North West London Integrated Care System

Child Health Hub (CHH)
ICS Value Analysis
Final

EBD.
EconomicsByDesign

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Table of Contents

Introduction

Economics By Design (EbD) has been appointed by North West London Integrated Care Board (NWLICB) to support the development of a Business Case for the spread and adoption of the Child Health Hub (CHH) across all North West London Primary Care Networks.

This report provides a synopsis of the context for the work, the options which have been developed and analysed, and details of the data analysis and modelling used to quantify budget impact and health system efficiency estimates. The results are to be used to inform an Options Appraisal and business case which is being developed by NWLICB.

Context

The CHH is designed to improve the health of children and young people through collaboration and engagement of patients, parents, citizens and hospital, community, primary and public health professionals.

The GP Hub model enables paediatric consultants and GPs to work together to provide care for children in the local area.
"The Child Health GP Hub model includes three different innovations:

- GPs have open access to children's health specialists at St Mary's hospital, with a phone line and email for advice
- Child health GP Hub (specialist outreach clinics and multidisciplinary meetings with GP hubs every 4-6 weeks)
- Building relationships and working with champions in the community to improve the health of local populations"[1]

Economic analysis of the initial pilots of the GP Hub Model in 2012, demonstrated the potential value of the model from a health system perspective. If effective, the model had the potential to divert paediatric outpatient visits and, by taking more a more effective integrated approach, prevent paediatric outpatient visits, non-elective inpatients, A&E attendances, and diagnostic tests.

The original plan for the CHH was to enable integration between primary, community, secondary and tertiary health care, and to develop multi-sectoral linkages with professionals working in other sectors such as schools and social care. A whole population life course approach was taken to service

[1] https://www.CHH.imperial.nhs.uk

segmentation. A patient centred approach was embedded supported by co-production and collaboration with children, parents, and carers.

When CHH was first established, it was operating within the context of an NHS system designed around an internal market. The internal market was designed around the fundamentals of choice and competition between providers, supported by complementary payment models and financial flows. For CHH, like many integration initiatives, the system efficiency benefits were not shared across the different accountable partners, and the payment models meant that funding would fall for the acute sector even though hospital employed clinicians were still supporting the service (albeit in a primary care setting). These perverse incentives mitigated effective collaboration across care settings within the health system. The design of the system in silos also necessitated special measures to pool budgets to enable multi-sectoral collaboration; these were rarely targeted on children.

Since 2012, however, there has been a significant policy shift. The NHS in England is now embracing a system design more consistent with People Centred Integrated Health Services (IPCHS)[2] promoted internationally by the World Health Organisation. This policy shift was articulated first in the NHS Long Term Plan[3], and subsequently operationalised through the establishment of 42 Integrated Care Systems across the NHS in England[4]. The need for this transformation was turbo charged by the Covid-19 pandemic, which highlighted prevailing system design faults. Contracts and payment models were suspended to remove perverse incentives and barriers to collaboration. Going forward there are real opportunities for embedding the new system design quickly.

The new NHS Health and Care Act[5] 2022 enshrines the new integrated care system arrangements in law. The goal of the new ICSs is to:

1. improve outcomes in population health and healthcare
2. tackle inequalities in outcomes, experience, and access
3. enhance productivity and value for money
4. help the NHS support broader social and economic development.[6]

The CHH has the potential to deliver against all these goals for children and their families.

Since its establishment in 2012, the CHH model has scaled up in North West London and now covers 17 of the 45 Primary Care Networks (PCNs). The hard work of the team, the on-going evidence of success, and the policy shift nationally has gradually resulted in increasing levels of adoption across the system. The establishment of the new ICSs now provides a platform for accelerating spread and adoption of CHH.

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[2] https://www.integratedcare4people.org/ipchs-framework/
[3] https://www.longtermplan.nhs.uk
[4] https://www.england.nhs.uk/integratedcare/what-is-integrated-care/
[5] https://www.legislation.gov.uk/ukpga/2022/31/contents/enacted
[6] https://www.england.nhs.uk/wp-content/uploads/2021/06/B1551--Guidance-to-Clinical-Commissioning-Groups-on-the-preparation-of-Integrated-Care-Board-constitutions.pdf

The CHH service was ahead of its time. It aligns well with the IPCHS design principles, namely: engaging and empowering people and communities, strong governance and accountability, reorientation of the model of care, coordination of services within and across sectors, all supported by an enabling health system.

Option Development

Stakeholder Engagement

Interviews were held with nominated stakeholders from children and young people's services across North West London. Interviews covered representatives from health and social care, clinical and non-clinical professions, and primary and secondary care settings.

Two options development workshops were attended by around 30 stakeholders. The first workshop reviewed the strategic context for the CHH, variations in the current operating models, the prevailing evidence of impact on health system efficiency, and challenges and issues experienced in relation to spread and adoption. The second workshop focused on the development of options for spread and adoption and an initial discussion of the potential advantages and disadvantages of each option.

Factors Influencing CHH Option Design and Development

Information from the interviews and workshops informed the development of the options for the CHH; these are summarised in Table 1. Important design features included: the potential development of **Integrated Neighbourhood Teams**[7] , the focus on **Core20Plus5** for children and young people[8], the development of **Population Health Management** (PHM) and the associated data sources (WSIC)[9], and the development of **Family Hubs**[10]. There is a real opportunity to use Integrated Neighbourhood Teams and PHM to formalise and develop the CHH model to further focus on those children and families most at risk of poor health outcomes, and to engage with local authority colleagues and patient and public engagement initiatives more generally through the Family Hubs.

