Title:

The impact of out-of-hospital models of care on paediatric emergency department (ED) presentations

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Abstract

Objective:
To estimate the potential impact of enhanced primary care and new out of hospital models (OOHM) on emergency department (ED) presentations by children and young people (CYP)

Design:
Observational study

Patients & setting:
Data collected prospectively on 3020 CYP 0-17.9 years from 6 London EDs during 14 days by 25 super-numerary clinicians. CYP with transient acute illness, exacerbation of long term condition(LTC), complex LTC/disability and injury/trauma were considered manageable within OOHM.

OOHM assessed included nurse-led services, multispeciality community provider (MCP), primary and acute care system (PACS) plus current and enhanced primary care.

Measures:
Diagnosis, severity; record of investigations, management and outcome that occurred; objective assessment of clinical need and potential alternative management options/destinations.

Results:
95.6% of patients had diagnoses appropriate for OOHM. Most presentations required assessment by a clinician with skills in assessing illness (39.6%) or injuries (30.9%). 1291 (42.75%) required no investigations and 1007 (33.3%) were provided only with reassurance. 42.2% of presentations were judged to have been totally avoidable if the family had had better health education.

26.1% were judged appropriate for current primary care (community pharmacy or General Practice) with 31.5% appropriate for the combination of enhanced General Practice and Community Pharmacy. Proportions suitable for new models were 14.1% for Nurse-led Acute Illness Team, MCP 25.7%, GP Federation CYP service 44.6%, Comprehensive walk-in centre for CYP 64.3% and 75.5% for a PACS.

Conclusions:
High proportions of ED presentations by CYP could potentially be managed in new OOH models or by enhancement of existing primary care.

Background

Improved integration of care for children and young people (CYP) across levels of the health service and across sectors including education and social care is a key element of plans to improve outcomes for CYP in the UK.(1-3) A major component of better integrated care is reducing unnecessary hospital attendances and providing better quality care closer to home when possible(1, 4, 5) consistent with national plans to expand 'out of hospital' (OOH) care.(6) Rising emergency department (ED) attendances amongst CYP, 20% higher than a decade previously,(7) have brought the need for improved OOH models into very sharp focus for those who commission and provide CYP health services.

Improvements in OOH care for CYP have focused on either enhancing existing primary care or on new models of care. Enhancement of primary care has included improving access by extending hours in general practice and community pharmacies, given evidence that that families generally prefer to access general practice for acute care if services are open and accessible,(8) that CYP with better access to GPs have fewer ED visits(9) and that most of the population live within walking distance of a pharmacy.(10) A further innovation has been the development of GP Federations to provide benefits at scale including improved access, a greater emphasis on health promotion and the potential for a more specialist offer for CYP.(11)

A range of new OOH models of care have been developed and evaluated for adults in the UK, using new funding, accountability and workforce models.(6) However, progress in developing models of care for CYP has lagged behind,(5) despite CYP aged 0 to 18 years comprising 24.9% of ED presentations in England in 2015-16.(12) Although some innovative CYP-focused pilot models exist across the country,(13, 14) there are few data available to support more widespread implementation of new acute models of care for CYP, despite commissioners actively examining how new models could be commissioned.(5)

Although population-level variation in levels of OOH care for CYP are well described(15), the impact of introducing new models of care is difficult to predict without reviewing the clinical needs of CYP attending ED and assessing the necessary level of care in each case. To estimate the potential impact of enhanced primary care and new OOH models on CYP ED presentations, we used data on clinical need from a prospective clinical cohort presenting to EDs across London to identify proportions of CYP that could be appropriately managed within each OOH model, thus reducing ED presentations.

Methods

Design: Observational study

Setting:
We purposely recruited 6 sites which had not implemented significant integrated care programmes for CYP, including sites from both north and south London, from boroughs with deprivation affecting children from amongst the lowest to amongst the highest in in England and boroughs with A&E presentation rate per 1000 children aged 1-4 years similar to England average. Sites were St. George's Hospital, St. Helier Hospital, Kingston Hospital, the Royal London Hospital, Newham Hospital and Whipps Cross Hospital. For site characteristics, see Appendix Table 1.

