Integrating health care and early years support for children and young people living in deprivation: a cost-effectiveness analysis of the Sparkbrook Children's Zone integrated clinic versus usual primary care in Birmingham, UK

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ABSTRACT

Background Increased use of emergency and secondary care by children and young people, especially in deprived populations, drives increased costs in health and social care systems in rich country settings, without necessarily delivering quality care. This study aims to assess the potential cost-effectiveness of the Sparkbrook Children's Zone (SCZ), a pilot clinic for children and young people which integrates health and early years support in a highly deprived area of Birmingham, the UK's second city, compared with standard primary care.

Methods A decision-analytic model taking a healthcare and partial social care perspective was developed using the best available, though limited, evidence from aggregated data of an ongoing pilot, published literature, expert opinions and assumptions. Effectiveness was measured as a proportion of patients attending the emergency department (ED). Deterministic and probabilistic sensitivity analyses were performed to assess the impact of parameter uncertainties.

Results The integrated SCZ clinic may potentially be cost-effective based on this preliminary model-based analysis. The SCZ had a lower proportion of patients attending ED, 0.017 compared with 0.029 for standard primary care, reducing the proportion of ED visits by 0.012. The average cost of SCZ was £66.22 compared with £110.36 for standard primary care, leading to a cost saving of £44.08 per patient. This potential reduction in total costs resulted from fewer referrals to children's social care and secondary medical services, including the ED. Extensive sensitivity analysis supported the indications that the intervention was likely to be cost-effective.

Conclusion The SCZ shows the potential that integrating health and social care that is place-based is potentially cost-effective, with its early years support likely enhancing the cost-effectiveness of the intervention compared with standard primary care. Further robust data and trial evaluation are essential to confirm these findings, ensuring the scalability and sustainability of such programmes.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The increased emergency department and outpatient visits by children and young people (CYP) have put a strain on the UK healthcare system against a backdrop of rising child poverty and attendant poor health outcomes.
⇒ There is emerging evidence that integrating care for CYP reduces emergency visits, hospital admissions, general practitioner appointments and inappropriate referrals to Child and Adolescent Mental Health Services.
⇒ Data for the cost-effectiveness of integrated care services for CYP remain limited.

WHAT THIS STUDY ADDS

⇒ The preliminary model-based economic evaluation suggests that integrating health and early years support in a local community clinic for CYP (Sparkbrook Children's Zone) outperforms standard primary care, with the potential to reduce total healthcare and social support costs.
⇒ The Early Help services potentially enhance their cost-effectiveness by addressing complex family needs and preventing costly, late interventions.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The study identifies data and knowledge gaps that need to be addressed to ensure the scale-up of integrated care improves CYP well-being and delivers value.
⇒ It supports the National Health Service England in integrating community-based health and social care for children while addressing health inequalities.

INTRODUCTION

The significant rise in emergency department (ED) and outpatient presentations to secondary care among children and young people (CYP) over the past decade has put

a strain on the UK's healthcare system,[1] especially in deprived areas with limited access to primary, community care services and early interventions.[2–4] To tackle these challenges, there is growing support from the National Health Service (NHS) England and the Royal College of Paediatrics and Child Health, and the recent Health and Care Act 2022, to move towards integrating community-based health and social care for children.[1 5 6]

These reforms align with the *NHS Long Term Plan,* introduced in 2019, which represents a significant shift in England's healthcare policy by focusing on integrated care to improve health outcomes and reduce inequalities. This plan aims to transform the NHS by prioritising more coordinated and personalised care, moving away from a hospital-centric model towards community-based services.[7] It is also in line with the NHS England Neighbourhood Health Guidelines (2025–2026), which focus on delivering personalised and locally tailored care at the neighbourhood level.[8] Integrated Care Systems are at the heart of this transformation, bringing together local NHS organisations, social care services and other partners to redesign care and improve population health.[7 8] This approach seeks to break down traditional barriers between primary and specialist care, physical and mental health services and health and social care, with the ultimate goal of providing seamless, efficient and equitable healthcare across England. Evidence from various initiatives in the UK shows that integrating children's services reduces outpatient and ED attendances, hospital admissions, general practitioner (GP) appointments and inappropriate referrals to Child and Adolescent Mental Health Services,[9 10] with emerging evidence of their long-term cost-effectiveness.[11]

The Sparkbrook Children's Zone (SCZ) is one of several place-based integrated care services being piloted by NHS England.[5] It was established in March 2022 as a pilot integrated health and social care clinic delivered through the Balsall Heath, Moseley and Sparkhill Primary Care Network, with a patient list of 14 000 CYP. This site was selected due to the area's high levels of diversity and deprivation,[5] infant mortality (8/1000, compared with 3.3/1000 nationally), childhood obesity (Year 6 children 42% overweight), special educational needs and disabilities, poor oral health and low immunisation uptake.[12] These characteristics of the local population mean that SCZ aligns with NHS England's long-standing goal to reduce health inequalities, focusing on the CORE20+5 population—targeting the most deprived 20% of the national population and other disadvantaged groups.[13] The area is also the source of a significant number of inappropriate ED attendances.[5]