[7] Next Steps for Integrating Primary Care – Fuller Stocktake Report, May 2022
[8] https://www.england.nhs.uk/about/equality/equality-hub/national-healthcare-inequalities-improvement-programme/core20plus5/core20plus5-cyp/
[9] https://www.nwlondonics.nhs.uk/professionals/whole-systems-integrated-care-wsic
[10] https://www.gov.uk/government/publications/family-hubs-and-start-for-life-programme-local-authority-guide

Table 1: Factors Influencing Option Development

Factors	Implications for CHH development
The Fuller Stocktake Report (May 2022) and, in particular, the recommendation for the formal development of integrated, multi-disciplinary, Neighbourhood Teams.	The MDTs are currently based on voluntary attendance on an informal basis. The development of Neighbourhood Teams for children and young people's services would enable named team members to be affiliated to each CHH – although attendance to a specific MDT would be "as needed".
The priority to be given to reducing Health Inequalities and in particular the scope to use the CHH as a focus for Core20Plus5 for children and young people.	There is no formal process for case selection in the CHH currently and practice varies across different PCNs. Some PCNs have already been trained in PHM approaches as part of the national capacity building programme. There is a real opportunity to systematically focus energies on those children and families who are most at risk of poor health outcomes.
The development of Population Health Management approach and its potential use by the CHH to focus efforts on those most at risk of poor outcomes.	
The availability of child health linked data and Population Health Management information and associated dashboards, now available through the Whole Systems Integrated Care (WSIC) Platform and the forthcoming development of linked child health and local authority data.	
The development of Family Hubs programme and the anticipated roll out to each Borough in North West London. "Family hubs are a "place-based way and bring services together to improve access, improve the connections between families, professionals, services, and providers, and put relationships at the heart of family support."	There is already a relationship developing between a CHH and the Family Hub in Westminster. There is potential to formalise this such that each CHH should have a link person at the MDT comprising either the family hub co-ordinator and/or the relevant social prescriber. This would also facilitate the health lens of the CHH to complement the wider societal issues affecting families and children and enable the relevant connections and integrated working.

Evidence of Effectiveness

The information from the interviews and workshops identified prevailing evidence of effectiveness of the CHH, including feedback from patients, families and staff on the difference made to the experience of care and health outcomes[11]. Models vary but the case study evidence is relatively consistent, showing reported improvements in care outcomes, and patient, families, and staff experience of care.

The health system efficiency evidence is summarised in Table 2. This has focused on the role played by the CHH in the prevention of outpatient attendances (in addition to those cases diverted to the CHH from acute), prevention of A&E attendances and admissions to hospital, and a reduction in GP appointments. There were also anecdotal reports of reductions in inappropriate referrals to Child and Adolescent Mental Health Services (CAMHS).

Table 2: Summary of Health System Efficiency Evidence

Evidence Source	Key Finding
Montgomery-Taylor S, Watson M, Klaber R Child Health General Practice Hubs: a service evaluation Archives of Disease in Childhood 2016;101:333-337.	Multi-practice CHH delivered: 81% reduction in outpatient appointments (42% shifted to out of hospital, 39% avoided) 22% Reduction in A&E attendances, 17% Reduction in Paediatric admissions
Connecting Care Children's Hubs Project and Lessons Learnt Report, Alison Day, Sanjay Patel (Hampshire and Isle of Wight Childrens STP) – undated but refers to 2019 project.[12]	Model CHH generated: 13% reduction in GP appointments 20% reduction in first outpatient appointments 7% reduction in all outpatient appointments 6.96% reduction in non-elective admissions 3.22% reduction in A&E attendance Analysis looking at specific patients who have been seen in a clinic (tracked via NHS number) shows significant reduction of 999- Hear treat/See treat/convey; emergency department attendance and emergency admission
Early findings from Sphere PCN (unpublished)	Data shows at a minimum diversion of cases (up to 15 cases seen or reviewed at the MDT each month at the hub).
Analysis from Hillingdon Paediatric Integrated Community Clinics (unpublished)	In addition to cases diverted from OPD to PICCs, reduction between 2017-2018 & 2018-2019 of: 261 in new GP referrals 316 in new and follow-up GP referrals

[11] See for example https://www.cc4c.imperial.nhs.uk/~/media/cc4c/documents/1-cc4c-network-evaluation-march-21.pdf

[12] https://www.cc4c.imperial.nhs.uk/~/media/cc4c/documents/partner-network/ccch-evaluation-lessons-learnt-report_.pdf?la=en

Gathering evidence of impact of service developments is extremely difficult and complex; simple comparisons between practices with and without access to a CHH are confounded by many other contemporaneous factors. Services have been impacted and interrupted in the last 2 years by the impact of the COVID-19 pandemic; this has resulted in the serious and severe increase in primary care waiting times and hospital waiting lists. The issues are further exacerbated by increased demand triggered from growing food and fuel poverty resulting from economic pressures currently facing the UK. It will therefore be important to build evaluation into the further development of the CHHs to continue to demonstrate impact and value to patients, families, and the system. This is discussed further later in this report.

Challenges and Issues

There are several other challenges and issues that impact the development of the CHH which have been considered in the development of the options.

PCNs vary in size, geographic coverage, and cultural maturity; spread and adoption will need to be planned carefully, starting with those that have already expressed an interest.

There is a shortage of consultant staff and general practitioners in some parts of North West London, and it is very difficult to release staff from dealing with the immediate pressures on the system, to provide time to develop a new way of integrated working.

Moreover, productivity and health system efficiency doesn't translate directly into budget impact, even though it should result in an easing of capacity constraints in a system under growing pressure. Using expected efficiency savings to "fund" the further development of the CHH is unlikely to lead to successful deployment. For these reasons additional transitional funding may be required to develop the new CHH model at pace.

