

ABSTRACT

Objectives: In line with a national policy to move care ‘closer-to-home’, a specialist children’s hospital in the National Health Service in England introduced consultant-led ‘satellite’ clinics to two community settings for general paediatric outpatient services. Objectives were to reduce non-attendance at appointments by providing care in more accessible locations, and to create new physical clinic capacity. This study evaluated these satellite clinics to inform further development and identify lessons for stakeholders.

Methods: Impact of the satellite clinics was assessed by comparing community versus hospital-based clinics across the following measures 1) non-attendance rates and associated factors (including patient characteristics and travel distance) using a logistic regression model; 2) percentage of appointments booked within local catchment area; 3) contribution to total clinic capacity; 4) time allocated to clinics and appointments; 5) clinic efficiency, defined as the ratio of income to staff-related costs.

Results: Satellite clinics did not increase attendance beyond their contributing to shorter travel distance, which was associated with higher attendance. Children living in the most-deprived areas were 1.8 times more likely to miss appointments compared with those from least-deprived quartile. The satellite clinics’ contribution to activity in catchment areas and to total capacity was small. However, one of the two satellite clinics was efficient compared with most hospital-based clinics.

Conclusions: Outpatient clinics were relocated in pragmatically chosen community settings using a “drag and drop” service model. Such clinics have potential to improve access to specialist paediatric healthcare, but do not provide a panacea. Work is required to improve attendance as part of wider efforts to support vulnerable families. Satellite clinics highlight how improved management could contribute to better use of existing capacity.

INTRODUCTION

In the English National Health Service (NHS) community-based family doctors (general practitioners (GPs)) refer patients requiring non-emergency specialist care to hospital-based, consultant-led services. This 'gatekeeper' system is meritorious,[1] but associated with longstanding concerns over access to hospital services,[1, 2] including paediatrics.[3, 4] In 2006, the Department of Health in England announced a major policy to move some care from hospital settings 'closer-to-home' in community locations.[3, 5, 6] The limited available evidence suggests that patient access may be improved, but that the impact on system efficiency is unclear.[7]

Birmingham Children's Hospital NHS Foundation Trust (BCH) is a specialist children's hospital in England. In 2006, BCH piloted the provision of outpatient appointments in community settings, here designated 'satellite' clinics, in addition to those at the city-centre hospital. The impetus for this quality improvement initiative was derived from the national 'closer-to-home' policy,[5] and had two locally-determined objectives: first, to reduce non-attendance at appointments by providing care in more accessible locations; second, to create new physical capacity for holding outpatient clinics as the hospital outpatient department had a full schedule of clinic sessions and so was unable to allocate additional clinic sessions to general paediatrics. In addition to the quality improvement benefits associated with enhanced convenience and experience for patients and parents, the initiative had potential benefits for patient health outcomes if greater attendance could be achieved. This is because non-attendance is associated with a risk of avoidable ill health from an absence or delay in diagnosis, treatment or condition monitoring.[8-10] There were also potential efficiency gains for BCH, if reduced non-attendance contributed to more appropriate use of the new clinic capacity.

This paper reports an analysis of the satellite clinics' impact on measures of attendance, capacity and efficiency, however data on health outcomes are not reported here. The findings are discussed in light of the views of staff, patients and parents, which are reported separately.[11-14] The ultimate aims of this study were to inform further development of the 'closer-to-home' initiative and identify lessons for service providers and policymakers.

METHODS

Setting

BCH is a secondary and tertiary hospital located in the densely populated, multicultural city centre of Birmingham, UK. It holds consultant clinics and advanced nurse practitioner (ANP) clinics for patients referred to the specialty of general paediatrics. ANP clinics provide care for less complex cases of conditions such as allergy and faecal/urinary incontinence. About 40% of consultant clinics are undertaken with a specialist trainee in paediatrics present. Differences in the clinics' clinical staffing are important because they impact on assessment of their comparative efficiency.