The CYP and families are directed to the SCZ or GP care through several approaches, including community outreach, healthcare referrals and self-referral. Outreach activities in local schools and community venues raise awareness about SCZ services, while partnerships with organisations such as the Hall Green Families Early Help Team also facilitate targeted referrals. The SCZ works with local GP practices, where healthcare professionals identify and refer families who might benefit. Additionally, families have the option to self-refer, either at community events or by accessing information on the SCZ website.[14]

The SCZ offers a comprehensive range of services focusing on three key areas: (1) healthcare delivered locally, including improved management of common conditions (asthma, eczema and constipation); (2) preventive health, including healthy weight, immunisations, oral health, smoking cessation and Healthy Start vitamins and (3) early years family support (Early Help, 0–19 years). During this evaluation, the SCZ pilot operated twice weekly, with each session running for 4 hours. Each session has two clinic lists: one for a paediatrician and one for a GP. The SCZ is supported by an outreach nurse focusing on health promotion and an Early Help Connector who provides social support. A mental health support worker from Pause is also colocated at the SCZ to offer additional assistance once a week. Beyond clinic hours, the SCZ team conducts outreach activities, including well-child clinics in schools, targeting children identified as being in need. A key component of the SCZ offer is the colocated Early Help support service, aimed at addressing social determinants of health. Their advisors play a pivotal role in signposting and referring families to local support services to prevent costly late interventions (see figure 1).

If the SCZ effectively improves healthcare outcomes for CYP in this area, it could have significant economic implications for the healthcare sector. However, with tight healthcare budgets and competing demands on resources, justifying the additional costs associated with integrated services by demonstrating value for money is crucial. We aimed to evaluate the cost-effectiveness of SCZ compared with usual primary care services, analysing how costs are allocated and where savings are generated. Given the limited evidence available on the benefits of integrating health and social support for underserved CYP populations,[15] our findings are intended to inform the development of similar initiatives in the West Midlands and beyond by identifying potentially cost-effective strategies.

METHODS

We developed a decision-analytic model in the form of a decision tree model in Microsoft Excel 2024 (Microsoft Corporation, Redmond, Washington, USA), which was parameterised to reflect the patient pathway within the SCZ compared with standard primary care. Decision trees offer a step-by-step, visual representation, enhancing understanding, especially in complex scenarios. They are particularly useful for decision-making processes involving multiple potential outcomes, allowing decision makers to explore various pathways and weigh probabilities.[16] Given the short-term nature of patient turnover within the SCZ, the decision tree model was well suited for our analysis. We evaluated the costs and benefits of
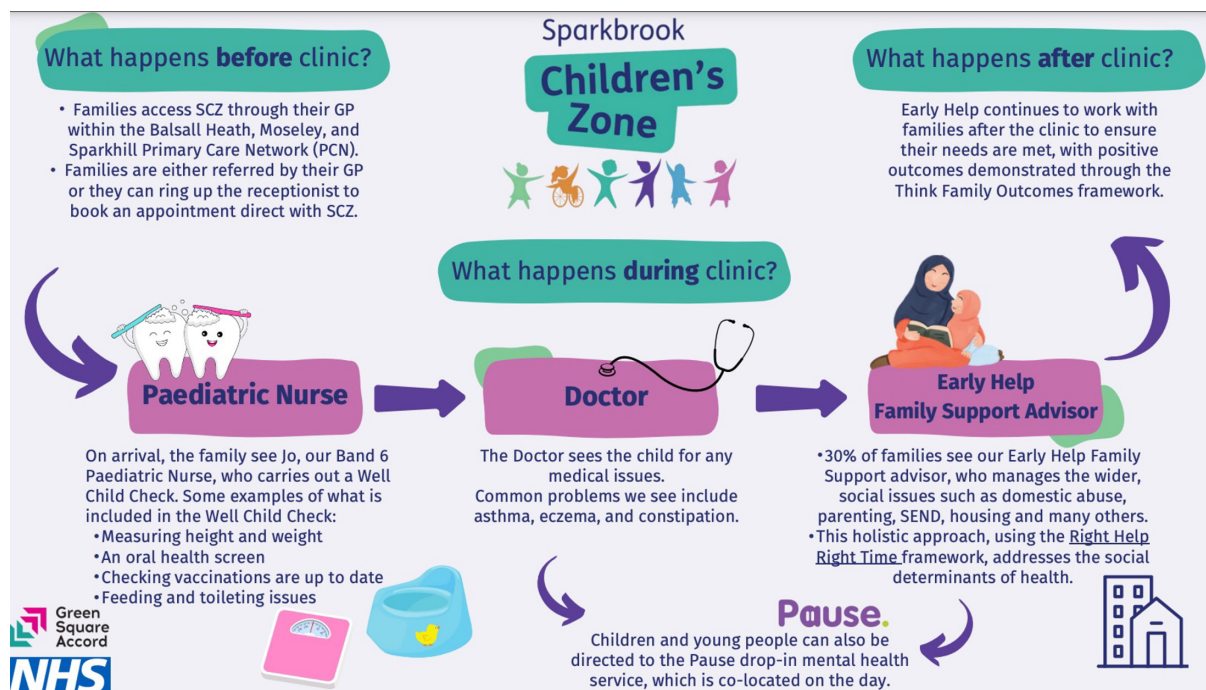
Figure 1 The Sparkbrook Children's Zone clinic model. A visual representation of the Sparkbrook Children's Zone clinic model, highlighting its integrated approach to CYP care and key service delivery components.

the SCZ in comparison to the standard primary care from the healthcare (NHS) and partial social care perspective.

