Child health and paediatric telehealth services: a mixed methods study of its uptake in children's healthcare services in response to the COVID-19 pandemic restrictions.

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Statement of Originality

This is to certify that the content of this thesis is my own work. This thesis is an account of the research studies undertaken between 2021 and 2025 whilst enrolled as a PhD candidate at The University of Sydney, NSW, Australia. This thesis has not been submitted for any other degree or purpose.

I certify that the intellectual content of this thesis is the product of my own work, and that all assistance received in preparing this thesis and all sources have been acknowledged.

Catherine Helen Jones

Abstract

Background

The COVID-19 pandemic restrictions led to a rise in the use of communications technology to enable the population to work remotely and to maintain education and health services virtually. In health this was via telehealth or other virtual care services. This rapid adoption of telehealth services provided the opportunity to explore the use of telehealth in children's healthcare services compared to traditional in-person healthcare service delivery.

Methods

A mixed methods design was used to explore the expanded use of telehealth across a suite of acute paediatric, community child health care and paediatric allied health (physiotherapy, occupational therapy, speech pathology and social work) settings in, Northern Sydney Local Health District (NSLHD), NSW, Australia 2020-22. Northern Sydney Local Health District telehealth data, a consumer survey, health outcomes data from NSLHD and publicly available Australian Early Development Census (AEDC) data were used for the descriptive statistical analysis of the quantitative data. Semi-structured interviews with consumers and providers of children's healthcare were conducted for the qualitative data.

In this study the data were 'mixed' by integrating the quantitative and qualitative data findings in the study. The convergent design level of mixing saw the quantitative and qualitative data collected simultaneously, analysed separately and then merged to compare the results. There was minimal mixing at the methods level with some free text qualitative questions within the predominantly quantitative questionnaire. The critical realism approach underpinning the study allowed for this integration and cross comparisons between the qualitative interview data and the quantitative utilisation, safety, and outcomes data at the interpretation level. Exploring telehealth through a critical realism lens provided a deep understanding of the structures and mechanisms impacting it, including the influence of values and experiences of clinicians and consumers.

Results

Telehealth utilisation data demonstrated a sharp increase in its use during the pandemic that corresponded with a sharp decrease in the in-person care delivery for all paediatric and children's healthcare services except for social work. Post pandemic trends differed for acute and community services. Paediatric acute services continued to build on the use of telehealth, whereas its use in community-based services decreased post pandemic. The measurable safety and clinical outcomes for acute and community services remained the same with no significant changes before, during or after the pandemic. A thematic analysis of the semi-structured interviews conducted with consumer and providers of telehealth for children's healthcare generated the following key themes; a) telehealth as a necessary form of service provision; b) learning how to best use telehealth; and c) individual relationships with technology.

Discussion

The rapid increase in telehealth service delivery during the pandemic was driven by the need to sustain healthcare services when the strict social restrictions were imposed. The use of telephone services within child and family health community services remained a steady form of care delivery before, during, and after the pandemic, and was reported by providers as separate from telehealth. Telehealth adoption for social work remained consistently low before, during, and after the pandemic. This was despite an increase in demand for family crisis intervention and counselling during the pandemic.

Telehealth outcomes were comparable to traditional in-person care delivery for aspects of healthcare that do not require physical assessments, procedures, or surgery. There were limitations for some mental health, child protection and domestic violence services due to privacy and safety concerns. The convenience, ease of use, indirect and direct cost benefits, and improved access to healthcare services for both consumers and providers were expressed as the key drivers for the use of telehealth both in response to the pandemic and beyond.

Telehealth safety and clinical outcomes were found to be comparable to those reported from in-person care. As such, the study findings supported the literature concluding that telehealth did not result in

patient harm or negative outcomes. The definition of 'best practice' in telehealth or virtual care was subjective at times. The costs of telehealth, including transactional costs of time and effort as well as financial, were potential motivators. Consumers and providers commonly expressed convenience and flexibility as advantages of telehealth.

The variability in the application of telehealth, along with the corresponding experiences and outcomes, was not inherently linked to the context or type of service provided. In this study, the greater influence was the individual values and experiences of clinicians. In particular, their level of comfort with telehealth and their broader familiarity with technology. Understanding individual motivation to use telehealth facilitated an analysis of professional self-efficacy. There was a consensus that telehealth was "here to stay." The future of telehealth is extrinsically linked with technological developments.

Conclusions

The rapid increase in the use of telehealth occurred during the COVID-19 pandemic. It's use has since decreased and a new hybrid of healthcare provision has emerged in its place. In this study, the greatest influence on the use of telehealth were individual values and experiences with telehealth, and the clinician relationships with technology. The more familiar an individual was with technology the more it was used and the more innovative its application was in their clinical practice. To improve access and increase the use of telehealth across healthcare services, the important influence of professional self-efficacy should be considered. In an environment of increasing demand for, and efficiencies in, healthcare services, it is hard for governments and healthcare service delivery planners to ignore telehealth as an option and seemingly ensures its continued use. However, quality, safety, and appropriate use of telehealth in clinical practice is required. Further research interest is recommended for emerging hybrid models of care, clinicians 'professional self-efficacy and the wellbeing of clinicians in a virtual care era.

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This material comprises Section 2.5 and Figure 2.04 with this Study. I designed the study, analysed the data and wrote the drafts of the manuscript.

In addition to the authorship attribution statements above, in cases where I am not the corresponding author of a published item, permission to include the published material has been granted by the corresponding author.

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Artificial Intelligence

No content produced by generative AI tools has been used in the preparation of this thesis. Proof editing of the thesis involved use of artificial intelligence tools as permitted by the University of Sydney Academic Integrity Policy 2022.

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Abbreviations & Definitions

ACE	Adverse Childhood Experience
ACI	Agency for Clinical Innovation (NSW)
AEDC	Australian Early Development Census
AEDI	Australian Early Development Index
AIHW	Australian Institute of Health and Welfare
ALOS	Average Length of Stay
BHI	Bureau of Health Information (NSW)
CEC	Clinical Excellence Commission (NSW)
CERS	Clinical Emergency Response System
CFH	Child and Family Health
CFHN	Child and Family Health Nursing
COVID-19	Coronavirus disease (COVID-19) caused by the SARS-CoV-2 virus
GP	General Practice/Practitioner
HITH	Hospital in the Home
HKH	Hornsby Ku-ring-gai Hospital
HS	Harm Score
IIMS/IMS+	Incident Management Systems
KPI	Key Performance Indictor
LGA	Local Government Area
MM	Mixed Methods
NAP	Non-Admitted Patient
NSLHD	Northern Sydney Local Health District
OOS	Occasions of Service
PAT	Patient Attributed Time
P-HITH	Paediatric Hospital in the Home
QIDS	Quality Improvement Data System
REDCap	Research Electronic Data Capture
REGIS	Research Ethics Governance Information System
RNSH	Royal North Shore Hospital
SAC	Severity Assessment Code
SSA	Site-Specific Authority
SPSS	Statistical Package for the Social Sciences
UHHV	Universal Home Health Visits
WHO	World Health Organisation

1. Background

1.1. Chapter Introduction

In this chapter the background to telehealth as a modality of healthcare delivery, its use in children's healthcare and the impact of the 2020 to 2022 COVID-19 pandemic on health and healthcare is provided. It is structured to provide background to the study. An overview of telehealth and the history of its use in health systems generally and then in acute paediatric and community child health services is followed by an overview of child health in Australia. The chapter then describes the pandemic restrictions enacted in response to the protection of Australian citizens during the COVID-19 pandemic, the use of telehealth in children's healthcare, the health of children in Australia, the Australian response to the pandemic and the impact this had the health of Australians and the healthcare system.

1.2. Telehealth

Telehealth, telemedicine, telecare, digital health, remote care, and virtual care are terms used to describe the use of technology and communication technology in healthcare. Throughout this thesis the term telehealth is used for consistency. The concept of telehealth, and the remote monitoring of patients emerged in the middle of the 20th Century. The American and Russian space programs of the 1960s first brought the concept to the public consciousness as NASA monitored the vital signs of the astronauts landing on the moon, an event that was televised into homes across the world (NASA (National Aeronautics and Space Administration), 2020; Nicogossian, Pober, & Roy, 2001; Simpson, Doarn, & Garber, 2020). Cardiac telemetry developed by NASA to monitor the health of the astronauts was later taken up into general hospital care. Patients with suspected cardiac arrythmias were able to have electrocardiograph (ECG) monitoring whilst mobilising or exercising in a hospital environment. These early steps into remote monitoring remain in use for modern cardiac hospital care (Chen et al., 2018; JAMA Network, 1964).

Telehealth has several advantages. It enables health professionals to deliver care when and where it is needed remotely and complements in-person care. It can be delivered by telephone; video conference; electronic prescribing; and remote monitoring. When telehealth is clinically appropriate, it is well received by consumers. This is discussed in the literature review section 2.3.

1.3. COVID-19 Pandemic 2020 to 2022

The World Health Organisation (WHO) declared the COVID-19 outbreak a Public Health Emergency of International Concern on 25 January 2020, and later declared it a pandemic on 11 March 2020 (AJMC Staff, 2021; World Health Organisation, 2020). The announcement in January was followed by State and Federal Government announcements in Australia for the public to be aware of the symptoms of a potential COVID-19 infection, and to seek immediate health assessment if they developed symptoms. On 27 February 2020 NSW Government released a statement urging the community to help prevent coronavirus through the simple strategies of hand hygiene, hand sanitiser in the workplace, staying at home when sick, and encouraging the use of technology to facilitate working from home where possible (Parliament of Australia, 2020). The screening and quarantining of travellers in countries around the world began by late January 2020. These were quickly followed by national and international travel restrictions, and the closure of borders to some countries including Australia, as well as to States within Australia (Parliament of Australia, 2020). Social restrictions were progressively introduced across Australia from March 2020.

An unprecedented focus on health research occurred during the first year of the pandemic, 2020. Research was supported to understand an emerging health crisis, the characteristics of the virus, the patterns of contagion, the treatments, the management, and the solutions to combat the disease. Clinical and research knowledge sharing facilitated researchers and clinicians across the globe to base decisions on the best available information. Authors have expressed concern that collaborative efforts to share datasets and information might diminish after the pandemic, and therefore the importance of ensuring these beneficial data-sharing collaborations are sustained (Davies, Audi, & Cuddihy, 2021).

On 5 May 2023 the World Health Organisation (WHO) declared the likely end of the COVID-19 pandemic. At the same time, WHO acknowledge that this did not mean the new virus was no longer a global threat. A decline in numbers of affected individuals had enabled most countries to return to life similar to that experienced pre-pandemic (United Nations, 2023). As of 3 May 2023, WHO reported 765 million confirmed cases, and 6.9 million reported deaths attributed to the pandemic as well as over 5 billion people fully vaccinated against COVID-19.

1.4. Telehealth in Children's Healthcare

Prior to the onset of the COVID-19 pandemic in early 2020, was being used among clinicians to deliver acute paediatric and community child health services. Yet its implementation and uptake were limited and sporadic. In New South Wales (NSW), telehealth services were primarily restricted to remote-living patients and their families. It was a solution to the problem of delivering health services across Australia's vast geographical distances. The landscape of telehealth changed dramatically in 2020.

The escalation in telehealth usage during 2020-2022 in Australia is closely linked to the COVID-19 pandemic and the accompanying 'Stay at Home' directives that were implemented to mitigate its spread. Pinpointing the exact moment telehealth services became fully operational and widely used within the Northern Sydney Local Health District (NSLHD) is challenging due to variability among clinicians, departments, and services. By March 2020, its use was ubiquitous. All health services had incorporated telehealth at an operational option, leveraging both telephone and videoconferencing platforms. This rapid adoption enabled valid pre and post implementation comparisons.

Prior to the pandemic, telephone consultations were already common within child and family health, particularly for parenting support and follow-up services. The longstanding significance and achievements of parenting support services and early childhood care in NSW have been well-documented in the literature (Ashton, 2009; NSW Health, 2015b; Rossiter et al., 2019; Schmied et al., 2013). It was essential to maintain their continuity when the pandemic curtailed in-person care. Telehealth, via videoconferencing, was chiefly introduced to offer remote appointments in lieu of home visits, necessitating modifications in care models. Assessments and screenings that could not be safely conducted via telehealth, such as physical examinations and domestic violence screenings, were promptly identified. New hybrid care models emerged, combining telehealth with shorter in-person visits to complete comprehensive assessments. Nonetheless, concerns about the potential for missed visual cues and alerts were noted (Ghazarian, 2020).

Allied Health service providers adopted telehealth widely. For example, speech pathology services adapted therapeutic sessions for delivery using online platforms. Additionally, new online tools were developed to assist physiotherapists conduct clinical assessments and prescribe remote therapy (Physiopedia International, 2024). On the other hand, the adoption of telehealth in social work services

was more limited compared to other allied health disciplines. This may be attributed to the specific challenges associated with telehealth and social work. Challenges related to confidentiality, cultural access to technology for the vulnerable populations they service and professional training requirements are described in the literature (Balogun, Dada, Kazeem, & Bakare-Adesokan, 2025; DeHart, Iachini, Browne, Reitmeier, & King, 2024; Gilson, Stewart, & Hodges, 2024; Hilty et al., 2023).

In NSLHD, the Paediatric Hospital in the Home service had been instituted in 2016 with both audio and audio-visual telehealth elements. During the 2020 to 2022 pandemic period, this service was leveraged by the NSW Health Virtual Hospital to extend remote care to children and families affected by COVID-19 who did not necessitate hospitalisation (NSW Health, 2022a). Both paediatric outpatient and home-based services amplified their telehealth utilisation to facilitate early discharges from hospital and avoid hospital visits during restrictive periods, thus ensuring continuous condition monitoring (NSW Agency for Clinical Innovation, 2021a, 2021b).

In 2021, The Royal Children's Hospital Melbourne published the results from a national poll called *Telehealth for kids: Experiences of Australian parents* (The Royal Children's Hospital National Poll, 2020). This survey involved 1,981 respondents across Australia, providing data on 3,440 children aged between one month and 18 years. By 2021, one in three parents had accessed healthcare for at least one of their children using telehealth in the previous year. Children under 5 years were more likely to have received telehealth care (32%) compared to children aged 13 years and over (24%). There were no significant differences in telehealth usage across diverse cultural backgrounds. Parents with higher education levels were more likely to use telehealth.

The most common services accessed via telehealth included general practice (69%), child health nursing (23%), and hospital specialist appointments or clinics (20%). Most parents (87%) indicated that they would consider using telehealth for their child in the future, with prior experience of telehealth increasing this likelihood (92%) compared to those without prior experience (83%). Additionally, 76% of respondents liked the option of having some appointments in-person or via telehealth. The advantages cited by parents included convenience for the family (69%), not missing school or activities (63%), and not having to take time off work (54%). Just over two-thirds (68%) of parents believed that having multidisciplinary team appointments via telehealth would be beneficial. Reasons for not using

telehealth included the belief that telehealth was not as good as in-person care (79%), data security and privacy concerns (61%), difficulty with hospital visits (52%), lack of quiet or private space (49%), and challenges with technology (44%) (The Royal Children's Hospital National Poll, 2020). The report indicated that telehealth for children was desirable to parents. Two-thirds (67%) of parents believed telehealth was comparable to in-person care for some healthcare needs for children. This acceptance was supported by other consumer surveys in New South Wales (Agency for Clinical Innovation, 2023; Bureau of Health Information, 2023).

In 2022, the NSW Bureau of Health Information (BHI) published a data summary on Patient's Experiences of Virtual Care (Bureau of Health Information, 2023). This survey included 2,301 respondents who had at least one virtual care appointment with an outpatient clinic in an NSW Health Public Hospital, and 1,554 respondents who had additional virtual care experiences with General Practices in 2022. Overall, 92% of respondents rated the virtual care they received as good (25%) or very good (67%). The key benefits reported were convenience (73%), saved time (57%), and feeling at ease in their own home/surroundings (43%). The key challenges included discomfort with virtual consultations (26%), long wait times for appointments to start (8%), and technology issues (6%). The BHI reported that patients were less positive if they had not previously seen the health professional, spoke a language other than English at home, or had an audio-only call compared to an audio-visual call (Bureau of Health Information, 2023). Similarly, a survey conducted between 2022 and 2023 with almost 17,000 respondents by NSW Health demonstrated an overwhelming acceptance and positive patient experience of virtual care. There was a significant increase in people rating virtual care as better than in-person care, from 16% in 2022 to 26% in 2023 (Agency for Clinical Innovation, 2023).

1.5. Health of Children in Australia

Rapid growth and development in early childhood, is monitored closely. Growth and development in the early years predicts an individual's lifelong physical, emotional, and mental health trajectory (Felitti, 2002, 2009; Felitti et al., 1998; NSW Health, 2019). In NSW, child development screening services are accessible to families through primary health services, encompassing general practice and child and family health nursing services. General practitioners are frequently consulted for immunisation and medical issues. Dedicated child and family health nurses provide essential parenting advice and conduct

well-child checks. Research on parental engagement with routine child health and development checks in NSW indicates that parents highly value these services. This underscores their vital role in the early identification of developmental concerns, thus warranting continuous promotion (Chutiyami, Wyver, & Amin, 2021; Jeffs, Nossar, Bailey, Smith, & Chey, 1994). Despite this, a considerable proportion of families, estimated at over 40% do not utilise child and family health nursing services. Reasons include, that they are unnecessary, families have poor access, or that they are unaware of the service (Rossiter et al., 2019; Schmied et al., 2013). Child health and development checks may be more frequently utilised by parents of relatively healthy children, suggesting a need for tailored approaches to engage families with children facing health or developmental challenges (Chutiyami et al., 2021).

NSW public hospitals deliver comprehensive healthcare for infants, children, and adolescents, addressing both acute and chronic health conditions. Various models of paediatric acute care exist, including paediatric emergency departments, inpatient wards, outpatient clinics, and hospital-in-the-home services. The aim of these services is to provide family-centred care as close to home as possible.

Australia maintains a structured immunisation schedule for children, with immunisation status assessed at 1, 2, and 5 years of age, with modifications for Aboriginal and Torres Strait Islanders. The schedule covers diseases such as diphtheria, tetanus, whooping cough, polio, hepatitis B, pneumococcal, Haemophilus influenzae type b, measles, mumps, rubella, meningococcal C, and varicella (NSW Health, 2023a). The Australian Institute of Health and Welfare (AIHW) reported in January 2025 that, 92.5% of one-year-olds, 90.7% of two-year-olds, and 93.7% of five-year-olds were fully immunised. Immunisation rates had remained relatively stable from 2009 to 2022, with a slight increase observed during the COVID-19 pandemic years of 2020 to 2022. However, this has been followed by a decline post pandemic that is below the national target of 95% (Australian Government, 2025; Australian Institute of Health and Welfare, 2023).

The Australian Early Development Census (AEDC) offers a comprehensive national overview of children's learning and development, predicting academic success, facilitating community planning and support initiatives (Australian Early Development Census (AEDC), 2018; Australian Education Research Organisation, 2023). Teachers collect data for each child during their first year of school using the Australian version of the Early Development Instrument (AvEDI), based on their observations and

knowledge of the child (Australian Early Development Census (AEDC), 2019a). The AEDC evaluates five developmental domains: physical health and well-being, social competence, emotional maturity, language, and cognitive skills (school-based), and communication skills and general knowledge. Children are scored on each domain, categorising them as either 'developmentally on track,' 'developmentally at risk,' or 'developmentally vulnerable' (Australian Early Development Census (AEDC), 2022). This triennial data collection has been conducted in 2009, 2012, 2015, 2018, 2021 and 2024, with national reports available on the AEDC website the following year. These reports were analysed as part of the clinical outcomes for this study, providing comparable datasets from before, during, and after the rapid adoption of telehealth initiated in response to the COVID-19 pandemic.

1.6. The Australian Pandemic Response

The Australian Government's response to the COVID-19 pandemic was marked by definitive actions, including comprehensive quarantine practices, social restrictions, travel limitations, and economic support, all introduced in the early stages of the pandemic. These measures were supported by effective policies and leadership practices (Child, Dillon, Erasmus, & Johnson, 2020). As a result, the curve was significantly flattened, with Australia recording 25,582 cases about 0.1% of the population and 909 deaths by January 12, 2021 (in NSW, 5,034 cases and 56 deaths) in a nation of approximately 25 million people (Australian Government, 2021). This is in stark contrast to countries with less stringent early-stage restrictions, for example, the UK with a population of approximately sixty-seven million people, had 3,164,051 cases, about 4.7% of their population, and 83,203 deaths. The USA with a population of approximately 331 million people, had 23,368,225 cases, about 7% of their population, and 389,599 deaths by the same date (World Health Organisation, 2021).

