonable distance from the PAU for those children that need to be admitted. Secondly, that there is a pre-agreed method of transporting the children to the inpatient hospital, be it by blue light, retrieval team or other method. Thirdly, that the PAU must be staffed by paediatric trained doctors and nurses. Lastly, that there is some form of hospital at home or community nursing available.

Macleod showed that the number of paediatric medical admissions markedly reduced

following the opening of a PAU.²⁸ The inpatient facility was closed and a PAU was opened. Any acute admissions were transferred to a base paediatric unit. In the third year after opening the PAU there was a 47% reduction in admissions compared to the baseline year.

Sartain demonstrated there was no difference in clinical effectiveness between a paediatric hospital admission and a hospital at home service.²⁹ They assessed the length of stay in either of those services for children with three conditions and also the readmission rate. The length of stay was one day longer in the hospital at home group compared to the hospital-care patients. The readmission rate was considered a measurable proxy for parental confidence. The pre-trial readmission rate was 17% and the trial readmission rate was 8-10%. It was felt that this may have been, in part, due to the recognised non-specific effect of conducting any research, tending to generate improvements in care.^{30,31} The readmission rate may well have also been affected by the type of patient, that is, they were all acutely unwell. It is those with chronic illness that are more likely to need readmission. Increased parental education in the hospital at home group may be the reason for improved parental recognition of respiratory distress in their children. This is a recognised phenomenon³² 50% of the overall admissions were due to breathing difficulties and 68% were readmissions. 19% of the readmissions occurred in the first week and they were mainly from the hospital-care group. Could it be that the hospital at home experience gave the parents better coping skills initially?

In summary, PAUs have been set up in countries around the world to fill a gap in services. They have been introduced with varying degrees of uniformity, even within Britain, and tend to be needs-based.⁹ The reasons for needing admission are changing as more is known about diseases and medications, and equipment become more sophisticated. The need is for a service that minimises the amount of time a child spends in hospital, such that they are safe to go home with follow up, if necessary, soon after discharge.

3 . Background



Figure 1: Map of the Audit area.

An audit of the referrals to a paediatric emergency clinic in a busy London hospital, UCHL, was performed.

There are 42,253 young people in Camden aged between 0-19 years (2001 Census data),³³ served by UCHL's Paediatric Service. UCHL provides a general secondary paediatric service, supported by several tertiary specialities and works closely with Great Ormond Street Hospital (GOSH) and the Institute of Child Health, under the direction of the Trust's Specialist Hospitals Clinical Board.

The inpatient service typically sees 3,000 admissions a year. There are 38 paediatric inpatient beds for general paediatrics, surgery, orthopaedics and oncology. The ward consists of a mixture of bays and single rooms.

At the time of the audit there was no ambulatory unit. All children who needed rapid access to a Paediatrician were seen in the emergency clinic. Some of the children were sent to the clinic, having been seen in A+E by a casualty officer or Paediatric senior house officer (SHO), with a problem that needed further input. Other children were referred by their GP or health visitor. Children were also seen in the clinic when they had been discharged from the ward for follow-up investigation or check.

There was no appointment system and the children had a referral letter with them. Physically, the clinic was placed on the fourth floor of a building which also housed an

accident and emergency department, on the ground floor, and a paediatric inpatient ward, on the sixth floor. The clinic ran from 10 until 11.30 in the morning. The clinic had a receptionist who generated a card for the child or found up to date records and results. Also there was a paediatric sister and two staff nurses who assessed the children before they were by a doctor (either a paediatric specialist registrar (SpR) or SHO). There was a nominated paediatric consultant who was available to answer any queries that may arise, but it was primarily an SpR run service.

In general, there was no prior knowledge of who was going to attend and how many children there would be. On average, six to eight children were seen per clinic and this could vary daily from one to twelve.

This audit was undertaken with three main aims;

1. To highlight short-staffing
2. To demonstrate that children were being referred with complex or chronic problems deemed inappropriate for the clinic.
3. To collect data prior to a planned move of hospital site taking place over several years with the long term view of opening a PAU.

The hospital site move has now begun and has started with all the services being moved from the original building, as this has been destroyed. The inpatient paediatric and adolescent services (including oncology) have been moved to adjacent floors in the same building (T11 and T12). The adolescent and oncology services were previously at the Middlesex site which was located a fifteen minute walk from the original in-patient building. Floor 12 (T12) holds 39 adolescent and young people's inpatient beds, and accepts acute admissions from adolescent medicine and rheumatology, adolescent oncology and adolescent surgery. Both wards consist of a mixture of bays and single rooms and are well supplied with play areas, activity rooms and hospital-based school rooms. Children aged 3 years and under, with acute surgical abdominal problems, are transferred to GOSH, whilst children 3-5 years and over are managed by the surgical

teams at UCHL. Children with faciomaxillary, plastic surgical, orthopaedic and dental needs are also treated within the trust.

Clinics are now located in the Rosenheim Building on Grafton Way (five minutes walk away from the main inpatient building) and day-care admissions are also seen there. Services include general paediatric clinics, rapid referral clinics, and speciality clinics in asthma, allergy, haemoglobinopathies, urinary tract infection and urogenital problems and paediatric surgery.

The A+E department is on the ground floor and there is a dedicated waiting room, two cubicles with beds and a room with a cot. The move occurred in June 2005 and nurse staffing for the paediatric A+E soon became a problem. There is a national shortage of paediatric nursing staff and, even with recruitment drives, the A+E department could not be opened due to their policy that there needed to be appropriately qualified staff working there. For a period of months the paediatric A+E was shut and the newly appointed Paediatric Ambulatory consultant continued to run an emergency clinic at the Middlesex hospital. The children were seen in the main adult A+E by adult trained staff.

This was an unsatisfactory situation and was remedied by the paediatric A+E being reopened in November 2005, staffed by one of the nurses from the paediatric inpatient ward, the ambulatory consultant, SHO and SpR. Acutely unwell children were being seen at the emergency clinic and then having to be transferred to the A+E site a 15minute walk away. As a consequence of this, the emergency clinic was closed. Children that would have been seen in the emergency clinic were seen in the paediatric A+E. The department was opened between 9am and 5pm, Monday to Friday initially. During these hours, 46% of weekday attendees would be seen, as shown in the figure below. This information is from the database of attendances at UCHL. In conjunction with this, a PAU has been set up on the in-patient ward. It is still in its infancy.