MODEL STRUCTURE

The model structure was developed in consultation with clinical experts from the SCZ. The agreed-upon model structure, depicted in figure 2, shows pathways for patients attending the SCZ clinic compared with the normal pathway provided in primary care.

In the SCZ arm, patients can either make appointments to visit the SCZ or directly visit the ED without any prior referral. Patients may either attend their appointment or not show up (did not attend/DNA). Patients are offered combinations of services from not only a GP but also from a paediatrician, an outreach nurse (who also delivers preventive health), a mental health professional and the Early Help family support team. After receiving treatment or services, patients may be discharged or require follow-up care with their GP or the SCZ clinic. Patients who cannot be clinically managed within these settings will be referred to secondary care services, either to outpatient specialists or to the ED. Patients who need social support will receive Early Help services in the SCZ. Around two-thirds of patients receive 'light touch' support (65%), with navigation to support in the community, while a proportion of patients who receive this service (approximately 39%) may need to fill out a family support form (Family Connect Form) to obtain more intensive support. The information from the form is reviewed by the multidisciplinary team to assess the family's specific needs and priorities. This assessment helps determine the most appropriate next steps, including

tailored interventions, referrals to specialised services or coordination of ongoing support. For the most complex cases, CYP are referred to Children's Social Care services for additional assistance.

The standard primary care offer is similar to that of the SCZ but does not include access to a collocated paediatrician, preventive health, an outreach nurse or Early Help services. Patients who require social support are assumed to be directed to Children's Social Care instead of Early Help services. Once referred to Children's Social Care, children can receive a decision of no further action without further assessment, or they can be assessed and classified into the following categories: children not in need (minimal intervention/light touch/general guidance); children in need; children under a child in need plan; children under a child protection plan and children in care/looked after.[17]

MODEL PARAMETERS
Probabilities

Probabilities represent the anticipated likelihood of patients progressing through various model pathways.[18] To ensure that the model accurately reflects the current conditions in the SCZ, we obtained probability estimates from the SCZ database using data collected from 31 March 22 to 29 February 2024. When data were unavailable, particularly concerning the lack of a comparator arm due to time constraints inherent to the study, we sought expert opinion, made informed assumptions and referred to published literature to derive the necessary probabilities. All assumptions were confirmed and
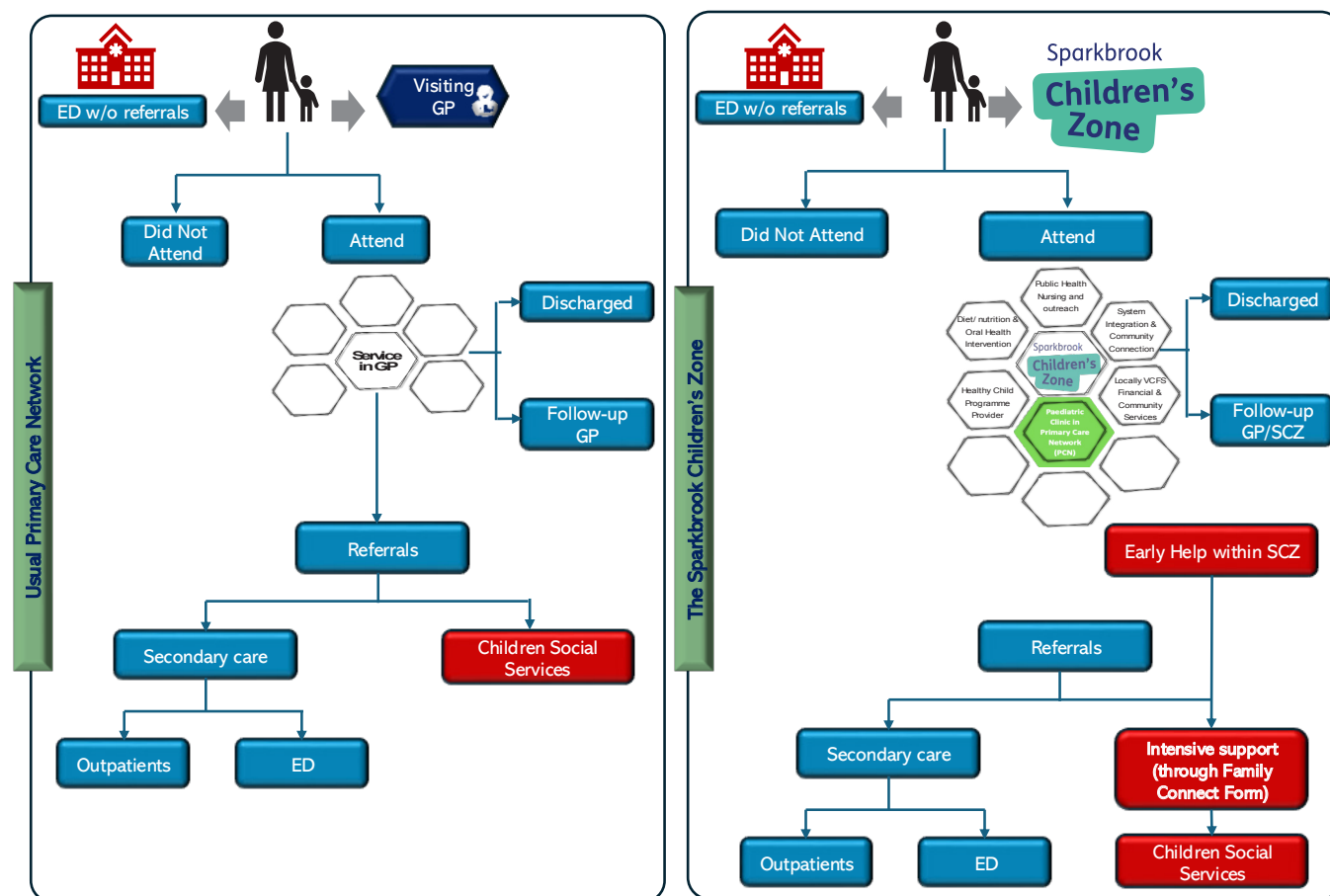
Figure 2 Model structure pathways for patients attending the SCZ clinic (right) compared with the normal pathway provided in usual primary care (left). ED, emergency department; GP, general practitioner; SCZ, Sparkbrook Children's Zone.

