Child and Family eHub - A Novel Digital Solution to Improve the Mental Health of Australian Children: Protocol for a Mixed Methods Evaluation of Feasibility and Acceptability.

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Abstract

Background: Child mental health disorders are a significant Australian public health issue with high prevalence rates compounded by inequitably higher rates for those living in families with lower income, lower levels of parental education and higher levels of unemployment. Prevention and early intervention approaches are critical to address problems early. When caregivers seek information and services to support their child’s mental health needs they commonly use many untested online search strategies. To address this, we developed a digital Child and Family eHub prototype (eHub) through a user-centred design process involving families experiencing adversity and local service providers. The eHub provides online navigation and evidence-based information for families and aims to increase equitable access to and use of: i) information and ii) the existing primary health, mental health, and social services system to improve mental health outcomes for caregivers with children 0-12 years.

Objective: This protocol outlines how we will evaluate the eHub.

Methods: Using a prospective cohort sample of 270 participants from three Australian states, we will undertake a mixed methods Type 3 implementation impact evaluation that tests an implementation strategy while observing and gathering information on the intervention's impact on relevant outcomes. In this protocol implementation will be assessed as a primary outcome using Proctor's outcomes for implementation framework and secondary outcomes will include caregiver access and use of the eHub and associated child and parent mental health outcomes. Baseline, ongoing eHub user analytic data and 6 month quantitative and qualitative data will be collected in parallel and integrated during data analysis and interpretation.

Results: Participant enrolment for the study will begin in February 2024 with participants involved in the eHub evaluation for 6 months.

Conclusions: The results of this study will be instrumental in refining the intervention for future scaling to other Australian sites. Clinical Trial: ISRCTN49839991

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Title

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Abstract

Background: Child mental health disorders are a significant Australian public health issue with high prevalence rates compounded by inequitably higher rates for those living in families with lower income, lower levels of parental education and higher levels of unemployment. Prevention and early intervention approaches are critical to address problems early. When caregivers seek information and services to support their child's mental health needs they commonly use many untested online search strategies. To address this, we developed a digital Child and Family eHub prototype (eHub) through a user-centred design process involving families experiencing adversity and local service providers. The eHub provides online navigation and evidence-based information for families and aims to increase equitable access to and use of: i) information and ii) the existing primary health, mental health, and social services system to improve mental health outcomes for caregivers with children 0-12 years. This protocol outlines how we will evaluate the eHub.

Methods and analysis: Using a prospective cohort sample of 270 participants from three Australian states, we will undertake a mixed methods Type 3 implementation impact evaluation that tests an implementation strategy while observing and gathering information on the intervention's impact on relevant outcomes. In this protocol implementation will be assessed as a primary outcome using Proctor's outcomes for implementation framework and secondary outcomes will include caregiver access and use of the eHub and associated child and parent mental health outcomes. Baseline, ongoing eHub user analytic data and 6 month quantitative and qualitative data will be collected in parallel and integrated during data analysis and interpretation.

Participant enrolment for the study will begin in February 2024 with participants involved in the eHub evaluation for 6 months.

Discussion: The results of this study will be instrumental in refining the intervention for future scaling to other Australian sites.

Trial Registration: ISRCTN49839991

Keywords

Child mental health, digital intervention, health services, navigation

Introduction

Current mental health concerns

Consistent with other international research,[1,2] one in seven Australian children aged 4-11 years reports mental health disorders in a year, with attention deficit hyperactivity disorder (ADHD) and anxiety being the most reported disorders.[3] Additionally, regulatory problems, such as excessive crying, sleeping or feeding problems in infancy, are known predictors of later behavioural and mental health problems, [4] with the Australian prevalence rates for one or more of these regulatory problem in infants of between 7.3-25.2%. [5] The distribution of mental health disorders; however, is inequitable with much higher rates in children and adolescents associated with lower socioeconomic status of families, lower levels of parental education and higher levels of unemployment. Recent Australian national data identifies additional mental health burden on children and their parents as a result of COVID-19,[6] with 50% of parents reporting their children as anxious,[7] and even higher rates among children from families experiencing financial distress.[8] These data reinforce the urgent need to implement effective and equitable prevention and early intervention strategies to mitigate the continuing and unequal rise in child mental health issues.