Finally, until now, there has not been a commissioning structure for CHH, with associated payment models. The current recovery targets (pre 2019 activity levels) and activity-based payment flows continue to mitigate the repurposing of resources required to enable the CHH to operate effectively. If the business case for the development of the CHH is approved, new models of commissioning and payment will need to be considered to enable existing resources to be repurposed to work in a new way.

Options for CHH

In the light of these design and development considerations, five options have been developed to inform the Options Appraisal. These are summarised in Table 3.

Table 3: Summary of Options for the Business Case

Option Number	Option Name	Option Description
Option 0	Status Quo	Continue with current CHHs as a "steady state"
Option 1	CHH decline	CHHs are withdrawn over the next year.
Option 2	CHH grow organically	Continue with current model of "organic growth".
Option 3	CHH +PHM Roll out slow	Commission to roll out the offer of CCH from 17 to 45 PCNs **over three years**, to include funding for coordinator role and additional support for PHM support and with 6 months transitional backfill for consultants and GPs setting up new CHH. This model would embed Integrated Neighbourhood Teams, PHM, Core20Plus5 and Family Hubs
Option 4	CHH +PHM Roll out fast	Commission to roll out the offer of CCH from 17 to 45 PCNs **over 18 months**, to include funding for coordinator role and additional support for PHM support and with 6 months transitional backfill for consultants and GPs setting up new CHH. This model would embed Integrated Neighbourhood Teams, PHM, Core20Plus5 and Family Hubs

Option 0 is the "status quo" option. There are currently 17 CHHs operating across North West London, and it is assumed under this option, these would continue in their current form. Stakeholders considered this unlikely, but it has been included as a baseline against which to compare the options for change.

Under **Option 1**, it is envisaged that lack of investment in the CHH programme could result in the existing CHHs being withdrawn and the teams reverting to traditional practice. The current model is very reliant on the commitment and enthusiasm of the staff leading them; some CHH are being sustained through clinical professionals working during their designated time off. Without positive commissioner affirmation, there would be a significant loss of enthusiasm and momentum. Under this option all 17 CHHs would wind up during the next 12 months.

Option 2 sees the continued organic growth of the CHHs. There are 9 PCNs who have expressed an interest and it is assumed that these would come on stream quarterly during the next 9 quarters. The stakeholders who participated in the workshop felt that this was unlikely to materialise and that there would be a high risk of implementation failure from this option. It was also thought that this would **increase inequalities** as it would disadvantage those families and children registered with practices who are not affiliated to a CHH.

Option 3 would involve the development of an enhanced CHH which would include assigned MDT members (Neighbourhood Teams), a funded co-ordinator (the current coordinator role does not

receive additional funding), and funded PHM technical support. The CHH would include attendees from the Family Hub. New CHHs would receive backfill for consultant and GP time to cover a 6-month transition period. The CHHs would be in every PCN within the next 3 years.

Option 4 is the same as Option 3, but envisages the rollout being accelerated and all 45 CHHs being established within the next 12 months.

Model Overview

Introduction

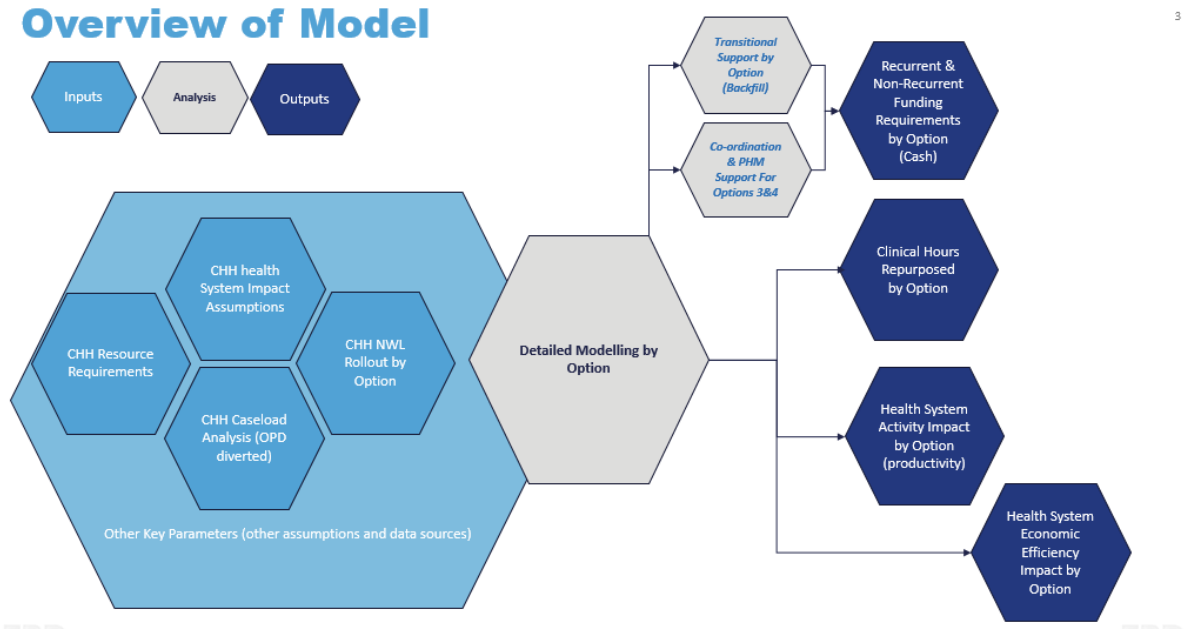
A model has been developed to measure, at a high level, the impact of implementing each of these options on certain key health system efficiency metrics, and to quantify the resource requirements to fund the development of Options 3 and 4.

The model has been developed in Microsoft Excel and is available separately.

Model Overview

A diagram of the model is shown in Figure 4 below.