agreed on before conducting any analysis and were not subsequently revised at any time (table 1).

Costs and resource use

The unit cost per SCZ consultation was derived from the SCZ business case. This was based on the staff costs of paediatrician, GP, band six nurse, early help connector, admin and management, room rental and consumables. Other relevant unit costs were identified from established national sources, including the NHS reference costs[19] and the Personal Social Services Research Unit costs.[20] For parameters where costs were not available from these sources, unit costs were extracted from other studies.

To calculate total costs, relevant unit costs were multiplied by the corresponding resource use data. The personal social services care perspective included the costs of Early Help and Children's Social Care services, which were calculated by weighting the average cost based on the proportion of patients receiving each stage of these services. All costs are reported in 2022–2023 Great British Pounds values. Where necessary, costs were inflated using the Hospital and Community Health Services Pay and Prices Index.[20] Model costs are presented in table 2, and the proportion of children in Early Help and Children Social Care services is presented in table 3. All data from

the SCZ database were collected for the period of the pilot starting from 31 March 2022 to 29 February 2024.

Benefit or effectiveness measure

The effectiveness measure was the proportion of patients attending an ED. In the analysis, an effectiveness value of '0' was assigned to pathways where patients did not attend the ED and a value of '1' was assigned to pathways where patients did attend an ED.

ANALYSIS
Model-based analysis

A roll-back method was employed to estimate the anticipated costs and outcomes for both the SCZ and standard primary care arms. The results were presented as the difference in costs and the disparity in the proportion of patients attending the ED. A 30-day timeframe was used for the evaluation. This short-term period aligns with the pilot nature of the SCZ programme and the typical monthly budget cycles of the programme. Additionally, children's health can change rapidly, making a shorter time frame suitable for observing the immediate effects of the intervention. There was also no discounting applied, as the analysis focused on a short time horizon.

Table 1 Model probabilities

Parameter	Value used (SE)	Distribution	Distribution parameter	Source
Sparkbrook Children's Zone				
Did not attend	0.146 (0.029)	Beta	α=5.19 β=30.26	SCZ database
Referrals from SCZ	0.039 (0.008)	Beta	α=5.96 β=147.16	SCZ database
Referred to secondary care services from SCZ (ED/outpatient)	0.158 (0.032)	Beta	α=5.10 β=27.13	SCZ database
Discharged	0.822 (0.164)	Beta	α=0.29 β=0.06	SCZ database
Referred to ED	0.152 (0.030)	Beta	α=5.14 β=28.75	SCZ database
ED without referral (inappropriate)	0.016 (0.003)	Beta	α=6.13 β=374.78	5 9
Standard primary care				
Did not attend	0.220 (0.044)	Beta	α=4.65 β=16.50	SCZ database
Referrals from GP	0.118 (0.024)	Beta	α=5.39 β=40.45	SCZ database[9 27]
Referred to secondary care services (ED/outpatient)	0.579 (0.116)	Beta	α=2.05 β=1.49	Assuming 10% more if without the ICS[9]
Discharged	0.822 (0.164)	Beta	α=0.29 β=0.06	Assuming the same as SCZ
Referred to ED	0.156 (0.031)	Beta	α=5.12 β=27.58	Assuming 3% more if without ICS[9]
ED without referral (inappropriate)	0.021 (0.004)	Beta	α=6.10 β=289.42	5

ED, emergency department; ICSs, integrated care services; SCZ, Sparkbrook Children's Zone.

SENSITIVITY ANALYSIS
Probabilistic sensitivity analysis (PSA)
Probabilistic sensitivity analysis (PSA) was conducted to assess the uncertainty of the model inputs and base case estimates. PSA presents uncertainty by simultaneously varying multiple input parameters, repeatedly drawing random values to re-estimate differences in costs and outcomes based on parameter distributions.[18] Parameters ranging between 0 and 1, such as model probabilities, were assigned a Beta distribution. Meanwhile, parameters expected to have positively skewed values, like cost data, were linked to a Gamma distribution. We also used the Dirichlet distribution to model the proportions of patients across different stages of Children's Social Care. This distribution is well suited for representing the distribution of multiple probabilities that sum up to one, such as the proportions of patients receiving various levels of social care. Given the limited data availability, we intentionally assigned a wide distribution around the estimates to identify the extent to which changes in these values gave a different cost-effectiveness decision. We arbitrarily used a wide coefficient of variation of 0.4 for parameters where SE was not available. A higher coefficient of variation indicates greater dispersion or variation around the mean value, implying greater uncertainty.[21] The PSA was run for 1000 Monte Carlo simulations, and the result was visualised on a cost-effectiveness plane.[22 23]