Sample size
ED attendance data suggested that 14 days of data collection should provide a sample of 3-4000; a sample of 3000 would provide precision of +/-1.5% for a proportion of 20% eligible for any OOH model. The precision estimate was obtained using the *cii proportions* command in Stata 14 (StatCorp, College Station, TX).

Population
We prospectively collected data on all CYP registered as attending participating EDs during 14 consecutive winter days (22 Feb to 06 March 2016), limiting data to those attending from 10am-10pm as this encompassed the peak attendance period in all Trusts and the likely opening hours of new OOH models.

Eligible CYP were i) those streamed by the hospital to attend the ED (rather than any other part of the hospital, e.g. UCC) and ii) who were given a clear diagnosis or management plan by ED/paediatric staff between 10am and 10pm.

We excluded CYP who were not directly managed in the ED, i.e. those managed within an onsite General Practitioner (GP)-led Urgent Care Centre (UCC) and those referred directly from their GP to a Paediatric Assessment Unit or Acute Short-Stay Unit (PAU/PASSU). Age criteria varied by hospital site, either <16 years or <18 years, reflecting national variation in service delivery for children in ED.

CYP attending ED were divided into 7 segments by diagnosis: transient acute illness, exacerbation of long term condition (LTC), complex LTC/disability and injury/trauma, safeguarding, mental health and non-trauma surgery. Whilst all CYP were included in the study, only the first 4 segments were considered potentially manageable within OOH models.

Data collection

Non patient-identifiable data were collected by a team of 25 supernumerary study clinicians (from General Practice, Emergency Medicine, Paediatrics; each with ≥4y post-graduate experience) who had no clinical responsibilities during the shift. Study clinicians were provided with an hour training by telephone using standardized written information. These study clinicians obtained data from the ED staff managing each of the patients in real time, and recorded data in an online secure data collection system.

Data collected (see Appendix Table 2):

A. *Details of presentation*: time of presentation, date of birth, patient segment, diagnosis and severity

B. *Management given in ED*: investigations and management received, staff types and seniority involved and outcome destination.

C. *Objective assessment of clinical need*: Clinical needs and most appropriate skill set and timeframe with which to address these needs. Options for most appropriate clinical skill set were one of (1) pharmacist only; (2) illness clinician who is competent in assessing an acutely unwell CYP, and has immediate telephone or face-to-face access to a Paediatric consultant if required; (3) clinician competent in assessing an acute injury; (4) specialist paediatrician; or (5) other specialist. Timeframe options for each were within 4, 12 or 48 hours.

D. Potential alternative destinations for each child given the existence of out of hospital (OOH) models providing follow-up or observation facilities.

Models

OOH models assessed included those previous identified by us that aimed to prevent ED attendance(16) and models taken from the NHS England 2015 *Five Year Forward View*,(6) such as multispeciality community provider (MCP) or primary and acute care system (PACS) models. For comparison, we also evaluated proportions of CYP that could be managed in current primary care (e.g. General Practice and Community Pharmacy), and in future enhanced primary care models including enhanced General Practice and a GP Federation model. Models are summarized in Table 1. Algorithms were derived a priori to assign CYP as eligible/not for each model, based (in order) upon segment, diagnostic group, severity, age range, opening hours and days of service, clinician expertise required and timescale, investigations needed and timescale and management needed and timescale (see Table 1).

Analysis

Data were cleaned by hand, including assigning free-text data on diagnosis, investigations or management to existing or new categories and ensure consistent assignment of diagnoses to segments. Algorithms were then used to assign CYP as appropriate or not for each OOH model. Note that CYP could be appropriately managed in multiple models of care. We described characteristics of the overall sample and the sample for each model. Assessment of effects of site and observer were made using multilevel models including random effects for site and study clinician. Analyses were undertaken in Stata 14.

Permissions

This work was identified as service evaluation not requiring patient consent by the National Research Ethics system (NRES). Caldicott Guardian permissions were obtained at each site.

Results

Data were collected on 3021 patient episodes with 1 excluded as ineligible due to age, making the sample for these analyses 3020. The 25 study clinicians entered data on an average of 121 (range 33 to 569) patients each. Patient characteristics are shown in Table 2 and were similar across sites. 95.6% of patients were within the 4 segments appropriate for OOH models.