Figure 4: CHH Health System Efficiency and Funding Model



There is a section for all **data inputs and assumptions**. These relate to:

- the resource requirements per hub
- the direct impact on outpatients (the redeployment of cases from acute to the CHH clinic and MDT) and the indirect impact of capacity released (some cases still need to go to the acute even having been seen at the CHH) and productivity differentials between the CHH and the standard outpatient department
- the wider health system impact including outpatients referrals prevented (in addition to the cases seen at the CHH), A&E attendances prevented, admissions prevented, GP appointments prevented, and potentially CAMHS referrals prevented
- the number of CHH over time under each option.

It is important to note that, for the purpose of the modelling:

- each CHH is assumed to serve a population (all) of 45,000
- each CHH has the same staffing profile and impact on health system efficiency
- CHH in Option 3 and 4 are more effective in terms of health system efficiency impact than other CHHs as they have assigned Neighbourhood Teams and PHM support
- there is no retrospective funding for support, transitional or otherwise
- all costs are 2022 price base
- a 10-year perspective has been used for all options
- where costs and benefits are measured in monetary values (for the economic analysis), the principles adopted in national guidance are adhered to[13].

There is an **analytical section of the model** where cost and impact calculations are made by Quarter (years 1-3) and by Year (years 4-10).

Model outputs include:

- Funding Requirement by Option at a 2022 price base
- Repurposed CHH clinical hours by Option
- Net productivity benefits direct outpatient capacity released, and activity avoided (OPD, A&E, Admissions, GP Referrals, CAMHS referrals).
    - compared with Do Nothing
    - compared with the status quo
- Net productivity benefits measured in
    - clinical hours compared with the Status Quo.
    - WTEs compared with the Status Quo.

[13] https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent/the-green-book-2020

- Economic analysis showing the change in monetary value of the net additional costs to the system (transitional support and coordinator time) and the net additional productivity benefits compared with the Status Quo.

The model is "deterministic" rather than "probabilistic". It is set up to enable a variety of sensitivity tests to be undertaken to measure the implications of changes to key data points and assumptions.

Model Assumptions

CHH Resources

CHH resources are assumed to comprise:

- A consultant paediatrician who would be available for 6 hours a month for clinic attendance (including travel and administration, a further 1 hour per month for the MDT meeting and on average 4 hours each month for direct access for questions and advice relating to the management of patients and families.

- A general practitioner who would be available for 4 hours per month to attend the clinic and a further 1 hour per month to attend the MDT (on-line).

- Additional MDT members comprising health visitors, community nurses, dieticians, mental health practitioners, school nurses, etc. On average 5 additional MDT members would attend the monthly one-hour MDT meeting. In addition, a further 2 local authority representatives would attend, under Option 3 and 4, these would be nominated by the Family Hub as these develop.

- Finally, the existing CHH have coordinator support. This would continue at around 8 hours per month. Under Option 3 and 4, there would, in addition be 4 hours per month support from a PHM coordinator to enable focus on Core20Plus5.

The CHHs are assumed to operate 11 months of each year. A summary of the hours required for each CHH is shown in Table 5 below:

Table 5: Summary of CHH Resource Requirements

Resource	Number	Service	Hours Per Month	Hours Per Year
consultant	1	Clinic (including travel and admin)	6	66
consultant	1	MDT	1	11
consultant	1	Direct access	4	44
GP	1	Clinic	4	44
GP	1	MDT	1	11
MDT representative (band 6 or equivalent)	5	MDT	5	55
Family Hub / social prescriber	2	MDT	2	22
PHM Support (Option 3&4)	1	CHH	4	44
Coordinator	1	CHH	8	88

CHH Rollout

Each option involves a different profile of CHHs over time. The assumptions are provided in Table 6 below.

Table 6: CHH Roll-Out Assumptions

Option	Roll Out Assumption
Option 0: Status Quo	No new CHH beyond the existing 17
Option 1: CHH Decline	4 CHH wind up per quarter Q1-Q3 2023-24, and 5 in Q4 2023-24
Option 2: CHH Grow Organically	1 new CHH per Quarter until all 9 additional CHHs are in place.
Option 3: CHH +PHM Roll out slow	4 new CHHs every 6 months during 2023-24, 5 every 6 months during 2024-25 and 2025-26.
Option 4: CHH +PHM Roll out fast	5 new CHHs every 6 months during 2023-24, 8 during the first 6 months of 2024-25 and a further 10 from Q3 2024-25.

Diversion of Outpatient Activity

For modelling, it is assumed that each CHH sees on average 6 cases per month in clinic, and 10 cases per month in the MDT. For an 11-month year, this equates to 66 cases per annum in clinic and 110 cases per annum for the MDT, a total of 176 cases.

Advice from the Connecting Care for Children (CC4C) [14] team suggests that these are the equivalent of new outpatient appointments. All cases would otherwise have been referred directly to the Outpatient Waiting List.

The CC4C paediatrician sees an average of 16 patients per clinic & MDT using 11 consultant hours (including admin). This equates to 1.45 cases per consultant hour. In a standard OPD clinic in hospital, new outpatients would require around 45 minutes per case (including admin); this equates to 1.33 cases per consultant hour. This implies a 9% productivity / efficiency improvement. In other words, for every 100 cases seen in the OPD, 109 can be seen in the CHH. Given 176 cases seen in the CHH, there is therefore an estimated **productivity benefit of 16 extra cases**.

There are also cases seen in the CHH which are still referred on to general paediatric outpatients. Caseflow analysis from CC4C suggests that 10.54% of CHH cases seen in the CHH are referred on to other specialists. If it is assumed that 50% of these refers to paediatric OPD, that implies that 5.27% of CHH cases are duplicated or additional. Given 176 cases seen in the CHH, this implies **an estimated 9.28 cases are duplicated**.