Intervention

Two satellite clinics were instigated pragmatically and opportunistically on a small scale, based on the enthusiasm of consultant paediatricians and available sites. Each satellite clinic was staffed by a consultant paediatrician (table 1). Satellite clinic implementation entailed a relocation of BCH's hospital outpatient model to community settings rather than service re-design or integration; an approach referred to as "drag and drop". New patients were either referred to BCH using a national web-based interface called 'Choose and Book', which allows parents to choose their appointment time and date for a named clinician[15] or, more commonly, patients were allocated to a clinic as part of a 'pooling' process. 'Pooling' means

that referrals are assigned to any consultant paediatrician (or ANP for less complex cases) without regard for specialist interests, to minimise overall waiting times. Referrals were 'pooled' to the satellite clinics on the basis of their proximity to its venue and the likelihood of requiring a blood test. Patients likely to require a blood test were not allocated to a satellite clinic, and several further steps were trialled to minimise the potential requirement for an additional phlebotomy appointment: first, a phlebotomist accompanied the paediatrician to the satellite clinic to carry out blood tests (as at satellite clinic 1 (SC1)); second, satellite clinics were used mainly for follow-up appointments. Apart from the criterion of not being likely to require a blood test, all types of cases suitable to be seen by a consultant paediatrician could be allocated to a satellite clinic during the pooling of referrals. The distinction between 'Choose and Book' and 'pooling' as mechanisms for managing new referrals is important because it has an impact on attendance rates.[15, 16] In addition, patients first seen in a hospital outpatient clinic could subsequently be allocated to a satellite clinic for follow-up, and for its first 18 months (until a change in clinician in June 2011) satellite clinic 2 (SC2) was used mainly for this purpose.

Table 1 Satellite clinic characteristics

Clinic	Start date	Venue	Distance from the hospital	Number of clinics per month
Satellite clinic 1	March 2008*	GP health centre	5.3km	2 or 3
Satellite clinic 2	January 2010	children's centre providing a range of services for families	9.5km	2

* following a six-month pilot in 2006/7

Evaluation

Impact of the satellite clinics was assessed by comparing them with hospital-based clinics in terms of non-attendance rates and associated factors; contribution to appointments booked within local catchment area and to total clinic capacity; and measures of clinic efficiency.

Qualitative analyses of staff, patient and parent descriptions of satellite clinic experience and attendance are reported elsewhere.[11-14] The evaluation formed part of an innovative programme funded by the National Institute for Health Research (NIHR) to promote service improvement through collaboration between local NHS staff and University researchers.[17]

The study was confirmed as service evaluation by the NHS National Research Ethics Service; NHS Research Ethics Committee approval was therefore not required.

Analysis

A logistic regression model was used to determine whether the satellite clinics experienced any difference in non-attendance rates compared with clinics held at the hospital, having adjusted for patient characteristics (age, sex, ethnicity, travel distance), relative deprivation (based on the 2007 Index of Multiple Deprivation at Lower Super Output Areas),[18] type of appointment (new referral/ follow-up), referral method (pooled/choose and book), complexity (consultant clinic/ANP clinic) and time of day. Results are reported as odds ratios. Routine data on 31,290 general paediatric outpatient appointments were available for the four years to

March 2012. Fifty-four appointments were excluded due to missing data relating to travel distance (49), deprivation (3) or age (2). Multiple imputation was used to impute missing ethnicity data for 1,925 appointments.[19] One hundred estimates for each missing value were generated using simulation based on the multinomial logistic imputation method using STATA 12.[19]

Impact was assessed by i) the percentage of appointments booked to each satellite clinic within its target catchment area (defined as the area bounded by the third quartile travel distance) up to March 2012; ii) the percentage contribution of each satellite clinic to total clinic capacity for general paediatrics, determined using BCH routine data on outpatient activity for the fourth quarter of 2011/12. Clinics undertaken by a consultant with a specialist trainee were not distinguished from consultant-only clinics in the routine data and were identified by checking diary records; iii) time allocated to clinics and appointments. Clinic and appointment duration, and the proportion of clinic time not booked, were estimated by examining the routine data on the start time of booked appointments; and iv) clinic efficiency, defined as the ratio of income to staff-related costs compared with hospital-based clinics, using national data on NHS staff costs[20] and NHS tariff prices for general paediatric attendances[21] (tables A1 and A2).