The management of social restrictions in Australia, along with the enforcement of these restrictions, fell under the purview of State and Territory Governments. Conversely, the Australian Federal Government was responsible for international travel restrictions, border controls, and economic stimulus packages. Within Australia, New South Wales (NSW), being the most populous state with 8,166,400 residents (almost 32% of the national population), faced the formidable task of managing a pandemic across large metropolitan, regional, and rural populations, including a significant transient and tourist population (Australian Bureau of Statistics, 2020). The impact varied significantly between metropolitan and

regional areas, with metropolitan areas experiencing the highest number of cases and deaths, and consequently, the longest duration of restrictions. Regional areas faced adverse experiences due to vulnerable indigenous populations and geographical challenges in healthcare infrastructure (Australian Bureau of Statistics, 2020).

In NSW, the initial social restrictions were implemented in mid-March 2020, following public advice on hand hygiene and social distancing issued by the NSW Government. The early cases in NSW were linked to international travellers, leading to community transmission and the first reported death on March 3,2020, of a resident of an aged care facility in Sydney. To ensure continued healthcare provision during these restrictions, changes to Medicare legislation facilitated the increased use of telehealth and digital access to prescriptions (Department of Health, 2020).

In March 2020, the NSW Government announced a series of measures, including increased health spending, cancellation of major events, and economic stimulus for businesses (Parliament of Australia, 2020). Social restrictions rapidly escalated to include bans on non-essential indoor gatherings, travel advisories, strict visitor rules for aged care facilities, social distancing mandates, and the temporary closure of non-essential businesses. Schools and childcare centres remained open for essential workers, but parents were encouraged to keep children at home, marking the beginning of home schooling and remote work. Supermarkets and pharmacies were permitted to operate 24/7, with designated shopping times for the elderly and healthcare workers. By the end of March, non-essential travel to regional towns and remote communities was prohibited to prevent the spread of the virus to areas with limited access to hospital care.

School closures in NSW became a key feature of social restrictions, impacting children and adolescents significantly. Initially, children were considered a low epidemiological risk, and schools reopened without affecting respiratory pathogen incidence, including COVID-19 (Lewis, Munro, Davey-Smith, & Pollock, 2021; National Centre for Immunisation Research and Surveillance, 2021; Russell et al., 2020). However, the Delta variant's emergence altered this perception, leading to prolonged school closures and targeted vaccination campaigns for high school students in 2021. Schools remained closed from late June until a staggered reopening in late October 2021, coinciding with high vaccination rates among

those aged sixteen years and over. Online schooling became prevalent during this period, although it was controversial.

By mid-May 2020, some social restrictions were eased, allowing outdoor gatherings, limited household visitors, and the reopening of cafes and restaurants. Regional travel and children's sports resumed, signalling a gradual return to normalcy. A significant third wave in June 2021 led to over 1,200 daily cases in NSW, the largest outbreak in terms of case numbers but not the deadliest, thanks to the vaccination rollout prioritising older populations and frontline workers. Social restrictions outlined permissible activities, such as remote schooling, outdoor exercise, and limited gatherings, while promoting online social interactions.

By October 2021, NSW achieved a 70% vaccination rate among those aged sixteen years and over, leading to the easing of many restrictions. The national vaccination goals of 70% and 80% for the adult population were reached shortly thereafter, allowing for the relaxation of domestic and international travel restrictions. The COVID-19 vaccination rollout expanded to include children aged 12 to 15 years in September 2021, following approval for the Pfizer and Moderna vaccines. This focus on vaccinating younger populations was driven by evidence of their role in virus transmission, despite generally milder symptoms. Telehealth and virtual care grew during the pandemic, necessitating provider information and guidance. By 2023, a range of guidelines and resources for Australian healthcare professionals emerged (Australian Health Practitioner Regulation Agency (AHPRA) & Nationals Boards, 2020; The Royal Australasian College of Physicians, 2022)

1.7. Impact of the Pandemic on Health & Healthcare

The impact of the COVID-19 pandemic and Australians' compliance with government imposed restrictions on healthcare systems and professionals was profound and extensively documented (Kitson, Huisman-de-Waal, & Muntlin, 2021). The restrictions imposed during the 2020-2022 pandemic were unprecedented, and their potential long-term effects remain largely unknown. Australians complied diligently with the restrictions imposed by governments (Leviston, Stanely, & Walker, 2023). Immediate impacts of both the virus itself and the associated restrictions have been studied. While the virus had less impact on children and young people compared to adults (Irfan et al., 2021), restrictions

impacted a number of aspects of children growth and development including children's play behaviour (Moore et al., 2020); and academic progression (Rose et al., 2021). Both positive and negative effects on children and families' behaviours were documented. The negatives being increased concerns about mental health issues, domestic violence, and child abuse, and the positives including increased levels of physical activity among children in NSW during the pandemic (Australian Institute of Health and Welfare, 2023; NSW Population Health Survey (SAPHaRI), 2025; The Royal Children's Hospital National Poll, 2020; Triggle, 2021; B. Wong, Lam, Lai, Wang, & Ho, 2021).

Of importance to this study were the concerns that arose regarding the potential impacts on children's health and development. Reduction in the attendance at health and wellbeing services, child development screenings, immunisation schedules, and emergency department visits (Hefferon et al., 2020; Place, Lee, & Howell, 2020; Rana, Shah, Ahmed, & Mothabbir, 2021; The Royal Children's Hospital National Poll, 2020) demanded research attention. A dramatic decrease in emergency department presentations across New South Wales was observed in April 2020, coinciding with the first wave of social restrictions. This included a fall in paediatric emergency presentations by approximately 50%, leading to a similar decline in paediatric inpatient ward admissions (Australian Government, 2021; NSW Government, 2020). These trends were mirrored internationally (Hefferon et al., 2020; Raffaldi et al., 2021).

The social restrictions effectively reduced the transmission of common respiratory pathogens, including COVID-19. Notably, the incidence of bronchiolitis, a common cause of paediatric hospital admissions, decreased significantly in Australia in 2020 compared to previous years (Haapanen, Frenko, Artama, & Kuitunen, 2021; NSW Government, 2020). Consequently, mental health issues and minor injuries became the leading causes of hospital admissions for children in New South Wales during the winter of 2020 (NSW Health, 2020). Children with congenital or chronic conditions continued to require specialised healthcare services, raising concerns about the potential long-term impacts of reduced pathogen exposure on immune system development (Olszak et al., 2012).

Additionally, there was a significant increase in hospital presentations for psychological distress among young people internationally, with a notable rise in self-harm and suicidal ideation in New South Wales (NSW Health, 2020; Rajgopal, Li, Shah, & Sundar Budhathoki, 2021). Hospitals and healthcare

facilities implemented enhanced infection control measures, including visitor restrictions and mandatory personal protective equipment (PPE) usage (Moss, Stelfox, Krewulak, & Ahmed, 2021; NSW Health, 2023b). These restrictions had a negative impact on patients, families, and healthcare staff, particularly in vulnerable populations such as Aboriginal and Torres Strait Islanders (NSW Health, 2023b; O'Dea, Caulfield, & Roche, 2023). The enforced visitor restrictions often led to traumatic experiences for patients and families, exacerbated by the need for virtual visitation facilitated by hospital staff (Hugelius, Harada, & Marutani, 2021; Mailer, Ward, & Aspinall, 2023).

The pandemic also catalysed the adoption of telehealth and virtual care, driven by the need to deliver healthcare services remotely while minimising virus transmission risks. The implementation of virtual technology for telehealth was largely well-received, although it did face some concerns. This provided a unique opportunity to explore the use and experiences of telehealth compared to traditional in-person delivery, before, during and after the pandemic in the literature.

2. Literature Review

2.1. Chapter Introduction

In this chapter, a scoping review of the literature relating to two topics is presented. Firstly, a focus on the use of telehealth, perceptions of telehealth, and the impact of the COVID-19 pandemic on children's health and healthcare. Secondly, the impact of the COVID-19 pandemic restrictions on children's growth and development. Studies published before, during and after the pandemic were included from searches undertaken in 2022 and 2025. This included literature on the adoption of telehealth in children's healthcare during the pandemic, and how the evolving healthcare landscape influenced research outputs and sources in this period of rapid uptake of digital health strategies.

A scoping review approach enabled the study to map the evidence around telehealth use in children's healthcare, to explore and describe the knowledge and gaps about telehealth in children's healthcare, as well as the impact of COVID-19 on child development research (Pollock et al., 2024; P. Sharma & Goyal, 2023). This chapter discusses the key concepts of, the benefits of telehealth, satisfaction with telehealth, the impact of the pandemic on children, and the post pandemic literature. The research statements and questions are then presented.

2.2. Literature Search Strategy

In November 2022, a systematic approach was used to search the literature in the Medline, PubMed, and Cochrane Library databases. Two distinct search strategies were employed to include the following:

1) The use and effectiveness of telehealth in children's healthcare; and

2) The impact of the COVID-19 pandemic on children's growth and development. The search terms used to identify the relevant literature for each search are shown in Table 2.01.

Table 2.01: Literature Search Outcomes 2022

Databases	Search No.	Search Terms	No. Papers	Related Thesis Section
Medline, PubMed, Cochrane Library	#1	*telehealth, *telehealthcare, *telemedicine, virtual care*, remote care*, digital health*, mHealth*, *paediatrics, *child, *effectiveness	16	2.3
	#2	*Child, infant, *COVID-19, *Child Development, *Preschool, *Early childhood*, growth, *impact, *health	26	2.4

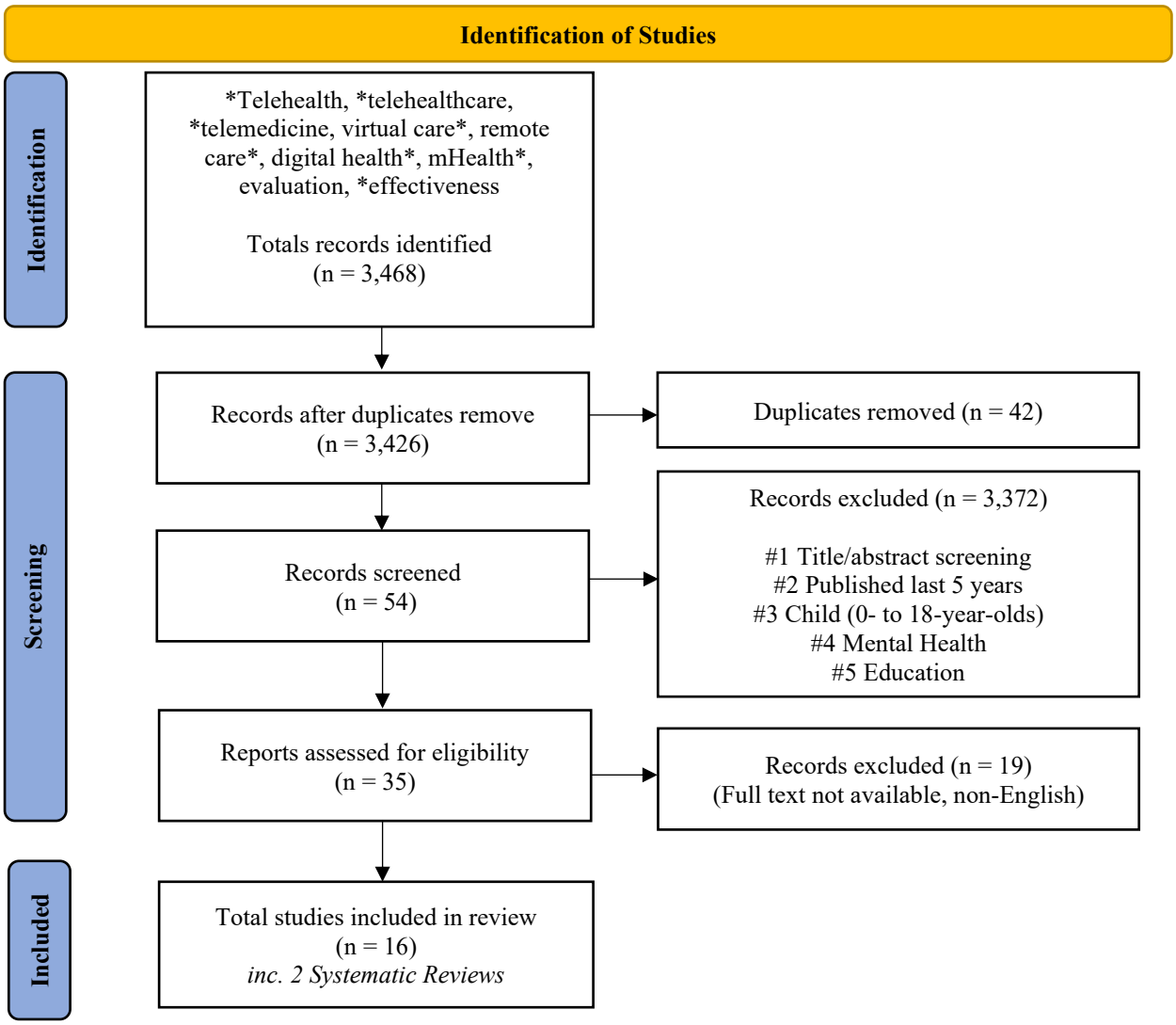
In March 2025, a systematic approach was used to further search the literature in the Medline and PubMed using search terms shown in Table 2.02.

Table 2.02: Literature Search Outcomes 2025

Databases	Search No.	Search Terms	No. Papers	Related Thesis Section
Medline, PubMed,	#3	*Child, infant, *COVID-19, *Child Development, *Early childhood*, growth, *impact, *telehealth, *outcomes	95	2.5

The first literature search, in 2022, about telehealth initially identified over three thousand articles, which reduced significantly when the search included evaluation and effectiveness of telehealth. This is detailed in the PRISMA Flow Diagram (BMJ, 2021) in Figure 2.01.

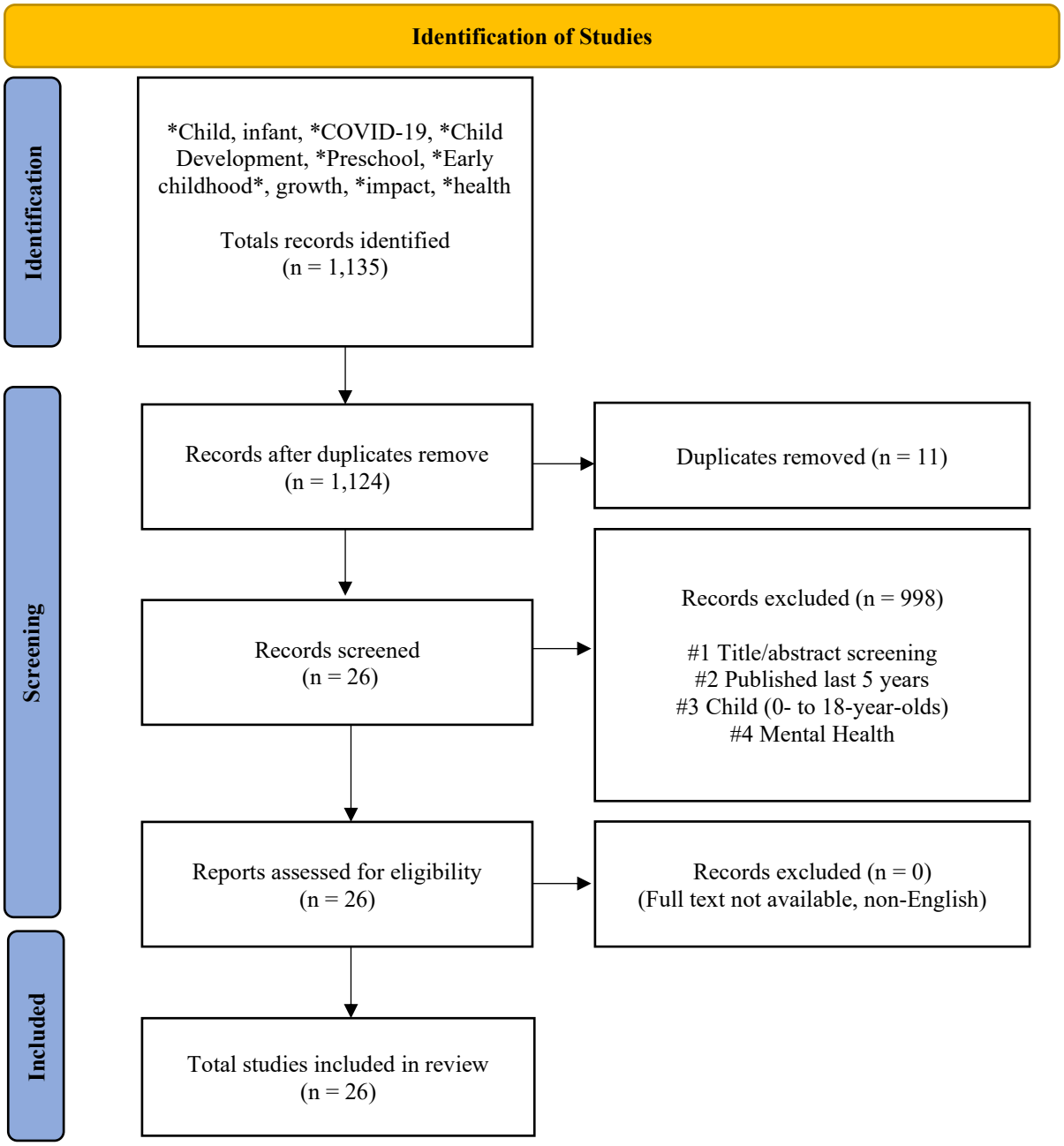
Figure 2.01: PRISMA Flow Diagram 1 – Effectiveness of Telehealth Literature



This first search included a Cochrane Library search which identified 28 published telehealth systematic reviews, of which only two were specific to paediatrics (Tan & Lai, 2012; Thabrew et al., 2018), and two incorporated children within broader study cohorts (Chuchu et al., 2018; Fisher, Law, Dudeney, Eccleston, & Palermo, 2019).

The second literature search, in 2022 identified 1,135 articles. Of these 365 were related to mental health in children and adolescents during COVID-19 pandemic. This is detailed in PRISMA Flow Diagram (BMJ, 2021) in Figure 2.02.

Figure 2.02: PRISMA Flow Diagram 2 – Child Development and COVID-19 Pandemic



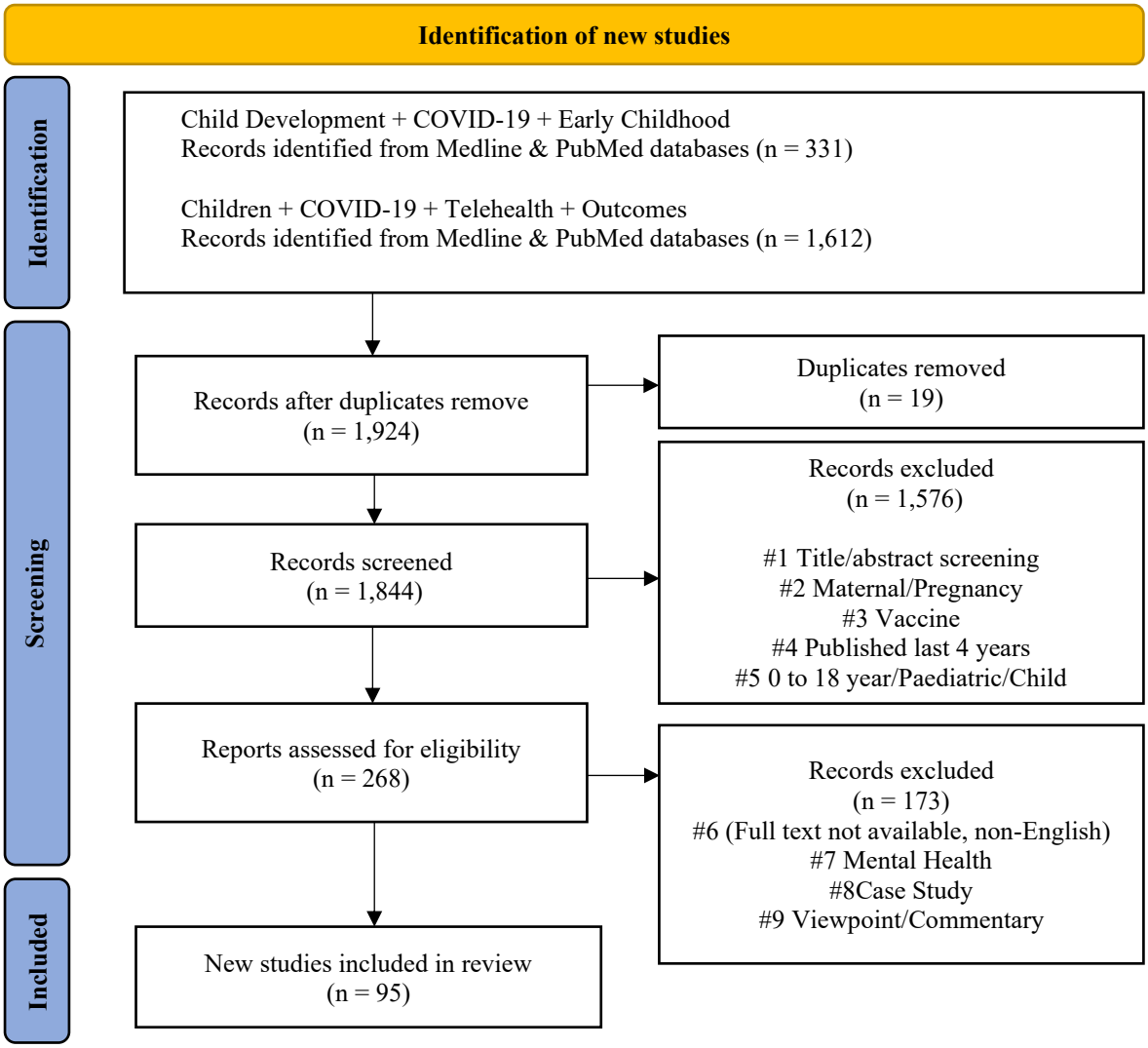
In the second search, only 2 international articles were identified that were specific to the impact of COVID-19 on child development in early childhood (Araújo, Veloso, Souza, Azevedo, & Tarro, 2020; Shumba et al., 2020). The search identified limited literature about the impact of social restrictions on early childhood development during the pandemic in 2021.