Taken together, the CHH is estimated to release **net additional capacity of 6.72 OPD cases per annum per CHH**.

Wider Impact on Health System Efficiency

Table 7 provides a summary of the estimates of wider impact used in the model.

Table 7: Estimated Impact on Wider Health System Utilisation as a Result of the CHH

Activity	Impact	NLW Activity Totals	Average Activity Per PCN	Average Impact Per CHH
Avoided Outpatients (follow-up)[15]	7.0%	200,000.00	4,444.44	311.11 (gross) = 135.11 (net)
A&E Attendances Avoided	3.1%	249,000.00	5,533.33	172.09
Admissions Avoided	7.0%	62,000.00	1,377.78	96.44
GP Appointments Avoided	13.0%[16]	1,335,717.43	29,682.61	385.87
CAMHS Referrals Avoided				10.00

[14] Connecting Care For Children was the original name for the Child Health Hub.
[15] This excludes new outpatients that have been diverted from traditional outpatients to the CHH.
[16] In the economic model, only 10% of this value was included pending substantiation from additional evaluations.

With 2 exceptions, the impact estimates are based on the evidence from Hampshire and Isle of Wight Evaluation referred in Table 2 above. These are more modest than the estimates from the CC4C evaluation published in 2016.

For GP Appointments Avoided, the impact estimate of 13% has been **deflated to 10% of its value**. This is an arbitrary adjustment but reflects the absence of corroborating evidence from other sources and reflects a more realistic ratio relative to the impact on other activity.

For the CAMHS referrals, there is no evidence of impact other than anecdotal reports of a reduction in inappropriate referrals. For this business case therefore, a simple illustrative assumption has been included of 10 cases avoided per annum per CHH.

Given that the CHH cases are new appointments, it has been assumed that the avoided outpatients are likely to be disproportionately repeat or follow-on attendances. This is a conservative assumption since follow-up attendances have shorter appointments and consume relatively less resources than new appointments. The modelling has been based on **net impact** after allowing for outpatient appointments that have moved to the CHH.

These impact estimates are also reported for CHH models which have been developed as exemplars with clinical champions. These impacts are unlikely to be achieved from a model developed at scale across North West London. For these reasons, it is further assumed that:

- **For the current CHH model, only 50% of the impact is achieved**.
- **For the CHH model supported by a PHM approach, only 80% of the impact is achieved.**

Sensitivity tests have also been undertaken to show the impact of changing these assumptions.

These impact estimates have also been converted from activity levels into clinical hours. This is illustrative and designed to show the potential impact on clinician capacity for each option.

Table 8 below provides a summary of the number of cases per clinical hour used for each type of activity. These figures do not include the full clinical team or other resources involved.

Table 8: Clinician Productivity Estimates

Activity	Throughput	Description
OPD new	1.33	cases per consultant hour (acute OPD)
OPD follow-up	2	cases per consultant hour (acute OPD)
GP	4	appointments per GP hour
A&E	1.33	cases per consultant hour (acute OPD)
admission	0.67	admissions per consultant hour
CAMHS appointments	1.33	cases per band 6 hour

Economic Analysis

Economic analysis has been undertaken to compare the monetary value of the net additional resources used in the CHH with the monetary value of the net additional benefits of the CHH.

Monetary values for the unit costs of staff have been taken from the PSSRU Unit Costs of Health and Social Care 2021. They are based on salaries plus on-costs with a 15% allowance for London Weighting.[17] The data are summarised in Table 9 below.

Table 9. Staffing Hours and Cost Assumptions Used in the Model

Professional Group	Hours	Salary + On costs including London Weighting	Salary + On Costs	Source
Consultant	1841	£151,198.55	£131,477.00	PSSRU unit costs of health and social care 2021
GP	1841	£151,198.55	£131,477.00	PSSRU unit costs of health and social care 2021
Band 6	1573	£52,908.05	£46,007.00	PSSRU unit costs of health and social care 2021
Band 6 SW	1513	£52,908.05	£46,007.00	PSSRU unit costs of health and social care 2021
London Weighting		115%	assumption	
Locum uplift		120%	assumption	

The economic analysis has been developed on the assumption that:

1. Except for the CHH coordinator, the clinical input for the clinics, MDT and direct access is time that would otherwise be used delivering care in the traditional way. **The net new resource for the CHH is the coordinator.** For options 3 and 4, there is, **in addition, an investment in PHM support.**
2. Options 3 and 4 also require **transitional support** to fast track the development of the CHH. This is essentially "backfill" for consultant and GP time to set up the CHH valued using hourly unit costs inflated by 20% on the assumption that locums would be used.

[17] https://www.pssru.ac.uk/project-pages/unit-costs/unit-costs-of-health-and-social-care-2021/

Estimates of the monetary value of the net additional outpatient capacity, and the wider impact on health system efficiency metrics are drawn from a combination of PSSRU data and Nov 2022 tariffs.

These data are summarised in Table 10 below. It is important to note that these are full opportunity costs of the activity avoided. **They do not represent cash-releasing savings**; rather they are the cost of the resources used by the NHS to deliver the relevant activity – in other words, the price paid by the NHS for the goods and services used to deliver each unit of activity. The advantage of including these monetary values is that it enables a direct comparison of the economic value of the investment and the economic value of the efficiency generated using a common unit of currency. **This should not be used to estimate budget impact or affordability.**

Table 10: Monetary Values for Health System Efficiency Analysis

Activity	Monetary Value	Description	Source
OPD new	£236.00	average cost per appointment	Nov 2022 NHS tariffs 420
OPD FU	£165.00	average cost per appointment	Nov 2022 NHS tariffs 420
GP	£28.00	unit cost per appointment	PSSRU 2021 - excluding direct care
A&E	£86.00	average cost per attendance	Nov 2022 NHS tariffs VB11Z
admission	£827	average cost per admission	PSSRU 2021 - non-elective short stay
CAMHS appointments	£165	average cost per hour	assumed same as FU OPD

Model Results

Funding Requirements

Options 3 and 4 would require investment funding to support the development of the CHH at pace and scale (backfill) and to provide sufficient sustainable resource to deliver the preferred service model (coordinator time and PHM support). Table 11 below provides a summary of the funding requirements for each option by year.