Early intervention

Investing in innovative prevention and early intervention approaches is time critical for the following reasons: (1) despite increasing Australian government investment in mental health services (e.g., over $2.4b nationally in 2018-2019 to enhance community mental health services)[9] existing services are unable to meet the growing demand for children's mental health, and there has not been a detectable reduction in the prevalence of psychological distress for youth,[10] (2) only 9-27% of young children experiencing emotional and externalising problems access Medicare-rebated services, with the lowest rates amongst families of low socioeconomic status or single parents and those with English as a second language,[11] (3) the cost to government of not intervening early is significant - $15.2b annually[7], and (4) there is currently strong policy commitment for mental health including the National Child Mental Health and Wellbeing Strategy.[12]

To increase efficiency of the support systems, we need to make better use of the existing (and already funded) health and social care system. In a National Child Health poll of 2000 Australian parents prior to COVID (2019) only 44 % reported feeling confident they would know where to go for professional help if their child was experiencing social, emotional, or behavioural difficulties.[13] Indeed caregivers often feel overwhelmed by the amount and complexity of information and need accessible, reliable and relevant support to guide them through the process of accessing services relating to their child's social, emotional, and behavioural problems.[14] Rather than looking for mental health services per se, caregivers seek practical tips, connections to a range of services and reassurance of the best approach to take with their family and child's mental health.[15] Low levels of access and use of community and mental health services are thought to be due to a combination of barriers including financial, cultural, transport and health literacy barriers.[16] The process of navigating a complex community and mental health service system leads to inequities in access, missed (and costly) opportunities for early intervention and subsequent inequities in outcomes for children.

Caregivers' current help seeking behaviour and use of information and services

Caregivers already use a range of digital search strategies and social media to seek information and services to support their child's health needs.[17] Common challenges for caregivers seeking online information or services are: too much, or not enough relevant or trusted information; lack of time to source information or services; a sense of burden felt by caregivers to find an appropriate solution; and, getting 'stuck' and unsure how to progress seeking appropriate support. [17]Caregivers report that they want to find practical actions to resolve their concerns or issues, connect with existing technologies and services and not feel judged. [17]

Digital solutions

Digital solutions offer great potential to provide high reach, low stigma strategies to deliver

information, programs and services [18], which can be tailored to a family's need. While there are many digital apps and platforms available, very few have been developed for children aged 0-12 years and their families, or specifically offer service navigation support for childhood adversities or their associated mental health problems. [19] Adversities include childhood maltreatment (e.g., physical, verbal, or sexual abuse) and household dysfunction (e.g., parental mental illness, family substance abuse) [20] as well as broader social determinants of health - non-medical factors that influence health outcomes, including the conditions in which people are born, grow, work, and live. [21]

To address this need, our team has developed a prototype or minimum viable product for a digital Child and Family eHub utilising a user-centred design process. The process involved local service providers and caregivers experiencing adversity. The eHub aims to optimise caregiver information and local service seeking experience and satisfaction. The user centred design process for the eHub is outlined in previous research. [15] The Child and Family eHub connects caregivers to evidence-based information and a range of health, education, justice and social services to support broader adversities families experience. The eHub: (1) is tailored to the specific needs of caregivers with young children aged 0-12 years; (2) is designed to deliver varying levels of supported navigation based on individual need/capacity; and (3) addresses specific issues related to the social determinants of health, diversity and reach. Improving access to information, services and supports we hypothesise will lead to improved and more equitable mental health outcomes for children.

Objectives

This protocol details the methods to evaluate the primary and secondary outcomes of the eHub for caregivers with children 0-12 years, with a specific focus on populations with low education, diverse languages and socio-economic deprivation. We will undertake a Type 3 implementation impact evaluation as defined by Curran.[22] Type 3 implementation impact evaluation tests an implementation strategy while observing and gathering information on the intervention's impact on relevant outcomes. In this protocol implementation will be assessed as a primary outcome using Proctor's outcomes for implementation framework (see Table 3).[23] Secondary outcomes will include family information and service access and use, as well as child and caregiver mental health.

Methods

Study design:

A multi-site Type 3 mixed methods hybrid implementation/impact evaluation will be conducted.[1] The approach will assist in understanding access and use of the eHub by caregivers via the collection of users' data analytics on the eHub platform, and via a prospective cohort sample, which will provide a 'deep dive' into factors affecting caregiver access and use of the eHub and associated child and caregiver mental health outcomes. Quantitative (survey) and qualitative (semi-structed interview) data will be collected in parallel and integrated during data analysis and interpretation.

Site selection:

eHub sites were chosen based on populations experiencing several adversities – as defined via low socioeconomic status, cultural diversity, child vulnerability, unemployment, low education levels. Sites in Australia include Marrickville and Fairfield in Sydney and Wyndham Vale in Melbourne (see Table 1). To note, Marrickville suburb experiences significant pockets of disadvantage amongst areas of advantage.

These three sites also had an existing physical Child and Family Hub within the local service system, which integrated health and social care for children and their families.

Table 1. Sites involved in evaluation.