The use of grey literature played a crucial role in this study. In response to the urgent need for evidence to inform policy, the search strategy identified numerous reports from government agencies and international organisations. These included publications from the Australian Government, NSW Government, NSW Ministry of Health, NSW Agency for Clinical Innovation, The Royal Children's Hospital Melbourne, Harvard University, Sydney Children's Hospitals Network, Northern Sydney Local Health District, the Centres for Disease Control and Prevention, and the World Health Organization.

It is important to note that this review was conducted at a time when there was a proliferation of research output. This occurred because of the global response to the pandemic, more time to publish due to restricted workplaces, and a broader trend of incorporating telehealth into routine clinical practice. It was therefore anticipated that the research corpus would experience substantial and exponential growth throughout the duration of this study. For example, the Lancet journals systematically gathered and published high-quality, COVID-19-related content, encompassing topics such as epidemiology, treatment strategies, vaccines, and the impact on children. These resources were made accessible through the Lancet COVID-19 online resource centre. Similarly, the Education Endowment Foundation (EEF) curated and synthesised research concerning the effects of COVID-19 and school closures on educational attainment, presenting findings as they became available (Education Endowment Foundation, 2021). As the pandemic progressed, media outlets and social media platforms served as sources for alerting the public to emerging changes in pandemic management, as well as alerting this study to emerging evidence about telehealth, and clinical practices. Additional literature was therefore incorporated into this review as it emerged following the initial 2021 literature search.

In March 2025, a further literature search was conducted which identified post pandemic publications as detailed in PRISMA Flow Diagram in Figure 2.03. The high volume of literature indicates the impact of the restrictions on telehealth uptake and the research interest in children's health outcomes.

Figure 2.03: PRISMA Flow Diagram 3 – COVID-19, Telehealth & Children's Healthcare 2021-25



In the following sections of this chapter, the literature is discussed. The literature from the first search is discussed in the 'benefits of telehealth' and 'satisfaction with telehealth' sections, and the second search in the 'pandemic and children' section. These discussions also include some literature that emerged post searches. The third search is discussed in the 'post pandemic literature' section.

2.3. Benefits of Telehealth

There has been research interest and technological development relating to telehealth since the 1960s. It is currently used to provide a broad range of services, across primary and secondary healthcare settings (Arntz et al., 2020; Cheng, Coote, & South, 2021; Chiang et al., 2021; Frye, Gardner, Campbell, & Katzenstein, 2022; Lee et al., 2021; Madubuonwu & Mehta, 2021; NSW Agency for Clinical Innovation, 2021b; Ouyang, Wen, Gu, Shen, & Song, 2021; Phillips, Penny, Herbert, & Owen, 2023;

Rynearson & Jarrin, 2021; White, Stoppelbein, Scott, & Spain, 2021; Wu et al., 2021). Telehealth has been successfully implemented across numerous children's healthcare settings. For example, virtual home visits for families with newborns (Bock, Kakavand, Careaga, & Gozalians, 2021); paediatric medical specialist consultations (Finkelstein, Nelson, & Estrada, 2020; Jaclyn et al., 2021); children's hospital outpatients (D. Cheng et al., 2021; Peterson et al., 2021); school-based health (Goddard, Sullivan, Fields, & Mackey, 2021); child health nursing (Phillips et al., 2023); adolescent or youth health (Hawke, Sheikhan, MacCon, & Henderson, 2021), and paediatric allied health (Lewis, Packman, Onslow, Simpson, & Jones, 2008; Wilson, Onslow, & Lincoln, 2004).

Research interest has focused on the assessment of paediatric and adult clinical outcomes using telehealth across the domains of; health education (Allida et al., 2020; Flodgren, Rachas, Farmer, Inzitari, & Shepperd, 2015); respiratory medicine (Cox, Alison, & Holland, 2013; Cox et al., 2021; Dennett et al., 2021; Goldbeck, Fidika, Herle, & Quittner, 2014; Janjua, Banchoff, et al., 2021; Janjua, Carter, Threapleton, Prigmore, & Disler, 2021; McLean et al., 2010; McLean et al., 2011); psychological therapies (Fisher et al., 2019; Goldbeck et al., 2014; Thabrew et al., 2018); symptom management (Fisher et al., 2019; Forster et al., 2023; Janjua, Banchoff, et al., 2021; Janjua, Carter, et al., 2021; McLean et al., 2010; McLean et al., 2011; Ream et al., 2020); early detection of deterioration (Chuchu et al., 2018; Flodgren et al., 2015); family support (Tan & Lai, 2012); diagnostic assessments (McCleery, Laverty, & Quinn, 2021); and tele-rehabilitation (Bittner, Yoshinaga, Wykstra, & Li, 2020; Cox et al., 2013; Cox et al., 2021; Flodgren et al., 2015; Khan, Amatya, Kesselring, & Galea, 2015; Laver et al., 2020). A variety of outcome measurements have been employed in these studies, including treatment wait times (Ballini et al., 2015); quality of life or daily activity measurements (Bittner et al., 2020; Cox et al., 2021; Dennett et al., 2021; Khan et al., 2015; Laver et al., 2020; Stevenson et al., 2019; Thabrew et al., 2018); physiological measurements (Fisher et al., 2019; Forster et al., 2023; Jones, Ray, Moy, & Buckley, 2019; Raman, Shepherd, Dowswell, Middleton, & Crowther, 2017; Stevenson et al., 2019); clinical symptoms (Bittner et al., 2020; Chuchu et al., 2018; Fisher et al., 2019; Flodgren et al., 2015; Janjua, Banchoff, et al., 2021; Janjua, Carter, et al., 2021; Kew & Cates, 2016; McLean et al., 2010; McLean et al., 2011; Ream et al., 2020; Thabrew et al., 2018); costs and cost effectiveness

(Forster et al., 2023; Stevenson et al., 2019); adverse events (Laver et al., 2020); and user satisfaction (Fisher et al., 2019; Forster et al., 2023).

The clinical utility of telehealth and indeed on its impact on health outcomes was equivocal, although many authors cite an insufficiency of evidence (Ballini et al., 2015; Bittner et al., 2020; Cox et al., 2013; Cox et al., 2021; Dennett et al., 2021; Fisher et al., 2019; Forster et al., 2023; Goldbeck et al., 2014; Janjua, Carter, et al., 2021; Jones et al., 2019; Kew & Cates, 2016; Khan et al., 2015; Laver et al., 2020; McCleery et al., 2021; McLean et al., 2010; Palmer et al., 2021; P. Raman et al., 2017; Ream et al., 2020; Stevenson et al., 2019; Tan & Lai, 2012; Thabrew et al., 2018). However, there is growing evidence in the literature that telehealth does not have adverse effects or harm patients (Forster et al., 2023; Janjua, Carter, et al., 2021). Additionally, telehealth has been shown to be comparable to in-person healthcare delivery, with no significant differences in health outcomes in certain applications (Allida et al., 2020; Chuchu et al., 2018; Flodgren et al., 2015; Kew & Cates, 2016; Khan et al., 2015; Russell, Buttrum, Wootton, & Jull, 2011). A systematic review in 2021 that was republished in 2023, concluded that of the 38 studies, telehealth can be of equivalent or more clinically effective as in-person care in 37 of the studies (Snoswell et al., 2023 (republished)). Telehealth is especially effective in managing chronic conditions such as diabetes and asthma, where regular monitoring and timely interventions can help prevent complications and reduce hospitalisations (Patel et al., 2021).

2.4. Satisfaction with Telehealth

The paediatric literature included in this review underscores the high acceptance, desirability, and comparability of telehealth as a mode of care delivery. Parents consider telehealth to be as effective as in-person care for certain healthcare needs, but 21% did not (The Royal Children's Hospital National Poll, 2020, 2021). This positive acceptance of telehealth by consumers, viewing it as comparable to or in some scenarios even better than in-person care, was reported throughout paediatric and adult consumer surveys conducted in NSW (Agency for Clinical Innovation, 2023; Bureau of Health Information, 2023). A Cochrane review suggested that telehealth may have little to no impact on either provider or consumer satisfaction with healthcare services (Gonçalves-Bradley et al., 2020). Patient and healthcare professional satisfaction surveys indicated that telehealth generally met their needs, with convenience being a frequently cited advantage. However, common disadvantages included technology

issues and concerns related to security (Bull, Neigel, Malvey, & Szalma, 2016; Hentati, Cabrera, D'Anza, & Rodriguez, 2021; Jaclyn et al., 2021; Lee et al., 2021).

The studies that identified barriers to the implementation of telehealth and the strategies to overcome these barriers were particularly useful. For example barriers to the successful implementation of telehealth included telehealth infrastructure, support, education, and staff attitudes (Ghazarian, 2020; Yang et al., 2021). The reliability and performance of technology are particularly important to staff, as frustration with technical issues can lead to reluctance in offering telehealth as an option (Bull et al., 2016; Hah, Goldin, & Ha, 2019; Odendaal et al., 2020). Additionally, patient access to devices and data necessary to engage with telehealth services has been highlighted as another significant barrier (Odendaal et al., 2020; Phillips et al., 2023). Lower levels of telehealth utilisation have been linked to lower socio-economic and vulnerable populations, contributing to inequities in access to care (Collins et al., 2023; Hsiao et al., 2021). Not all patients and families preferred telehealth; for example, youth patients expressed a willingness to participate in individual telehealth sessions but were less inclined to engage in group sessions virtually (Hawke et al., 2021). Additionally, concerns have been raised regarding the use of telehealth for children with behavioural and social communication challenges (White et al., 2021).

Provider attitudes toward the value of telehealth in clinical care have been identified as a significant factor influencing its use (Alexander, Nerminathan, Harrison, Phelps, & Scott, 2015; Odendaal et al., 2020), alongside staff familiarity with telehealth technology, (Frye et al., 2022; Hah et al., 2019). Those who regularly use technology in their personal lives tend to be more motivated to integrate telehealth into their clinical practice (Hah et al., 2019), as are those who have received adequate training and information about telehealth (Phillips et al., 2023; Xyrichis et al., 2021). As technological advancements continue, telehealth has increasingly been recognised in the literature as a more viable and reliable healthcare option (Arntz et al., 2020; Bock et al., 2021; Finkelstein et al., 2020; Jaclyn et al., 2021; Lee et al., 2021).

Prior to 2020, literature indicates that telehealth implementation was often met with resistance from clinicians, primarily due to challenges associated with adapting to change. However, with the onset of the pandemic, this dynamic shifted, and telehealth was rapidly propelled into the forefront as a key

healthcare delivery option (Arntz et al., 2020; Bomba, Alibert, & Velt, 2021; D. Cheng et al., 2021; Chiang et al., 2021; Department of Health, 2021; Goddard et al., 2021; Graziano et al., 2021; Hentati et al., 2021; Kanthimathinathan, Pollak, & Shekerdemian, 2021; NSW Agency for Clinical Innovation, 2021b; Onofri et al., 2021; Ouyang et al., 2021). A willingness to continue using telehealth beyond the pandemic has been observed (Ghazarian, 2020; S. Scott, Fontana, Zuger, Laimer, & Stettler, 2021). However, this is accompanied by the caution that telehealth should not replace the availability of traditional in-person care (Collins et al., 2023; Yang et al., 2021). Some individuals still express a preference for in-person consultations (Lynch, Stefancic, Cabassa, & Medalia, 2021), and there is concern that clinicians may revert to traditional in-person or telephone modalities if they face barriers to using telehealth (Phillips et al., 2023). Additionally, there are concerns that telehealth cannot replace all aspects of service delivery, particularly in areas such as physical examinations, therapies, or psychosocial support, which may require in-person interaction. As a result, there is a growing recognition that hybrid models of care, integrating telehealth as a component but not the entirety of the care model, should be developed (Collins et al., 2023; Frye et al., 2022; Hawke et al., 2021; Hentati et al., 2021; Jones, Anderst, & Harman, 2021; Kenney et al., 2021; Scott et al., 2021; Sharma & Daniel, 2020). The literature also emphasises the need for clear guidance on how to structure these hybrid models, with telehealth serving as an adjunct to traditional in-person care (Collins et al., 2023).

At the start of the pandemic, families expressed gratitude for the availability of telehealth, recognising it as a flexible and convenient option that ensured the continuity of services (Collins et al., 2023; White et al., 2021). Additionally, telehealth reduced the risk of hospital-acquired infections (Sarcevic, 2021), and facilitated a more family-centred and family-involved approach to care (Rynearson & Jarrin, 2021). A scoping review on the potential cost efficiencies of telehealth highlighted that while telehealth can eliminate the need for in-person visits, thereby reducing transportation costs for families, it does not necessarily lead to a decrease in overall care delivery costs for healthcare services (Snoswell et al., 2020).

The literature highlights the need for further research into the use of telehealth, particularly to better understand its effectiveness, limitations, and potential for integration into various healthcare settings. (Collins et al., 2023; Finkelstein et al., 2020; Jaclyn et al., 2021; Janjua, Banchoff, et al., 2021; Janjua,

Carter, et al., 2021; Jones et al., 2019; Kenney et al., 2021; Kew & Cates, 2016; Khan et al., 2015; Phillips et al., 2023; Raman et al., 2017; Rynearson & Jarrin, 2021). A need for telehealth research that explores beyond evaluations of staff and consumer satisfaction, and the challenges of implementation and viability. Instead, studies that focus on the broader, perhaps unforeseen advantages of telehealth, and examining how this modality is influencing healthcare delivery and clinical outcomes.

2.5. Pandemic and Children

At the onset of the pandemic, children and young people were considered at low risk of both contracting and transmitting the virus. Internationally, children experienced fewer fatalities and milder symptoms, resulting in significantly lower mortality and morbidity rates (Bailey et al., 2020; Bhopal, Bagaria, Olabi, & Bhopal, 2021; Churchill, 2020; Dong et al., 2020; Williams et al., 2022; World Health Organisation, 2021). Within this infrequent but clinically significant paediatric cohort there were clinical and social nuances. Clinically, there were differential diagnosis concerns, with some of the paediatric presentations associated with the COVID-19 virus also resembled the clinical signs of Kawasaki Disease (Rigante, 2021; Wong-Chung, Engin, Wolfs, Renson, & deBoer, 2021). In addition, most paediatric COVID-19 related hospitalisations were associated with children's social needs rather than clinical needs. For example, caring for children during the hospitalisation of their parents/carers with the virus when social restrictions prevented alternative care arrangements (Williams et al., 2022).

There were concerns about the potential negative impacts of the pandemic restrictions on children. A major concern was the closure of schools and childcare centres, which significantly impacted children's education, social development, and overall well-being (Russell et al., 2020). With children mandated to stay at home during school terms and receive schooling remotely, there was a significant reduction in attendance at schools and preschools. This shift led to disruptions in children's education and limited their academic progress, opportunities for social interaction and developmental activities. (Aynsley-Green, 2020; Hefferon et al., 2020; Parliament of Australia, 2020; The Lancet Editorial, 2020). Evidence indicates that school closures had a negative impact on children's learning outcomes, especially among disadvantaged pupils. These students faced challenges such as unequal access to the internet and devices like laptops, which contributed to a widening of the attainment gap and heightened

their risk of long-term disengagement from education and the education system overall (Lewis et al., 2021; Rose et al., 2021; Russell et al., 2020).

Concerns were raised about the widespread loss of socialisation opportunities typically provided by attending school, which further impacted children's development and overall well-being, (Drane, Vernon, & O'Shea, 2020; Lewis et al., 2021), as well as neuropsychological or sensory concerns (Jha & Arora, 2020; Nandhan & Kameswaran, 2020). For some children, homeschooling or remote learning was a positive experience, especially for those with behavioural issues or neurodivergent traits, as it offered a learning environment that better suited their needs (Reicher, 2020). The closure of schools in the United Kingdom has been described as an intergenerational transfer of harm, shifting the burden from socioeconomically advantaged elderly individuals to socioeconomically disadvantaged children. This has been seen as contrary to children's rights, as they had the least to gain and the most to lose from school closures. Additional concerns were raised regarding child protection, with risks such as domestic violence going undetected due to the lack of in-person school attendance (Lewis et al., 2021).

Accompanying the closure of schools was the loss of extracurricular activities such as excursions, celebrations, performing arts, and sports. Children and adolescents experienced reduced access to school sports, community sports, and organised physical activities, all of which were suspended during school closures. This led to reported decreased levels of physical activity for some children (Australian Institute of Health and Welfare, 2024; Aynsley-Green, 2020; Nathan et al., 2021), as well as limited interaction with extended family and close friends (Evans et al., 2020). However, the total physical activity time for younger children was less impacted, as organised activities were often replaced with unstructured physical activities, such as playing at home or in parks (Australian Institute of Health and Welfare, 2023; Nathan et al., 2021; NSW Population Health Survey (SAPHaRI), 2025).

During the pandemic, Australian children were reported to have experienced significant changes in behaviour. Many spent more time on screens, such as phones, tablets, laptops, and gaming devices for entertainment (51%). Additionally, 42% of children engaged in less exercise, and 25% reported eating more unhealthy food (The Royal Children's Hospital National Poll, 2020). While many reported negative changes in social behaviour during the pandemic restrictions, not all were detrimental. Increased family time with immediate family and enhanced parent-child interaction were notable

benefits of the social restrictions and changes in work patterns (Evans et al., 2020; The Royal Children's Hospital National Poll, 2020).

A significant increase in emotional and mental health concerns were reported in the population during the pandemic (Evans et al., 2020; Hafstad, Saetren, Wentzel-Larsen, & Augusti, 2021; headspace, 2020; Hefferon et al., 2020; McGhee & Robb, 2020; The Royal Children's Hospital National Poll, 2020; Webb, McManus, & O'Connor, 2021). In New South Wales, this sudden increase in screen time was particularly evident among adolescents and young adults (Agency for Clinical Innovation, 2021; Australian Institute of Health and Welfare, 2024; NSW Health, 2020). Similar concerns about the increasing prevalence of mental health issues in Europe during the pandemic were noted; however, the challenges of capturing an accurate picture of these issues have also been well documented (Webb et al., 2021).