Assessment, investigation and management needs are shown in Table 3. The majority of presentations required assessment by a clinician with skills in assessing illness (39.6%) or injuries (30.9%). 1291 (42.75%) required no investigations and 1007 (33.3%) were provided with no treatment other than reassurance. Table 4 shows patient destination together with the potential alternative destination judged appropriate for clinical need. 42.2% of presentations were judged to have been totally avoidable if the family had better health education.

Table 5 shows the proportions of all CYP likely to be appropriately managed within each OOH model of care. 26.1% were appropriate for current primary care (community pharmacy or General Practice). Proportions suitable for each new OOH model ranged from 14.1% for Nurse-led Acute Illness Team through to 75.5% for a PACS model. The combination of enhanced General Practice and Community Pharmacy was appropriate for 31.5% of presentations.

There were very marked age differences for primary care models and for enhanced illness models, with proportions of children <5 years appropriate for these models being nearly double that of older children. There were notable differences across site in proportions appropriate for primary care and illness models but not for comprehensive models.

In multilevel models for each OOH , intraclass correlation coefficients (ICCs: see Appendix Table 3) for site and for clinician observer were low, indicating little variation at the site or observer levels, with the exception of Community Pharmacy.

Discussion

Assessments of clinical needs in real time by experienced clinicians in a large sample of CYP presenting to London EDs suggests that high proportions of ED presentations by CYP could potentially be managed in current or new OOH models. Just over one-fifth (22.3%) could have been appropriately managed in current general practice, with one quarter (26%) manageable within the current primary care offer i.e. either in community pharmacy or general practice. Enhancements to the general practice offer including extended opening hours and ready access to senior paediatric advice increased this to 28% for general practice alone and to 32% when enhanced general practice was combined with current models for community pharmacy.

Further enhancement of the primary care offer for CYP across a GP Federation, including access to experienced paediatric nursing and capacity to treat minor injuries as well as rapid access to senior paediatric opinion, expanded this to nearly half (44.6%) of ED presentations. New nurse-led models in primary care or the community also present considerable potential to reduce ED presentations (e.g. 28.4%) if they provide walk-in opportunities and the range of conditions treated is not excessively narrow. However services focused on ill children with a restricted range of conditions have only a limited potential to reduce ED presentations. More comprehensive models offer the potential to manage very large proportions of ED presentations, up to 75% for a PACS model for CYP. The potential for new models to reduce ED presentations was markedly higher for children <5 years for primary care and illness-only models, reflecting the higher proportions of injuries or serious presentations seen amongst older CYP in our data.

There were differences across sites in proportions appropriate for different models, particularly for primary care and illness-only models. However, our multi-level analyses suggested that variation largely lies at the individual rather than the site level, i.e. that the apparent differences between site represent differences in the types of individuals seen at the sites rather than an inherent difference in how the sites function. We speculate that these variations are likely to reflect differences in the populations presenting to EDs, with some seeing a larger proportion of younger children, particularly for febrile illnesses, as nonuse of primary care for febrile children is higher in deprived communities.(17)

We are not aware of similar previously published studies of the potential impact of various OOH models on ED presentations by CYP. Our study clinicians judged that around 26% of ED presentations could be managed within current primary care and that 50% could have been avoided with better health promotion and/or greater family confidence in self-management. These are consistent with previous systematic review findings that 20-24% of all-age ED presentations were inappropriate,(18) highest amongst CYP,(19) and findings that low health literacy is associated with higher risk of ED presentation.(20) Our finding that enhancement of the primary care offer in terms of improved patient access and availability of senior paediatric advice increased the proportion that could be managed within primary care is consistent with evidence that CYP in England attending GP practices with higher levels of access have lower ED presentations(9, 21) and short-stay admissions,(9) and that routine availability of senior paediatric advice in primary care reduces ED attendances.(13)

The chief limitation of our study was that we could not address the very important issues relating to patient choice or health-seeking behaviour or the practicalities of funding and staffing alternative models. Parental attendances to EDs may not be easily diverted in reality despite the existence of alternative services, with habit, issues relating to knowledge and the assumption of expertise residing in hospitals likely to strongly influence family behaviour. Some of the models examined here do not currently exist, and the necessary workforce (e.g. APNPs, additional GPs and community nurses) to staff them or existing models are not yet available. Systems to stream CYP to attend community or hospital services are not yet available, although NHS 111 and similar services may ultimately provide this. Our data cannot address these issues, but instead provide an estimate of the likely maximum potential for new models to reduce ED attendances, i.e. if all parents chose to and could attend the appropriate service and adequate staffing were available to run the services.