RESULTS

Access and attendance

During the four years to March 2012, the percentage of new referrals assigned to satellite clinics increased by 1.3% points to 4.3% (table A3). During this period, the mean distance travelled by patients and parents attending the hospital for new and follow-up appointments was 8.5 km (median 7.6 km, inter-quartile range 5.0 to 10.3 km) (figure A1). The comparable mean distance travelled by patients attending SC1 was 2.9 km (median 1.9 km,

inter-quartile range 1.1 to 3.2 km), compared with a mean of 5.6 km (median 5.0 km) that would have been required had they attended the hospital (figure A2). The mean travel distance for patients attending SC2 was 3.2 km (median 3.1 km, inter-quartile range 1.8 to 4.3 km), compared with a mean of 11.9 km (median 11.6 km) had they attended the hospital (figure A2).

For new referrals, appointments managed by 'Choose and Book', which allowed parents to select an available time/date, were associated with significantly lower non-attendance rates for each type of clinic (hospital/satellite/ANP) compared with pooled appointments (table A4). However, only one new referral allocated to a satellite clinic was managed via 'Choose and Book' and so the satellite clinics did not benefit from this national initiative. A smaller proportion of follow-up appointments were managed using 'Choose and Book' and the differences in non-attendance rates for these appointments were not significant (table A4). Overall, the non-attendance rate for new referrals at the satellite clinics (15.8%) was similar to that for the consultants' hospital clinics (14.2%; difference 1.6, 95% CIs -1.8 to 5.0) and ANP clinics (13.0%; difference 2.8, 95% CIs -1.0 to 6.5) (table A4). Similarly, the overall non-attendance rate for follow-up appointments at the satellite clinics (18.1%) was not significantly different to that for the consultant's hospital clinics (15.8%; 2.3, 95% CIs -1.0 to 5.7) or ANP clinics (19.1%; -1.0, 95% CIs -4.8 to 2.7) (table A4).

After controlling for patient and other characteristics, the logistic model confirmed that the satellite clinics did not have a significant impact on whether or not patients were brought to their appointments (table 2). The analysis also confirmed that 'Choose and Book' appointments had lower non-attendance rates (with odds of a non-attendance being nearly half (56%) of the odds of a pooled appointment being missed). Non-attendance rates were also lower for appointments between 2 and 4pm compared with those before 10am and higher for children aged 2 to 4 years compared with younger children. Children living in more

deprived localities experienced higher non-attendance rates. Compared with the least deprived quartile, children living in the most deprived two quartiles were 1.8 times more likely to not attend. Compared with children living up to 4.8km from the clinic, children living more than 7.5km away were 1.2 times more likely to not attend. There were also differences in non-attendance associated with ethnicity (table 2).

Table 2 Logistic regression model results of factors associated with non-attendance