State	**Site**	**Population details**				
		Socio-Economic Index for Area (SEIFA)- 1000 is average, lower scores indicate more disadvantage, 1st quintile= most disadvantaged.*	*Australian Early Development Census (AEDC) - % of children vulnerable in 1 domain (National comparison – 22%)*	*Percentage of the population 15+ years unemployed (National comparison – 5.1%)*	*Percentage of the population completed year 12 or equivalent (National comparison – 51.9%)*	*Percentage of population born overseas (National comparison – 27.7%)*
Victoria	Wyndham Vale	972 (2nd quintile)	24.2%	7.3%	48.8%	40.1%
NSW	Marrickville	1050 (4th quintile)	15.5%	4.7%	64.9%	35.1%
NSW	Fairfield	838 (1st quintile)	28.6%	8.7%	48.2%	56%

***** SEIFA is a group of four indexes that provides a relative measure of socio-economic advantage and disadvantage for small geographic areas.

Child and Family eHub minimum viable product (MVP)

The eHub minimum viable product was developed using user centred design with caregivers and local service providers and aims to support and guide caregivers through a local, proportionate approach including increasing tiers of support. These tiers, outlined in Figure 1, include self-navigation for all families (Tier 1) through to guided chatbot technology and finally, human navigator assistance which has shown to be effective[24] for those most in need (Tier 4). Caregivers determine the level of support they need based on their ability to find and access information and services that suit their family needs. Each caregiver enters the eHub at Tier 1 and progress to additional tiers based on their needs e.g. filtering topics or geographic areas to find appropriate information or local services (Tier 2), using a chat bot to assist with defining the mental health topic most suitable to their needs (Tier 3), or speaking to a personal navigator to understand the child or families' specific information or service needs and assist with navigation to services (Tier 4). It is anticipated that 90-95% of eHub users will interface with Tiers 1-3 based on theories of proportionate universalism,[25,26] with only 5-10% of users requiring the more intensive element of the eHub - personal navigator. See Table 2 for a brief overview of each tier of the eHub.

Figure 1. Tiers of support provided through the eHub

Recruitment

Prospective cohort of caregivers

The study will recruit 270 caregivers of children aged 0-12 years from the three identified sites (Table 1). To ensure representation of caregivers experiencing a range of adversities, the eHub will be advertised widely in the community in each site through posters and flyers with QR codes at physical primary care, community health and non-government organisation hub sites, local community groups, schools, parent groups, playgroups, and social media to recruit caregivers with children 0-12 years. Interested caregivers will follow the QR code link to REDCap – a secure online portal, where they can watch an online informational video on the study and consent to be involved. Caregivers will then complete a baseline survey for the evaluation, including whether they meet inclusion criteria (listed below); this will be our Prospective Cohort sample of caregivers. If caregivers respond 'no' and would prefer not to participate in the evaluation, they can continue to use the eHub. eHub data analytics will be collected on all users of the eHub, including those involved in the evaluation and those who are not. Those not involved in the evaluation will not require consent to participate as all eHub data analytics collected will be unidentifiable. Demographic details of participants will be collected through pop-up surveys on the eHub site. Figure 2 outlines the caregiver journey through the evaluation.

Recruitment for the evaluation commenced in February 2024 and will continue for each caregiver involved for 6 months.

Figure 2. Caregiver journey for the evaluation trial

Caregiver inclusion criteria:

- Parents or primary caregivers with at least one child aged 0-12 years. Noting only one

primary caregiver per family unit can enrol in the evaluation study.
- Live in eligible intervention sites (Marrickville, Fairfield in NSW, or Wyndham Vale in Victoria).
- Can speak sufficient English to participate in the study and complete the survey. Noting, that although each of the study sites are culturally diverse, many residents speak English.
- Provide informed consent.

Escalation pathways for child or family concerns

To ensure appropriate clinical governance, escalation pathways were developed with each study site with support from the Steering Committee to i) support caregivers if they are distressed or unsafe when calling the personal navigator related to Tier 4 of the eHub and ii) support eHub personal navigation phoneline staff.

Cross-sectoral service providers

We will purposively recruit service provider participants who meet the inclusion criteria (listed below) within each study site to participate in semi-structured interviews at 6 months from the eHub first going live. Site leads at the three trial sites will provide access to individual service provider contact details who may wish to take part. We will then directly approach these primary care, mental health, health, welfare, and community providers to take part, ensuring they meet inclusion criteria and consent to be involved in the evaluation. Many of these service providers are represented through networks that we have existing relationships within Wyndham, Fairfield and Marrickville, such as Wyndham Child and Family Alliance (Vic) and the Local Council Vulnerable Children's Group (NSW). Potential participants will be sent a personalised email of invitation to participate in qualitative interviews at the 6 month time point with information about the details of the study objectives, and providing the Service provider participant information sheet.