Our study had a number of other limitations. We obtained data on 52% of those recorded as presenting to ED at our sites during the study period, however the true denominator for our study is lower than this as those treated in PAUs or UCCs may have been registered with ED but not eligible for our study. We could not examine whether the proportion of attendances included differed by time or day at each site, and the direction of any biases from this is unclear. Estimates of proportions suitable for each model are based upon clinical skills, investigations and

management options we judged were available in each model. These are not standardized and our data cannot account for variations in provision within models. We did not collect data before 10am so we could not fully assess models with earlier opening hours. Our data apply to winter, when acute illness presentations are higher than in summer months. We were unable to collect identifiable data including gender and ethnicity or data on deprivation; however these were not directly relevant to the aims of the study. We could not track which of the episodes within our dataset were re-attendances within the study period. However, this is unlikely to be an issue as unplanned reattendance rates within 7 days are < 5%.(22)

Conclusions

Our data provide support for the enhancement of current primary care and commissioning of new OOH models to reduce ED presentations and improve quality amongst CYP, particularly children <5 years. Enhancement of access to primary care in England is already a high priority for the NHS, and our data suggest that modest additions to the primary care offer offers significant potential to reduce ED presentations, if appropriate incentives are in place for families to use these services and sufficient primary care capacity is available. More comprehensive models, such as a PACS service for CYP, offer the greatest potential to reduce ED presentation, yet we are not aware of current PACS models operating for CYP in the UK. Further work is needed to understand the potential economic costs and benefits of new models, including data on family choice and behaviour. The models studied here are not exhaustive, and these data could be used to study additional future models.

What is already known on this topic

- Improved integration of care for children and young people (CYP) is a key element of plans to improve outcomes for CYP in the UK
- Improvements in out-of-hospital care for CYP have focused on either enhancing existing primary care or on new integrated models of care.
- The impact of introducing new models of care is difficult to predict without detailed clinical studies assessing the potential for management in new models

What this study adds

- Just over one-quarter of ED presentations could appropriately be managed within the current primary care offer i.e. either in community pharmacy or general practice.
- New OOH models offer the potential to manage from 14% (in limited nurse-led services) through to 75% (in a PACS model) of current ED presentations
- Further work is needed to understand the potential economic costs and benefits of new models, including data on family choice and behaviour.

Contributors

The study was conceived and designed by RV, TP, FB and RM. CL, AR, MW, FC and DH helped to refine the design. FB, FW and TP organized and undertook data collection. RV led the analyses, with input from FB and FW. RV led the writing of the paper, with input from DH, FW, TP and MH. All authors approved the final version of the paper.

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Table 1. Out of hospital (OOH) models of care assessed in this study

Model	Descriptor	Site	Hours / Days	Age	Segments	Investigations	Management	Clinician expertise	Obs facilities?	Health education
Current primary care					`					
Community pharmacy	Community pharmacy with pharmacists providing walk in care for basic illness and minor injuries	Community pharmacy	To 7pm Mon-Sat 10-4 Sun	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability 4. Injury	Nil	Reassurance Health Education Oral rehydration Antipyretic Analgesia Bronchodilator inhaler	Pharmacist	No	Yes
Standard GP practice	GP practice offering appointments during standard working hours	GP practice	To 630 Mon-Fri To 1230 Sat	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability	Basic Ix Basic lab Ix 48h Micro 48h	All excluding: Minor injury NG or IV fluids Inpatient Rx Resuscitation	GPs Practice nurse	No	Yes
Enhanced primary care										
Enhanced GP practice	GP practice with extended hours, walk-in opportunities; regular visits/contact with Paediatrician (available within 48hrs)	GP practice	To 10pm 7 days	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability	Basic Ix Basic lab Ix 48h Micro 48h	All excluding: Minor injury NG or IV fluids Inpatient Rx Resuscitation	GPs Practice nurse Paediatrician 48H	No	Yes
GP confederation CYP service	APNPs and GPs working within GP confederation with extended hours: coverage includes minor injuries plus illness; regular visits/contact with Paediatrician (available within 48hrs). No facilities for observation.	GP practice	To 10pm 7 days	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability 4. Injury	Basic Ix Basic lab Ix 48h Micro 48h	All excluding: NG or IV fluids Inpatient Rx Resuscitation	GPs APNPs Paediatrician 48H	No	Yes
Enhanced illness assessment and management models										
Nurse-led Acute Illness Team for CYP	APNP appointment-only service, using strict algorithms to manage a very limited set of common illnesses	GP practice	To 8pm 7 days	6m to 17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability	Basic Ix Basic lab Ix 48h Micro 48h	Reassurance Health Education Oral rehydration Oral antibiotic Antipyretic Analgesia	APNP	No	Limited