Opening hours	Weekday	Weekend
0900-1700	46%	49%
0900-2000	67%	68%
0800-2000	69%	70%
0800-2200	76%	81%

Table 4 Percentage breakdown of attendance in a 24 hour period at UCHL within defined time periods (July to December, 2005)

The next phase of the relocation is another building, in place of the original, that will contain an eight-bedded paediatric A+E and also house a PAU. Alongside this, on the ground floor, will be an outpatient department.

Currently, there are 12,000 attendances to paediatric A+E, per annum, with numbers expected to increase by at least 20,000 by 2008. When the Children's Emergency Centre opens this number is set to increase dramatically, due to a number of factors;

- the new GP contract which means there is a lack of out-of-hours GP emergency provision,
- increasing patient demand and expectations,
- “feel-good factor” – with local knowledge of available services and positive report of patient satisfaction, demand will increase by word-of-mouth.
- local developments in the North Central Sector - the closure of 2 out of 6 paediatric inpatient units within the sector;
 - the Royal Free A+E currently sees around ten thousand children per annum,
 - the Whittington Hospital sees around fourteen thousand children per annum,
 - Great Ormond Street does not have an acute paediatric facility,
 - possible migration of acute paediatric patients from Northwick Park
- “Over-flow” from out-of-sector:
 - the Paddington Basin Development/Paddington Health Campus
 - St Mary's proposed expansion has stalled leaving a potential four to five thousand children that could potentially require UCHL paediatric facilities,

- Bedfordshire and Hertfordshire’s proposed restructuring,
- possibility of patient migration from Queen Elizabeth the second Hospital, Welwyn,

The table below demonstrates activity in four established London paediatric A+E departments, showing significant increases from that initially predicted to current day levels. This data was sourced from the individual hospitals. The data for UCHL is predicted for when the new building is ready.

Hospital	UCHL	St Mary's	Guy’s & St Thomas’s	Homerton	Royal London
Year opened	2008	2000	2003	1996	1998
Expected annual attendances	20000	14000	18000	10000	25000
Current activity (annual attendances)	12000	22000	25000	26920	36000

Table 5: Activity in 4 established London Paediatric A+E Departments

With these considerations, UCHL’s Children’s Emergency Centre is strategically placed to become the leading Paediatric Emergency Centre for North Thames.

4 . Review of the literature

A search of the literature identified key papers regarding PAUs focussing on the following;

1. Patient outcome
2. Re-attendance of patients
3. Cost benefits
4. Patients and parental satisfaction
5. Staff Satisfaction

4.1 Browne (1996)

Browne did a university teaching hospital-based study in Australia.²⁷ The hospital is the referral unit for three small children's units that have a collective population of 350,000 children of mixed ethnic origin, which is larger and a different set up to UCHL. They collected data on 1300 children admitted to hospital from April 1994 to April 1995. The data included appropriateness of stay as determined by the acute care consultant, according to their working policy, and adverse event reported within three days of discharge.

They found of the 13,150 children presenting to A+E, 1300 were admitted to their equivalent of the PAU and 2892 were deemed unwell enough to be admitted to the in-patient ward. 70% of admissions to the PAU were between 1200 and 2000 hours. 58% of admissions were children under 2 years. They found that only 1% was felt to be inappropriate admission and only 4% were transferred from the PAU to an in-patient bed. There were no critical incidents reported in the study period. The criteria for admission are not given. The consultants involved in the study define "appropriate". This may introduce some bias as they may not be completely objective.

Critical incident monitoring was reviewed after 3 days. Three days seems a short time and there is no explanation why this length of time is used. However, the numbers of children involved were large and this study is based in a city based teaching hospital, which is pertinent to the hospital we shall be looking at.

Browne found that the reduction in bed days due to the introduction of a short stay facility, where children were admitted for 24 hours or less, produced a saving of \$500,000 (Australian dollars). This was calculated by taking the cost of a PAU bed away from the cost of an inpatient bed, which was \$250 a day. This would vary considerably in the United Kingdom, as PAUs are so very different in their set up. There is a gap in information regarding costs of setting up and running PAUs. This may be, in part, due to the RCPCH paper 'Ambulatory Paediatric Services in the UK' which states that 'the development of these units (PAUs) was primarily for quality purposes managing the child for as short a period of time as possible within the hospital situation and by promoting early discharge for care at home by parents, rather than for reducing cost. It was important to emphasise this as some have taken the view that an ambulatory service may be a cheap alternative to inpatient facilities. Although there may be a reduction in numbers of in-patient bed days, an increased number of paediatric episodes is likely to be experienced'.²

4.2 Lal (1999)

Their PAU was based in a district general hospital in Middlesbrough.³⁴ They assessed the unscheduled return visits within 72 hours after discharge from the PAU. They collected information over a 30 month period using three main sources. The first source was a hand written register based on the unit, the second the hospital computerised patient administration system used with the medical records for hospital numbers, and, finally, the interdistrict hospital information register.

7328 children were referred for admission, which is just over half of the expected annual attendance at UCHL. 43% were discharged home. 2% of the children were identified as unscheduled returns, the majority of whom had respiratory difficulties, and only a third of these needed to be admitted as inpatients. Parents' perception of the severity of illness was a large determinant of whether there was an unscheduled return visit. The intensity of work sounds very different to UCHL, due to the report not identifying any intensive care admissions. The expectation of the UCHL PAU would be that there would be thirty intensive care admissions in a thirty month period.

Furthermore, they do not have data on which children returned to their GP. This would

have been useful, as the GP may be sorting out problems related to a child's visit to PAU that was not known about.

4.3 Beverley (1997)

An audit of the first year's activity after the opening of a PAU in a district general hospital in Yorkshire is presented by Beverley in their paper.³⁵ Their childhood population is 45000, a similar number to the UCHL population, and during the year of their audit, 1731 children were assessed of whom 658 did not require admission to the in-patient ward. They have shown that there was a decrease in the number of children who were admitted and discharged from the PAU, in the same day, within the year of opening the unit. However, due to the fact that data prior to the opening of the PAU was not collected for this information, it is difficult to assess the extent of the improvement.

Only 11 children reattended because of non-resolution of their problems; seven of these did not need admission and four needed to be admitted on second or subsequent presentation. Only one of these was a missed diagnosis, in the others the disease evolved naturally.

Beverley used 'zero length of stay' (meaning children who were admitted to and discharged from a bed on the same day) as a measure of efficiency. This, however, did not differentiate between those children who were admitted and discharged in daytime hours and those who had an overnight stay. These two scenarios would have a very different effect on the family life of those children involved. It would be useful, therefore, to label these types of stay in such a way as there was a clear distinction. They also looked at staffing costs on the children's wards and found that there was a 5% decrease in expenditure on staff in the two years after the opening of the unit. This was in part due to a reduction in staff sickness, which can also be used as a proxy of success of the unit. The staff sickness levels reduced from 2.9% to 2.4%, a reduction of 17%. They themselves recognise that this is a very low level of staff sickness to start with. They also attribute a lot of the success to the children's services manager.