Cross-sectoral service provider inclusion criteria
- Adults aged 18 years or older.
- Work within the study intervention areas - Marrickville, Fairfield or Wyndham Vale in health, or social service located at the Marrickville Community Health Service, Karitane in Fairfield or IPC Community Health Service in Victoria
- Provide verbal informed consent.

Figure 3. Evaluation overview

Baseline data collection

Prospective cohort caregiver baseline survey

For those that consent to be involved in the eHub evaluation, when accessing the eHub for the first time, caregivers' baseline data will be collected via online survey, which includes the research measures outlined in Table 3. This online survey will be built into a secure online portal (REDCap) [27,28] through the eHub. If consented families do not complete the baseline questionnaire, they will be contacted by a study researcher by phone, email, or text to complete.

Data collection throughout the eHub study

Data analytics on eHub users

eHub metadata and digital analytical data on participants' average session length and frequency, page use and tiers of service use when utilising the eHub, as well as satisfaction scores and responses to short on-line surveys and questionnaires will be collected for any

users of the eHub, using Google Analytics and Hot Jar™ (a web-based feedback poll that pops-up on the eHub screen during an episode of use). Additionally brief demographic data, including postcode and country of birth of user will be collected. See Table 3 for more information on data collected.

Continuous learning and improvement of the eHub throughout evaluation

A project team will be established including members of each evaluation site and researchers, to utilise implementation science activities, conducting 2-3 short Plan-Do-Study-Act (PDSA) quality improvement cycles [29] over the 6 months of implementation to detect and respond to caregiver barriers using and accessing the eHub, such as whether caregivers are progressing to higher tiers of support, and caregiver satisfaction with the navigation processes and content. These short learning cycles will allow agile minor improvements of the eHub.

eHub Outcome data collection (6 months)

Prospective cohort caregiver outcome surveys (6 months)

Caregivers involved in the evaluation will be sent an email or SMS invitation to complete an online survey at 6 months post baseline measurement to measure outcomes on access and use of health services, accessibility, and overall experience of utilising the eHub. Secondary outcomes will also be measured via the caregiver outcome survey. All measures and associated data are outlined in Table 3. Surveys will be collected in REDCap, a secure online portal. Study team members will follow up those caregivers who do not complete the caregiver outcome survey via phone, text or email to complete.

Prospective cohort caregiver and cross-sectoral service provider semi- structured interviews

Caregivers (n = 15-20 in total) and intersectoral service providers (n = 15-20 in total) from the evaluation sites will be invited to participate in individual semi-structured interviews at 6 months post eHub implementation. Interviews will be conducted by web-conferencing platform (Zoom). Participants will be invited to provide their perspectives on barriers and enablers of using the eHub, such as were caregivers needs satisfied by using the eHub? Was the eHub able to support their unmet social needs? Did caregivers use or intend to use strategies provided in information sourced on the eHub? And were there changes to caregivers' behaviour (e.g., help-seeking, implementing new strategies)? (see Supplement 1 for interview guide). Participants will be invited to expand on any points they feel are important, and the interviewer may ask follow-up questions to elicit further details. The qualitative researcher will be trained and experienced in qualitative methods; the interviews are expected to last between 20-30 minutes.

Table 3 shows the evaluation objectives and quantitative and qualitative data collected in parallel and integrated during data analysis and interpretation.

Table 3. Evaluation outcomes and associated measures.

Primary outcomes: eHub Implementation outcomes		**Measure**
eHub Access:	**Reach**: What is the proportion of caregivers within each site that access the eHub?	*Data analytics on eHub users*: Proportion of people who have accessed the eHub (numerator) among families that have children under 15 years based on Australian Bureau of Statistics reports for each site (denominator).
	Coverage: Is the eHub reaching the intended audience of priority families (defined by residential socio-economic disadvantage (SEIFA IRSD score in the lowest quintile or quartile?), and	*Data analytics on eHub users*: user visits to each tier mapped against their demographic data including suburb to determine socio-economic disadvantage, based SEIFA scores and nomination of