Table 11: NET Funding Requirement Cash 2022 price base

Year	2023-24	2024-25	2025-26	On-going per annum
CHH +PHM Roll out slow	£171,498.38	£231,022.37	£275,420.73	£199,792.64
CHH +PHM Roll out fast	£195,503.68	£333,703.29	£199,792.64	£199,792.64

As can be seen, Option 3 requires slightly less funding than Option 4 due to a longer time for deployment and a delay in appointing coordinators and PHM support.

Repurposed Clinical Hours

The CHH requires a repurposing of clinical hours for consultants, general practitioners, and MDT participants. The number of hours involved per year for each option is shown in Table 12 below.

Table 12: Repurposed Clinical Hours from Traditional Practice To CHH

Year	2022-23	2023-24	2024-25	2025-26	On-going Per Annum
Consultant					
0-Status Quo	2057.00	2057.00	2057.00	2057.00	2057.00
1-CHH decline	2057.00	816.75	0.00	0.00	0.00
2-CHH grow organically	2057.00	2359.50	2843.50	3146.00	3146.00
3-CHH +PHM Roll out slow	2057.00	3932.50	3932.50	5142.50	5445.00
4-CHH +PHM Roll out fast	2057.00	2964.50	4840.00	5445.00	5445.00
General Practitioner					
0-Status Quo	935.00	935.00	935.00	935.00	935.00
1-CHH decline	935.00	371.25	0.00	0.00	0.00
2-CHH grow organically	935.00	1072.50	1292.50	1430.00	1430.00
3-CHH +PHM Roll out slow	935.00	1265.00	1787.50	2337.50	2475.00
4-CHH +PHM Roll out fast	935.00	1347.50	2200.00	2475.00	2475.00
MDT Participants					
0-Status Quo	1309.00	1309.00	1309.00	1309.00	1309.00
1-CHH decline	1309.00	519.75	0.00	0.00	0.00
2-CHH grow organically	1309.00	1501.50	1809.50	2002.00	2002.00
3-CHH +PHM Roll out slow	1309.00	1771.00	2502.50	3272.50	3465.00
4-CHH +PHM Roll out fast	1309.00	1886.50	3080.00	3465.00	3465.00

Health System Efficiency

Table 13: Health System Activity Avoided as A Result of the CHH, Compared With Status Quo

Year	2023-24	2024-25	2025-26	P. A
Additional Outpatient Capacity Released (Net of CHH caseload)				
1-CHH decline	-69	-114	-114	-114
2-CHH grow organically	17	44	60	60
3-CHH +PHM Roll out slow	40	104	171	188
4-CHH +PHM Roll out fast	50	155	188	188
Net Reduction in Outpatients Avoided				
1-CHH decline	-692	-1148	-1148	-1148
2-CHH grow organically	169	439	608	608
3-CHH +PHM Roll out slow	1338	2364	3445	3716
4-CHH +PHM Roll out fast	1500	3175	3716	3716
A&E Attendances				
1-CHH decline	-882	-1463	-1463	-1463
2-CHH grow organically	215	559	774	774
3-CHH +PHM Roll out slow	1704	3012	4388	4732
4-CHH +PHM Roll out fast	1910	4044	4732	4732
Admissions Avoided				
1-CHH decline	-494	-820	-820	-820
2-CHH grow organically	121	313	434	434
3-CHH +PHM Roll out slow	955	1688	2459	2652
4-CHH +PHM Roll out fast	1071	2266	2652	2652
GP appointments Avoided				
1-CHH decline	-1978	-3280	-3280	-3280
2-CHH grow organically	482	1254	1736	1736
3-CHH +PHM Roll out slow	3820	6753	9840	10612
4-CHH +PHM Roll out fast	4283	9068	10612	10612
CAMHS Referrals Avoided				
1-CHH decline	-51	-85	-85	-85
2-CHH grow organically	13	33	45	45
3-CHH +PHM Roll out slow	99	175	255	275
4-CHH +PHM Roll out fast	111	235	275	275

Table 13 above shows the estimated health system activity avoided because of the CHH by Option, compared with the Status Quo.

As can be seen, under Option 1, CHH decline, the withdrawal of the current 17 CHHs could potentially substantially increase pressure on outpatients. In addition to the cases being redeployed back from the CHH, additional capacity would be needed to support a net additional 114 new cases on-going and a potential 1148 follow-up cases. Pressure on A&E would increase by 1463 cases per annum, there could be an additional 820 inpatient admissions per annum, and pressure on GP practices would continue to increase with an estimated 3,280 additional appointments needed. The figures for CAMHs also illustrate increased pressure on these services.

Option 2 sees a continuation of the benefits of the current model enhanced from the addition of a further 9 CHHs. However, compared to Options 3 and 4, over a 10-year period, the net benefits would be relatively small and would leave inequitable access across the North West London system.

Options 3 and 4 see the most significant efficiencies given the full adoption of the CHH across 45 PCNs. Option 4 provides slightly more benefit over the 10-year period, as earlier roll-out provides accelerated access to the benefits from the CHH.

Table 14 shows the estimated health system activity avoided presented as estimated WTE for the CHH by Option, compared with the Status Quo.