In the paper it is acknowledged that there can be difficulties with so many people

having admitting rights to the ward (up to thirty different consultants), with the ward being very busy at certain times of the day.

They also say that there are benefits to the family from not being admitted such as less disruption of home life, no need for alternative child care arrangements for siblings and less time off work for parents and less emotional trauma for the child. Even though these may seem obvious benefits there is very little literature to back these claims and there is certainly a need for studies into this area.

4.4 Gouin (1996)

Gouin described a retrospective study based in an urban tertiary care A+E in Canada.³⁶ They looked at the admission rates for children with asthma before and after the opening of a PAU. They have more than 50,000 patient visits to their A+E and 2,000 of these are children with asthma. This is larger than our A+E. They included children from 1 to 18 with asthma and randomly selected 17% of children who attended for a year before the PAU opened and the same again in the year after it opened.

They showed a decrease in admissions from 31% to 24% and an increase in repeat-visit rates within 72 hours from 3.2% to 5.0%. This echoes the statement from the RCPCH paper 'Ambulatory Paediatric Services in the UK', quoted above.² They do not have any information regarding possible attendance of these patients at other hospitals or medical practitioners.

The decision to admit was left up to individual doctors and so there may well have been a lot of variability. There is a gap in the literature regarding severity of illness and relationship to admission. This is difficult to analyse as reasons are based on experience and knowledge. Experience is difficult to quantify and standardise. There is a need for study into this area in order to try to standardise practice.

4.5 Macleod (2002)

This paper looks at the opening of a PAU, in Northern Ireland, in response to criticism that the paediatric in-patients were being looked after by adult physicians.²⁸ They closed their inpatient unit and opened a PAU which was open from 9am until 5pm on weekdays. It is staffed by two staff grades and the consultant physician visits daily. Their population is 17,800 of 0 to 14 year olds and their admission rate is 700 per year, 97% of whom came from that area. This is much a much smaller number than most inner city teaching hospitals. This is also in a rural community and therefore may be difficult to compare to an urban teaching hospital.

They looked at the effect the opening of the PAU had on admissions (any patients that needed admission were sent to another hospital twenty two miles away). They also looked at levels of GP satisfaction and parental satisfaction.

Parents were telephoned by members of the nursing staff on the unit and the survey was done using a structured interview format. Fifty individuals were chosen at random, but they ensured that there was an equal male/female ratio of patients and that the entire paediatric age range was covered.

Of the fifty parents, all were either very satisfied or satisfied. Only one parent considered the service unsatisfactory. Most parents felt that their child benefited from not being admitted to hospital. Parents felt that not being admitted meant that there was less disruption to family life, the home environment was less stressful for the child and they had confidence that there would be close follow-up. This reiterates some of Beverley's findings.³⁵

The majority of parents felt that they had received adequate information about their child's illness - some verbal and others both verbal and written. The most pressing problem reported by parents was the lack of car parking space.

There are two concerns with this survey; one is that the unit's own nursing staff undertook the telephone survey and the other is that we do not know when the families

were being contacted in relation to their admission. If nursing staff were doing the survey, even if it was structured, this could introduce bias, as either the parent may report more positive experiences to please the nurse, or the nursing staff may have preconceived ideas about what the parent will say. Then if parents were being telephoned a long time after their child had been in the unit they may have forgotten what happened exactly and may not have been able to give accurate feedback. Also, if all the children chosen were those that had attended in the first six months of opening they may have had a very different experience to those who used it later on.

They also looked at the levels of GP satisfaction following the opening of their PAU. GPs were sent an anonymous questionnaire designed to assess their level of satisfaction with the new service. This was designed to look at areas of concern that had been identified during meetings between hospital paediatricians and the local GPs. No pilot was conducted.

The questionnaire was sent with a covering letter from the paediatric medical staff in the ambulatory unit.

Given that the questions were based on discussions that had taken place in the face of closure of the inpatient facility, there may well be bias introduced into the survey. The questions may only concentrate on those discussions and may omit crucial aspects of the service that need feedback. We also do not know what the covering letter said as that may also have given leading information to the respondent.

The response rate was 65%, which is fairly low. Just over half of those who had referred to the unit "agreed" or "strongly agreed" that the new service had succeeded in allaying their fears about the closure of the inpatient facility. Unfortunately, these concerns are not described and this detail would have been of interest. 23% disagreed or strongly disagreed with this. Again we do not know the nature of their concerns. 97% reported ease of access, but we do not know exactly how they access the service.

97% felt that requests for consultation were met promptly, but we do not know the average time lag from request to child being seen. 94% of GPs thought that feedback

was appropriate. We do not know how and when feedback was made to GPs. One useful statistic was that 61% of GPs wanted to see extended opening hours to 9am-9pm Monday to Friday and 12noon to 6pm on Saturday and Sunday. In the discussion there was no mention of this being an option for the future.

4.6 MacFaul (1998)

MacFaul wanted to compare views of parents, general practitioners and consultants on severity of acute illness and need for admission.³⁷ They sampled all (n=887) emergency general paediatric admissions in five hospitals in Yorkshire, during two separate three week periods, one in summer and one in winter. We do not know the demographics of the hospitals used, but the fact that they sampled from summer and winter will mean we have views at busy and quieter periods on the PAU. They gave questionnaires to parents at the time of admission and to the admitting SHO and then one to the consultant paediatrician after the child had left hospital. Parents had to score their thoughts on the severity of their child's illness and need for admission on a visual analogue scale of one to ten, nine or more was graded as a high score. Consultants recorded the reason why they felt admission was necessary and how they think this may have been avoided and, if so, using what alternative services.

For a random selection of 123 admissions, a questionnaire was sent two weeks later, to parents and GPs, to elicit their views on alternatives to admission. This contained a series of questions with a visual analogue scale and free text sections inviting comments.

The parental severity of illness score were normally distributed, whereas the need for admission scores were heavily skewed to the left, meaning that a third of parents felt very strongly that their child needed admission (>9). High parental score for admission was particularly likely for children who had had a fit or where the parents mentioned a past illness. Interestingly, ingestion of potentially toxic substances was not associated with a high score. In interpreting this, it has to be remembered that parents were being expected to rate their child as they were admitted and this may well have been a

frightening time for them and may have skewed their view of need for admission. The authors also looked at the 123 responders who were surveyed two weeks later and found that the results were similar. Only 63 (55%) replied which is a small number. If those who responded were the ones whose illness was more severe, then this would correlate. Those who were not so ill may not have responded to the survey, but the paper gives us no measure of this.