							Bronchodilator inhaler Oral steroids			
Walk-in Nurse-led Centre for Illness in CYP	Walk-in centre with APNPs using algorithms to manage a limited set of common illnesses	Community centre	To 10pm 7 days	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability	Basic Ix Basic lab Ix 48h Micro 48h	Reassurance Health Education Oral rehydration Oral antibiotic Antipyretic Analgesia Bronchodilator Inhaler Oral steroids	APNP	Yes <6hrs	Limited
Multi-speciality Community Provider for CYP	MCP providing appointment-only service focused on illness, including nurses, GPs and daily Paediatrician input. Broad range of illnesses treated.	GP practice	To 8pm 7 days	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability	Basic Ix Basic lab IX 48h Micro 48h XR & US 48h	Reassurance Health Education Oral rehydration Oral antibiotic Antipyretic Analgesia Bronchodilator inhaler Oral steroids	GP Nurses Pharmacist Paediatrician 12H	No	Limited
Comprehensive assessment and management models										
Walk-in Centre for Illness & Injury in CYP	APNPs in walk-in centre using algorithms to manage a limited set of illnesses and common injuries. Paediatrician input available within 48 hours.	Community Centre	To 10pm 7 days	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability 4. Injury	Basic Ix Basic XR Basic lab IX 48h Micro 48h	Reassurance Health Education Oral rehydration Oral antibiotic Antipyretic Analgesia Bronchodilator inhaler Oral steroids Basic resusitation	GP Nurses Pharmacist Radiographer Paediatrician 48H	Yes <6hrs	Limited
PACS (Primary & Acute Care System) Acute Health Centre for CYP	GPs, APNPs providing a walk-in service for CYP on hospital site with rapid access (<4 hours) to paediatric and other specialists, thus able to manage a very broad range of illnesses and injuries	GP practice on Hospital site	To 10pm 7 days	0-17.9y	1. Transiently unwell child 2. Exac of LTC 3. Complex LTC / Disability 4. Injury	Basic Ix Lab IX 12h Micro 12h XR & US 12h	All management excluding IV fluids or IV treatments.	GP Nurses Pharmacist Radiographer Paediatrician 4H Other disciplines or specialists 4H	Yes <6hrs	Yes

Abbreviations: APNP: Advanced Paediatric Nurse Practitioner; Exac: Exacerbation; LTC: long-term condition; Ix: Investigations; IV: intravenous; Obs: observation; Rx: treatment
Hours: all data collection started from 10am however actual models start from 8 or 830am.
Investigations (Ix): Ix shown as being necessary within 4, 12 or 48 hours. Micro: microbiology' Basic Ix= temperature, heart rate, respiratory rate, blood pressure, urine dipstix, pulse oximetry, blood glucose; Basic lab Ix: simple biochemistry and haematology;
Imaging: XR: x-rays; US : ultrasound
Management:
Workforce: Staff available all hours shown without hour indicator; Paediatrician shown as being available within 4, 12 or 48 hours.