As can be seen, under Option 1, CHH decline, the withdrawal of the current 17 CHHs could potentially substantially increase pressure on staffing. The system would need to find an additional 2 paediatricians and additional GP time.

The efficiencies generated by Options 3 and 4 are equivalent to appointing 5.2 new paediatricians compared with traditional practice, and an additional 1.44 general practitioners.

Table 14: Health System Activity Avoided as A Result of the CHH, Compared with Status Quo, Expressed as WTE

Year	2023-24	2024-25	2025-26	Per Annum
Additional Outpatient Capacity Released (Net of CHH caseload) Consultant WTEs				
1-CHH decline	-0.03	-0.05	-0.05	-0.05
2-CHH grow organically	0.01	0.02	0.02	0.02
3-CHH +PHM Roll out slow	0.02	0.04	0.07	0.08
4-CHH +PHM Roll out fast	0.02	0.06	0.08	0.08
Net Reduction in Outpatients Avoided Consultant WTEs				
1-CHH decline	-0.19	-0.31	-0.31	-0.31
2-CHH grow organically	0.05	0.12	0.17	0.17
3-CHH +PHM Roll out slow	0.36	0.64	0.94	1.01
4-CHH +PHM Roll out fast	0.41	0.86	1.01	1.01
A&E Attendances Consultant WTEs				
1-CHH decline	-0.36	-0.60	-0.60	-0.60
2-CHH grow organically	0.09	0.23	0.32	0.32
3-CHH +PHM Roll out slow	0.70	1.23	1.79	1.93
4-CHH +PHM Roll out fast	0.78	1.65	1.93	1.93
Admissions Avoided Consultant WTEs				
1-CHH decline	-0.40	-0.67	-0.67	-0.67
2-CHH grow organically	0.10	0.26	0.35	0.35
3-CHH +PHM Roll out slow	0.78	1.38	2.00	2.16
4-CHH +PHM Roll out fast	0.87	1.85	2.16	2.16
GP appointments Avoided GP WTEs				
1-CHH decline	-0.27	-0.45	-0.45	-0.45
2-CHH grow organically	0.07	0.17	0.24	0.24
3-CHH +PHM Roll out slow	0.52	0.92	1.34	1.44
4-CHH +PHM Roll out fast	0.58	1.23	1.44	1.44
CAMHS Referrals Avoided Band 6 WTEs				
1-CHH decline	-0.02	-0.04	-0.04	-0.04
2-CHH grow organically	0.01	0.02	0.02	0.02
3-CHH +PHM Roll out slow	0.05	0.08	0.12	0.13
4-CHH +PHM Roll out fast	0.05	0.11	0.13	0.13

The net health system efficiencies expressed in monetary values for each option are shown in Table 15 below. These show the monetary value of the health system efficiencies that are generated net of the marginal cost of running the CHHs compared with traditional models.

Table 15: Monetary Value of Net Health System Efficiencies

Year	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-2030	2030-31	2031-32	2032-33	Total
Undiscounted values: 2022 prices											
1-CHH decline	-£631,707	-£1,047,709	-£1,047,709	-£1,047,709	-£1,047,709	-£1,047,709	-£1,047,709	-£1,047,709	-£1,047,709	-£1,047,709	**-£10,061,084**
2-CHH grow organically	£154,075	£400,594	£554,669	£554,669	£554,669	£554,669	£554,669	£554,669	£554,669	£554,669	**£4,992,023**
3-CHH +PHM Roll out slow	£1,158,576	£2,081,179	£3,070,599	£3,404,682	£3,404,682	£3,404,682	£3,404,682	£3,404,682	£3,404,682	£3,404,682	**£30,143,129**
4-CHH +PHM Roll out fast	£1,289,643	£2,753,862	£3,404,682	£3,404,682	£3,404,682	£3,404,682	£3,404,682	£3,404,682	£3,404,682	£3,404,682	**£31,280,962**
Discounted using H.M. Treasury discount rate of 3.5%											
1-CHH decline	-£610,345	-£978,047	-£944,973	-£913,018	-£882,143	-£852,312	-£823,489	-£795,642	-£768,736	-£742,740	**-£8,311,445**
2-CHH grow organically	£148,865	£373,959	£500,280	£483,362	£467,017	£451,224	£435,965	£421,222	£406,978	£393,215	**£4,082,087**
3-CHH +PHM Roll out slow	£1,119,397	£1,942,803	£2,769,505	£2,966,984	£2,866,651	£2,769,711	£2,676,049	£2,585,555	£2,498,121	£2,413,643	**£24,608,419**
4-CHH +PHM Roll out fast	£1,246,032	£2,570,760	£3,070,828	£2,966,984	£2,866,651	£2,769,711	£2,676,049	£2,585,555	£2,498,121	£2,413,643	**£25,664,334**

These estimates show that if the existing CHH are discontinued, there is a potential loss of net health system efficiencies for North West London over 10 years. Expressed in monetary values this equates to £10m, which, once discounted to reflect the economic value of efficiency now versus later, equates to £8.3m in present day values. Continuing with the organic growth of the CHH, if feasible, would add net additional health system efficiencies with a monetary value of £5m, with a present-day value of £4m. Options 3 and 4 offer much greater health system efficiencies with Option 4 showing higher values given the accelerated implementation. Option 3 shows a net efficiency valued in monetary terms of £30.1m (£24.6m present day value), and Option 4 a net efficiency value of £31.3m (25.7m present day value). Option 4 is the preferred option overall in terms of health system efficiency.

Sensitivity tests

The model has been developed based on several parameters and assumptions. Material assumptions include:

- CHH productivity estimates (direct impact on outpatients being seen in CHH compared to acute)
- CHH impact estimates. Although these are based on conservative evidence data and have been adjusted down to reflect the likely impact of adopting the model at scale, there is still more work to do to measure the real-world impact of rolling out the CHH model.