Deterministic sensitivity analysis (DSA)
Deterministic Sensitivity Analysis (DSA) was performed to evaluate the sensitivity of the base case results to changes in specific input parameters. This involved altering the value of certain parameters at a time while keeping the rest constant. A parameter was deemed sensitive if its value change affected the base case cost-effectiveness results. We considered the lower and upper bounds for the probabilities and costs and for this study adjusted them arbitrarily by 20% to 80%. We also used values available from other studies. We additionally explored scenarios involving the variation of the proportion of Early Help (early years support) cases within the SCZ:
1. Scenario A: in this scenario, 30% of the original light-touch cases in SCZ would require intensive support.
2. Scenario B: in this scenario, 30% of the original light-touch cases in SCZ would require intensive support,

Table 2 Model input costs

Resource use	Unit cost (£)	Detail	Distribution	Distribution parameter	Source
SCZ consultation	62	Per child (25 min consultation) Clinic operates twice weekly, 4 hours each session	Gamma	α=6.25 β=9.92	SCZ database/ business case
GP consultation	45.48	Per 10 min consultation	Fixed		PSSRU 2022[20]
Outpatient Paediatric Service	300.6	Per consultation (weighted average of the outpatient care consultant-led paediatric service code 420)	Fixed		National Cost Collection for the NHS 2021/2022[19]
ED Attendance (non-admission)	190.24	Per consultation (weighted average of the emergency care code VB07Z - VB11Z (non-admission))	Fixed		National Cost Collection for the NHS 2021/2022[19]
ED Attendance (admission)	279.46	Per admission (weighted average of the emergency care code VB07Z - VB11Z (non-admission))	Fixed		National Cost Collection for the NHS 2021/2022[19]
Did not attend	32.49	Per DNA	Gamma	α=6.25 β=5.20	35 36
Referrals to Early Help worker within the SCZ (light touch/signposting)	62	Per child	Gamma	α=6.25 β=9.92	Covered in SCZ consultation
Early Help—intensive support (Family Connect Form)	84.35	Per child	Gamma	α=6.25 β=13.50	17
Decision of no further action without assessment (after referral to Children's Social Care Service)	274.98	Per child	Gamma	α=6.25 β=44	37
Children not in need	400.64	Per child, assuming just need assessment	Gamma	α=6.25 β=64.10	37
Children in Need (post Children's Social Care Service referral)	755.95	Per child monthly	Gamma	α=6.25 β=120.95	17
Children in need with a plan (post Children's Social Care Service referral)	1312.08	Per child monthly	Gamma	α=6.25 β=209.93	17
Children on Child Protection Plan (post Children's Social Care Service referral)	871.59	Per child monthly	Gamma	α=6.25 β=139.45	17
Children in care/looked after (post Children's Social Care Service referral)	4873.42	Per child monthly	Gamma	α=6.25 β=779.75	17

DNA, did not attend; ED, emergency department; PSSRU, Personal Social Services Research Unit; SCZ, Sparkbrook Children's Zone.

Table 3 Proportion of children in Early Help and Children's Social Care Services

Parameter	Value used	Distribution	Distribution parameters	Source
Early Help within SCZ				
Referrals to Early Help worker within the SCZ (light touch/signposting)	0.64	Dirichlet	$\alpha_1=237$; $\alpha_1+\alpha_2+\alpha_3=370$	SCZ database
Intensive support (Family Connect form)	0.34	Dirichlet	$\alpha_2=124$; $\alpha_1+\alpha_2+\alpha_3=370$	SCZ database
Referral to Children's Social Care	0.02	Dirichlet	$\alpha_3=9$; $\alpha_1+\alpha_2+\alpha_3=370$	SCZ database
Children's Social Care				
Decision of no further action without assessment (post Children's Social Care Service referral)	0.07	Dirichlet	$\alpha_1=49\,421$; $\alpha_1+\alpha_2+\alpha_3+\alpha_4+\alpha_5+\alpha_6=639\,901$	38
Children not in need (require light touch/general guidance/minimal intervention) (post Children's Social Care Service referral)	0.27	Dirichlet	$\alpha_2=187\,390$; $\alpha_1+\alpha_2+\alpha_3+\alpha_4+\alpha_5+\alpha_6=639\,901$	38
Children in Need (post Children's Social Care Service referral)	0.24	Dirichlet	$\alpha_3=164\,140$; $\alpha_1+\alpha_2+\alpha_3+\alpha_4+\alpha_5+\alpha_6=639\,901$	38
Children in Need (post Children's Social Care Service referral)	0.15	Dirichlet	$\alpha_4=106\,000$; $\alpha_1+\alpha_2+\alpha_3+\alpha_4+\alpha_5+\alpha_6=639\,901$	39
Children on Child Protection Plan (post Children's Social Care Service referral)	0.07	Dirichlet	$\alpha_5=50\,780$; $\alpha_1+\alpha_2+\alpha_3+\alpha_4+\alpha_5+\alpha_6=639\,901$	39
Children in care/looked after (post Children's Social Care Service referral)	0.12	Dirichlet	$\alpha_6=82\,170$; $\alpha_1+\alpha_2+\alpha_3+\alpha_4+\alpha_5+\alpha_6=639\,901$	38

SCZ, Sparkbrook Children's Zone.

and 10% of those receiving intensive support would be referred to Children's Social Care/trust.