Consultants rated the severity of illness, with only 10% of scores exceeding 6, and need for admission, similarly. However, it does have to be borne in mind that the consultants were doing this after discharge and hindsight will have played a part in their assessment.

Looking at alternative arrangements for care, parents were very much in favour of admission for their child as opposed to home nursing care. In addition, GPs felt that children's nurses calling into the home would not be helpful. The consultants, however, suggested that outreach or day case provision could have prevented admission in 19% of children. We do not know whether different methods of ambulatory care were explained to parents or GPs, or what their level of experience of them was, and so it is hard to suggest their opinions were balanced.

Overall, from the comments the parents made, they seemed to be seeking the security in an admission; from experienced staff who could educate them. "Parents views in the sample showed that they valued the close observation by hospital staff (especially at night), access to investigations, or a period of respite."³⁷

4.7 Leduc (2002)

This paper is based on a descriptive, retrospective survey study³⁸ They looked at nursing staff opinions after the introduction a PAU. A seven-question survey was sent to all the nursing staff one year after the PAU was introduced. There was a 64% response rate which is not very high. They felt that nurse to patient ratios were safer (96%) and admissions to the observation unit were appropriate (71%). They felt uneasy about looking after children who were awaiting an intensive care bed (64.3%) - it was

due to the number of them on the unit. There was no dedicated nurse for the PAU at this time and as a result of this survey one was assigned each shift with a "resource nurse" who could come and help when needed. This is not very pertinent to our proposed unit as it is recognised that one, if not more, dedicated nurse would need to run a PAU.

The nurses also felt that the families were more satisfied with the observation unit. 79% of them also said they liked rotating through the PAU, as it gave them a change of pace.

This is interesting and may be worthwhile investigating further.

A family satisfaction survey showed a 50% decrease in complaints before and after the PAU was up and running. Unfortunately, no information is provided regarding the nature of concerns and what improvements were made.

5 . Methods

The audit focussed on a three month period: 11th of June 2004 until 17th September 2004. For this period all referral letters and casualty cards were collected and information transcribed onto a proforma developed for this purpose. (appendix 1) information . Two hundred new referrals were reviewed; this was the total number of referrals in this time period.

General details were collected which were the patient's age, sex and the date the patient attended the clinic.

It was noted if a referral letter was sent. If there was a referral letter it was looked at with regard to its legibility, whether or not the basic details were correct and whether there was an adequate history and reason for referral. The source of referral was also noted - from the GP, the paediatric inpatient ward, A&E, the paediatric team (SHO or SpR) or other. This information was gathered by me and two SHOs working in the department.

The clinic letter was used as a guide to appropriateness of the referral. Appropriateness was judged by those of us who were collecting the information. We had been running the clinic. As it was at the time, there were no guidelines given to the referrers regarding who should be referred. We judged appropriateness according to our knowledge of the clinic and the resources available in the hospital, for example dermatology clinic. If the referral was felt to be inappropriate, then it was categorised in one of five different ways:

1. The child was sent to the wrong clinic.
2. The case was non-urgent.
3. The referral should have been sent to another clinic.
4. The child's parents could have been phoned with results or advice rather than coming into hospital
5. The clinic was being used as a 'safety net'.

The outcome of the consultation was then looked and categorised into one of the following:

1. Discharge
2. Refer to another clinic
3. Bring back to the clinic at a later date or phone with the results of any investigations
4. Admit to the inpatient ward

We also compared the diagnosis on the referral letter with the outcome diagnosis.

The proformas for each referral were then analysed and the audit presented to the paediatric department.

Ethical approval was not deemed necessary by the Ethics Committee.

6. Results

Of the 200 referrals looked at, 141 (70.5%) were felt to be appropriate, by those of us undertaking the study, and 59 (29.5%) were felt to be inappropriate and would have been better dealt with in other ways.

Figure 1 shows the source of referral for the 200 children. The highest number of referrals were made by general practitioners (see figure 1), with senior house officers, both casualty and paediatric, being the next highest. The other referrals were smaller in number. They were from the SpR and the paediatric inpatient ward.