Increased unemployment and reduced household incomes had an immediate impact on many families due to social restrictions and the closure of businesses, both temporary and permanent. This financial stress raised child protection concerns, as it is a known risk factor for higher rates of family violence, child abuse, and mental health issues (Churchill, 2020; Hefferon et al., 2020; Herrenkohl, Scott, & Higgins, 2020; S. Raman et al., 2020; Rodriguez, Lee, Ward, & Pu, 2021) (Australian Institute of Health and Welfare, 2021; Cheng, Moon, Artman, & Pediatric Policy Council, 2020; Herrenkohl et al., 2020; Rodriguez et al., 2021). An increase in the incidence of reported child abuse and domestic violence was reported in 2020 (Aynsley-Green, 2020; Hefferon et al., 2020). However, challenges in accurately assessing the incidence of child maltreatment emerged during the pandemic, compounded by the associated increase in social isolation. It was reported as plausible that the actual incidence of child abuse and neglect was higher than the reported figures, and it is unlikely to be lower. (Australian Institute of Health and Welfare, 2021; Herrenkohl et al., 2020; Rodriguez et al., 2021). The disproportionate impact of COVID-19 on minority communities, both in terms of incidence and mortality, heightened concerns regarding the welfare of children, particularly for families living in poverty or under the threat of violence, during the pandemic (Raman et al., 2020). The nature of the restrictions implemented to manage the outbreaks reduced the opportunities for mandatory reporters of suspected child abuse or neglect, such as teachers, childcare workers, and sports coaches, to have contact with at-risk children. This potentially led to a decline in reported cases of child abuse and

neglect, which not only reflected a decrease in the visibility of welfare concerns but also suggested that many cases may have gone unreported (Herrenkohl et al., 2020).

The pandemic was an event of historic significance that impacted both the immediate and potentially future health and well-being of children through increased mortality and morbidity, community stress stemming from unemployment and food insecurity, trauma and mental health challenges, delays in healthcare, obesity, and under-immunisation. It also created adverse home environments, marked by increased isolation for families, higher unemployment, and rising mental health concerns. Consequently, this elevated stress for families and created greater opportunities for child protection issues to arise (Cheng et al., 2020; Herrenkohl et al., 2020; Rajgopal et al., 2021; Rodriguez et al., 2021; Russell et al., 2020). Such experiences of hardship, abuse, and loss during the early years of a person's life have been defined as Adverse Childhood Experiences (ACEs), and critical determinants of an individual's lifelong health and well-being. These experiences highlight the importance of the physical, social, and emotional environment during early childhood, that can significantly influence growth and cognitive development as well as an individual's future health outcomes (Centre for Early Childhood, 2023; Ebrahimi, Khatami, & Mesdaghi, 2022; Felitti, 2002, 2009; Hughes et al., 2017; NSW Health, 2019).

Many factors influenced child health during the pandemic, which potentially impacted the growth and development of children in Australia. A full discussion of these issues was published online during the first year of the pandemic in the COVID-19 pandemic: Effects on the lives of Australian children and families (The Royal Children's Hospital National Poll, 2020). The impacts of the pandemic on children are discussed in more detail in a published discussion paper included in this thesis (Figure 2.04), *A sledgehammer to crack a nut: weighing up the rights of children in a pandemic* (C. Jones, Fraser, Davies, & Randall, 2023).

2.6. Post Pandemic Literature

Studies demonstrated the rapid uptake in telehealth use for various paediatric and child health services, and the importance of this to maintaining health services during the COVID-19 pandemic (Atabaki et al., 2024; Galway, Stewart, Maskery, Bourke, & Lundy, 2021; Kim, Tyrell, Moss, & Siddiqi, 2022; Nageswaran, Grefe, Chen, Kirkendall, & Ip, 2023; Oliveira et al., 2025; Shi et al., 2021). Telehealth was

successfully used via video and phone (Chang et al., 2021; Federici, De Marchis, Alghisi, Fiocchi, & Bella, 2024), e-prescriptions (Payvandi, Correa, Hatoun, O'Donnell, & Vernacchio, 2022), and remote patient monitoring (Denker, Dean, Chapman, & Sump, 2022).

There were concerns and limitations around the use of telehealth identified. With regard to limitations, there was consensus that physical examinations or assessments, therapies and procedures could not be fully achieved through telehealth, and that there was the ongoing need for access to in-person appointments (Bajwa et al., 2024; Kumari, Jat, & Kabra, 2021; Pooni, Ronis, & Lee, 2021). The concerns raised were about inequity to access with telehealth for vulnerable and minority populations (Duan, Ruiz De Luzuriaga, Schroedl, & Rosenblatt, 2022; Hanna, Siddiqui, Jernigan, & Edobor-Osula, 2022; Haynes, Kompala, Neinstein, Rosenthal, & Crossen, 2021; Kaufman et al., 2023; Sen et al., 2022). These inequities were associated with language and cultural barriers (Hanna et al., 2022; Sen et al., 2023; Wallis et al., 2014; Zacher et al., 2023); digital health literacy (Bregstein, Fenster, & Lame, 2021; Duan et al., 2022; Makhlouf et al., 2023; Rahim et al., 2023; Ray et al., 2023), access to the internet or availability of technology (Mills, Hazeltine, Zucco, Phan, & Baker, 2023; Ray et al., 2023), generational (Haynes et al., 2021), and the consumer-provider relationship (Bajwa et al., 2024). However, there was contradictory evidence about the impact of telehealth on access to care with some studies demonstrating a reduction in ‘no shows’ for appointments using telehealth (Brociner, Yu, Kohane, & Crowley, 2022) and others a lower participation rate for vulnerable families with telehealth (Kaufman et al., 2023). In addition, there were concerns being raised in the media about the convenience of telehealth services to provide online prescriptions and medical certificates over clinical appropriateness (eClinical Medicine, 2025; Flemming, 2023; Heaney, 2024; McKenna, 2020).

Surveys and questionnaires were a popular method to collect data about provider and consumer satisfaction and revealed a deeper understanding of the use of telehealth by them (Elliott, Bogard, & Kohlhoff, 2024; Goudswaard, Penny, Edmunds, & Arnautovska, 2024; Hall, Luechtefeld, & Woods, 2021; Hall, Woods, & Luechtefeld, 2021; Pooni, Pageler, Sandborg, & Lee, 2022; Severini et al., 2021; von Sengbusch et al., 2022; Wong, Bent, Omar, & Abousamra, 2024). Reduced time to attend appointments and travel costs were highlighted as a key benefit of telehealth (Bajwa et al., 2024; Waqar-Cowles et al., 2021) for consumers, along with ease and convenience. Providers reported

concerns about staff burnout with telehealth (Bento et al., 2023). Most of the families with neurodivergent children were satisfied with telehealth assessments and appointments, but not all (Kellom et al., 2023; McNally Keehn et al., 2022; Reisinger et al., 2022; Vivekanandarajah, Carr, Hurwitz, So, & Raman, 2024).

Retrospective data for outcomes of rehospitalisation rates, length of stay, mortality and morbidity, were analysed to assess the effectiveness of telehealth in the USA (Brociner et al., 2022; Payvandi et al., 2022; Sepsey, Sokol, Huestis, & Bhandari, 2023; Wallis et al., 2014). Alongside qualitative interviews and focus groups with providers and consumers to gain insights into their perceptions and experiences of telehealth in USA, Tunisia and Australia (Lajoie et al., 2025; Makhlouf et al., 2023; Mills et al., 2023; Vivekanandarajah et al., 2024). A thematic analysis of interviews with providers (n = 6) identified the themes; Experience of TH Care Delivery, Conflicting Expectations of Parents/Patients vs. Providers, Regulatory, Ethical, and Legal Concerns, Knowledge Gaps, Data Burden, and Moral Distress (Lajoie et al., 2025). The individualistic compatibility of telehealth was highlighted, and the need for clinicians to select patients and families carefully for good outcomes with telehealth (Armeno et al., 2022).

COVID-19 had potential impacts on the attainment of physical, social and language child developmental milestones (Choi et al., 2024; Hoffmann, Tschorn, & Spallek, 2024; Sato, Fukai, Fujisawa, & Nakamuro, 2023; R. Scott, Nguyentran, & Sullivan, 2024). Developmental delays had been reported in China after the earlier SARS outbreak (Fan et al., 2021). There were potentially negative impacts on maternal health and wellbeing and consequently on that of unborn children (Ebrahimi et al., 2022). However, a study of 50,205 children in the USA before, during and after the pandemic, demonstrated only a modest change in the attainment of communication, problem-solving and social developmental milestones and no change to fine or gross motor skills (Johnson et al., 2024). There were positive impacts of the pandemic on child development; increased activity for pre-schoolers (Lafave, Webster, McConnell, Van Wyk, & Lafave, 2021) and increased parental time with children (McIsaac et al., 2022). Protective factors identified to mitigate the risks of developmental delay included, high quality early childhood education (Wolf et al., 2022); positive childhood experiences such as after school activities and family resilience (Crouch, Radcliff, & Probst, 2023); and living with grandparents (Costa, Forni, Amato, & Sassaki, 2022). The need to strengthen early childhood education services to

ensure equitable access for families was highlighted (Costa et al., 2022; Wolf et al., 2022; Zahedivash, Padrez, & Chamberlain, 2023).

Studies provided practical guidance for using telehealth (Galway et al., 2021), and highlighted the need for further regulatory guidance as well as measures to monitor quality and effectiveness (Curfman et al., 2021; Srinivasan, Wallis, & Soares, 2022). There was a reported need for further research into the effectiveness of telehealth (Carroll et al., 2022; Ferrante, Licari, Marseglia, & La Grutta, 2021; Perdue, Mullett, Umer, & Rosen, 2021; Raina et al., 2023), and to address concerns for disparity for vulnerable populations, minority populations, non-English speaking clients and different generations (Choo et al., 2021; Haynes et al., 2021; Michel et al., 2023; Raina et al., 2023; Wallis et al., 2014).

The literature exposed that otherwise healthy children and young people experienced milder symptoms, fewer hospitalisations and lower mortality and morbidity rates than adults. However, social restrictions and the closure of schools and childcare centres, followed by the move to remote school and learning led to negative outcomes for learning, physical, emotional, and mental health. The impact of each of these areas varied with children's ages and stages of childhood. The longer-term impacts of the pandemic restrictions on children were evident in the post pandemic literature on the child development concerns and the continued high demand for mental health services for children and adolescents.

The healthcare delivery landscape dramatically changed at the start of the pandemic including the rapid uptake of telehealth. This was driven by the need to maintain healthcare services in an environment of social restrictions. However, it was facilitated by changes to Medicare billing to ensure providers were paid for telehealthcare. At the start of the pandemic evidence about the use of telehealth in children's healthcare was limited, with most of the literature focused on consumer satisfaction with telehealth. Although, there was evidence of no adversity or harm associated with using telehealth, there was a lack of evidence about the impact of telehealth use on clinical outcomes especially in children's healthcare.

2.7. Research Statements & Questions

The purpose of the study presented herein was to explore the use and experiences of telehealth in children's healthcare before, during and after the pandemic in NSLHD. In addition, to compare the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using

telehealth with traditional in-person delivery, as well as the experiences of consumers and providers with telehealth. This exploration took place in the context of an unprecedented, broad implementation of telehealth, rather than a planned approach that would typically involve selective implementation, pilot testing, and subsequent evaluation of processes and outcomes. The study aimed to contribute to the growing evidence for using technology to deliver quality healthcare (Kang et al., 2017; Robards et al., 2019; Robards et al., 2018). Taken together, the findings from the literature demonstrated a gap in knowledge of the quality of child health services delivered using telehealth compared to in-person healthcare service delivery. The primary objective was therefore, to understand the utilisation of telehealth in children's healthcare, before, during and after the COVID-19 pandemic. The secondary objectives were to understand if the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using telehealth was comparable to those delivered in-person. In addition, to understand the experiences of telehealth from the perspectives of consumers and providers. Based on the literature reviewed above, the research questions for this study in NSLHD were;

RQ1	*What was the utilisation of telehealth in children's healthcare, before, during and after the COVID-19 pandemic?*
RQ2	*Were the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using telehealth comparable to those delivered in-person?*
RQ3	*What were the experiences of telehealth from the perspectives of consumers and providers?*

The research design, ontology, methodology and methods are discussed in the next chapter.

3. Research Design

3.1. Chapter Introduction

A mixed methods approach was used to explore the expanded use of telehealth across a suite of acute paediatric and community child health care settings in Northern Sydney, NSW, Australia in response to the pandemic of 2020-22. The selected clinical settings were; a paediatric hospital in the home service; a child and family health care service; community paediatric services and paediatric allied health (physiotherapy, occupational therapy, speech pathology and social work). The mix of qualitative and quantitative data aimed to strengthen a comprehensive examination of the use of telehealth in children's healthcare. Other comparison studies aimed to study telehealth alongside the patient experience in individual specialties (Candelaria et al., 2022), but not across a spectrum of community and hospital child health services. The quantitative data were collected from three sources; 1) Northern Sydney Local Health District for telehealth utilisation and health outcomes data; 2) a consumer questionnaire; and 3) the publicly available Australian Early Development Census (AEDC) data.

The qualitative data were from semi structured interviews with both consumers and providers of children's healthcare via telehealth. The methods for the qualitative and quantitative components of this study are detailed in separate chapters as follows; Chapter 4 Quantitative Methods and Chapter 5 Qualitative Methods. The data sources are further detailed in Table 4.03.

3.2. Ethics

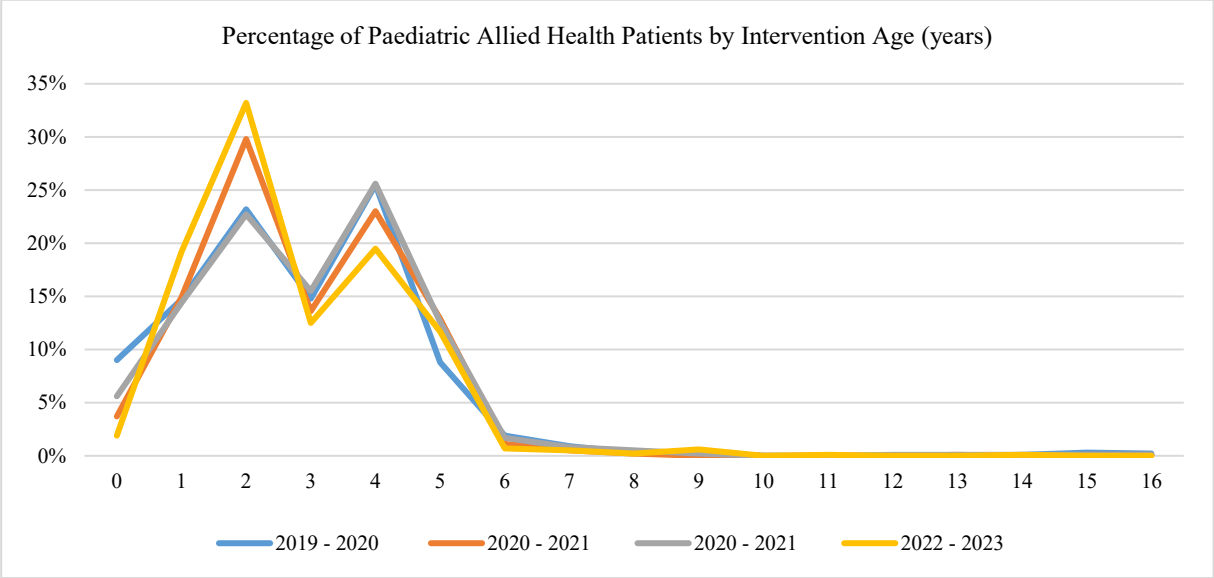
Ethics approval was gained on 14 September 2022 (2022/ETH01828) for this mixed methods study. Site Specific Assessment (SSA) approved the study (reference number 2022/STE03546) for Children's Healthcare services in Northern Sydney Local Health District on 28 March 2023. An ethics amendment in May 2023, was approved to amend the recruitment strategy. Approval was gained from the Research Ethics Governance Information System (REGIS) reference number: 2022/ETH01828.

Many of the providers interviewed, had known the researcher as a manager in children's healthcare in NSLHD. This position of authority within the district may have influenced individual the clinicians' decision to participate as a colleague and a person they knew and trusted. It is not known whether the response rate was affected.

Having said that, none of the interview participants, consumers, or providers, were related to or had a personal relationship outside of the work relationship with the researcher. The interviewer did have professional or working relationships with most of the provider interviewees but no prior contact or relationships with any of the consumers. The impact of the relationships with the recruitment and the content of the interviews is difficult to determine and cannot be ignored, but the researcher aimed to minimise through reflexivity techniques. The researcher adopted an approach of assume no prior knowledge approach to the participants to neutralise the effects but recognising that interpersonal dynamics did not necessarily come from a neutral space (Olmos-Vega, Stalmeijer, Varpio, & Kahlke, 2023; Walsh, 2003).

Children were not surveyed or interviewed for this study directly as most recipients of paediatric and child health telehealth services were preschool age as demonstrated in Figure 3.01 below, and as such their parents or carers were the most appropriate participants in the study.

Figure 3.01: Paediatric Allied Health - Patient Age Distribution



Source: NSLHD Data and Analytics Unit

3.3. Data Confidentiality

The telehealth utilisation data and the outcomes data from NSLHD were requested as anonymous with no patient names or identifiers to be included in the data.

The publicly available outcomes data from AEDC contained no individual participant data or identifiers.

The online questionnaires were completed anonymously using the REDCap (Research Electronic Data Capture version 14.3.14) online tool except for participants who indicated they were willing to be contacted for a follow-up interview. The participants were asked to provide contact details.

The interview data were collected confidentially. The transcripts were de-identified. The qualitative data were analysed as a collective and not an analysis of individual performances or experience. The purpose of the study was to examine the use of telehealth as a service delivery option and not as an evaluation of individual clinician's practice, or individual consumer healthcare experiences or outcomes.

3.4. Data Storage

A data management plan was developed as per the University of Sydney guidelines (Dash R). All data collected for this study were gathered electronically and stored as de-identified data in password protected files, stored in a password secured laptop computer, as per the University of Sydney Data Management Declaration. The password-protected files containing de-identified data were backed up on a dedicated Microsoft Teams Site with membership limited to the researcher and supervisors only. Some study notes were temporarily recorded as paper copies but once transferred to an electronic format all paper files were disposed of securely. Only the PhD candidate and the supervisors had access to the data.

Online questionnaire data were captured and managed through a dedicated REDCap data collection software account through the University of Sydney. The REDCap online collection tool account was specific to this study and not available or accessible by anyone other than the researcher. The data and data analysis from the online collection tool were used and included in this thesis. Collective data may be used and published in future journal publications related to the study, however, individual responses and respondents will not be identified. The relatively small number of paediatric and child health clinicians in the NSLHD means a clinician could be identified by their position title. To mitigate this generic, descriptive titles such as manager or nurse were used.

All data were stored securely, and any person or place identifying information kept in strictest confidence, except as required by law. Any information obtained during the study that suggested malpractice or unsafe clinical practice by healthcare professionals would have been discussed with the

individual and referred to NSLHD management, as per section 2.4 of the NSW Health Code of Conduct PD2015_049 (NSW Health, 2015a).

The University of Sydney's Research Data Management Policy 2014 informed the management of all data used. Supported University platforms were used to maintain the integrity and security of the research data. The times series data from NSLHD was extracted by the NSLHD Analytics & Performance Unit and made available to the researcher via a secure TeamSite link, then securely managed same as the other study data.