Detailed information regarding the values used in the DSA is presented in table 4.

Patient and public involvement

Patients and/or the public were not involved in the design, conduct, reporting or dissemination plans of this economic evaluation research.

RESULTS
Model-based analysis results
Base case results

The base case result is presented in table 5. The average cost of SCZ per patient was £66.22, which was cheaper compared with £110.36 for standard primary care. Additionally, the SCZ arm had a lower proportion of patients attending the ED (0.017 vs 0.029). Consequently, SCZ led to a cost saving of £44.08 per patient and a reduced proportion of ED visits by 0.012, indicating that it dominated standard primary care in terms of being both cheaper and more effective.

Probabilistic sensitivity analysis

The PSA results are visualised in the cost-effectiveness plane (see figure 3), plotting the difference in costs against the difference in the proportion of ED visits. The results indicate that most points fall within the South-East quadrant of the cost-effectiveness plane, indicating a 76.3% probability that the SCZ could be cost-effective, as it is associated with lower costs and fewer ED visits compared with standard primary care.

Deterministic sensitivity analysis

The results of the DSA (see appendix online supplemental table S1) consistently indicate that the SCZ dominates standard primary care, being both cheaper and resulting in a lower proportion of ED visits. The cost savings range from £2.99 to £102.81, while the difference in the proportion of ED visits ranges from 0.008 to 0.016.

DISCUSSION

This analysis was model-based with limited data availability, which required us to seek expert opinion and make assumptions that were confirmed and agreed on before the analysis began. While the preliminary results

Table 4 Parameter values used in deterministic sensitivity analysis

Variable	Base case value	Lower bound	Upper bound	Source
Model probabilities				
Strategy: Sparkbrook's Children Zone				
Did not attend	0.146	0.117	0.176	−20%, +20%
Referrals from SCZ	0.039	0.031	0.047	−20%, +20%
Referred to secondary care services from SCZ (ED/outpatient)	0.158	0.127	0.190	−20%, +20%
Discharged	0.822	0.657	0.986	−20%, +20%
Referred to ED	0.152	0.122	0.182	−20%, +20%
ED without referral (inappropriate)	0.016	0.013	0.019	−20%, +20%
Strategy: standard primary care				
Did not attend	0.220	0.176	0.264	−20%, +20%
Referrals from GP	0.118	0.094	0.141	−20%, +20%
Referred to secondary care services (ED/outpatient)	0.579	0.463	0.695	−20%, +20%
Discharged	0.822	0.657	0.986	−20%, +20%
Referred to ED	0.156	0.125	0.188	−20%, +20%
ED without referral (inappropriate)	0.021	0.017	0.025	−20%, +20%
Cost input				
SCZ consultation	£62	£49.60	£74.40	−20%, +20%
Referrals to Early Help worker within the SCZ (light touch/signposting)	£62	£49.60	£74.40	−20%, +20%
Intensive support (Family Connect Form)	£84.35	£67.48	£101.22	−20%, +20%
Referrals to Children's Social Care	£1146.94	£917.55	£1376.32	−20%, +20%
Decision of no further action without assessment (post Children's Social Care Service referral)	£274.98	£219.98	£329.98	−20%, +20%
Children not in need (require light touch/general guidance/minimal intervention) (post Children's Social Care Service referral)	£400.64	£320.51	£480.77	−20%, +20%
Children in Need (post Children's Social Care Service referral)	£755.95	£604.76	£907.15	−20%, +20%
Child in Need with plan (post Children's Social Care Service referral)	£1312.08	£1049.66	£1574.50	−20%, +20%
Children on Child Protection Plan (post Children's Social Care Service referral)	£871.59	£697.27	£1045.91	−20%, +20%
Children in care/looked after (post Children's Social Care Service referral)	£4873.42	£3898.74	£17 994.19	Lower bound −20%; upper bound from[17]
Proportion of Early Help cases within SCZ				
Scenario A: +30% light-touch cases will need intensive support				
Light touch/signposting cases	0.641	0.448		−30%
Intensive support (Family Connect form)	0.335	0.527		+30% light-touch cases
Referrals to Children's Social Care	0.024	0.024		No change
Scenario B: 30% light-touch cases will need intensive support and 10%of the intensive support will be referred to Children's Social Care/trust				
Light touch/signposting cases	0.641	0.448		−30%

Continued

Table 4 Continued

Variable	Base case value	Lower bound	Upper bound	Source
Intensive support (Family Connect form)	0.335	0.475		+30% from light-touch cases and −10% to Children's Social Care
Referrals to Children's Social Care	0.024	0.077		+10% intensive support cases

ED, emergency department; EH, Early Help; GP, general practitioner; SCZ, Sparkbrook Children's Zone.