Table 2. Patient characteristics for the overall sample (all segments) and by hospital site

		Total sample		Site A		Site B		Site C		Site D		Site E		Site F	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Number at site		3020	100%	532	18%	476	16%	348	12%	497	16%	740	25%	427	14%
Age (yr)	Mean	6.13		6.12		5.91		6.69		4.72		6.49		7.00	
	Range	(0-17.9)		(0-17.9)		(0-15.9)		(0-15.9)		(0-15.7)		(0-17.7)		(0-17.9)	
	%(n) aged <5 years	1592	52.7%	291	54.7%	245	51.5%	160	46.0%	328	66.0%	362	48.9%	206	48.2%
Segment	1. Well CYP with transient acute illness	1,472	48.7%	247	46.4%	211	44.3%	131	37.6%	349	70.2%	357	48.2%	177	41.5%
	2.Complex LTC / disability	36	1.2%	8	1.5%	17	3.6%	4	1.1%	2	0.4%	2	0.3%	3	0.7%
	3. Exacerbation LTC	95	3.1%	15	2.8%	18	3.8%	12	3.4%	18	3.6%	22	3.0%	10	2.3%
	4. Injury	1,286	42.6%	248	46.6%	209	43.9%	187	53.7%	112	22.5%	307	41.5%	223	52.2%
	5. Mental health	20	0.7%	3	0.6%	0	0.0%	1	0.3%	5	1.0%	5	0.7%	6	1.4%
	6. Non-trauma surgery	94	3.1%	10	1.9%	15	3.2%	11	3.2%	7	1.4%	43	5.8%	8	1.9%
	7. Safeguarding	17	0.6%	1	0.2%	6	1.3%	2	0.6%	4	0.8%	4	0.5%	0	0.0%
Illness type	Not applicable*	1,428	47.3%	263	49.4%	232	48.7%	202	58.0%	128	25.8%	361	48.8%	242	56.7%
	Abdominal pain	120	4.0%	15	2.8%	16	3.4%	10	2.9%	29	5.8%	34	4.6%	16	3.7%
	Breathing difficulties	176	5.8%	36	6.8%	31	6.5%	16	4.6%	41	8.2%	34	4.6%	18	4.2%
	Diarrhoea	130	4.3%	19	3.6%	19	4.0%	15	4.3%	29	5.8%	32	4.3%	16	3.7%
	Febrile illness	700	23.2%	121	22.7%	94	19.7%	56	16.1%	185	37.2%	165	22.3%	79	18.5%
	Neonatal	64	2.1%	6	1.1%	21	4.4%	9	2.6%	18	3.6%	8	1.1%	2	0.5%
	Other	207	6.9%	41	7.7%	37	7.8%	17	4.9%	32	6.4%	56	7.6%	24	5.6%
	Rash	134	4.4%	20	3.8%	15	3.2%	13	3.7%	20	4.0%	44	5.9%	22	5.2%
	Seizure	61	2.0%	11	2.1%	11	2.3%	10	2.9%	15	3.0%	6	0.8%	8	1.9%
Clinical severity	Not ill/injured	695	23.0%	39	7.3%	133	27.9%	31	8.9%	240	48.3%	219	29.6%	33	7.7%
	Mild	1,814	60.1%	402	75.6%	268	56.3%	231	66.4%	170	34.2%	426	57.6%	317	74.2%
	Moderate	373	12.4%	70	13.2%	62	13.0%	75	21.6%	62	12.5%	51	6.9%	53	12.4%
	Severe	33	1.1%	4	0.8%	6	1.3%	7	2.0%	7	1.4%	7	0.9%	2	0.5%
	Life-threatening	7	0.2%	2	0.4%	0	0.0%	0	0.0%	3	0.6%	1	0.1%	1	0.2%

Missing/not scored**	98	3.2%	15	2.8%	7	1.5%	4	1.1%	15	3.0%	36	4.9%	21	4.9%

Notes: All total N are 3020 *Illness type not applicable to mental health, injury, surgery and safeguarding segments. **Severity score not recorded

Table 3. Patient needs for assessment, investigation and management for overall sample (all segments) and by hospital site