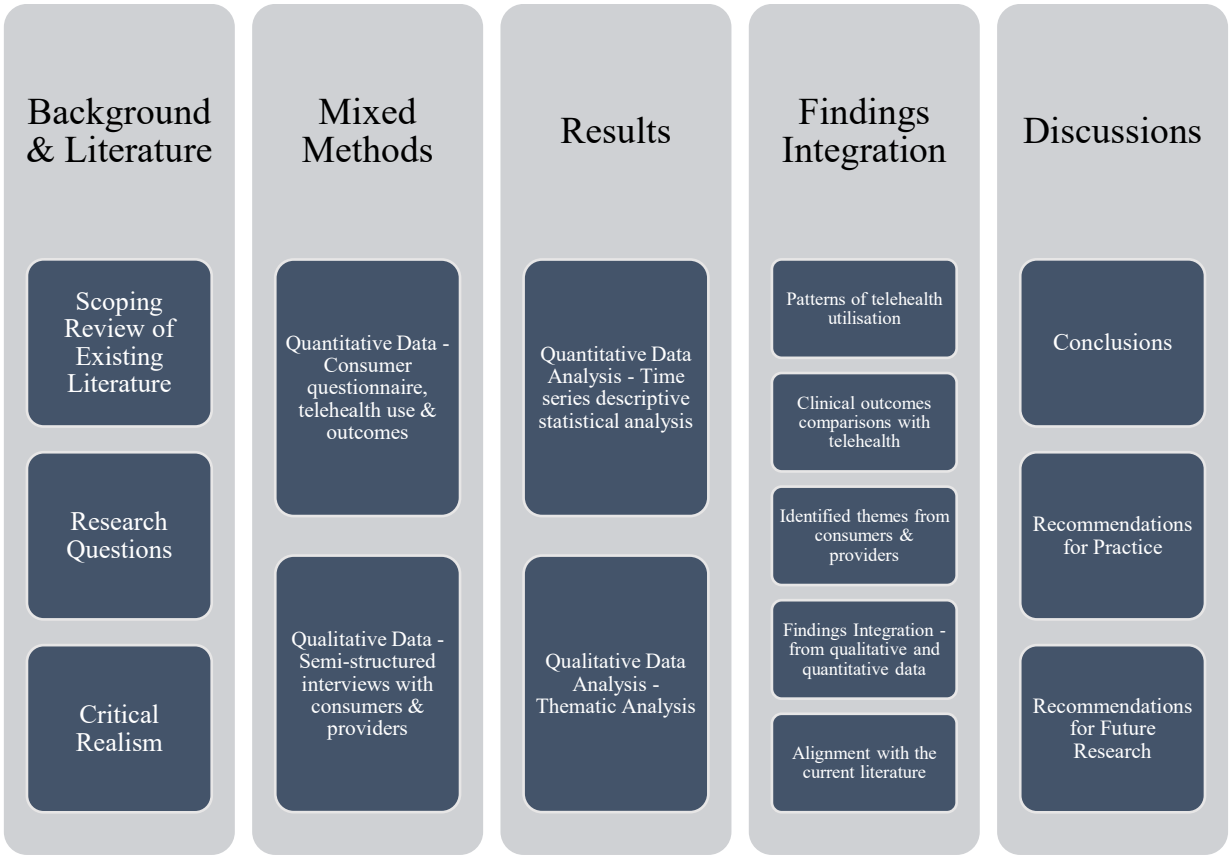
The interviews were audio recorded, which were deleted once they have been transcribed. Only the transcripts were stored securely for the study. The data collected during the interview were anonymous and all attempts to ensure participants could not be identified were taken. Study records including online questionnaire results and interview transcripts will be retained for a minimum of 5 years post study completion or last publication due to this research being considered Health Research/Social Science, as per the University of Sydney Research Data Management Provisions 2017.

The information collected for this study may be used in future projects. By providing their consent they agreed to allow us to use their information in future projects. The researcher does not know at this stage what these may involve, if at all. Applications for variation to the ethics approval will be made if required.

3.5. Research Approach

A mixed methods approach was used for this study. This approach sought to acheive a comprehensive exploration of telehealth in children's healthcare by leveraging the strengths of both qualitative and quantitative methods. The approach explored the experiences of consumers and providers of telehealth in children's healthcare and compared clinical outcomes across a times series of before, during and after the pandemic. The study herein provided the opportunity to examine telehealth in a natural, or real-world setting, which can have its own bias limitations (Minary et al., 2019). However, naturalism is a 'cornerstone' of critical realism, the underlying philosophy for this study (Bhaskar, 1979). The thesis overview of the research plan is summarised below in Figure 3.02.

Figure 3.02: Overview of Thesis



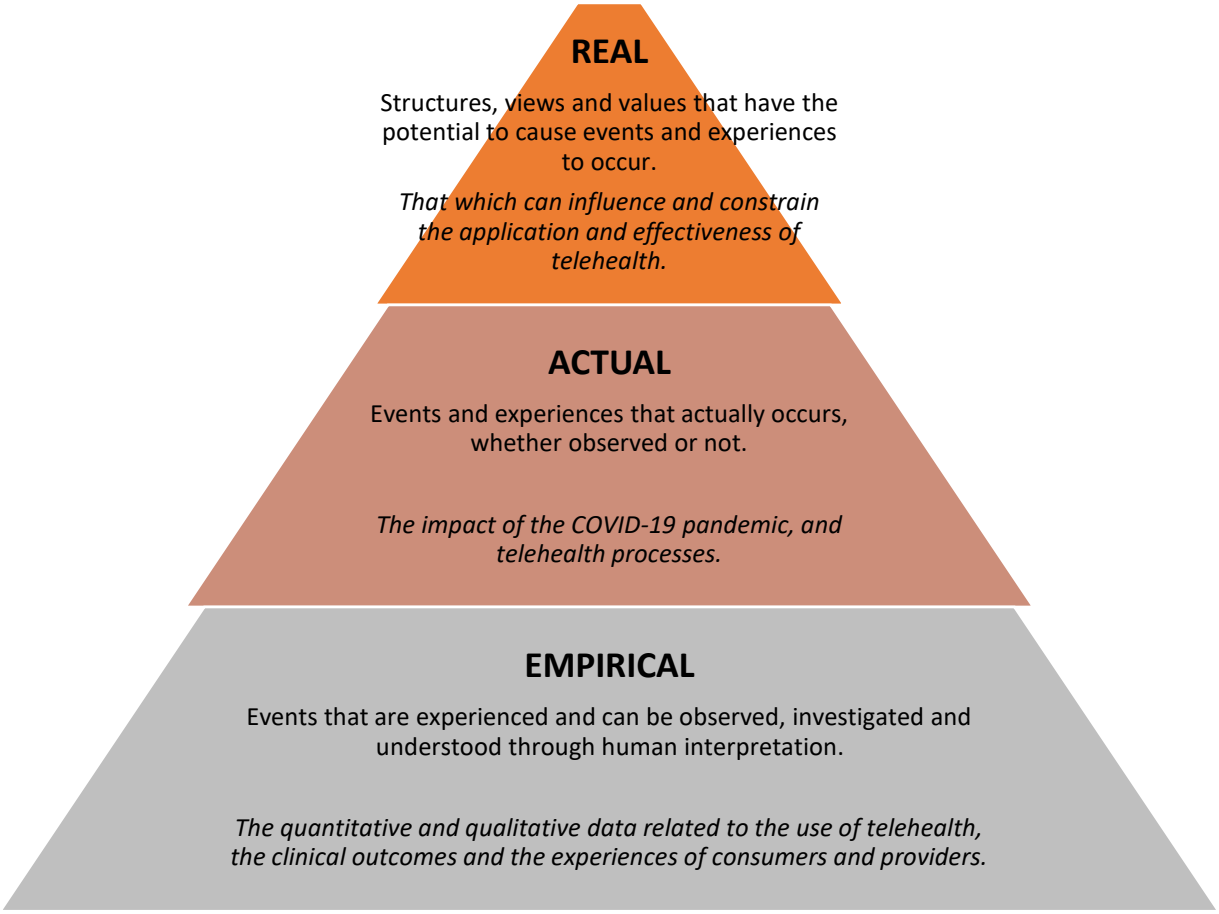
3.6. Critical Realism

A study of the use of telehealth in children's healthcare called for an approach that could accommodate complexity. A critical realism approach provided the ability to identify coherence and consistency in the quantitative and qualitative methods (Deforger & Shaw, 2011). Critical realism was an appropriate approach to compare the clinical outcomes from children's healthcare services delivered through the range of modalities and by healthcare providers representing a suite of health disciplines. It provided the freedom to uncover a deeper understanding through the integration of quantitative and qualitative methods. In addition, the researcher was aiming to capture an insider, or emic perspective on the use of telehealth from the provider and consumer perspectives, within a naturalist setting and to represent them accurately, through a mixed methods study (Milne & Oberle, 2005).

The application of critical realism to this study provided an opportunity to explore a deeper understanding of the mechanisms and structures that underpin the observed reality of telehealth and therefore provide insights into how this could be altered or influenced. Critical Realism combines elements of both realism and interpretivism to understand a reality, and the deeper mechanisms that

influence that reality (Mukumbang, 2023). It assumes there is an observable reality, that we can see, hear, and feel, but that is also shaped by personal, social, historical, and cultural influences. As such it can provide an understanding of the social world accepting the influence of both social structures, and the actions and beliefs of individuals (Fletcher, 2017; McEvoy & Richards, 2006; Mukumbang, 2023). Critical Realism proposes three ontological levels of reality, or the events and experiences of that reality, Empirical, Actual and Real (Refer to Figure 3.03).

Figure 3.03: Three Ontological Levels of Reality



The *Empirical level* encompasses our observations and experiences. It refers to the events and experiences we can directly perceive and measure. The *Actual level* includes events and processes that occur, whether they are observed or not. It is the domain of what happens, independent of our awareness of it. Lastly, the *Real level* represents the underlying mechanisms and structures that generate observable events and experiences. It involves the deeper, often hidden factors that influence the empirical and actual levels (Mukumbang, 2023). The mechanisms can be defined as the causal entities that trigger or generate an observable event (Bygstad & Munkvold, 2011; Dalkin, Greenhalgh, Jones,

Cunningham, & Lhussier, 2015; Danermark, 2022; Edwards, 2021a; McEvoy & Richards, 2006; Mukumbang, 2023), that is that Critical Realism emphasises the importance of both empirical evidence, and theoretical insights to understand the mechanisms. To bridge the gap, a context-sensitive analysis is needed (Mukumbang, 2023). The delivery of children's healthcare using telehealth, interacts with these ontological levels of critical realism as follows:

The Empirical Level

Telehealth involves the direct experiences and observations of patients and healthcare providers using telehealth tools of video calls, messaging, and remote monitoring devices. These are tangible, observable interactions that can be measured and assessed. In this study the quantitative and qualitative data related to the use of telehealth, the clinical outcomes from services using telehealth, and the experiences of consumers and provider with telehealth form the empirical level.

The Actual Level

Telehealth systems and processes occur regardless of whether they are observed or not and fall into this category. For example, the actual practice of delivering care via telehealth including consultations, assessments, and therapies, happens regardless of whether it is directly witnessed by an external observer, or not. This includes both the successful and unsuccessful attempts at telehealth delivery, such as technical issues or missed appointments.

The Real Level

Telehealth is influenced by underlying structures and mechanisms that might include the technological infrastructure (internet access, telehealth platforms), socioeconomics (access to technology, digital literacy), institutional structures (healthcare policies, funding models), as well as the views, values and beliefs of both consumers and providers of telehealth. These can influence and constrain the application and effectiveness of telehealth, potentially in ways that are not immediately apparent in the empirical observations.

Exploring telehealth through the lens of critical realism aims to appreciate that while we can observe and measure its effects (empirical) and recognise that it operates in practice (actual), there are deeper, often less visible structures and mechanisms (real) that impact its success and integration into the

healthcare system. Critical Realism uses several steps to analyse and evaluate the events and experiences, and the structures, mechanisms, views and values that influence them (Bhaskar, 1979; Danermark, Ekström, & Karlsson, 2001; Edwards, 2021b; McEvoy & Richards, 2006). This begins at the empirical level where initial insights into empirical data and individual perceptions of an event or experience are derived, along with identifying irregularities and issues that require further explanation (Bygstad & Munkvold, 2011; Danermark et al., 2001; Fletcher, 2017; Mukumbang, 2023). To develop a deeper theoretical understanding of these a process of theoretical redescription, retroduction or abduction to modify, reject and support theoretical explanations and perspectives to explore the key issues are used (Bygstad & Munkvold, 2011; Fletcher, 2017). The purpose of this analytical process was to hypothesise about the structures, mechanisms, views and values to lead to a deeper examination of the events and experiences of telehealth being studied (Bygstad & Munkvold, 2011; Fletcher, 2017; Mukumbang, 2023; Wynne & Williams, 2012).

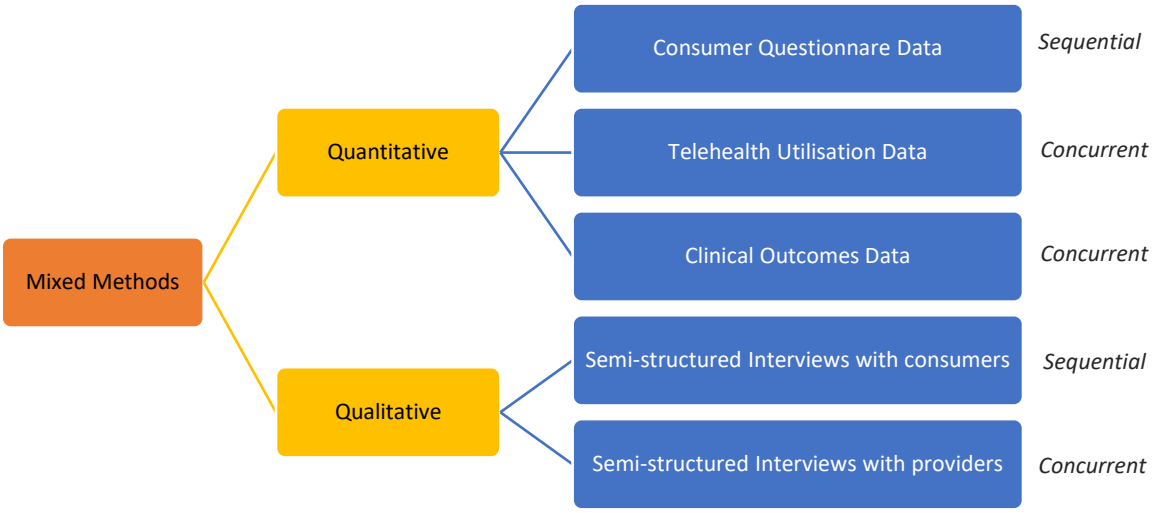
3.7. Methodology

Mixed Methods (MM) research in its simplest terms, is a study whereby a mix of qualitative and quantitative methods are applied, to enable the researcher to collect, analyse and draw conclusions from a mix of data methods for a single line of enquiry (Creswell & Plano-Clark, 2010). The timing of the quantitative and qualitative strands of a mixed methods study can be concurrent, sequential or a multi-component combination of the two (Creswell & Plano-Clark, 2010; Tashakkori & Teddlie, 2010). This study combined concurrent and sequential strategies within a mixed methods design with multiple components, allowing for flexibility in the timing and sequence of the qualitative and quantitative components (Creswell & Plano-Clark, 2010; Tashakkori & Teddlie, 2010). The concurrent mixed methods design resulted in the majority of the qualitative and quantitative data collected at the same time and the study informed by a theoretical perspective, in this case critical realism, and the data integrated at the interpretation level (Kroll & Neri, 2009). However, within the qualitative data collection was a sequential component, whereby the consumers completed a quantitative questionnaire followed by an interview for those who volunteered to participate. The recruitment of the consumers for the interviews was via the consumer questionnaire meaning this component of the data collection had to

be sequential, although the findings from the questionnaire did not necessarily guide the qualitative interviews.

This mixed methods research design was in pursuit of a comprehensive examination of the use of telehealth for children's healthcare services. The multiplism of data collection methodology and analysis for this study consequently required integration to gain a deeper understanding of the reality of telehealth in children's healthcare (R Johnson, Onwuegbuzie, & Turner, 2007). The study's mixed methods design is presented in Figure 3.04.

Figure 3.04: Mixed Methods Design



Along with qualitative research and quantitative research mixed methods research is recognised and respected as its own research approach or research paradigm and has evolved, in response to the evolution of the complexity of research questions, by providing the means to combine data sources within research to achieve more complex analysis of questions. (Johnson et al., 2007). A composite definition based on consensus from the literature, sought to provide researchers with identified characteristics of MM and to propose its importance in research for the provision of superior findings and outcomes in the right application, and acknowledge MM as the third paradigm or third methodological movement (Creswell & Plano-Clark, 2010; Johnson et al., 2007).

There are variations within mixed methods studies based on; a) what is being mixed; b) where in the process the mixing occurred; c) the scope of the mixing; d) the reason for mixing and e) the elements driving the research (Creswell & Plano-Clark, 2010; Johnson et al., 2007). In this study the integration or mixing of data was based on the premise that a greater depth of investigation and understanding is

achieved through the combination of mixed data sources and mixed data analysis. The mixed methods approach is not without disadvantages and challenges. For example, multiple skills are required of a researcher for the different methods, in addition the data collection and the analysis from multiple sources can be time consuming (Creswell & Plano-Clark, 2010).

As a mixed methods research design, it was important to look at sample sizes, data collection methods and participants for each method. This study had a significantly larger sample size for the quantitative data, than the qualitative data. The participants for the qualitative interviews were recruited through an invitation to participate in the follow-up interviews at the end of the qualitative online questionnaire. This enabled one set of data to build on the other as part of mixed methods research.

The emic and etic nature of holistic healthcare and the increasing complexity of questions in healthcare research lend themselves to mixed methods approaches (Creswell & Plano-Clark, 2010; Johnson et al., 2007; Mukherjee, Wray, Commers, Hollins, & Curfs, 2013). The interviews allowed for an emic perspective, uncovering individual viewpoints on telehealth, which complemented the etic perspective of the healthcare system's broader view on telehealth.

3.8. Methods

Method pluralism was embraced for this study. The research question relied on the value of analysing numerous sources of data (May, Hunter, & Jason, 2018). The quantitative data for this research were consumer questionnaire data, healthcare performance data, and times series clinical outcomes data.

The qualitative data gathered from semi-structured interviews with staff and consumers focused on their experiences and perspectives regarding the use of telehealth or virtual care for children. Focus groups were considered for this study, as a popular alternative to interviews for qualitative research, but the relatively small number of interview participants and the availability of participants did not make focus groups a viable option. (Bradshaw, Atkinson, & Doody, 2017; Elliott & Timulak, 2005). Participants were provided the option to undertake the interviews in-person (if restrictions permitted), or via a suitable online platform depending on the preference of participants and their availability to attend. All participants chose to be interviewed online using the videoconferencing through the Microsoft Teams application.

3.9. Data Integration

The multiplism of this mixed methods study facilitated data analysis through integration and cross comparisons between the qualitative interview data and quantitative utilisation and outcomes data. The analysis of multiple data sources together aimed to enhance theoretical outcomes that are supported by the data and the research methodologies through data integration (Creswell & Plano-Clark, 2010).

Integration in its most simplistic sense, is the combining, merging, or integrating of data from diverse sources for analysis. Integration can occur at the design, methods, and interpretation levels within a mixed methods research study (Fetters, Curry, & Creswell, 2013). As a mixed methods study the data analysis happens separately, but integration happens at the interpretation level when the findings from both qualitative and quantitative data were merged to be compared and interpreted together (Kroll & Neri, 2009). This merging of data enabled a deeper understanding of the events and experiences of telehealth by seeing how the distinct types of data complemented or contradicted each other.

Data integration in research offers the benefits of potentially enhanced insights, and a deeper, more comprehensive understanding. However, it also comes with challenges that researchers must navigate carefully to ensure the validity and reliability of their findings including; complexity in design and implementation (Creswell & Plano-Clark, 2010); challenges in data integration (Teddlie & Tashakkori, 2009); increased time and resource requirements (Johnson & Onwuegbuzie, 2004); potential for conflicting results (Greene, Caracelli, & Graham, 1989); integration expertise required (Fetters et al., 2013); difficulty in comparing and synthesising data (Plano-Clark & Ivankova, 2016); and risk of one type of data overshadowing the other (Bryman, 2006). In this study, the approach was integration through narrative, with a contiguous approach whereby the qualitative and quantitative findings are reported separately within this thesis (Creswell & Plano-Clark, 2010; Fetters et al., 2013). Refer to Quantitative Data in Chapter 6 and Qualitative Data in Chapter 7.

This concludes the mixed methods research design for the study. The details of the quantitative and qualitative methods are provided separately in the next chapters. The quantitative and qualitative data then provided in separate chapters before the findings are integrated in the discussion chapter.

4. Quantitative Methods

4.1. Chapter Introduction

This chapter details the methods used for collecting and analysing the quantitative data. These data were a) telehealth utilisation data, b) consumer questionnaire data, and c) health outcomes data. The methods used for collecting and analysing the qualitative data are detailed in section 5.0 Qualitative Methods.

4.2. Research Questions

The quantitative research part of this study was framed by the first two research questions in section 2.7.

RQ1 - What was the utilisation of telehealth in children's healthcare, before, during and after the COVID-19 pandemic?

RQ2 - Are the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using telehealth comparable to those delivered in-person?

A PICO framework was used to focus the research question and the data collection plan (Table 4.01), as is often used by researchers when examining interventions or comparing different treatments or outcomes (Jensen, 2018). PICO stands for:

- **P** (Population or Patient): The group or individual being studied.
- **I** (Intervention): The treatment, procedure, or exposure being investigated.
- **C** (Comparison): The alternative intervention, or treatment.
- **O** (Outcome): The expected effect or result of the intervention

A Program Logic Model (Table 4.02 in Appendices) was used to further define the research and link the expected outcomes of the research with the research questions. The logic model provided a visual framework of the relationship between inputs, activities, outputs, and outcomes to illustrate how I intended to achieve the study goals (NSW Centre for Epidemiology and Evidence, 2020). From this, several quantitative sub-research questions were applied (Table 4.03).