are indicative, they offer the potential that the SCZ is likely to outperform standard primary care for CYP. The preliminary findings show that, on average, the total costs associated with the SCZ were lower compared with those of standard primary care, while also demonstrating a lower proportion of ED visits. The cost saving of £44.08 per patient achieved by the SCZ primarily stems from reduced referrals to Children's Social Care and secondary medical care services compared with standard primary care. If we extrapolate this cost saving to cover the entire 14 000 CYP eligible for SCZ services, it could potentially result in savings of £617 120 for the NHS. This could indicate that despite the slightly higher cost of integrated SCZ consultations (priced at £62 per SCZ consultation compared with £45.48 per GP consultation, which amounts to £16.5 more than standard GP consultations), the potential reduction in total costs resulting from fewer referrals to Children's Social Care and secondary medical services, including the ED, could outweigh this additional expense. Our PSA supports these findings, indicating that under increased uncertainty surrounding input values, the SCZ has a 76.3% probability of being the preferable option. Furthermore, when deliberately inflating the cost of SCZ consultations by 50% and 80%, the results still indicate cost savings of £18.4 and £2.99, respectively, in comparison to standard primary care. These findings underscore the potential advantages of integrating health and social care services within a community setting for CYP.

Building on these preliminary findings, Early Help emerges as a pivotal component of the SCZ's integrated approach. About 32% of CYP attending SCZ's face-to-face clinics are referred to this service, addressing the complex needs of families, particularly in areas such as diet and nutrition, special educational needs and disabilities and behavioural issues. Notably, 39% of these cases benefit from coordinated support via the Family Connect Form—a tool developed by Birmingham Children and Young People's Partnership to capture detailed information on a family's circumstances and needs.[24–26] This enables professionals from various disciplines to collaborate more effectively, allowing for the early identification of potential risks and the organisation of a multidisciplinary team support around the family to address these issues before they escalate. Evidence indicates that investment in early help interventions reduces the number of children reaching the threshold of becoming 'in need and in care' under Section 17 of the Children's Act 1989, therefore saving local authorities money by preventing costly late intervention.[27]

The wider potential benefits of the integrated clinic offer

There are wider potential benefits of the SCZ that are difficult to quantify or assign a monetary value due to the current data constraints and the long-term timeframe required to observe them. The integrated approach of the SCZ attempts to tackle health inequalities by ensuring equitable access to health and social care services. It specifically targets factors such as social deprivation and limited access to services, which are known contributors to health disparities.[3 28] Operating within an area characterised by high levels of diversity and deprivation, the SCZ aims to ensure that marginalised populations receive the necessary care and support, aligning with the CORE20+5 approach advocated by NHS England to address healthcare inequalities.[13]

The cornerstone of the SCZ's strategy is its emphasis on early years support, which is designed to identify and address issues at an early stage and so prevent them from escalating into more complex problems that necessitate intensive and costly social care interventions. This proactive stance stands in contrast to the reactive nature

Table 5 Base case results

Strategy	Mean costs	Mean effect (proportion attending ED)	Mean incremental costs	Mean incremental effect	ICER
SCZ	£66.28	0.017	-£44.08	0.012	SCZ dominates
Standard primary care	£110.36	0.029			

ED, emergency department; ICER, Incremental Cost-Effectiveness Ratio; SCZ, Sparkbrook Children's Zone.
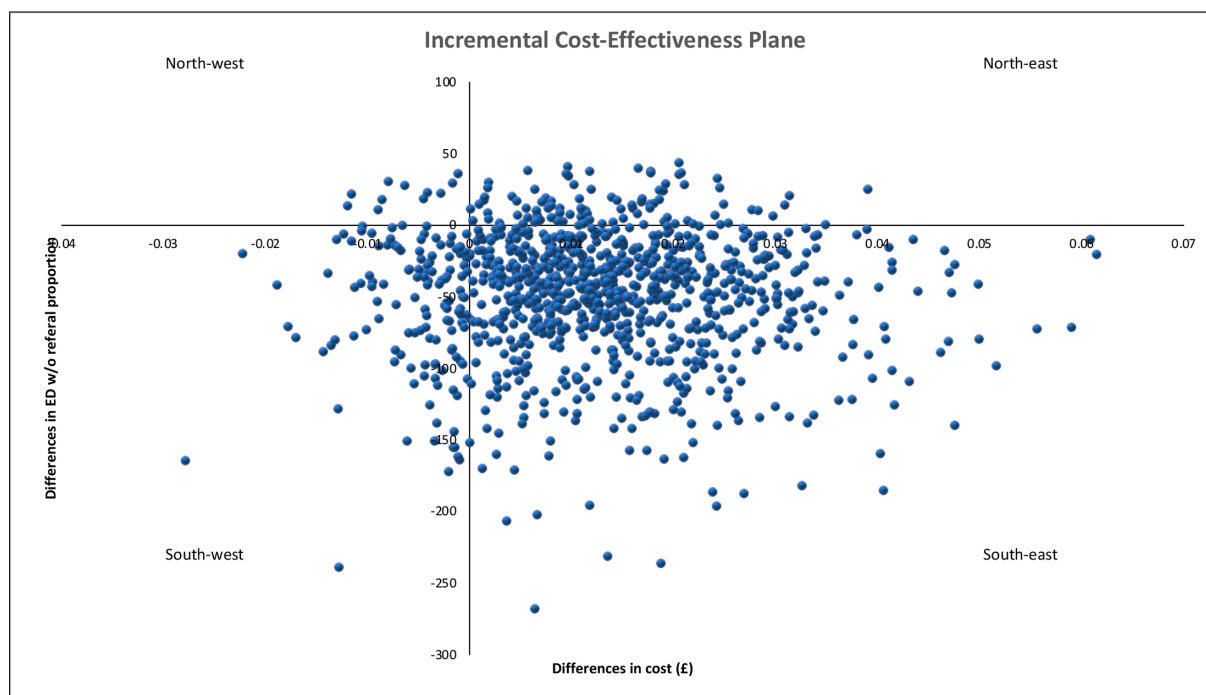
Figure 3 The Cost-Effectiveness Plane. The plot shows differences in costs against differences in benefits (proportion of emergency department visits) between the Sparkbrook Children's Zone (SCZ) and usual primary care. Most points fall in the South-East quadrant, indicating a 76.3% probability that SCZ is cost-effective, with lower costs and fewer visits compared with usual care.