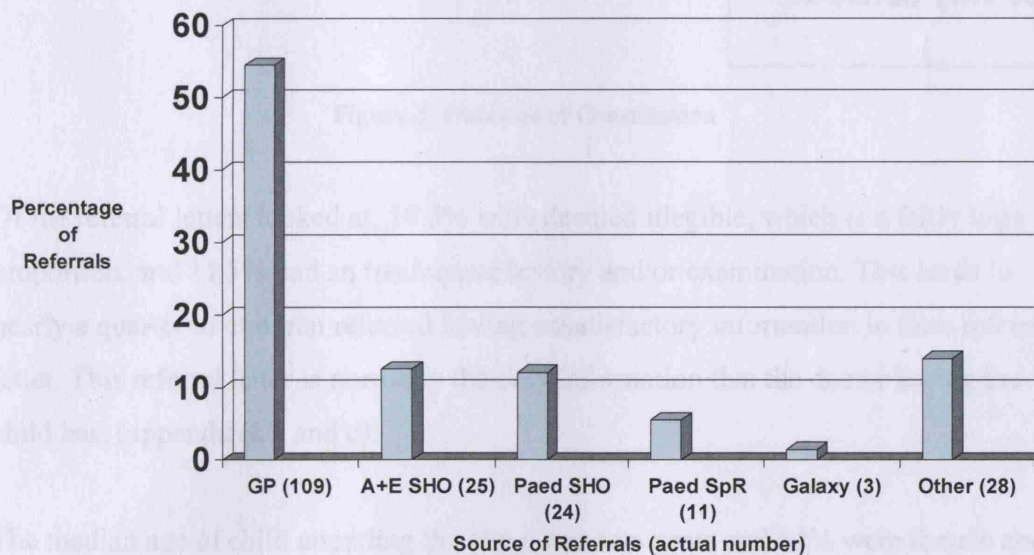


Figure 2: Sources of Referral

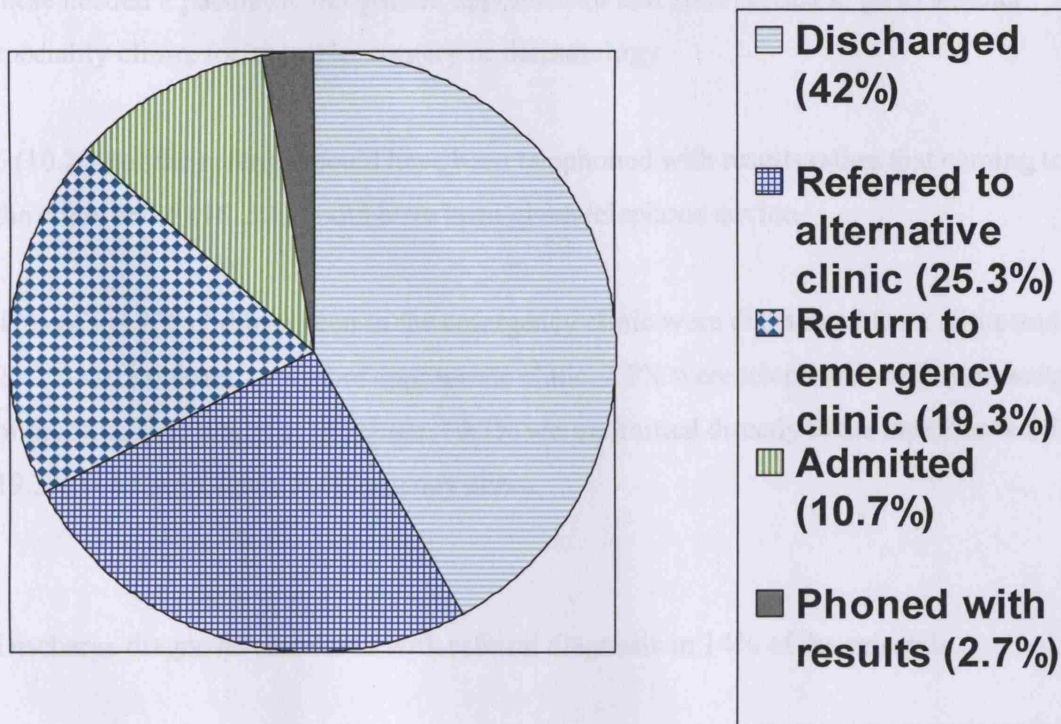


Figure 3: Outcome of Consultation

Of the referral letters looked at, 10.5% were deemed illegible, which is a fairly high proportion, and 11.5% had an inadequate history and/or examination. This leads to nearly a quarter of children referred having unsatisfactory information in their referral letter. This referral letter is normally the only information that the doctor seeing the child has. (appendices b and c).

The median age of child attending the clinic was two years and 62% were female and 38% were male.

We felt that nearly a third of all referrals were inappropriate and should have been sent elsewhere. One third of these were felt to be 'safety net' referrals. 16 of the 19 'safety net referrals' were from A+E SHOs.

One fifth of the inappropriate follow ups could have been phoned at home and did not need to return to the hospital.

Half the inappropriate referrals should not have attended the clinic at all. Nearly 40% of

these needed a paediatric out-patient appointment and 10% needed to go to another speciality clinic, for example, surgery or dermatology.

6 (10.2%) of the referrals could have been telephoned with results rather than coming to the clinic and 6 (10.2%) could have been given telephone advice.

42% of the 200 children seen in the emergency clinic were discharged from clinic and 25.3% were referred to a more appropriate clinic. 2.7% were telephoned with the results of the tests done whilst at the clinic. 10.7% were admitted directly to the inpatient ward. 19.3% were seen again in emergency clinic.

Discharge diagnosis correlated with referral diagnosis in 14% of the referrals.

7 . Discussion

Using the aforementioned criteria nearly a third of the referrals to the emergency clinic was inappropriate. As the clinic runs a 'see on the day policy', it was not possible to sift these out prior to the children arriving at clinic. A fifth of the inappropriate referrals could have been dealt with over the telephone. As just over half of the inappropriate referrals were being sent by GPs, this reflects the need for instant paediatric access from primary care. The GPs could be given updated guidelines detailing who to refer, where they should be referred and the criteria for those that should be referred to the outpatient department. There may also be need for feedback to the referrer to encourage more appropriate use of the service in order that the guidelines are followed. Regular updates regarding waiting times for outpatient clinics could also be sent. If GPs felt that the child needed to be seen more urgently then they could have access to a 'hotline' staffed by one of the paediatric consultants for one session per week. Meates piloted such a study at a busy London district general hospital.¹ She found that, in one year, 44% of the calls resulted in urgent appointments, 24% in a routine appointment and 21% were dealt with over the telephone. Meates also found that 82% of those attending the urgent clinic were felt to be appropriate referrals.¹

The appropriateness of referral to clinic was subjective, as there were no clear guidelines regarding who should be referred. Consequently, this will almost certainly have introduced bias. A way to look at this further, trying to exclude the bias, would be to create standardised guidelines that could be sent to all the potential referrers, then audit their referrals, looking at the referral and outcome diagnoses and the appropriateness of referral. The appropriateness of the referral could be judged according to the guidelines created. A comparison of the results before and after the guidelines were sent could be made.

The large number of inappropriate referrals may also demonstrate that children were being wrongly followed up from A+E, or the proper out of hours procedures were not being followed. These may have been averted if the referrer had had a very clear diagnosis and management plan prior to discharging the child after the initial

consultation. Then they would have been able to give parents succinct criteria for if, and when, to return for medical help and, if so, whether to seek primary care help or return to the hospital. The SpR should be involved in the more “grey cases”, formulating a full management plan prior to the child being discharged from A+E. This may not have been occurring during the audit due to the workload of the doctors. An SHO covered A+E and the ward out of hours, whilst the SpR covered those areas and was also responsible for another SHO on another site 15 minutes walk away. That site had two oncology wards that could admit acutely unwell patients and was the tertiary referral centre for oncology and haematology. A lot of additional pressure has been put on those who work in already very busy A&E departments, by the introduction of the “four hour wait”.¹⁰ It is sometimes not feasible for children to cooperate in such strict time constraints and they may need to be admitted in order for observation and/or investigations to be completed. The alternative is that these children are sent home, and possibly followed up, inappropriately. Neither of these scenarios is best practice. As discussed so far, PAUs have been shown to be a more efficient use of staff, time and resources.

We shall now look at the main considerations when planning to set up a PAU.

Where should it be?

Ideally, the assessment unit should physically bridge the A+E department and the paediatric in patient ward so that there is easy flow between the three for staff and patients. However, this is not possible in many cases and in UCHL the in-patient ward is now on the 11th floor with the A+E department on the ground floor. The ambulatory unit is now situated on the eleventh floor.