variable	Odds ratio	standard error	p value	OR 95% confidence intervals
Site (hospital)				
Satellite clinic 1	0.940	0.121	0.63	0.731 to 1.210
Satellite clinic 2	1.230	0.160	0.11	0.953 to 1.587
pooled/Choose and Book	0.556	0.029	<0.001	0.501 to 0.616
new/follow-up	1.046	0.037	0.21	0.976 to 1.121
consultant/ANP	1.091	0.056	0.09	0.987 to 1.206
female/male	0.961	0.031	0.21	0.903 to 1.023
Ethnicity (white)				
South Asian	0.889	0.043	0.02	0.808 to 0.977
Black	1.290	0.077	<0.001	1.147 to 1.451
other	1.158	0.063	0.01	1.040 to 1.289
Age quartiles (0 to 1 years)				
2 (2 to 4 years)	1.221	0.054	<0.001	1.120 to 1.331
3 (5 to 9 years)	1.077	0.049	0.10	0.986 to 1.177
4 (10 to 19 years)	1.067	0.050	0.17	0.973 to 1.169
Year (2008/9)				
2009/10	1.091	0.050	0.06	0.997 to 1.195
2010/11	1.264	0.057	<0.001	1.157 to 1.380
2011/12	1.141	0.052	<0.001	1.044 to 1.248
Quarter (April to June)				
July to September	1.112	0.049	0.02	1.019 to 1.213
October to December	1.018	0.046	0.70	0.932 to 1.111
January to March	0.911	0.041	0.04	0.834 to 0.994
Appointment time (before 10am)				
10-12	1.002	0.045	0.96	0.917 to 1.095
12-2pm	0.940	0.063	0.36	0.825 to 1.072
2-4pm	0.861	0.042	<0.001	0.783 to 0.946
after 4pm	1.088	0.065	0.16	0.967 to 1.224
Distance quartile 1 (0.0 to 4.8 km)				
2 (4.8 to 7.5 km)	1.026	0.055	0.63	0.923 to 1.141
3 (7.5 to 10.1 km)	1.207	0.070	<0.001	1.076 to 1.353
4 (10.1 to 82.4 km)	1.198	0.074	<0.001	1.062 to 1.353
Deprivation quartile 1 (lowest deprivation: 1.2 to 23.0)				
2 (23.0 to 43.3)	1.669	0.080	<0.001	1.519 to 1.834
3 (43.3 to 56.0)	1.828	0.089	<0.001	1.662 to 2.011
4 (56.0 to 79.7)	1.812	0.107	<0.001	1.615 to 2.033
constant	0.093	0.009	<0.001	0.078 to 0.112

Impact on localities and total capacity

Defining the target catchment area of a satellite clinic as being bounded by the third quartile travel distance, then up to March 2012, SC1 was the venue for 7.3% (89/1123) of booked appointments within its catchment area, and SC2 was the venue for 12.1% (119/867) of booked appointments within its catchment area.

Remaining results focus on the fourth quarter of 2011/12 to show how the satellite clinics contributed to the delivery of outpatient activity. Two consultant paediatricians undertook satellite clinics during the fourth quarter of 2011/12 (labelled SC1 (consultant C) and SC2 (consultant E) in table 3). During this period, satellite clinics contributed 8.6% (14/162) of the consultant clinics, and 9.5% (55/578) of the new and 4.3% (41/951) of the follow-up patients booked to consultant clinics.

Allocation of time to clinics and appointments

Duration of the satellite clinics were close to the extremes, with SC1's being 3.8 hours compared with 2.3 hours for SC2 (table 3). Paediatricians chose different appointment slot durations for their satellite clinics, and some longer slots compared with their hospital clinics (table 3). This difference in practice may have contributed to the perception that the satellite clinics were less busy.

Table 3 General paediatric clinic characteristics, quarter ending March 2012

clinic type	clinicians	number of appointments booked per month (mean)		number of clinics per month ¹ (mean)	number of hours per clinic (mean)	appointment slot duration (minutes)	
		new	FU			new	FU
hospital (consultant)	A	21	33	5	3.5	20	10 ²
	B	16	11	3	4.0	20	20
	C	16	45	6	3.3	20	15
	D	24	15	6	3.3	30	30
	E	1	4	1	2.0	20	10
	F	0	27	2	3.5		15
	G	11	19	3	3.3	25	15
	H	10	1	2	3.5	30	30
	J	6	12	2	3.0	30	15
	total	106	166	29	3.4	24.3	15.7
satellite	SC1	9	10	3	3.8	30	15
	SC2	9	4	2	2.3	20	20
	total	18	14	5	3.1	24.9	16.3
hospital (consultant & specialist trainee)	A +*	22	0	4	2.9	20	
	B +#	14	20	4	2.8	20	15
	E +	10	23	3	2.2	20	10
	F +*	13	14	3	3.3	30	15
	H +*	1	41	3	3.0	30	15
	I +#* ³	9	39	4	3.3	45	30
	total	69	138	20	3.0	25.3	18.4
ANP		24	25	8	3.8	40	25
	*	19	14	7	2.8	30	20
	total	44	40	15	3.3	35.6	23.2
total		236	357	69	3.3	26.7	17.6