Table 4.03: Quantitative Research Questions, Sub-Questions & Data Sources

Research Questions	Research Sub-Questions	Data Source
RQ1 - What was the utilisation of telehealth in children's healthcare, before, during and after the COVID-19 pandemic?	a. Was there an increased use of telehealth in children's healthcare during the pandemic?	• Telehealth Utilisation Data (NSLHD)
RQ2 - Are the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using telehealth comparable to those delivered in-person?	b. Are the clinical outcomes using telehealth comparable to in-person health delivery?	• Consumer Questionnaire • Clinical Outcomes Data (NSLHD) • Acute Paediatrics Average Length of Stay
RQ2 - Are the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using telehealth comparable to those delivered in-person?	c. Are consumers and providers satisfied with telehealth? d. Were there any changes between the age of children being referred to paediatric allied health services and delays in either accessing services or identifying the need for services, and the use of telehealth? e. Were there any changes between child development assessment services and referral rates to specialist services for child development concerns, and the use of telehealth? f. Were there any changes between the length of paediatric allied health treatment time and therapeutic progress, and the use of telehealth? g. Were there any changes between the incidence of developmental vulnerabilities in pre-school children, before, during and after the pandemic and the extended periods of social restrictions?	• Consumer Questionnaire • Clinical Outcomes Data (NSLHD) o Age distribution for paediatric allied health services o Paediatric allied health referral rates o Child health developmental checks o Average Patient Attributed Time Paediatric Allied Health Completion Rates • AEDC Data o Numbers of children developmentally on track when they start school
RQ2 - Are the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using telehealth comparable to those delivered in-person?	h. Is telehealth a safe modality of care?	• Clinical Incidents (IMS+) related to telehealth • Clinical Deterioration Data - Paediatric Hospital in the Home a) No. Readmissions b) No. Ambulance calls or ED readmission

4.3. Telehealth Utilisation Data

The Telehealth Utilisation Data were received from the NSLHD Analytics & Performance Unit following a formal request to each site-specific authority (SSA) for which the study had approval for in NSLHD. The data were sourced from a) the Allied Health Dashboard (Qlikview); b) Non-admitted

Patient and Supplementary Services Data Collection; c) Allied Health Data Set Extension; and d) Paediatric HITH databases within NSW Health and NSLHD. These data sources are part of the NSW Health and NSLHD routine data capture and data governance to monitor trends and inform clinical and operational decision making as well as quality initiatives. The datasets requested specifically for this study covered the same period as the clinical outcomes data from the 2018/19 to 2022/2023 financial years. The data pertained to paediatric patients (before their 16th birthday). The occasions of service (OOS) data were received for a) the paediatric hospital in the home, b) allied health, c) child and family health and d) community paediatric services. In the Australian healthcare systems, the term occasions of service or OOS is defined as any examination, consultation, treatment, or other service provided to a patient by a healthcare provide (Australian Institute of Health and Welfare, 2025). All data were received de-identified before a descriptive statistical analysis was applied.

4.4. Consumer Questionnaire

An online questionnaire for families of children who had recently used telehealth, was developed by the researcher to capture the consumer experience and satisfaction with telehealth and promoted to parents via posters in various child health facilities in NSLHD. The questionnaire was intended to generate quantitative data using multichoice questions, rating scales, and free text questions about the various aspects of telehealth. The start of the questionnaire outlined the purpose of the questionnaire and requested consent to proceed. The initial questions related to demographic data from the participant including age, education level, and language spoken. This was followed by seven multiple choice questions exploring their experiences and perceptions as a consumer of telehealth in children's healthcare. For example, which of these services have you used in the past 12 months for your child's health and wellbeing with telehealth?; based on your most recent experience with telehealth for your child, did you achieve everything you wanted through your telehealth appointment compared to an in-person appointment?; how satisfied were you with the following health services and the use of telehealth for your child?; and did you need to have an in-person appointment after your telehealth appointment to complete your child's care?.

The final part of the questionnaire consisted of free text questions such as what factors made telehealth successful or unsuccessful for you and your child? were there any unexpected benefits to using

telehealth? and how can telehealth/virtual care be improved in the future? These free text questions generated a small amount of qualitative data. The questionnaire is detailed in Figure 4.01.

The questionnaire was referred to as a 'survey' in the online tool and participant documents. This was an inaccurate use of the term survey, which is a broader method that involves collecting data using various tools, while a questionnaire is a specific tool used to gather responses from participants (Koo & Yang, 2025; Ranganathan & Caduff, 2023).

Branching logic, sometimes referred to as skip logic was used in the design of the questionnaire to enable fields in the database to be hidden from participants during circumstances where it is not relevant based on earlier responses. For example, only if the participant answers 'yes' to the consent question were the remainder of the questions visible to them. Similarly, they were only asked to rate services they had identified as accessed in an earlier question. The aim was to create a more tailored questionnaire for the participant by hiding questions not relevant to them, and minimise participant drop out (Nestler, Thielsch, Vasilev, & Back, 2015). Anonymity had been demonstrated to encourage participation. Short questionnaires with demographic questions at the beginning aimed to reduce participant drop-out (Nestler et al., 2015). The questionnaire had section breaks with the benefit of capturing data within each section even if the questionnaire was not completed in its entirety.

Questionnaire Collection Period

The questionnaire was distributed between May 2023 to April 2024.

Questionnaire Data Capture Tool

Data were collected and managed using REDCap electronic data capture tools hosted at The University of Sydney (Harris et al., 2019; Harris et al., 2009). REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies. It provides; a) an intuitive interface for validated data capture; b) audit trails for tracking data manipulation and export procedures; c) automated export procedures for seamless data downloads to common statistical packages; and d) procedures for data integration and interoperability with external sources.

REDCap permits downloads of data to Excel, PDF, SAS, SPSS, Stata, and R-Excel and SPSS software. This was used to assist with the data management and data analysis. The free text responses from the Excel download of the REDCap questionnaire results, were uploaded to NVivo to incorporate into the qualitative analysis of the interviews.

Questionnaire Sample Size

The sample size was approximately 2,000 families who would have potentially had the opportunity to participate in the online questionnaire with an expected participation rate between 5% and 15%, or between 100 to 300 responses. To calculate the optimal sample size this study used the Raosoft online sample size calculation tool (Raosoft Inc, 2004). The calculated sample size for a representative sample allowing generalisation of the consumer survey results was 323. This was based on an expected margin of error of 5%, confidence level of 95%, an estimated population size of 2,000; and the response distribution of 50%. An allowance of 20% for incomplete questionnaire responses was added to the calculated 323, resulting in an optimal sample size of 403.

The sample size power calculations are based the statistical assumptions that variation is acceptable, that a confidence level of 95% is represents tolerable certainty, and an estimated denominator i.e., the population who could have received healthcare for their child via telehealth in NSLHD, is approximately 2,000 annually.

Questionnaire Distribution

Participant recruitment posters (Figure 4.02) for the consumer questionnaire were distributed to all the acute paediatric hospital and child health community facilities in NSLHD to be displayed in patient areas such as waiting rooms. The posters contained a QR code link to the REDCap online questionnaire tool. Similarly, flyer versions of the posters were available to be given to families on attendance to an NSLHD child health service.

Families of children aged under 16 years of age, who had received care through a telehealth were eligible to participate in an online questionnaire post discharge from a child health service in NSLHD identified in the inclusion criteria section, which provided (or commenced) them with child healthcare via telehealth during the data collection period. However, by the nature of telehealth, the parents/carers

were at home and not in the healthcare facilities to see the posters, resulting in the initial response rate to this strategy being minimal with only six (6) responses in the first two months and no recruitment of families to be interviewed. A variation to ethics was sought and approved that allowed parents/carers of children who had received care via telehealth to be sent an invitation via email or SMS message from an administrative officer, not a clinician involved in their care. The email and SMS messages mirrored the wording in the poster (Figure 4.03).

Inclusion Criteria

This compromised of families with children aged under 16 years of age, who had received child health services via telehealth in NSLHD in the preceding 12 months. In NSW, paediatrics is defined as under 16 years of age (NSW Health, 2010a). These services were Paediatric Hospital in the Home; Paediatric Outpatients; Paediatric COVID Virtual Hospital; Child and Family Health Nursing; Child Development Service; Community Paediatrics; Paediatric Physiotherapy; Paediatric Speech Pathology; Paediatric Occupational Therapy; and Social Work.

Exclusion Criteria

Families with children aged over 16 years of age, or families who had received child health service more than 12 months prior to study were excluded from the study. Other exclusions were families whose telehealth interactions included child protection and family violence services; mental health; general practice; and private practice.

Consent

The online questionnaire included access to the PIS and a consent question on the landing page, was *"I am the parent/carer of a child/children who has received healthcare in Northern Sydney Local Health District via telehealth in the past 2 years and have read the Participant Information Sheet (PIS) and agreed to participate."* This was a YES/NO response. The branching logic only permitted the rest of the questions to be shown if the participant responded YES to question 1. Participants were able to commence the questionnaire once they had answered that they had read the PIS.

Questionnaire Statistical Analysis

Descriptive statistics, including frequencies and percentages, median scores for Likert scales, standard deviations were used for the ordinal data from the questionnaire. Free-text responses were treated as qualitative data and analysed using thematic analysis to identify patterns and key themes (refer to section 5.9 Thematic Analysis Plan).

4.5. Telehealth Utilisation Data

The Telehealth Utilisation Data were received from the NSLHD Analytics & Performance Unit following a formal request to each site-specific authority (SSA) for which the study had approval for in NSLHD. The data were sourced from a) the Allied Health Dashboard (Qlikview); b) Non-admitted Patient and Supplementary Services Data Collection; c) Allied Health Data Set Extension; and d) Paediatric HITH databases within NSW Health and NSLHD. These data sources are part of the NSW Health and NSLHD routine data capture and data governance to monitor trends and inform clinical and operational decision making as well as quality initiatives. The datasets requested specifically for this study covered the same period as the clinical outcomes data from the 2018/19 to 2022/2023 financial years. The data pertained to paediatric patients (before their 16th birthday). The occasions of service (OOS) data were received for a) the paediatric hospital in the home, b) allied health, c) child and family health and d) community paediatric services. In the Australian healthcare systems, the term occasions of service is defined as any examination, consultation, treatment, or other service provided to a patient by a healthcare provide (Australian Institute of Health and Welfare, 2025). All data were received de-identified before a descriptive statistical analysis was applied.

4.6. Clinical Outcomes Data

Outcomes are a measure of quality or achievement and can be measured using empirical data. The World Health Organization defines outcomes as a *"change in the health of an individual, group of people, or population that is attributable to an intervention or series of interventions" (cited in Manglik et al 2024, page 36) (Manglik, Experts, & Community, 2024)*. The clinical outcomes data include examination or test results, patient reported outcomes or experience, service utilisation, timeliness of treatment, safety, morbidity and mortality rates, satisfaction, and cost effectiveness (Abimbola et al.,

2019; Serban, 2019). All available data were included in the study, representing; a) Readmission rates for paediatric hospital in the home; b) Ambulance calls or ED readmission for Paediatric Hospital in the Home; c) Clinical incidents related to telehealth; d) Acute Paediatrics Average Length of Stay; e) Age distribution for paediatric allied health services; f) Paediatric allied health referral rates; g) Child health developmental checks; h) Average Patient Attributed Time; i) Paediatric Allied Health Completion Rates; and j) Numbers of children who are developmentally on track.

4.6.1. Outcome Measurements Rationale

Regarding the safety of telehealth services, clinical deterioration responses were measured as readmission rates from paediatric hospital in the home and virtual care services. In the NSW Health system, there are two levels of clinical deterioration (NSW Health, 2025):

1. Red Level (Rapid Response): Critical, life-threatening deterioration requiring immediate, high-level intervention e.g., Code Blue or Cardiac Arrest.
2. Yellow Level (Clinical Review): Moderate deterioration that requires urgent attention but is not immediately life-threatening. An urgent clinical review by the medical team is required.

Both levels are part of a structured system aimed at ensuring timely responses to changes in a patient's condition, helping to minimise the risk of serious harm or adverse outcomes. For paediatric hospital in the home (P-HITH) patients, clinical deterioration is often noted by parents/carers who contact the paediatric hospital clinicians for advice. If deterioration is suspected, then the child is readmitted to hospital as an inpatient. The readmission rates for these services therefore provides data associated with clinical deterioration rates for P-HITH and COVID virtual hospital care for children. This is comparable with the yellow response level for paediatric inpatients. A comparable red response level for P-HITH is when the family call an ambulance or present their child to an emergency department whilst still under the care of paediatric hospital in the home or virtual care services. Comparable readmission rates would be expected before, during and after the pandemic. Readmission rates are the percentage of patients who have an unplanned readmission within 28 days following discharge to the same facility for any purpose. It is often used as a measure of healthcare quality and can indicate ineffectiveness of treatment during a hospital stay. As P-HITH is classified as a virtual inpatient service, readmission rates can be reported.

Clinical Outcomes data from community-based child health services such as child and family health, and allied health included the number of child development checks completed; the number of referrals for developmental concerns to specialised services; sessions attended per child/ length of treatment or intervention; and referral waiting times for specialist child health services such as allied health and specialist medical consultations. These were different to paediatric hospital outcomes to reflect the different nature of the services. There were two distinct sub-groups to this data. Firstly, the outcomes data to demonstrate the ability for child and family health nurses to continue to successfully complete child development checks via telehealth as part of routine child development screening. Secondly, to effectively identify any concerns or vulnerabilities that required referral to specialist health services.

The second sub-group was paediatric allied health. The clinical outcome measurement was the therapeutic progress, and the fact that it should require comparable numbers of sessions or lengths of treatment time regardless of the service delivery modes, if all delivery options are equally effective. The Average Patient Attributed Time (PAT) per patient for allied health professionals is the total amount of time they are involved in a patient's direct care as well as the associated time related to their care e.g. case meetings, phone calls or correspondence to organise care or care delivery for an individual.

The Australian Early Development Census (AEDC), previously known as the Australian Early Development Index (AEDI), data provides a national child development measurement monitoring in Australia, and have been shown to predict children's later outcomes in health, wellbeing, and academic success (Australian Early Development Census (AEDC), 2022). The AEDC data is gathered by teachers collect data for each child during their first year of school in Australia. The data is collected from five domains; language and cognitive skills; communication skills and general knowledge; emotional maturity; social competence; and physical health and wellbeing (Australian Early Development Census (AEDC), 2016, 2019a, 2019b, 2022, 2025; Australian Early Development Index (AEDI), 2011 (Re-issue), 2013). Children are determined to be either 'developmentally on track,' 'developmentally at risk' or developmentally vulnerable' on each domain. This data has been collected every three years since 2009 and national reports published the year following each data collection. For this study, the AEDC data reports were accessed for the 2009, 2012, 2015, 2018, 2021 and 2024 censuses to provide child health outcomes over study comparison periods. NSLHD data were derived by combining the data from

the nine relevant Local Government Areas (LGAs) within the boundaries of NSLHD; Hornsby; Hunters Hill; Ku-ring-gai; Lane Cove; Mosman; North Sydney; Northern Beaches; Ryde; and Willoughby.

From a safety perspective, the incidents, complaints, and compliments data for NSLHD were sourced by the NSLHD Clinical Governance Unit from the IMS+ and QIDS databases. Incident data for NSW healthcare facilities is accessible via the NSW Clinical Excellence Commission (CEC) Quality Improvement Data System (QIDS) (Clinical Excellence Commission, 2024).

4.6.2. Times Series Dates

The times series data covered a 5-year period from 2017 to 2023 to include the before, during and after periods of the pandemic (refer to Table 4.04). The data collection time periods assume minimal, or no telehealth was used for children's healthcare prior to COVID-19, but that it became a routine part of care in response to the first COVID-19 outbreak and continued beyond 2021. The data were not specifically or exclusively related to telehealth but reflective of all service delivery modalities.

Table 4.04: Times Series Dates

Time Period	Dates
Before Pandemic	January 2017 to December 2019
During Pandemic	January 2020 to June 2022
After Pandemic	July 2022 to December 2024

4.6.3. Data Sources

There were two primary sources for the quantitative clinical outcomes and safety data. Firstly, the NSLHD databases (part of NSW Health Ministry of Health). Secondly, the publicly available Australian Early Development Census (AEDC) data and reports from 2012, 2015, 2018, 2021, and 2024.

The telehealth utilisation and some of the outcome data were received from the NSLHD Analytics & Performance Unit following a formal request for the data as specified in the approved ethics application, and subsequent site-specific authority (SSA) for NSLHD. The data collection period was conducted over approximately 12 months following Ethics approval, as the researcher went back and forth to NSLHD for data clarification and refinement. The data were sourced from the; Allied Health Dashboard (Qlikview); Non-admitted Patient and Supplementary Services Data Collection: Incident Management

Systems; Allied Health Data Set Extension; and Paediatric HITH databases within NSW Health and NSLHD. The NSLHD deidentified outcomes data were provided as Excel spreadsheets and pivot tables.

In late 2023 to early 2024 NSLHD transitioned Dashboard access to data for internal healthcare staff, the information from the dashboards now comes from EDW (EDWARD) instead of HIE. Data accessibility was made available via the NSLHD Intranet 'data hub' with Guided Insight dashboard available for ED, AP (Admitted Patients), and NAP (Non-admitted patients).

4.6.4. Limitations of the Data

Due to limitations in the available quantitative outcomes data, the research questions about referral rates could not be addressed. Some child health outcomes lacked detailed or accurate data due to changes in reporting methods, KPI definitions, and the modality of care. Additionally, the movement of families across LHD boundaries during the first five years of a child's life further complicated the monitoring of population numbers for child developmental checks. For example, the percentage of children who underwent developmental milestone checks could not be determined in this study, as the denominator for children residing in the NSLHD area at any given time was unknown.

Between 2018 and 2023 there were changes to the Key Performance Indictors (KPIs) for Local Health Districts (LHDs) related to the health and developmental checks undertaken in the first weeks of a child's life, as well as changes to data collection systems used. Previous reporting had been on the number of Universal Home Health Visits (UHHV) conducting in the first 2 weeks after birth, but this was changed to the number of 1-to-4-week checks. UHHV were a mandatory requirement for LHDs to offer a minimum of one universal contact with families within two weeks of birth in the families' homes, with the aim of engaging and supporting families with young children (NSW Health, 2010b). The move to 1-to-4 week checks was in line with the NSW Health First 2000 Days framework (NSW Health, 2019). In the 2023/2024 financial year, NSW Ministry of Health began extracting this data directly from a new system known as EDWARD and reporting parameter details for LHDs had not yet been made available.

4.7. Statistical Analysis

For the telehealth utilisation and clinical outcomes data, a descriptive statistical approach using Microsoft Excel enabled the researcher to format, organise and calculate data in a spreadsheet. The Pivot Table feature in MS Excel enabled the management, analysis, and visualisation of the data. Data are reported as frequencies (n) and percentages (%), with 95% confidence intervals (95% CI) calculated for some of the percentages. CIs were calculated using the online tool 'Epitools' (https://epitools.ausvet.com.au/ztesttwo). CIs represents the plausible range of values for the true population parameter, offering more insight than a single point estimate. CIs that do not overlap, or partially overlap, are considered to indicate statistical significance ($P < 0.05$) between the groups in the comparison (Cumming, 2009; Hazra, 2017). The rationale for 95% CIs in this study was to compare the significance of clinical outcomes data before and after the pandemic that started in 2020. When reporting results based on the 95% CIs, the term 'significance' denotes statistical significance.

4.7.1. Analysis Approach

An inferential, multivariable Time Series Descriptive Analysis of the telehealth utilisation and clinical outcomes data was conducted using multiple points in time to retrospectively explore trends and changes before, during and after the pandemic. This approach allowed for the identification of underlying patterns. Descriptive statistics were employed to provide insights into how the data evolved, using techniques like plotting data to identify trends (increasing, or decreasing), calculating measures of central tendency (mean, median, mode, confidence intervals) to observe shifts in central values, and analysing measures of dispersion (range, variance, and standard deviation) to understand the spread of the data. The multiple points in time considered for analysis were before, during, and after the COVID-19 pandemic, with clinical outcome measurements collected and analysed monthly for the calendar and financial years between 2017 and 2023. Refer to Table 4.04: Times Series Dates.

This concludes the chapter on quantitative methods. Details of how the quantitative data were collected and analysed are provided and the limitations of using existing health service data are explained. The next chapter will similarly provide details of the qualitative data collection processes and analyses.

5. Qualitative Methods

5.1. Chapter Introduction

In this chapter, the qualitative data collection process for this mixed methods study including interview participants, interview data collection methods, interviewer reflexivity and thematic analysis approach are detailed. The interviews were conducted to capture the experiences of telehealth from the perspectives of providers and consumers in children's healthcare in NSLHD in the State of New South Wales, Australia. The Quantitative Data methods were detailed in 4.0 Quantitative Methods.