of traditional social care services, which typically intervene only after issues have deteriorated.[27] Our modelling found a disparity in costs between Early Help support and the expenditures associated with children requiring more intensive social care intervention. While the Early Help services incur an average cost of approximately £900 per child annually, the financial burden increases considerably for children in need and in care, ranging from £8300 to £192 000 per child annually.[17]

Meanwhile, the health promotion initiatives within the SCZ cover preventive health for CYP, including immunisation advice, opportunistic immunisations, distribution of Healthy Start vitamins, measurement of body mass index and referrals for healthy diet and exercise, oral health promotion and smoking cessation advice. These activities collectively contribute to improved health outcomes and have the potential to generate significant cost savings. For instance, childhood immunisation effectively reduces healthcare costs by preventing diseases like measles, diarrhoea and pneumonia,[29 30] which in turn reduces hospitalisation and medical expenses and prevents productivity losses for caregivers. Similarly, promoting healthy eating and exercise addresses childhood obesity, reducing future healthcare costs associated with treating diabetes, cardiovascular disease and other related diseases and potentially saving the NHS over £37 billion and society over £202 billion by 2030.[31 32] Additionally, promoting dental health could reduce the incidence of dental caries, which can lead to gum disease and tooth loss and the high cost of ignoring preventive

care (teeth extractions are the most common reason a child undergoes a general anaesthetic in the UK).[33]

Strengths of the study
To the best of our knowledge, this is the first model-based economic evaluation conducted to analyse the cost-effectiveness of a clinic integrating health and early years support for CYP. We conducted a range of sensitivity analyses to test the robustness of our findings and to explore the impact of different assumptions and inputs on the cost-effectiveness results. Evaluating integrated care is challenging due to the complexity of the programme itself and the limited availability of data in a pilot programme to capture its true potential impacts and benefits.

Limitations
The study's main limitation was the lack of robust available data, leading us to rely heavily on literature, expert opinion and assumptions, especially for comparator data input. However, all assumptions were established and approved in advance to ensure they would not be swayed by the results of the analysis. The impact of these parameters on the model results was also tested through probabilistic and deterministic sensitivity analyses, which showed a positive indication that the SCZ could be a cost-effective intervention. Moreover, we also did not incorporate the potential long-term benefits of the SCZ, which could include additional cost-saving opportunities.

Consequently, our analysis may underestimate the true cost-saving potential of the SCZ.

Future studies and the next step

The model-based analysis presented here relied on limited primary data and a number of assumptions, and we deliberately attempted to undermine the benefits of the SCZ. Despite this, the preliminary results show potential for the SCZ to be a cost-saving intervention. Alongside the potential cost savings, the study has also helped identify data and knowledge gaps that will need to be filled to ensure the scale-up of integrated care both improves CYP well-being and is cost-effective.

A qualitative analysis is also under review to provide a deeper understanding of the SCZ, focusing on the experiences and perspectives of families and professionals involved in its services. Additionally, we are exploring a more detailed evaluation of the Early Help services, in particular in addressing complex family needs and their contribution to the overall outcomes of the SCZ, which presents challenges due to the need to capture nuanced impacts, the complexity of social support interventions and variability in service delivery.

Future studies require more robust data to confirm these findings and to ensure fair and rigorous comparisons between the SCZ and alternative care settings. They should also focus on identifying key indicators to measure the impact and cost-effectiveness of integrated care and evaluate these over the longer term. Tracking patient outcomes and healthcare costs over extended periods through longitudinal studies will provide more solid evidence of sustained benefits, as demonstrated recently on the health benefits of the UK's Sure Start early years programme.[34] Research should also examine the specific components of integrated care that contribute most significantly to cost savings and improved outcomes. Understanding which aspects of the programme are most effective can inform the design of future services and help optimise resource allocation.

Finally, collaboration with stakeholders, including healthcare providers, policymakers and community organisations, will be essential to secure the necessary support and funding. Developing a robust implementation framework to integrate the service into existing healthcare pathways will be crucial for ensuring its scalability and sustainability over time.

CONCLUSION

The SCZ demonstrates a potentially cost-saving approach to delivering integrated health and social care within a community setting with high levels of deprivation. The inclusion of Early Help services enhances the cost-effectiveness and overall impact of the SCZ compared with standard primary care. Policymakers and healthcare providers should explore adopting and expanding similar integrated care models to improve the efficiency and equity of healthcare delivery. However, further robust data and evaluation are essential to confirm these findings, ensuring the scalability and sustainability of such programmes.

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