Analysis has been undertaken to explore whether changing these assumptions would alter the preference ranking of the options from the perspective of health system efficiency. These are shown in Table 16. As can be seen, the preference ranking of the options are not changed under various sensitivity scenarios relating to the overall impact of the CHH.

Table 16: Present Day Net Monetary Value of Health System Efficiency Under Various Sensitivity Scenarios

Option	Base Case CHH	No CHH productivity advantage	Wider Health Efficiency Impact reduced to 10%	Wider Health Efficiency Impact Restricted To			
				Outpatients	A&E	Admissions	GP Appointments
1-CHH decline	-£8,311,445	-£7,802,211	-£464,170	-£1,095,496	-£590,182	-£4,970,460	-£320,799
2-CHH grow organically	£4,082,087	£3,831,982	£227,973	£538,043	£289,862	£2,441,194	£157,557
3-CHH +PHM Roll out slow	£24,608,419	£23,861,959	£1,267,693	£3,145,493	£1,642,499	£14,671,081	£841,254
4-CHH +PHM Roll out fast	£25,664,334	£24,877,451	£1,326,921	£3,284,906	£1,717,732	£15,302,655	£882,272

Impact assumptions which differentiate between the options relate to the additional benefit which would be achieved from adopting a PHM approach. The modelling assumes that for:

- the existing CHH, impact is likely to be 50% of that shown in Table 7 above (Options 1 and 2)
- for the CHH +PHM model, impact is likely to be 80% of that shown in Table 7 above (Options 3 and 4)

If instead it is assumed that all models have the same proportionate impact, the option ranking is still unaffected. This is primarily because of the scale of adoption under Option 3 and 4 compared to options 1 and 2, and the speed of adoption of Option 4 compared with Option 3.

Finally, there was considerable discussion in the options development workshops regarding the potential to separate the clinic and the MDT components and assess the relative costs and benefits of each. There is no evidence of the different impact of these two components, it is the combined effect which is thought to produce the wider health efficiency impacts which have been seen in past studies. However, sensitivity modelling has been done to illustrate the impact of removing clinic activity and reducing the health system efficiency in proportion to CHH caseload seen. Again, the preference ranking of the options is unaffected.

The results of these additional sensitivity tests are shown in Table 17 below.

Table 17: Present Day Net Monetary Value of Health System Efficiency Assuming the Same Impact Per CHH For All Options (25%,50%,75%, and 100%) and The Base Case MDT Only

Option	Base Case	Wider Health Efficiency Impact				Base Case
	CHH	25%	50%	75%	100%	MDT Only
1-CHH decline	-£8,311,445	-£3,951,848	-£8,311,445	-£12,671,042	-£17,030,639	-£6,859,970
2-CHH grow organically	£4,082,087	£1,940,912	£4,082,087	£6,223,262	£8,364,436	£3,369,209
3-CHH +PHM Roll out slow	£24,608,419	£5,064,789	£11,455,299	£17,845,809	£24,236,318	£18,251,680
4-CHH +PHM Roll out fast	£25,664,334	£5,359,346	£12,095,928	£18,832,510	£25,569,092	£19,058,849

Evaluation and Benefits Realization

The on-going development of the CHH provides a unique opportunity for on-going proportionate evaluation of the impact of the CHH on patient outcomes, patient satisfaction, staff satisfaction and health system efficiency.

The evaluation should have a “formative” component which would involve monitoring the adoption of the CHH and collecting up-to-date information on clinical input (hours by professional group in clinic, MDT, and direct access), cases seen and referral outcomes. The formative element could include an assessment of challenges and issues, barriers and enablers, and practical lessons for improving the development and adoption of the CHH, the neighbourhood teams and the PHM approach.

Summative service evaluations are difficult to design and deliver. There are many factors which influence outcomes and impact over time and differentiating the unique impact of a service changes requires sophisticated analytical methods which carry a risk of “attribution bias”. Double-blind

random assignment trials are the preferred method for assessing the impact of clinical treatments on outcomes, however, these are not usually possible for service changes.

However, high-quality mixed-method techniques are available, which combine qualitative and quantitative data to understand cause and effect and draw conclusions regarding value; government guidance on using these techniques for public policy evaluation is available from H.M. Treasury[18].

It is recommended that on-going mixed methods evaluation is undertaken to show the impact of introducing new CHHs. This could combine data from patient reported outcomes and experience (PROMs and PREMs), staff surveys of the experience of supporting the CHH, and process evaluations to compare different operating practices of different CHHs.

This evaluation could also examine explicitly the impact of introducing a PHM approach and more formal Integrated Neighbourhood Teams on existing CHHs. Given the WSIC data, it should be possible to look at the impact of improved targeting the work of the CHH on Core20Plus5 for children and young people.

It is also recommended that the evaluation include a quasi-experimental design which compares the pre and post impact on health system efficiency of the new CHH Model. This would involve using an analytical technique known as "difference-in-difference"[19]. The availability of individual linked data through WSIC should enable a comparison of the changes in health system activity trends over time across all practices, and then separately identify the impact on these trends for each practice:

- as they join a CHH for the first time.
- (for existing CHHs) as they adopt the new PHM and Neighbourhood Team approach.

The technique requires that practices who have not yet joined the CHH are matched where they exhibit similar trends in health system activity; in other words that they are experiencing similar contemporaneous confounding factors over time (increasing A&E attendances for example). Comparing changes in trends in activity pre-and post CHH for matched practices, would provide an estimate of the North West London impact of adopting the CHH at scale and would help to inform wider adoption across the NHS in England.

[18] https://www.gov.uk/government/publications/the-magenta-book
[19] https://dimewiki.worldbank.org/Difference-in-Differences