FU = follow-up, + = consultant and specialist trainee, ANP = advanced nurse practitioner, SC1 = satellite clinic 1, SC2 = satellite clinic 2, * = afternoon clinic, # = specialist trainee did not have their own patient list. ¹ eight hospital outpatient clinics held by four consultants were excluded for not conforming to the regular characteristics. ² estimated. ³ Consultant I's clinics included both a specialist trainee and a staff grade paediatrician (an experienced physician who had completed the training required for a consultant post)

Nine of the 10 consultant paediatricians undertook their own clinics in the hospital (table 3). There was consultant-level variation in both the duration of clinics (mean 3.4 hours) and the duration of slots booked for new and follow-up appointments (mean 24.3 and 15.7 minutes, respectively) (table 3). Five of the 10 consultants also undertook outpatient clinics with a specialist trainee present (table 3). ANP clinics contributed a fifth of all the outpatient clinics, and the time booked for new and follow-up ANP appointments was considerably longer than for the consultants (table 3).

Clinician-level variation in the number and duration of clinics held, and the number and duration of new and follow-up appointments booked, resulted in substantial differences in the time spent in outpatient clinics by the clinicians, and how that time was allocated (figure 1 and table A5). The two satellite clinics illustrate a marked difference in the allocation of clinic time including the percentage of time not allocated; 30.0% for SC1 and 7.1% for SC2 (figure 1 and table A5).

[figure 1]

In hospital clinics undertaken by a consultant only, on average 73.9% of monthly clinic time was booked to new and follow-up patients seen, non-attendance accounted for 11.3% and the remaining 14.8% was not allocated (table A5). The overall impact of having a specialist trainee present with a consultant was limited, although the wide variation in the proportion of clinic time booked suggests that there was considerable consultant-specific discretion in how the specialist trainees contributed (table A5 and supplementary information).

Ratio of income to staff related cost

The clinic-level ratio of income to staff-related cost is a measure of efficiency that facilitates comparison across clinicians and clinics (figure 2). ANP clinics had comparatively high

median income to staff-related cost ratios, with the comparatively few patients seen per clinic more than offset by the low nurse staff costs (figure 2). In contrast, consultant clinics illustrate a wide range of efficiency, with a satellite clinic being located towards each end of the range (figure 2). SC2, with its comparatively short clinic duration, shorter new referral appointment slots, and larger proportion of time booked with appointments, performed better than SC1.

[figure 2]

DISCUSSION

Satellite clinics were successfully implemented in the two community sites using a “drag and drop” delivery model. However, while facilitating comparatively shorter journeys for patients, the scale of the satellite clinics remained small in terms of the number of clinics provided, the number of patients seen, and the overall impact on local activity and total capacity. Furthermore, satellite clinics did not provide a panacea for improving attendance. In this urban setting, the proportion of children who were not brought to their appointment was not affected by the clinic location, beyond their contributing to shorter travel distance (associated with higher attendance) (table 2). Substantially higher attendance was associated with ‘Choose and Book’. This finding is consistent with a national study and is unsurprising given that the ‘Choose and Book’ system provides families with more control over the timing of their appointment, although ‘Choose and Book’ is controversial.[15, 16, 22] Initiatives to encourage GPs to use this facility warrant attention. .Analysis of factors associated with non-attendance indicated those, including deprivation, travel distance and ethnicity, that could inform the choice of satellite clinic location in order to address access barriers and reduce missed appointments. These findings add to the limited evidence on the role of social and logistical factors that influence attendance.[23, 12]

Improving attendance is a quality issue for paediatric services, as the hospital has a duty of care to the child and it is not the child's decision to miss their appointment.[8] It also represents a widely recognised waste of scarce clinic capacity, but there are other potential sources of waste. For example, across all clinic types, the percentage of clinic time not booked on average was greater than the percentage of time allocated to patients who were not brought. Furthermore, the range of appointment durations booked for both new and follow-up consultations (table 3) reflect the work practices and preferences of individual consultants, rather than differences in case mix or specialist interests. If the GP referral letter indicated a possible complex clinical situation, a consultant might specify a double time slot, but this would be unusual.