Who should staff it?

Most PAUs that have been set up in this country have a dedicated paediatric consultant. The statement by the RCPCH entitled ‘Ambulatory Paediatric Services in the UK’² states that there should not be the term ‘ambulatory’ in the title of a paediatric consultant, although the term could be used in as a major part of the job description.

This consultant would head a team of paediatricians that would include a paediatric middle grade and SHO. As this PAU also has an inpatient department, the consultant will also need to take part in the on call rota and the junior staff would rotate through the inpatient ward, the ambulatory ward and A+E to fulfil their training needs.

There would have to be adequate anaesthetic cover as any acutely unwell children may deteriorate rapidly and anaesthetic intervention would be necessary.

The nursing staff would have to be paediatrically trained staff. At UCHL the nurses are funded by the paediatric and adolescent services so they would need to rotate between the PAU and the inpatient department to maintain skills in all areas of paediatric nursing.

Play therapists have been found to be of great benefit to children with acute or chronic illness, who are undergoing investigation and treatment in the hospital setting. Most A+E departments and paediatric wards find them an invaluable asset. In this case there is a play therapist already employed who could be available initially in all 3 areas, with scope to expand numbers if deemed necessary.

A ward administrator would be a necessary post on the ward to ensure that notes are found promptly, children are entered onto the hospital system and there is smooth running of the ward. This is essential in an environment of high turnover of patients and also to collect information that can be audited to aid improvement in service provision. Meates described a running unit that had no ward administrator, as in fact, the nursing staff took on this role in addition to their duties.¹ This needs to be investigated further, as this may not be the most efficient use of nurses' time.

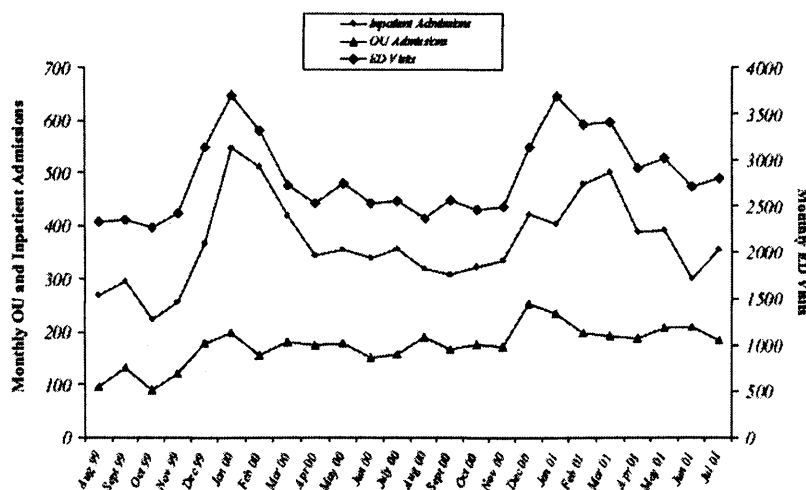
Health care assistants would be employed to work alongside the nursing staff and domestic staff would also be part of the team, to ensure cleanliness and hygiene of the ward.

How many staff should there be?

Initially there would have to be the minimum of staff and the numbers would have to be reviewed at a pre-agreed time after the opening of the PAU. This would give scope for expansion, and would have to be done on a needs basis.

Factors that would influence the numbers of staff would include numbers of children that were found to need the PAU facility, the intensity of the work on the unit and the speed of turnover. All these could be contained initially and then reassessed with a view to expanding the role of the department.

Zebrack looked at the seasonal variation in attendance in PAU and perhaps counter-intuitively found none.¹⁷ This is in stark contrast to the A+E department.



Patient volume per month. ♦, patient visits to the ED (scale on right); ●, inpatient admissions from the ED, not including patients who failed OU (scale on left); ▲, OU admissions from the ED and community, not including patients with scheduled procedure (scale on left).

Figure 4: Patient Volume per Month¹⁷

When should it be open?

Most Paediatric A+Es experience a busy time between midday and midnight, six to seven days a week. The fact that the busy time only ends at midnight would make one think that a twenty four hour facility would be useful, independent of the inpatient ward. This would mean that a dedicated consultant would do a ward round on the PAU

possible twice a day. This would encourage short stays on the PAU, by ensuring decisions made by juniors were appropriate and children were not on the unit awaiting a senior management plan.

However, given that the UCHL ambulatory facility is funded by the paediatric and adolescent services then it would be reasonable to utilise the inpatient beds initially and look at keeping the PAU open twenty four hours if necessary. Looking at the documents from RCPCH - 'Old Problems, New Solutions'⁹ and 'Ambulatory Paediatric Services in the UK: report of a working party',² it is evident that the majority of the established PAUs in the UK are open 9am to 5pm, Monday to Friday. They nearly all have a hospital at home service and some form of rapid referral clinic supporting them. Only three of the thirteen PAUs reviewed were open twenty four hours a day and one of those was only open twenty four hours for two days a week.

Looking at table 4, the majority of children attend A+E between 8am and 10pm in the week as well as at the weekend (81%). It would seem reasonable to open the PAU between 9am and 9pm, Monday to Friday initially. It will be GPs who will be, in the main, referring and these hours fit in their working time and suit most hospital shifts which are usually twelve hours.

What equipment should it have?

As in any area treating children who are acutely unwell, there should be adequate resuscitation equipment for children and babies, including a defibrillator, endotracheal tubes, laryngoscopes and intraosseus needles.

The store room needs to contain the equipment used by nurses and doctors in the investigation and treatment of children. Examples would be monitoring machines, intravenous cannulae and pumps for giving intravenous fluids and medication.

The range of medication that should be kept on a PAU is debatable. Medication used to treat the diseases commonly seen on the PAU would be necessary. These diseases include asthma, fits and common infections such as those of the urinary and respiratory

tract. Medications that may be given at discharge would also need to be available so as not to impede early and safe discharge home. It would be against the ethos of the PAU if children were being kept in because medication was not available, so this would have to be carefully monitored and stocks updated.

The PAU itself should have computers in order that results could be looked up and children registered within the hospital. X-ray display machines are also necessary.

Who should refer?

The main sources of referral would be GPs, health visitors, A+E doctors and paediatricians who have seen children in A+E, outpatient clinic or the community. As discussed earlier, guidelines of who and how they should be referred, should be sent to all referrers and a letter sent to them at discharge of their patient.

Who should be seen?

Patients seen on the PAU should include those who have been seen in A+E or referred by GPs or health visitors. The patients should need investigation or treatment that is predicted to last more than four hours, but less than twelve.