5.2. Qualitative Research Questions

The qualitative research part of this study was framed by the third research question from section 2.7 and applied to the qualitative methods as detailed in Table 5.01.

Table 5.01: Qualitative Research Questions, Sub-Questions & Data Sources

Research Question	Research Sub-Questions	Data Source
RQ3 - What were the experiences of telehealth from the perspectives of consumers and providers?	Refer to Figure 5.05 semi-structure interview questions	• Semi structured interviews with consumers • Semi structured interviews with providers

5.3. Methods

The qualitative data collection method was primarily from semi structured interviews with consumers and providers of children's telehealth. Consumers were the families who had received care via telehealth in NSLHD. The providers were clinical staff who delivered healthcare to children and families via telehealth or virtual care platforms.

5.3.1. Interview Participant Sampling

Purposive sampling was used to identify participants who were the parents/carers of children under the age of 16 years of age who have received child health services via telehealth during the data collection period or were the providers of healthcare services for children and families via telehealth or virtual care delivery methods. The sample was hoped to be representative of the diversity within the NSLHD population. Children were not interviewed for this study.

5.3.2. Interview Participant Recruitment

Voluntary participation in semi-structured interviews aimed to recruit around 5 to 10 consumers, and 5 to 10 providers of telehealth, but neither group was limited to these numbers. Focus groups were considered but not required.

The consumers were recruited from the consumer questionnaires, with the last question asking if they would be willing to participate in an interview and provide a contact number or email address. Those who expressed an interest were contacted via their preferred contact and provided the Participant Information Sheet (PIS) and a consent form to complete prior to participation in an interview. If questionnaire participants did not wish to be interviewed, they simply select 'no' and as the questionnaire was anonymous, they could not be contacted without them providing their details. Participants could decline being interviewed at any point including during an interview. There was no financial incentive to participate and no implications for their child's care if they choose to participate in an interview or not.

Paediatric and child health clinical staff from NSLHD, as outlined in the inclusion criteria, were invited to participate in a semi-structured interview through an email invitation sent by the Children & Young People Clinical Network Director to the appropriate managers, who then passed the information along to their respective teams in accordance with the Ethics approvals. Interested individuals responded via email to the researcher to express their willingness to be interviewed. Participants were free to decline participation at any stage, including during the interview itself. There was no financial compensation for participation, nor were there any employment-related consequences for choosing to participate or not.

5.3.3. Interview Participants

Twenty-one interviews were undertaken; 14% (3) consumers; 86% (18) providers. The characteristics of the providers and consumers interview is summarised in Table 5.02.

Consumer Participants

Despite the poster campaign and the targeted emails post appointment, there was a limited response to the consumer questionnaire, which was also the consumer interview participation strategy, with only four

parents (4) expressing an interest in being interviewed and three (3) subsequently being interviewed for the study.

The consumers interviewed were all mothers of children who received healthcare for their child via telehealth. No fathers or other family relatives expressed an interest to be interviewed and so the researcher was only able to interview mothers in this study. The consumers had varying experiences of children's healthcare with experiences of multiple child health services, for example, acute paediatrics, hospital in the home, community paediatrics, child and family and allied health. This reflected the variety of acute and chronic conditions they required healthcare services for. The consumers seemed to be, at least in part, motivated to be interviewed so they could share their very positive experiences and their hope of the possibility to influence the continuation of the service option they so valued. The researcher made no indication that their interview would in any way directly influence decisions around service provision in NSLHD or anywhere else.

The researcher had no prior relationship or contact with any of the consumers interviewed for this study. The first communication with them was the invitation to participate in the study and arranging a convenient time to undertake the interview. The first meeting with the consumer participants was online for the interview. As such it was important to spend a few minutes before the interview building a rapport and making the participant feel comfortable with the researcher. An important technique for successful qualitative interviewing and managing any potential power relation (Braun & Clarke, 2013).

Provider Participants

Of the eighteen (18) provider interviews; 28% (5) represented paediatric hospital care; 22% (4) represented paediatric allied health; and 50% (9) represented community child and family health. The providers represented a variety of healthcare disciplines with 33.3% (6) medical; 44.5% (8) nursing; and 22.2% (4) allied health professionals. Some of the providers interviewed were known to the researcher in a professional capacity, as the researcher had worked in various clinical and managerial roles in children's healthcare in NSLHD. However, this was mitigated as the researcher was no longer working in a role associated with children's healthcare at the time of the interviews. The researcher's intention to

undertake research into telehealth would have potentially been known to some of the participants prior to receiving the email invitation.

The providers interviewed were all extremely experienced clinicians and experts in their subspeciality areas, with the majority identifying they had over 20 years' experience in children's healthcare. This did raise several questions for the researcher early during the interviewing, about the necessity for clinicians to be experienced or not to use telehealth, and if telehealth is an advanced skill rather than a core skill for clinicians. These concepts were explored in subsequent interviews.

The male clinicians who were interviewed were all medical officers. The nursing and paediatric allied health staff all females. There were female medical officers as well who were interviewed. This is reflective of genders ratios within paediatric and child health clinicians in Australia. In 2020 in Australia the ratio of male to female healthcare professionals was 2 to 9 with 166,000 men and 476,500 women registered and employed in the healthcare workforce. For nursing and midwifery, the number of females was 6.8 times that of males, and 1.7 times in Allied Health. For medical practitioners there were more men than women at a ratio of about 5:1 (Australian Institute of Health and Welfare, 2022).

Table 5.02 Interview Participants

Providers	***n =***	***Consumers***	***n =***
Female	15	Female	3
Male	3	Male	0
Child & Family Health	9	1 child	1
Acute Paediatrics	5	2 children	2
Paediatric Allied Health	4	More than 2 children	0
Less than 5 years of experience	0	Parent	3
5 to 10 years of experience	1	Carer	0
10 to 20 years of experience	3	Grandparent	0
More than 20 years of experience	14	Other Family	0
Medical	6	Child/ren with acute condition	2
Nursing	8	Child/ren with chronic condition	1
Allied Health	4	Attended single service	0
		Attended multiple services	3
Total	**18**	**Total**	**3**

5.4. Consent

The semi structured interviews required a written consent to be completed prior to the interview commencing. The consent was emailed to the participant along with PIS prior to the interview.

- Figure 5.01: Participant Information Statement (PIS) – consumer
- Figure 5.02: Participant Consent Form – consumer
- Figure 5.03: Participant Information Statement (PIS) – provider
- Figure 5.04: Participant Consent Form - provider

All participants were free to withdraw from the questionnaire or interviews at any time.

5.5. Interview Times

The total interview time for both the consumer and provider interviews were 11 hours, 25 minutes, and 01 seconds; 01 hour, 42 minutes and 44 seconds for consumers and 09 hours, 42 minutes, and 17 seconds for providers. The interview lengths ranged from 14 minutes and 23 seconds to 46 minutes and 59 seconds for consumers, and 20 minutes and 28 seconds to 53 minutes and 41 seconds for providers.

5.6. Interview Data Collection

The data collection period was conducted between August 2023 and April 2024 following Ethics approval. They were conducted subject to expressions of interest to participate in the interviews. Interviews were undertaken and recorded using functions available through MS Teams to allow the interviews to be undertaken remotely and with least inconvenience to participants. The interview data were collated and analysed as a collective and not as an analysis of individual performances or experience. The purpose of the study was to examine the use of telehealth/virtual care as a service delivery option but not an evaluation of individual clinician's practice, or individual consumer healthcare experiences or outcomes.

5.7. Interview Data

The interviews with both the consumers and providers were all conducted online as was the preference of the interviewees for reasons of ease and convenience. This was in line with online methods of

qualitative data research collection becoming more accepted as day to day personal and work interactions have also moved online (Carter, Shih, Williams, Degeling, & Mooney-Somers, 2021).

The interviews were conducted via Microsoft Teams and recorded for transcription using this platform. All the interview transcriptions were deidentified with names of interviewees replaced with an alpha-numeric reference. In addition, any references made to the names of people or places, and dates of events were removed, and replaced with [name of child] or [name of place] for example.

A semi-structured interview technique was used for a comprehensive exploration of the topics (Jamshed, 2014). The interviews were conducted one-to-one with the interviewer and interviewee only, for around half an hour. Multiple interviewing techniques were used in the interviews, including importantly building a rapport and trust. The semi-structured nature of the interviews enabled the interviewer to explore concepts, perspectives and ideas as they arose through probing, clarifying and transitioning questioning to free-flowing communication between interviewee and interviewer (Braun & Clarke, 2013; Fossey, Harvey, McDermott, & Davidson, 2002). The probing was sometimes direct, tell me more about..., or non-directive through nods and agreeing comments such as '*ummm'* and '*ah ha.'* At times it was necessary to orientate to the specific for example *'which resources in particular, are underutilised?'* (Child and Family Health 1 Interview) to ensure the depth of information required.

Active listening through verbal and non-verbal gestures were employed to encourage the interviewees to open-up and describe their experiences, as well as allowing time for the interviewees to extend and elaborate on their responses. The temptation to interject all silences in an interview by the interviewer with the next question can risk losing the opportunity for richer data as the interviewee elaborates after having a moment to think about their response.

Each interview was unique, and each required a unique set of techniques to be employed to ensure the interviews generated quality data for the study. This required flexibility and adaptability by the interviewer to achieve this, as some interviewees required little prompting to talk. Others needed more encouragement and prompting to reveal their true experiences and perspectives.

5.8. Data Saturation

One of the challenges, and ongoing debates about qualitative data analysis is determining when there have been enough data collected for accurate representation of perspectives and experiences (Mthuli, Ruffin, & Singh, 2022). Qualitative sampling may involve a relatively small number of participants to generate a large volume of data (Fossey et al., 2002; Hennick & Kaiser, 2022). There is no mathematical tool to estimate the ideal number of participants, nor defined minimum number of participants or interview hours.

Sufficiency of qualitative data is instead more commonly defined by the richness of the information, with sampling continuing until themes have fully emerged and no new themes or information can be generated, or as the concept of saturation or information redundancy (Braun & Clarke, 2019b; Lincoln & Guba, 1985). A systematic review of sample sizes for saturation in qualitative research concluded that 'studies using empirical data reached saturation within a narrow range of interviews between 9 and 17 (Hennick & Kaiser, 2022). However, a critical discussion by Braun and Clarke argues that data saturation cannot be 'operationalised' through concrete sample size guidelines. Although without such guidance determining saturation seems to be left to the discretion of the researcher as if it is a self-explanatory concept that requires little definition by researchers. Therefore, this leaves it open to criticism that the concept of data saturation can simply be used to validate any sample size. Other criticisms of data saturation are that there can always be new insights from new data collected and that the idea that there is no new information to be found is a fallacy (Braun & Clarke, 2019b; van Rijnsoever, 2017). Despite the critique, data or thematic saturation remains widely used and widely accepted concept in qualitative research sample sizing for thematic analysis.

As a possible alternative to saturation, Braun and Clarke discuss ideal sample size for qualitative research in terms of having sufficient information power for thematic analysis (Braun & Clarke, 2019b). They discuss the definitions and concepts of data saturation in qualitative studies including 'information redundancy' and 'thematic exhaustion' being the points at which no new codes or themes can be generated from the data and attempts to quantifying this point. Thematic exhaustion was used in this study to determine the required sample size for data saturation. The researcher's and supervisor's awareness of the data was used to determine when sufficient data had been collected. This was at the point were no new codes or themes were being generated, as thematic analysis progressed (Braun &

Clarke, 2019b; Mason, 2002). This was evident in the provider data. However, the consumer data was limited by the number of participants who volunteered. Theme saturation was still evident among the consumer data, but a larger number of participants would have potentially confirmed this. Within the concept of saturation there are several strategies to ensure adequacy of data in different scenarios. For the study herein a purposive sampling strategy was used with the aim to obtain the perspectives of consumers as well as medical, nursing and allied health providers on telehealth (Fossey et al., 2002).

A contemporaneous analysis was engaged whereby the researcher examined the real-time interview journal entries record immediately after each interview, in addition to the transcribing and coding of the interviews (Goys & Sandberg, 2024). This iterative and reflective process enabled the refinement of interview questions and pursuant of emerging themes in subsequent interviews. Through this process, the researcher was confident that data saturation had been reached before the final interviews were completed as no observed new themes or concepts were emerging and signalling that enough data had been collected. The thematic analysis supported this with no additional codes or themes identified from the later interviews to be analysed. This determination of data saturation was made by the researcher, and through discussion with the supervisors. This was within the data collection process based on the adequacy of the data in terms of richness, and depth as well as thematic exhaustion or no new codes or themes being generated.

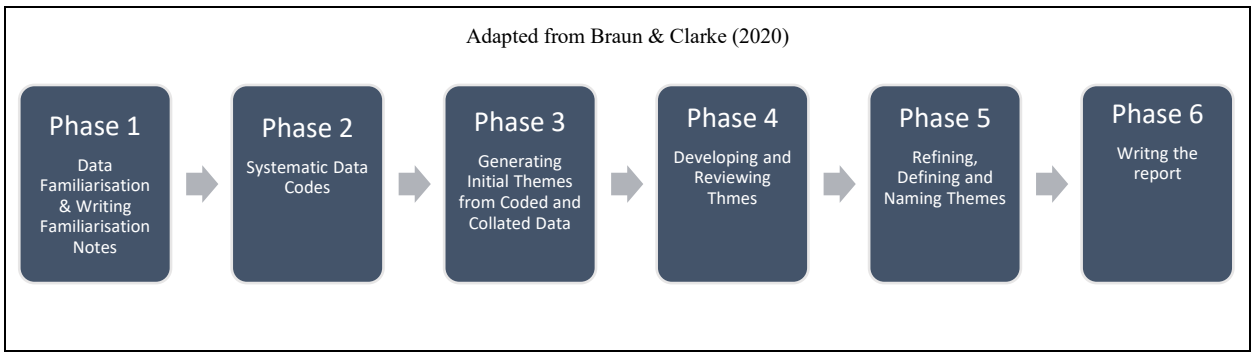
5.9. Thematic Analysis Plan

The qualitative interview data were thematically analysed using the six phases of Braun and Clarke's (2020) approach. Braun and Clarke's reflexive thematic analysis is a method for identifying, analysing, and reporting patterns or themes within qualitative data. Reflexive thematic analysis involves a process whereby themes are actively generated, not simply passively emerging, through a researcher undertaking a rigorous analysis of the data (Braun & Clarke, 2019a). This approach encourages a *"rigorous and systematic approach"* to code and theme generation, as well as one that is *"fluid and recursive, rather than rigid and structured"* (Braun & Clarke 2019a, page 591).

There are two broad categories of thematic analysis, inductive and deductive. An inductive approach is one where the themes are generated, whereby in deductive the themes are selected or known prior to the

analysis starting. The two can be exclusively used or co-exist within a study, as an Inductive/Deductive Hybrid Thematic Analysis in Mixed Methods Research (Bingham, 2023; Bingham & Witkowsky, 2022; Proudfoot, 2022). For this study an inductive thematic analysis of the interview transcription data was undertaken progressing through Braun and Clarke's six phases of reflexive thematic analysis; Data Familiarisation & Writing Familiarisation Notes; Systematic Data Codes; Generating Initial Themes from Coded and Collated Data; Developing and Reviewing Themes; Refining, Defining and Naming Themes; and Writing the Report (Braun & Clarke, 2006, 2019a, 2020). The analysis process was supported using the NVivo (version 14) software tool. Braun and Clarke's reflexive thematic analysis model has developed and been refined from the original version published in 2006 to the version published in 2020 used for this study. See Figure 5.06 (Braun & Clarke, 2019a).

Figure 5.06: Braun and Clarke's Six Phases of Reflexive Thematic Analysis



In the first phase of the thematic analysis, data familiarisation, the interviews with the consumers and providers were transcribed after each interview was completed. MS teams generated the initial transcriptions when the online interviews were recorded. Each one then was repeatedly edited to ensure accuracy and anonymity, with the MS Teams literal transcriptions needing to be corrected, for example 'and juice anxiety' to 'induce anxiety' or 'wake Spain' to 'explain'. This process generated some amusement for the researcher but more importantly ensured accuracy and familiarity with the data through the multiple reading of the transcripts.

A log of the interviews was kept during the duration of the interviewing data collection period. The log included contact details (which were deleted after the collection period); dates, times, and length of each interview, as well as researcher notes recorded immediately following each interview. These notes

captured the initial impressions of the researcher to each interview, which contributed to the collective qualitative data.

In the second phase the initial data codes were generated by the researcher and recorded in NVivo. Excerpts of the interviews were highlighted and coded as part of the second phase of the thematic analysis to create systematic data codes. As expected in this phase there was a wide spectrum of codes generated from over 350 pages of interview transcriptions.

The initial theme generation began in the third phase, with further development and reviewing of the themes in phases four and five, resulting ultimately in the refined and defined themes at the end of the fifth phase. Some authors refer to the approach as simply thematic analysis, but Braun and Clarke have described their increasing preference for the term reflexive thematic analysis, recognising the researcher's role being at "the heart" of knowledge production with their distinctive approach (Braun & Clarke, 2019a). Braun and Clarke's reflexive thematic analysis approach is deeply intertwined with the concept of reflexivity, which is crucial for producing nuanced and credible qualitative research. The 'reflexive" emphasises the researcher's role in the analysis process. It integrates reflexivity by acknowledging that thematic analysis is a subjective and interpretative process. Reflexivity helps researchers understand and manage their influence on the research process, ensuring a more transparent and credible analysis, and as such was an important part of this study.

5.10. Reflexivity

An epistemological assumption of this research is that there are multiple influences on research including the researcher and the context of the research. As a researcher we bring our own perspectives, values, history, experiences, politics, and opinions into research which cannot be ignored. Any knowledge produced is going to reflect these even if only minimally. Consequently, there was a need for reflexivity to critically reflect on the knowledge produced and our role in its production (Willig, 2001).

Qualitative research interviews require researcher reflexivity, whereby the researcher is continually and consciously self-aware of their own experiences, beliefs, values and relationships with participants, and how their own subjectivity could influence the research process (Olmos-Vega et al., 2023; Raheim et al., 2016; Walsh, 2003). Braun and Clarke highlight that thematic analysis is inherently subjective,

meaning that the themes generated in the analysis are influenced by the researcher's interpretative lens (Braun & Clarke, 2006, 2019a). This researcher subjectivity is intertwined with the qualitative research process with positive benefits but also potential negativity if not acknowledged and addressed (Olmos-Vega et al., 2023). Reflexivity in qualitative research is said to bring positive benefits by enhancing the richness, clarity, quality, accountability, and trustworthiness of the study, all of which contribute to the integrity of the research. (Probst, 2015). Additionally, reflexivity has been recognised for its benefits to the researcher, particularly in terms of enhancing their well-being and fostering personal growth (Gilgun, 2010; Hsiung, 2008; Probst, 2015).

Reflexivity techniques for this study involved a continuous process of researcher reflection on how personal biases, experiences, and theoretical assumptions affect the data coding and theme generation. For example, my interest in exploring the use of telehealth in children's healthcare stemmed from my direct involvement in supporting the rapid expansion of telehealth access across the district at the onset of the pandemic in 2020, as well as my role as clinical network manager for health and wellbeing services for children and young people across the district. In this study the qualitative researcher engaged in reflexivity through fieldnotes about participants' comments and researcher's thoughts during and immediately following interviews as well as relevant reflections on the researcher's subjectivity statement. Further reflections were undertaken by discussing the interpretations with supervisors and maintaining transparency about the researcher's positionality in this thesis (Finlay, 2002; Gergen, 2015; Gilgun, 2008). These notes and reflections were then integrated into the analysis process with the aim of not simply acknowledging the existence of the researcher's subjectivity but accepting the researcher's perspectives as part of the study.

This ensured that the researcher remained conscious of their influence throughout the theme generation process, which helped develop more thoughtful and well-rounded themes (Braun & Clarke, 2014; Liamputtong, 2011). Additionally, it contributed to good ethical research practices enabling the researcher to address any potential bias and ensure a fair representation of the data findings (Hammersley & Atkinson, 2007; MacBeth, 2001). However, it is important to recognise that reflexivity is not a panacea for issues of bias, inequity, or misunderstanding within a study. Simply being aware of

these issues as a researcher does not necessarily mean they are being effectively addressed (Probst, 2015). The literature highlights the importance of equipping researchers with essential qualitative interview skills and techniques, particularly emphasising the need to teach epistemologically grounded interview methods, to ensure reflexivity in qualitative interview research (Hsiung, 2008).