	parental country of birth (parents born overseas?)	whether user was born overseas. Proportion of people who are vulnerable (demographic characteristics of caregivers that access the eHub, including postcode to link SEIFA, parents place of birth compared with caregiver data from ABS) in the Population cohort who have accessed the eHub (**numerator**), among families (1 and 2 parent) who are vulnerable and have children under 15 years (**denominator**)
eHub Use:	**Engagement**: Are families engaging with the eHub?	*Data analytics on eHub users*: Do caregivers passively use the eHub? Page hits, links opened to information and services within each tier of the eHub, &/or actively use the eHub i.e., searches undertaken through tiers 2 and 3 & clicking through to tier 4 support. eHub user data will include: • Length of time on site / sessions length • Visits/time per critical feature • Interactions with filters • Number of engaged sessions and engagement rate • Engaged sessions per user/IP address • Average engagement time • Views per session/user.
	Acceptability: Do caregivers view the eHub as satisfactory?	*Data analytics on eHub users:* Pop up surveys on satisfaction, Did you find what you were looking for?/ Was this useful? (Thumbs up/down or smiley /sad face) *Survey (6 months):* Satisfaction with content, delivery, level of support provided, credibility.
	Adoption: To what extent can caregivers find & use information, services & supports on the eHub?	*Prospective Cohort survey & interview (6 months):* • Did caregivers find information provided useful for their needs? • Were caregivers able to find an appropriate service or information to support their/their child's need? • Did caregivers use or intend to use strategies provided in information? • Changes to caregivers' behaviour (e.g., help-seeking, implementing new

		strategies)
	Appropriateness: Do caregivers perceive the eHub as useful & relevant? Did the caregiver feel reassured/supported by the information or services provided?	*Prospective Cohort Survey (6 months):* perceived fit; relevance; compatibility; suitability; usefulness; practicability
	Barriers and enablers: accessing & using information, services & supports on eHub?	*Prospective Cohort Caregiver & service provider qualitative interviews (6 months).*
Cost	**Cost** of: • Providing the eHub. • Inter-sectorial service use • Effectiveness of eHub	Costs of implementation and national scaling of the model will be estimated *(using study protocols, budgets and population of children)*. The costs associated with caregiver-reported intersectoral service usage will be estimated. Costs effectiveness estimated based on number of families engaged and those with unmet needs being met. *Prospective Cohort Survey (6 months)*
Demo-graphics	Postcode, single/couple parent, country of birth, language spoken at home, education status, number of adversities.	*Prospective Cohort Survey (baseline)* *The Population cohort* - eHub meta-data will provide (demographic characteristics of caregivers that access the eHub, including postcode to link SEIFA, parents place of birth compared with caregiver data from ABS)
Secondary outcomes: Impact		**Measure**
Inform-ation and service access and use	**Service access and use:** Did the eHub assist caregivers with finding & connecting with relevant services including those relevant to social determinants of health and adversity? If not, why?	*Prospective Cohort Survey (baseline & 6 months):* Using the General[30] and Actual[31] Help seeking questionnaires: • Intention to seek help • Actual help seeking
	Information access and use: Did caregivers find the information needed? If not, why? Did accessing information change the caregiver's behaviour.	*Prospective Cohort Survey (6 months):* Did you find the information you needed? If not, why not?
Care-giver mental health	**Caregiver distress**: Is eHub exposure associated with improvements in caregiver levels of distress?	*Prospective Cohort Survey (baseline & 6 months):* Kessler Psychological Distress Scale (K10)[32]
	Caregiver stress: Is eHub exposure associated with reduced caregiver stress related to 1. Access to services 2. Their child's mental health	*Prospective Cohort Survey (baseline & 6 months):* Study designed Likert scale of stress.
Child	**Child mental health needs met:** Did	*Prospective Cohort Survey (baseline & 6*

mental health	the caregivers' child have unmet mental health care needs? If yes, were they met by the eHub resources?	*months):* Unmet child mental health need [33]
	Child mental health symptoms: Is eHub exposure associated with improvements in parent reported child mental health symptoms	*Prospective Cohort Survey Child 2m-2 years* - Survey (baseline & 6 months) of Well-being of Young Children [34] *Child aged 2-12 years* - Strengths & Difficulties Questionnaire (SDQ)[35]

Statistical Analysis

Sample Size Estimation for impact evaluation

We will recruit a total of 270 caregivers to give the study 90% power to detect a 11% increase in the proportion of caregivers accessing services via the eHub i.e. from 9% to 20% based on previous research [36], with a hypothetical 5% increase without the intervention. This allows for 10% loss to follow up.

Statistical methods for all quantitative outcomes

We will describe the characteristics of the caregivers and children using the mean (standard deviation) and median (interquartile range or IQR) for continuous data (based on data distribution) and proportions for categorical data, at each time of measurement. To evaluate changes in key outcomes over time (baseline, 6-months), we will analyse the prospective cohort survey data using logistic and linear regression models for binary and continuous outcomes, respectively, specified in Table 3. Binary outcomes will be reported as odds ratios (as change in proportions), with 95% confidence intervals; continuous outcomes will be reported as mean differences (as change in means) with again 95% confidence intervals. We will conduct generalised estimating equations (GEE) approach to account for repeated measures (i.e., baseline, 6-month) for each participant. We will undertake stratified analyses by service site to explore whether outcomes vary by site. In consideration of change in participants' characteristics between baseline and 6-month surveys due to loss-to-follow up, we will control for family socio-economic characteristics. Missing data will be handled using appropriate statistical techniques (such as multiple imputation for missing at random). We will describe proportions of measures derived from data analytics from eHub users (specified in Table 3). We will conduct all analyses using STATA 16 or SAS statistical software packages.