The patients deemed appropriate for a PAU are going to vary between units, depending on their resources and the differing strengths of the people staffing it.

Another use of the PAU is as a day case unit i.e. performing investigations or treatments that take a day or less and then the children are ready for discharge. These patients also help to balance out a PAU day's work as they can be planned to be admitted at the time when A+E is less busy i.e. before midday and discharged before the unit closes, meaning no need to admit as an inpatient. These could include chemotherapy, blood transfusions, day case surgery, allergy testing and many more.

What is the estimate of the number of children that will be seen there?

In a systematic review of studies of intervention for children with acute medical problems, Oglivie found that approximately 40% of children referred as emergencies to a PAU were discharged without requiring admission.¹²

The best way of estimating the numbers of children that would attend a PAU before opening it would be to look retrospectively at attendances to A+E and work out who would have been suitable for PAU admission over a given period of time. It would be best to do this a summer and winter period.

Where should they be reviewed if follow up is necessary?

These children seen on the PAU would have to have easy access to follow up. Ideally, all the normal results could be phoned through to the parents. Any follow up that would necessitate the child to come back to hospital would be most appropriately done in an outpatient clinic or back on the PAU if further tests needed to be done. Between 0.4% and 7% of children discharged from the PAU would return unexpectedly to hospital.¹²

How much would it cost?

This would have to take into consideration the hours the PAU was going to open. Assuming that it would be open 9am-9pm seven days a week then the cost of a paediatric SpR would be £64,000 per annum and then the SHO would cost £53,700 and 3 band 6 staff nurses would be £130,100. As discussed earlier, the nursing staff may be able to do the majority of the administrative work (entering patients onto the PAU ward list etc) and there may be no need for administrative staff.

As the PAU would be based on the inpatient ward, much of the emergency equipment would be shared. The extra costs would be for the monitoring equipment such as saturations monitors (which cost around £1000-1500).

As to who should pay for this, it would depend on who initiated the changes and who took most ownership and benefited most from it.

How would you evaluate its effect?

Data would need to be collected prior to the opening of the PAU regarding numbers of children being admitted, their ages, lengths of stay, diagnoses, which team they are under. Similar information regarding children being seen in A&E, outpatient clinics, emergency clinics etc would need to be collected. After opening the PAU, similar data would need to be collected and a “before and after” comparison of children's pattern of admission and treatment could be determined.

The RCPCH in their paper 'Ambulatory Paediatric Services in the UK'² advises data collected should include;

“recording of clinical and other data about acute contacts with children who are not admitted or who do not receive care in a short stay unit.

Acute contacts 'admitted' to short stay observation units should have equivalent data to that collected for more conventional admissions.”

They also recommend that the nature of presenting problem and the diagnostic and demographic data be collected. Also the nature of follow up needs to be recorded as there may be fewer admissions, but this work may just be soaked up by other services such as hospital at home or acute follow up clinics. In which case, those services may need more funding in the future in order to cope. RCPCH has called for evaluation and monitoring of “the extent to which ambulatory specialist practice overlaps into that provided by primary care. Some measure of whether or not specialist workload and responsibility is increased, or whether specialist contact with a greater proportion of the population result from this service”.²

In addition, parent, child and staff (including nursing, medical and clerical staff, professionals allied to medicine and GPs) opinion of the standards and accessibility of care before and after the opening of the PAU would be invaluable, as there is limited published information about their attitudes to this kind of innovative alternative to conventional paediatric care and a lot potentially could be learnt from their thoughts.

Clinical incident monitoring before and after the opening would give vital information regarding the safety of the PAU and staff sickness days could also be used as a proxy for feelings about the unit.

Data would need to be collected about the staffing levels required to maintain the smooth running of the PAU. This would have to be factored into the costs of maintaining the PAU.

All this information would need to be collated and acted upon to continually improve the service, make it more user and provider friendly, to see if it is cost effective and most importantly to ensure it is a safe way to provide a paediatric service.

Audits of this information would have to be continually done to ensure the highest level quality of care in an ever-changing medical world.

In searching through the literature and looking at good working examples of PAUs, it has become clear that there is no 'one size fits all' model. The PAU in the United Kingdom is an evolving species, having to adapt to changing work patterns, increasing knowledge of disease and treatment and increasing staff skill mixes. Learning from others and modifying existing models to suit particular needs and available resources, certainly seems a prudent path to take to set up a successful PAU. There is, however, a need for further research to look at how to maximise its capability, given the existing paediatric services available.

8 . References

- (1) Meates M. Ambulatory paediatrics--making a difference. *Arch Dis Child* 1997; 76(5):468-473.
- (2) Royal College of Paediatrics and Child Health. Ambulatory paediatric services in the UK : report of a working party. Royal College of Paediatrics and Child Health; 1998.
- (3) Court SDM, Great Britain. Committee on Child Health Services, Great Britain. Dept. of Health and Social Security, Great Britain. Dept. of Education and Science, Great Britain. Welsh Office. Fit for the future : report of the Committee on Child Health Services. London : H.M.S.O, 1976; 1976.
- (4) British Paediatric Association, British Association of Paediatric Surgeons, Casualty Surgeons Association. Joint statement on children's attendances at accident and emergency departments. British Paediatric Association; 1988.
- (5) Boyle R, Smith C, McIntyre J. The changing utilization of a children's emergency department. *Ambulatory Child Health* 2000; 6(1):39-43.
- (6) Taylor B. How many inpatient paediatric units do we need? *Arch Dis Child* 1994; 71(4):360-364.
- (7) British Paediatric Association. Flexible options for paediatric care : a discussion document. British Paediatric Association; 1993.
- (8) British Paediatric Association. Future configuration of paediatric services : report of a working party. London : British Paediatric Association; 1996.
- (9) Royal College of Paediatrics and Child Health. Old problems, new solutions: 21st century children's healthcare. London: Royal College of Paediatrics and Child Health; 2002.
- (10) Milburn A, Department of Health. The NHS plan : a plan for investment : a plan for reform. London : Stationery Office, 2000; 2000.
- (11) British Association of Accident and Emergency Medicine. Recommendations for accident and emergency wards. 1989. London, BAEM.
- (12) Ogilvie D. Hospital based alternatives to acute paediatric admission: a systematic review. *Arch Dis Child* 2005; 90(2):138-142.
- (13) Wiley JF. Pediatric clinical decision units: Observations past, present, and future. *Clinical Pediatric Emergency Medicine* 2001; 2(4):247-252.
- (14) Levett I, Berry K, Wacogne I. Review of a paediatric emergency department observation unit. *Emerg Med J* 2006; 23(8):612-613.