		Total		Site A		Site B		Site C		Site D		Site E		Site F	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Number at site		3,020		532		476		348		497		740		427	
Clinical skill needed	Nil needed	74	2.5%	13	2.4%	7	1.5%	3	0.9%	14	2.8%	21	2.8%	16	3.7%
	Illness clinician with paediatric support available	1,196	39.6%	246	46.2%	192	40.3%	107	30.7%	164	33.0%	304	41.1%	183	42.9%
	Injury clinician	933	30.9%	200	37.6%	160	33.6%	169	48.6%	9	1.8%	228	30.8%	167	39.1%
	Specialist paediatrician	63	2.1%	25	4.7%	8	1.7%	20	5.7%	2	0.4%	5	0.7%	3	0.7%
	Other specialist	206	6.8%	36	6.8%	52	10.9%	30	8.6%	15	3.0%	50	6.8%	23	5.4%
	Pharmacist only	524	17.4%	10	1.9%	57	12.0%	18	5.2%	292	58.8%	117	15.8%	30	7.0%
	Missing	24	0.8%	2	0.4%	0	0.0%	1	0.3%	1	0.2%	15	2.0%	5	1.2%
Investigations needed	Basic investigations	612	20.3%	112	21.1%	105	22.1%	79	22.7%	66	13.3%	174	23.5%	76	17.8%
	throat/urine/stool swabs	133	4.4%	29	5.5%	26	5.5%	9	2.6%	17	3.4%	24	3.2%	28	6.6%
	Basic radiology	610	20.2%	135	25.4%	86	18.1%	100	28.7%	35	7.0%	148	20.0%	106	24.8%
	Specialist radiology	59	2.0%	8	1.5%	6	1.3%	7	2.0%	13	2.6%	14	1.9%	11	2.6%
	Pathology/bloods	307	10.2%	59	11.1%	49	10.3%	38	10.9%	32	6.4%	84	11.4%	45	10.5%
	Blood cultures	40	1.3%	3	0.6%	10	2.1%	8	2.3%	2	0.4%	9	1.2%	8	1.9%
	LP	4	0.1%	1	0.2%	1	0.2%	2	0.6%	0	0.0%	0	0.0%	0	0.0%
	Other Ix	45	1.5%	13	2.4%	9	1.9%	6	1.7%	6	1.2%	6	0.8%	5	1.2%
Treatment needs	Reassurance only	1,007	33.3%	219	41.2%	189	39.7%	116	33.3%	145	29.2%	161	21.8%	177	41.5%
	Basic oral, topical or inhaler Rx	1,390	46.0%	175	32.9%	184	38.7%	174	50.0%	275	55.3%	464	62.7%	118	27.6%
	Minor injury Rx	403	13.3%	73	13.7%	69	14.5%	65	18.7%	52	10.5%	70	9.5%	74	17.3%
	Oral fluids	217	7.2%	27	5.1%	23	4.8%	31	8.9%	46	9.3%	72	9.7%	18	4.2%
	NG or IV fluids	85	2.8%	14	2.6%	17	3.6%	10	2.9%	12	2.4%	23	3.1%	9	2.1%
	Inpatient delivered Rx	97	3.2%	21	3.9%	19	4.0%	12	3.4%	14	2.8%	17	2.3%	14	3.3%
	Mental health Rx	21	0.7%	4	0.8%	0	0.0%	1	0.3%	5	1.0%	5	0.7%	6	1.4%

Note that rows for Management and Investigations do not sum to 100% as CYP may have needed multiple investigations or treatments. The exception is Reassurance only, which excludes all other treatments. Basic investigations = urine dipstix, blood glucose from finger prick or pulse oximetry

Table 4. Destinations and potential alternative destinations for whole sample and by hospital site