These findings and the evident lack of consensus about the appropriate duration of clinics and how appointments should be booked was presented to the General Paediatric team at BCH. It proved to be a powerful catalyst for consideration of changes to longstanding working practices and led to the department committing to address how clinic capacity is allocated. This work could lead to substantial improvements in the efficiency of existing outpatient capacity, as well as informing the use of satellite clinic capacity.

Qualitative investigations linked with this work and conducted as part of the wider NIHR-funded evaluation provide triangulation with the findings reported here. NHS stakeholders supported delivery of care 'closer to home', as family choice and keeping children out of hospital was viewed as intrinsically desirable.[11] However, the pragmatic "drag and drop" service model presented significant practical and financial challenges for some staff.[11] Moreover, hospital-based clinicians were unconvinced about the potential for satellite clinics to reduce missed appointments, as there was scepticism over whether travel difficulties affected attendance.[12]

Interviews with parents of child patients also revealed that satellite clinics provide a very different experience for families compared with hospital visits. [13] Attending community-based clinics was perceived as less disruptive to daily life, and the more comfortable environment of satellite clinics was associated with more meaningful consultations. However, some parents voiced concerns about the absence of medical technologies in community locations. Adolescent patients suggested that their needs were not accounted for in either BCH outpatients or satellite clinics.[13] The views and concerns of both families and clinicians will need to be taken into account in future planning of satellite clinics in order to ensure adequate engagement, and to improve experience and attendance rates.

In this observational study, satellite clinics only made a small contribution to the delivery of paediatric outpatient services and the provision of care ‘closer-to-home’ was only achieved for a minority of those in the catchment areas. However, the comparative efficiency of SC2 suggests that the “drag and drop” model has potential, and deserves development. BCH is planning a third satellite clinic, which will take these findings into account. The experience of this hospital further highlights that the choice of paediatricians to lead satellite clinics is of paramount importance; they need to embrace the ‘liberating’ ethos of working away from the hospital and adapt their clinical practice style accordingly. Our findings can also inform future research and innovation required to improve attendance as part of a wider challenge to address problems facing vulnerable families.[11, 24, 25]

This study was limited by the small scale of the satellite clinics. However, the findings are important for building the evidence-base for care closer-to-home. The “drag and drop” model implemented by BCH is not well represented in the limited evaluative literature on shifting specialist care out of hospitals, which has focused on development of community-based clinicians, such as GPs with a special interest, as a substitute for hospital-based specialists.[7, 26, 27] Although the approach taken by BCH risked running counter to the national policy

intention: “specialists seeing small numbers of patients in GP surgeries – should be ruled out”[2], it nevertheless demonstrates a potential for specialists to leave their “Ivory Tower” and take care ‘closer-to-home’ without necessarily compromising efficiency. Furthermore, the process of local innovation, albeit on a small scale, has led to a wider impetus to address historical working practices.

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Figure 1 monthly mean allocation of paediatric clinic time by clinician staffing arrangements, quarter ending March 2012

Figure 1 footnotes: + = consultant and specialist trainee, ++ = consultant, specialist trainee and staff grade paediatrician, * = pm, FU = follow-up, DNA = did not attend

Figure 2 Clinic-level ratio of median income/staff cost by clinician and clinic type, quarter ending March 2012

Figure 2 footnotes: + = consultant and specialist trainee, ++ = consultant, specialist trainee and staff grade paediatrician, * = pm

The white line in the box shows the median income/staff cost ratio, and the box extends from the 25th percentile to the 75th percentile (the interquartile range). The 'whiskers' show the range of income/staff cost ratio that are within 1.5 times the interquartile range. More extreme ratios, if any, are shown individually. The width of the boxes indicates clinic numbers.