-
- (15) Mace SE. Pediatric observation medicine. *Emerg Med Clin North Am* 2001; 19(1):239-254.
 - (16) Mace SE, Graff L, Mikhail M, Ross M. A national survey of observation units in the United States. *Am J Emerg Med* 2003; 21(7):529-533.
 - (17) Zebrack M, Kadish H, Nelson D. The pediatric hybrid observation unit: an analysis of 6477 consecutive patient encounters. *Pediatrics* 2005; 115(5):e535-e542.
 - (18) ACEP Practice Management Committee ACoEP. Management of observation units. 1994. Irving, TX, American College of Emergency Physicians.
 - (19) North AF, Jr. When should a child be in the hospital? *Pediatrics* 1976; 57(4):540-543.
 - (20) Dougherty G. When should a child be in the hospital? A. Frederick North, Jr, MD, revisited. *Pediatrics* 1998; 101(1 Pt 1):19-24.
 - (21) Statistiques Générale. Med-Echo Plus. Series 800 1993-1994. 1994. Montreal, Canada, L'Hôpital de Montréal pour Enfants.
 - (22) Welch SB, Nadel S. Treatment of meningococcal infection. *Arch Dis Child* 2003; 88(7):608-614.
 - (23) Wilson D, Burniston M, Moya E, Parkin A, Smye S, Robinson P et al. Improvement of nebulised antibiotic delivery in cystic fibrosis. *Arch Dis Child* 1999; 80(4):348-352.
 - (24) Wiley JF, Friday JH, Nowakowski T, Pittsinger-Kazimer L, Platt K, Scribano PV. Observation units: the role of an outpatient extended treatment site in pediatric care. *Pediatr Emerg Care* 1998; 14(6):444-447.
 - (25) Numa A, Oberklaid F. Can short hospital admissions be avoided? A review of admissions of less than 24 hours' duration in a paediatric teaching hospital. *Med J Aust* 1991; 155(6):395-398.
 - (26) Dawson KP, Mogridge N, Abbott GD. A paediatric day unit: the first year's experience. *N Z Med J* 1991; 104(911):185-187.
 - (27) Browne GJ, Penna A. Short stay facilities: the future of efficient paediatric emergency services. *Arch Dis Child* 1996; 74(4):309-313.
 - (28) Macleod C, McElroy G, O'Loan D, Kennedy F, Kerr RM, Jenkins J et al. Ambulatory paediatrics: does it work? *Ir Med J* 2002; 95(2):41-44.
 - (29) Sartain SA, Maxwell MJ, Todd PJ, Jones KH, Bagust A, Haycox A et al. Randomised controlled trial comparing an acute paediatric hospital at home scheme with conventional hospital care. *Arch Dis Child* 2002; 87(5):371-375.

-
- (30) Stiller CA, Draper GJ. Treatment centre size, entry to trials, and survival in acute lymphoblastic leukaemia. *Arch Dis Child* 1989; 64(5):657-661.
- (31) Reiser J, Warner JO. The value of participating in an asthma trial. *Lancet* 1985; 1(8422):206-207.
- (32) Evans D, Mellins R, Lobach K, Ramos-Bonoan C, Pinkett-Heller M, Wiesemann S et al. Improving care for minority children with asthma: professional education in public health clinics. *Pediatrics* 1997; 99(2):157-164.
- (33) London Borough of Camden. Camden statistics: 2001 census. <http://www.camden.gov.uk/ccm/navigation/council-and-democracy/about-the-council/camden-statistics/census-2001/>
- (34) Lal MK, Kibirige MS. Unscheduled return visits within 72 hours to an assessment unit. *Arch Dis Child* 1999; 80(5):455-458.
- (35) Beverley DW, Ball RJ, Smith RA, Harran MJ, Durrans GM, Keenan S et al. Planning for the future: the experience of implementing a children's day assessment unit in a district general hospital. *Arch Dis Child* 1997; 77(4):287-292.
- (36) Gouin S, Macarthur C, Parkin PC, Schuh S. Effect of a pediatric observation unit on the rate of hospitalization for asthma. *Ann Emerg Med* 1997; 29(2):218-222.
- (37) MacFaul R, Stewart M, Werneke U, Taylor-Meek J, Smith HE, Smith IJ. Parental and professional perception of need for emergency admission to hospital: prospective questionnaire based study. *Arch Dis Child* 1998; 79(3):213-218.
- (38) Leduc K, Haley-Andrews S, Rannie M. An observation unit in a pediatric emergency department: one children's hospital's experience. *J Emerg Nurs* 2002; 28(5):407-413.

A. Bibliography

- (1) Department of Health, National service framework for children, young people and maternity services. October 2004
- (2) David M B Hall and David Elliman, Health for all Children . Fourth Edition, Printed 2004

B. Appendices

a. Proforma for new referrals

EMERGENCY CLINIC AUDIT (11/6/04 – 17/9/04)

PROFORMA FOR NEW REFERRALS

General Patient details:

Clinic Date:

Age of patient:

Sex:

Referral:

Referred by a) GP b) Galaxy Ward c) A and E SHO d) a and E paed SHO/SpR e)

Other

(circle as appropriate)

Referral Letter:

It is legible?

Correct patient details?

Addressed to correct person/clinic?

Adequate history and examination/reason for referral?

Appropriateness of referral:

Is it an appropriate referral for emergency clinic? Yes No

If no – why not? (circle reason below)

Wrong clinic – eg is it a surgical problem etc?

Not an urgent problem/should have been referred to children's OPD/other clinic?

Could have been phoned with investigation results?

Could have been given advice over the phone?

“Safety net?”

Outcome of clinic consultation: (circle outcome below)

Discharged

Referred to alternative clinic

Brought back to emergency clinic at a later date

Phoned with results etc

Admitted

b. Referral Note 1

Thank you for seeing this 5 year old with a fever and painful l hip this am. He has been previously well and is on no medication. Please see consultation note below:

Last Consultation

16.8.2004
G.P.Surgery
Dr P Posner

Onset

E: Hip pain
S: This am woke with pain L groin and limp
fever, better after paracet, ?tender sw
O: slight limp running, no tenderness or s
enl groin nodes bilateral, restricted h
movements - pain rotn. T-36.2, enl ton
not inflammed, ears-nad, slight enl nec
R: Referral to paediatrician, University C
walk-in clinic
P: ?irritable hip

Yours sincerely

c. Referral Note 2