Qualitative data analysis: Caregiver, inter-sectoral service provider interviews

Experienced qualitative researchers at each site will employ deductive and inductive analysis of stakeholder interviews using Framework analysis. Framework analysis is suitable for this applied study because the technique is not aligned with any specific epistemological stance and places the research questions at the forefront of the analysis. [37] Interviews will be transcribed and Nvivo used to code data from interviews. The first 10% of interviews at each site will be double coded by researchers and any issues resolved prior to finalising coding for all interview participants.

Health economic analysis

Using study protocols and budgets, the cost of implementing the eHub model will be estimated. This will include fixed or upfront costs of building the eHub as well as variable ongoing costs of maintaining and staffing. The cost of caregiver-reported intersectoral service use will be estimated. Cost effectiveness will be calculated as a cost per additional child/caregiver engaged with the program and a cost per additional child with unmet needs who accesses the eHub model. The estimated cost of a national roll-out of the eHub model will be estimated based on numbers of children serviced by the study versus the whole Australian population of children. An estimation will be made on number of eHub local

modifications needed nationally.

Ethics and dissemination:
The evaluation has ethics approval from the Royal Children's Hospital Human Research Ethics Committee #84970.
A manuscript with the results will be published in a peer-reviewed journal. On completion of the trial, and after publication of the manuscript, results will be presented to relevant state and federal government contacts and presented at relevant domestic and international conferences.

Discussion

Despite significant increases in mental health needs, families with young children (0-12), especially from priority groups, are still not accessing services and supports early and they often present after complexities and co-morbidities have set in and they often experience significant emotional burden of seeking help.[14] Lack of timely access to supports and services is further compounded by the poorly co-ordinated and fragmented Australian child and family health and social care service systems that families find difficult to navigate. While there are some digital applications available for practitioners to support families' navigation for developmental needs in the preschool period and wrap around social care [38,39], none focus on families of children with mental health issues in the broader age range of 0 to 12 years incorporating support for broader social determinants of health and mental health, such as housing, finances, food insecurity, employment and legal issues. Whether these digital applications can be feasibly implemented and adopted, especially within diverse and disadvantaged populations in Australia, remains largely unknown.

In this protocol, we outline the methodology to assess the uptake, usability, acceptability, appropriateness and cost of the Child and Family eHub; noting a complementary quality improvement approach to improve as implemented. [1] This study builds on the minimum viable product that has already been developed and it will validate the design by testing the eHub, optimising it existing functions and informing future features. Given the current gap in the existing "market" for this type of digital service, it will be essential to consider how best to learn from the evaluation to enhance its replicability to other sites. Furthermore, this study will provide insights into potential mechanisms underlying the intervention's impact, shed light on the effectiveness, or ineffectiveness, of its various components, and offer possible explanations that will, again, be essential for replication. This study will most importantly determine whether the eHub is effective in meeting the needs of priority populations and, therefore, improves the current inequitable access and uptake of support and services for families who are experiencing a range of adversities.

In summary, the results of this study will provide much-needed data and insight into the wider sustainable implementation of the Child and Family eHub to facilitate equitable access to relevant evidence-based information and services to support child and family mental health. In addition, this project has the potential to increase our understanding of how digital solutions can improve navigation to information and services for a variety of health and social issues in a cost-efficient manner at a national level.

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Conflicts of Interest
The authors declare there are no competing interests.