		Total		Site A		Site B		Site C		Site D		Site E		Site F	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Numbers by site		3,020		532		476		348		497		740		427	
Recorded Destination	Home with no planned follow-up	1,703	56.4%	384	72.2%	222	46.6%	192	55.2%	232	46.7%	420	56.8%	253	59.3%
	Left before seen	98	3.2%	15	2.8%	7	1.5%	4	1.1%	15	3.0%	36	4.9%	21	4.9%
	Home with GP follow-up	446	14.8%	16	3.0%	100	21.0%	44	12.6%	175	35.2%	65	8.8%	46	10.8%
	Home with ED follow-up	50	1.7%	10	1.9%	21	4.4%	1	0.3%	0	0.0%	11	1.5%	7	1.6%
	Home with paediatric ward follow-up	25	0.8%	4	0.8%	3	0.6%	2	0.6%	8	1.6%	7	0.9%	1	0.2%
	Home with CAMHS follow-up	2	0.1%	1	0.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.2%
	Home with community nurse follow-up	37	1.2%	3	0.6%	12	2.5%	5	1.4%	12	2.4%	2	0.3%	3	0.7%
	Home with OPD follow-up	324	10.7%	44	8.3%	41	8.6%	65	18.7%	29	5.8%	95	12.8%	50	11.7%
	PASSU admission	106	3.5%	5	0.9%	7	1.5%	4	1.1%	5	1.0%	64	8.6%	21	4.9%
	Inpatient admission	229	7.6%	50	9.4%	63	13.2%	31	8.9%	21	4.2%	40	5.4%	24	5.6%
Potential destination according to clinical need															
	Managed at home if family self-confident	1,707	56.5%	177	33.3%	283	59.5%	226	64.9%	275	55.3%	559	75.5%	187	43.8%
	Home if could access telephone advice	189	6.3%	47	8.8%	47	9.9%	21	6.0%	27	5.4%	14	1.9%	33	7.7%
	Home if visited at least daily by nurses	21	0.7%	2	0.4%	8	1.7%	3	0.9%	1	0.2%	5	0.7%	2	0.5%
	Home if attend clinic/ED daily	41	1.4%	4	0.8%	29	6.1%	3	0.9%	0	0.0%	1	0.1%	4	0.9%
	Observation needed 0-6 hours	673	22.3%	228	42.9%	34	7.1%	57	16.4%	150	30.2%	61	8.2%	143	33.5%
	Observation needed 6-12 hours	71	2.4%	13	2.4%	11	2.3%	4	1.1%	8	1.6%	23	3.1%	12	2.8%
	Admission/observation >12 hours	210	7.0%	46	8.6%	54	11.3%	25	7.2%	21	4.2%	40	5.4%	24	5.6%
	Missing	108	3.6%	15	2.8%	10	2.1%	9	2.6%	15	3.0%	37	5.0%	22	5.2%
Would admission have been necessary with health education															
	Still necessary	1,541	51.0%	310	58.3%	294	61.8%	238	68.4%	45	9.1%	359	48.5%	295	69.1%
	Yes not necessary if had prior health education	1,275	42.2%	210	39.5%	176	37.0%	109	31.3%	275	55.3%	373	50.4%	132	30.9%
	Missing	204	6.8%	12	2.3%	6	1.3%	1	0.3%	177	35.6%	8	1.1%	0	0.0%

All groups sum to 100% with total n=3020

PASSU: Paediatric short stay assessment unit

Table 5. Proportions of CYP potentially manageable within current and new OOH models of care

Model & site		Total %(n)	Site A	Site B	Site C	Site D	Site E	Site F
A. Current primary care								
Community pharmacy	Total <5 years 5-17 years	9.5% (288) 10.0% (159) 9.0% (129)	0.8%	5.9%	5.2%	27.6%	10.3%	5.9%
Standard General Practice	Total <5 years 5-17 years	22.3% (672) 28.5% (453) 15.3% (219)	21.1%	24.0%	15.2%	28.2%	23.4%	18.7%
B. Enhanced primary care								
Enhanced GP practice	Total <5 years 5-17 years	28.4% (858) 37.4% (595) 18.4% (263)	25.6%	27.9%	16.7%	44.5%	29.1%	22.2%
GP Federation CYP service	Total <5 years 5-17 years	44.6% (1346) 51.8% (825) 36.5% (521)	37.4%	49.6%	34.5%	55.9%	46.2%	40.0%
C. Enhanced illness assessment and management models								
Nurse-led Acute Illness Team for CYP	Total <5 years 5-17 years	14.1% (425) 19.2% (305) 8.4% (120)	12.8%	12.6%	8.3%	20.5%	15.4%	12.2%
Walk-in Nurse-led Centre for Illness in CYP	Total <5 years 5-17 years	28.4% (858) 39.7% (632) 15.8% (226)	26.5%	24.4%	14.9%	49.7%	25.5%	26.5%
Multi-speciality Community Provider for CYP	Total <5 years 5-17 years	25.7% (776) 33.4% (531) 17.2% (245)	24.2%	26.9%	19.5%	32.2%	27.6%	20.4%
D. Comprehensive assessment and management models								
Walk-in Centre for Illness & Injury in CYP	Total <5 years 5-17 years	64.3% (1941) 65.6% (1044) 62.8% (897)	69.4%	61.3%	57.5%	69.4%	58.5%	70.7%
PACS Acute Health Centre for CYP	Total <5 years 5-17 years	75.5% (2280) 76.4% (1217) 74.4% (1063)	80.1%	75.4%	68.4%	79.7%	70.5%	79.4%

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