Abbreviations
eHub – Child and Family eHub

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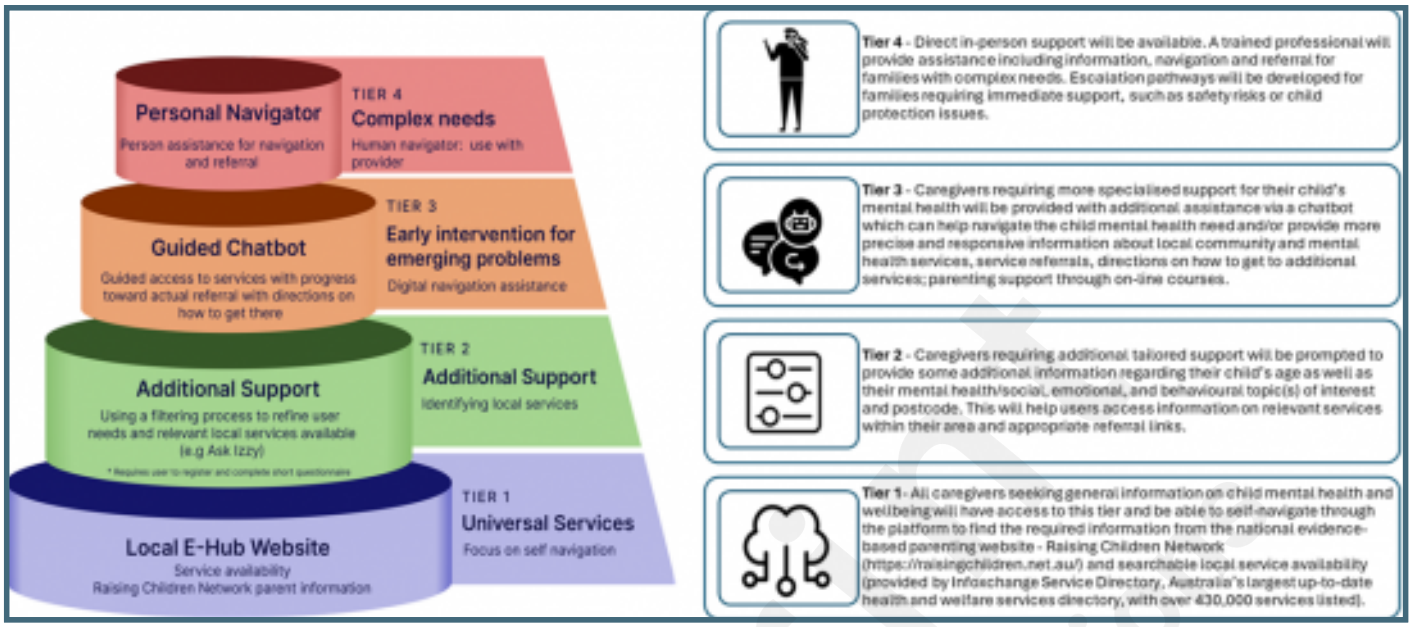
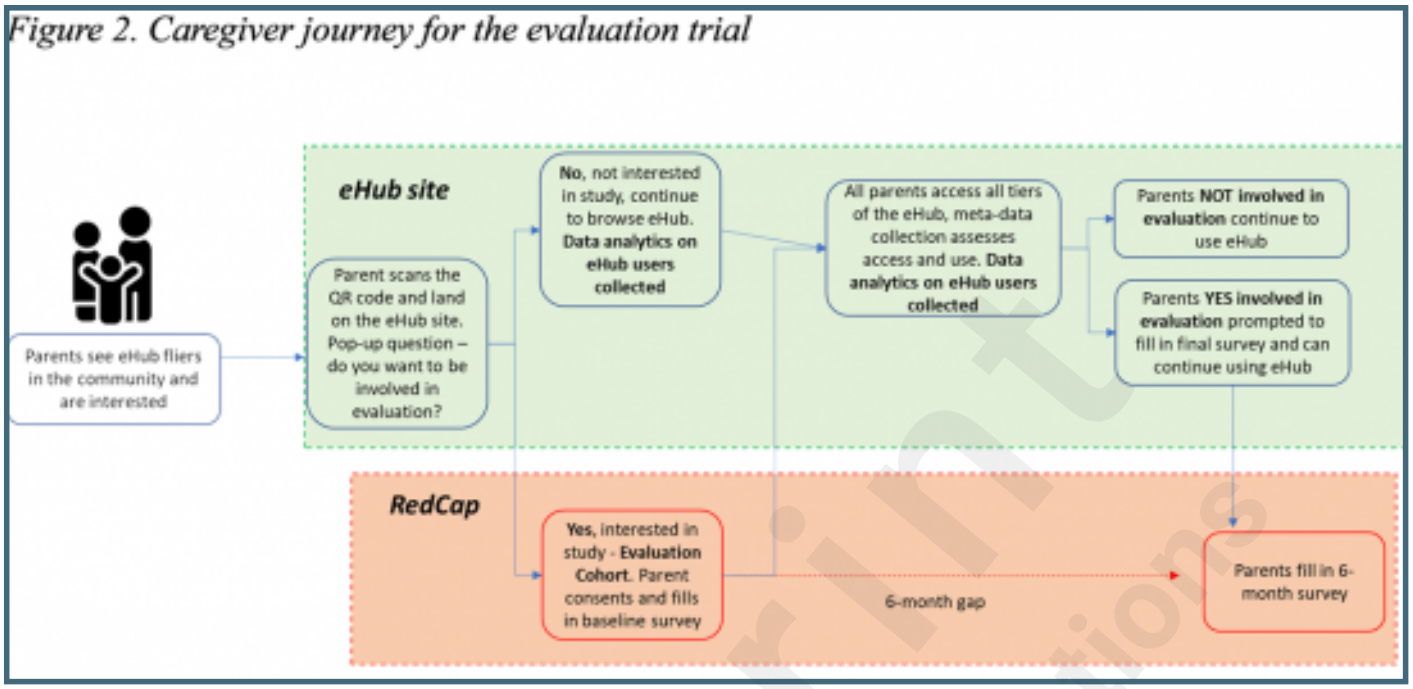
Supplementary Files

Figures

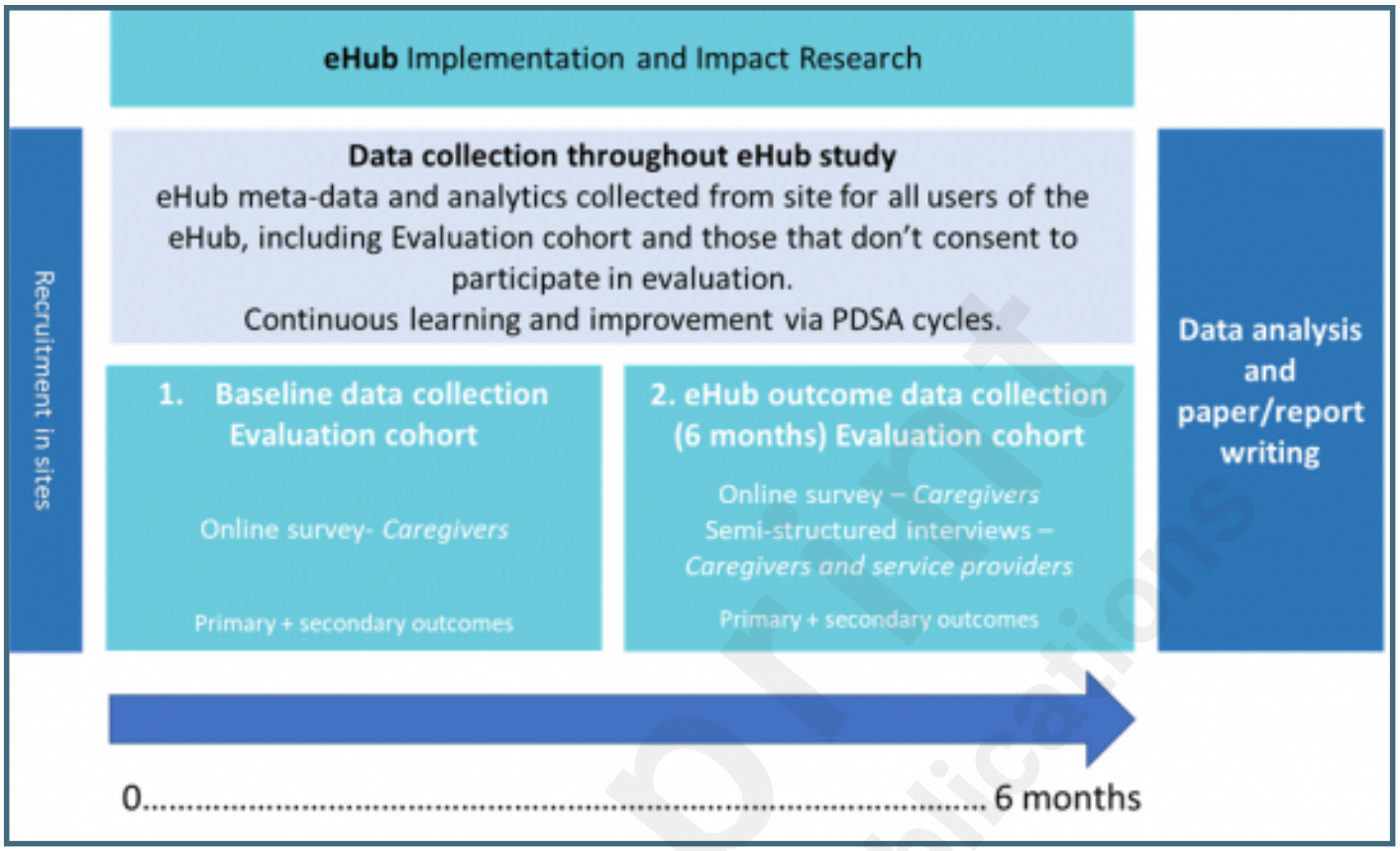
Tiers of support provided through the eHub.



Caregiver journey for the evaluation trial.



Evaluation overview.



Multimedia Appendixes