This concludes the chapter on qualitative methods. Details of how the qualitative data were collected and analysed are provided and the reflexivity considerations when using interview data are explained. The next chapters provide details of the quantitative and qualitative results.

6. Quantitative Results

6.1. Chapter Introduction

In this chapter, the results from analyses conducted on the; a) telehealth utilisation b) consumer questionnaire; and c) clinical outcomes data collected between 2017 and 2022 are detailed. The quantitative research questions explored through the quantitative data were:

RQ1 - What was the utilisation of telehealth in children's healthcare, before, during and after the COVID-19 pandemic?

RQ2 - Are the clinical outcomes, consumer and provider satisfaction, and the safety of services delivered using telehealth comparable to those delivered in-person?

The qualitative data results are presented in Chapter 7 Qualitative Results.

6.2. Telehealth Utilisation Data

Utilisation data from occasions of service provided via telehealth and other modalities of care, were collected from the paediatric allied health disciplines; child and family health; community paediatrics and paediatric hospital in the home between 2017/18 and 2022/23. The overall trends were of an increase in the use of telehealth modalities (audio and audio-visual) to varying degrees, alongside a decrease in the in-person modality during the pandemic years. Refer to Figures 6.01, 6.02, and 6.03 below.

Between 2018 and 2023 the highest use of telehealth (audio only and audio-visual) for paediatric allied health services was speech pathology with an average of 38.3% occasions of service (OOS) in total and peaking in 2021 and 2022 with 56.8% and 56.7%, respectively. This was followed by physiotherapy (11.4% peaking to 20.8% in 2021) and occupational therapy (22.0% peaking to 27.8% in 2021 and 2022). Social Work reported the lowest use of telehealth averaging at 4.6% and, peaking at 11.2% in 2022. The Confidence Intervals (CIs) demonstrated the significance of the increase in audio only in 2022 compared to 2018 to 2020, and the significant decrease in 2023 compared to 2022. Audio-visual use increased from 2019 to 2020, and again increased in 2021 compared to 2020, with a decrease after 2022. The reverse results were demonstrated for in-person with significant decrease from 2019 to 2020,

further decrease in 2021 and significant increase from 2022 to 2023. The wider ranges for the CIs for 'other' and 'no client contact' increased variation and hence uncertainty in the percentages. Refer to Table 6.01: Paediatric Allied Health – Percentage of Occasions of Service (OOS) by Modality of Care and Discipline 2018-23.

Prior to COVID in 2017 to 2019 the predominant modalities for care delivery for child and family health nursing were in-person and telehealth via the telephone. There were only 4 Occasions of Service (OOS), out of a total of 287,823 OOS, using audio-visual telehealth recorded in the three financial years before the pandemic. In the second quarter of 2020, as the pandemic waves first hit Australia, the number of occasions of service using audio-visual telehealth rose steeply from almost nothing (0.2%) 2020 quarter 1 to 9.3% in following quart, The use of audio-visual telehealth peaked in the third quarter of 2021 at 14.3% with the second wave of the pandemic. As the COVID waves reduced so did the use of audio-visual telehealth to 2.6% by the fourth quarter of 2023. The use of the telephone saw similar spikes Q2 2020 and Q3 2021 However, pre, and post COVID telehealth via telephone remained relatively consistent with 14.6% of OOS delivered via this modality in Q4 2019, immediately prior to the first wave, and 15.3% Q4 2023 after the pandemic. 18.5% to 25.1% (see Figure 6.01). Other modalities included email, postal/courier service, text messaging, and non-client contacts such as case planning and case conferencing.

In Community Paediatric Medicine there was a sharp increase in the use of both audio and audio-visual telehealth at the start of the pandemic in Q2 2020 with a decreasing trend from Q3 2020 onwards, followed by a much smaller spike in Q3 2021 with the second wave of the pandemic. This decline in the use of telehealth in community paediatrics continued post pandemic (Figure 6.02).

Figure 6.01: Child and Family Health Telehealth and In-person Modalities Utilisation

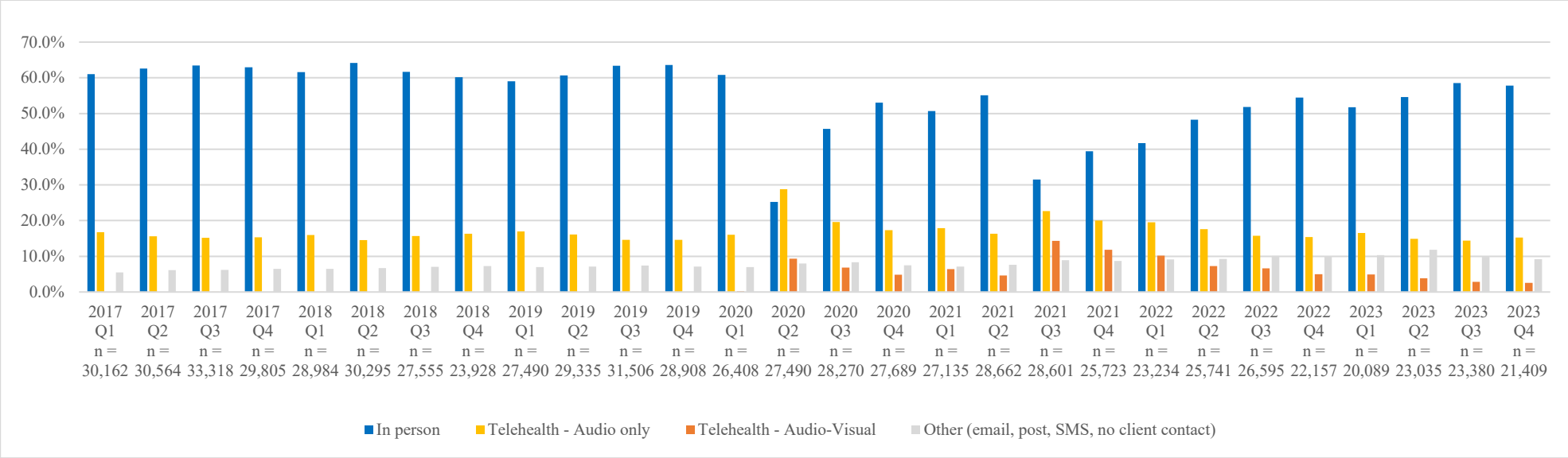
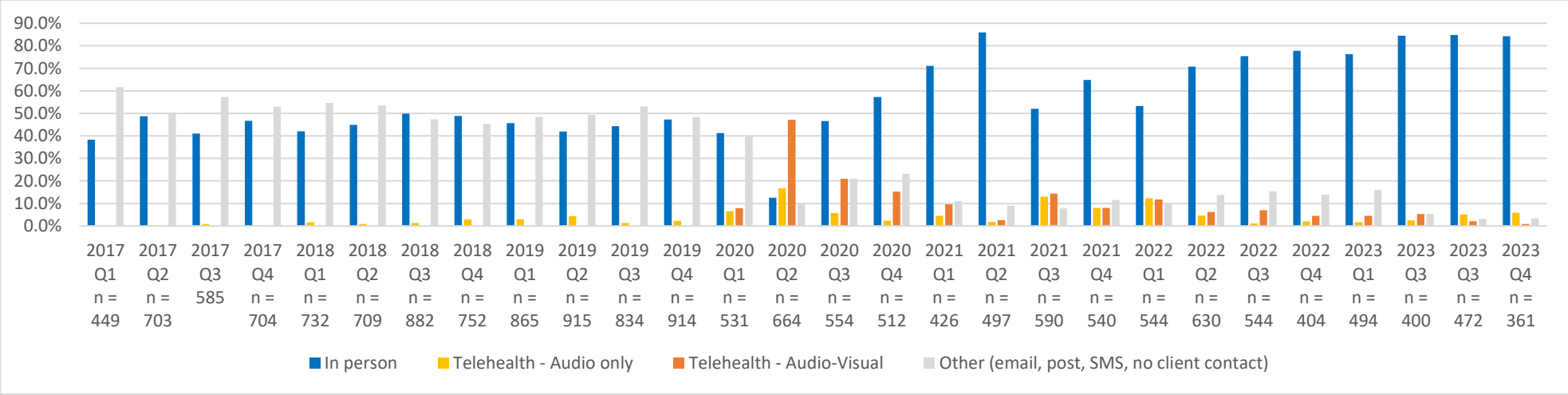


Figure 6.02: Community Paediatrics Telehealth and In-person Modalities Utilisation



Counts for telehealth (audio only and audio-visual) were relatively low across all timepoints, particularly for audio only, with wider 95% CIs. Both modalities showed an increase during the pandemic, with a preference for audio-visual over audio only in 2019/2020 and 2020/2021. Both modalities showed a decline in 2022/2023 compared to the pandemic, with greater uncertainty associated with audio only. A considerable number of the OOS in 2017-18, 2018-19 and 2019-20 were recorded as 'Other technology – not elsewhere classified'; it was unclear what this referred to. See Table 6.05: Child and Family Health Occasions of Care and Modality of Care. This was the reverse for in-person visits. With a statistically significant decrease from 3,035 in 20118/19 to 1,282 in 2020/21. Although in-person appointments had increased from 2021/2022 to- 2022/2023 to 1,439, they had not returned to pre-pandemic levels pre-2020. Similar patterns were demonstrated with Child and Family Health (CFH), and Community Paediatrics, but with greater certainty in CFH due to sample sizes.

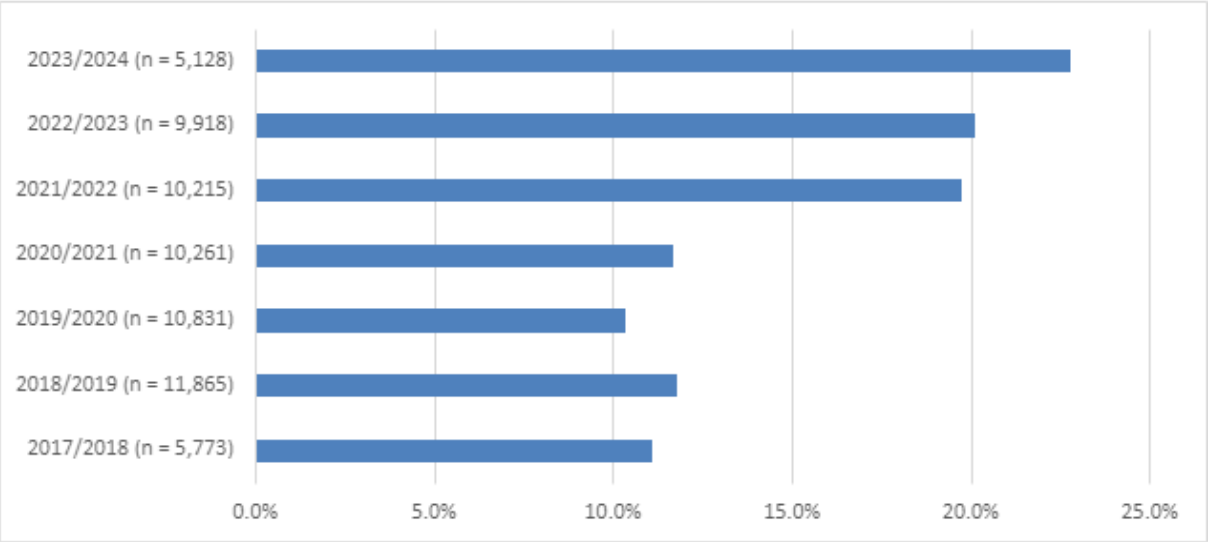
Telehealth Utilisation Data for acute paediatric hospital care in NSLHD was primarily associated with the Paediatric Hospital in the Home (P-HITH) service, provided from the Royal North Shore Hospital (RNSH) and Hornsby Ku-ring-gai Hospital (HKH). The Virtual Hospital for Children in the District during the pandemic years was based at Royal North Shore Hospital P-HITH. The paediatric hospital data were therefore collected from the P-HITH service at RNSH. The data included 2017 to 2022. During that time there were 4,262 paediatric patients, of which almost 64% received care, or method of review via telehealth. In addition, P-HITH provided 6,926 bed days with an average of 3.14 patient reviews per day and a readmission rate on average of 4.3% with no emergency calls over the 5 years. Refer to Table 6.07 in section 6.4.1.

Most of the referrals for the Paediatric Hospital in the Home care came from the Paediatric Ward (85.5%), followed by 12.2% from the emergency department, 0.8% from clinics and 1.4% from other sources. There was a significant increase in telehealth as the method of review for P-HITH patients from 2017 to 2018, with a second significant increase from 2021 to 2022. Refer to Table 6.06: Paediatric Hospital in the Home Referrals and Methods of Review.

Between 2017-18 and 2023-24 financial years the percentage of hospital admissions that included paediatric HITH care increased from 11.1% in 2017-18 to 22.8% in 2023-24, with the greatest year on

year increase occurring between 2020-21 (11.7%) and 2021-22 (19.8%) when P-HITH in NSLHD expanded to provide a Virtual COVID Hospital for Children across NSLHD, as paediatric COVID infection rates were relatively low in the first waves of the pandemic in 2020 but increased in 2021. Refer to Figure 6.03.

Figure 6.03: Percentage of Paediatric Hospital Episodes of Care that included P-HITH



6.3. Consumer Questionnaire

The response rate to the consumer questionnaire was underpowered at 19 responses out of approximately 2,000 families (less than 1%) considering the optimal sample size for this study was determined to be 403. Of the nineteen responses, ten were complete and nine were incomplete responses, resulting in a differing number of responses for each question. There was no risk of identifying individuals through their responses with the small response rate, as there was no list of potential individuals that could have responded, just an estimate sample size.

The median age of the parents participating was 39 (SD = 7.46) with a range of 27 to 53 years old. 91.7% of participants who identified their gender were female (n = 11), and 8.3% male (n =1). The age of the participant's child or children ranged from 0 to 16 years of age with a median of 2 (SD = 5.60). None (0.0%) of the participants identified as Aboriginal or Torres Strait Islander. The languages spoken at home by the participants were English only (9, 75.0%), Cantonese (1, 8.3%) and other language (2, 16.7%). The other languages were identified as Hindi and Nepali.

The highest educational qualifications held by the participants were Year 11 or below (includes Certificate I/II) (0, 0.0%), Year 12 (0, 0.0%), Certificate III/IV (0, 0.0%), Advanced Diploma and Diploma (1, 8.3%), Bachelor Degree (5, 41.7%), Graduate Diploma and Graduate Certificate (1, 8.3%), Postgraduate Degree (5, 41.7%).

The families were asked what services they had used in the past 12 months for their child's health and wellbeing with telehealth, and the responses were; General Practice (5, 50.0%), Child and Family Health Nurse (Early Childhood Centre) (1, 10.0%), Paediatrician (2, 20.0%), Paediatric Nurse Specialist (0, 0.0%), Paediatric Hospital in the Home (4, 40.0%), Hospital Admission (3, 30.0%), Emergency Department (2, 20.0%), Physiotherapist (1, 10.0%), Occupational Therapist (2, 20.0%), Outpatient Clinic (1, 10.0%), Speech Therapist (4, 40.0%), COVID-19 Virtual Hospital (1, 10.0%), and other (1, 10.0%) For this question (n = 10) participants were able to identify multiple services used.

The approximate number of times families had used telehealth for their child's healthcare were only once (2, 20.0%), up to 5 times (5, 50.0%), up to 10 times (0, 0.0%), more than 10 times (1, 10.0%), and use regularly e.g. weekly therapy (2, 20.0%). Based on their most recent experience with telehealth for their child families achieved everything they wanted through their telehealth appointment compared to an in-person appointment; completely (5, 50.0%), mostly (5, 50.0%), not really (0, 0.0%), not at all (0, 0.0%).

The participants indicated ‘extremely’ and ‘mostly’ satisfied with most of the aspects associated with telehealth provision. See Table 6.02: Telehealth Satisfaction Ratings. The only dissatisfaction identified was associated with the ‘Ability to provide treatment or therapy’ by one participant, and the need to have an in-person appointment after their telehealth appointment to complete their child's care.

Participants selected multiple options to identify children's healthcare services they thought should offer a telehealth/virtual care option; General Practice (9, 90.0%), Child and Family Health Nurse (Early Childhood Centre) (6, 60.0%), Paediatrician (4, 40.0%), Paediatric Nurse Specialist (4, 40.0%), Paediatric Hospital in the Home (6, 60.0%), Hospital Admission (0, 0.0%), Emergency Department (0, 0.0%), Physiotherapist (2, 20.0%), Occupational Therapist (2, 20.0%), Outpatient Clinic (4, 40.0%), Speech Therapist (4, 40.0%), COVID-19 Virtual Hospital (3, 30.0%), Other (0, 0.0%).

The satisfaction ratings for children's healthcare telehealth providers were mostly satisfied or a little satisfied with some a little dissatisfied. There were no participants who recorded mostly or extremely dissatisfied for any provider. Refer to Table 6.03: Satisfaction with Telehealth Providers. The free text questions mirrored the questions asked to consumers in the interviews, providing some additional qualitative consumer data. Refer to Table 6.04: Questionnaire - Free Text Responses.

6.4. Clinical Outcomes Data

Data from 2017 to 2022 were analysed. The data were not specifically or exclusively related to telehealth but reflective of service delivery models that included a considerable increase in the use of telehealth along with usual care. Using a time series design, data were retrieved from 2017, 3 years before the pandemic restrictions and 2 years post pandemic restrictions. The research questions 1, 3, 5, 6,7 and 8 are addressed in the following sub sections as detailed in Table 4.03.

6.4.1. Safety of Services Delivered Using Telehealth

Utilising data from the paediatric hospital services of paediatric hospital in the home, paediatric outpatients, and paediatric virtual COVID hospital, the clinical outcomes measured were related to clinical emergency responses associated with patient deterioration and readmission rates.

The readmission rates from 2017 to 2022 for paediatric hospital in the home and virtual care provide a measure of clinical deterioration rates; similar rates would be expected regardless of the amount of telehealth used for service delivery. Between 2018 and 2023 the total P-HITH readmission rate was 4.2%, with a range from 3.9% to 6.3%. 2021 was the outlier year with an increased rate of 6.3%. Excluding the year 2021, the average readmission rate was 3.9%. There were no Ambulance calls, or ED presentations reported as Code Red equivalents for the period 2018 to 2023. Refer to Table 6.07: Paediatric Hospital in the Home Utilisation & Clinical Deterioration.

Table 6.07: Paediatric Hospital in the Home Utilisation & Clinical Deterioration

	Patients (n)	Bed Days (n)	Average no. of Reviews per Day (n)	Readmissions (Code Yellow) (n)	Readmission Rates (Code Yellow) (%)	Ambulance Call or ED Presentations (Code Red) (n)	Ambulance Call or ED Presentation Rates (Code Red) (%)
2017	456	858	2.34	18	3.9% (CI 2.1,5.7%)	0	0.0%
2018	853	1,207	3.29	27	3.2% (CI 2.0,4.4%)	0	0.0%
2019	847	1,170	3.2	34	4.0% (CI 2.7, 5.3%)	0	0.0%
2020	594	986	2.68	26	4.4% (CI 2.7,6.0%)	0	0.0%
2021	525	930	2.45	33	6.3% (CI 4.2, 8.4%)	0	0.0%
2022	987	1,775	4.85	39	4.0% (CI 2.8,5.2%)	0	0.0%
TOTALS	4,262	6,926	-	177	4.2%	0	0.0%
Average per year	710	1,154	3.14	30	4.3%	0	0.0%

Clinical incident data associated with paediatric and child health services was sourced from the Incident Management Systems IIMS and IMS+, via the NSW Health Quality Improvement Data System (QIDS) (Clinical Excellence Commission, 2024). NSLHD moved from the IIMS to IMS+ system in March 2020, so data were sourced from both systems to cover 1 January 2018 to 31 December 2023. Within the IIMS system, data were filtered by the keywords telehealth and virtual. In the IMS+ system, data were filtered by the 'no. incidents reported associated with children and telehealth or virtual care' question. The results are combined and summarised in Table 6.08 below. Confidence Intervals for clinical incidents reported were not calculated due to extremely small sample size.

Table 6.08: Clinical Incidents Reported – Telehealth and Children in NSLHD (2018-23)

	SAC 1	SAC 2	SAC 3	SAC 4	SAC 5	Total NSLHD	Incident System
2018	-	-	-	-	-	0	*IIMS*
2019	-	-	-	1	-	1	*IIMS*
2020	-	-	-	2	-	2	*IIMS/IMS+*
2021	-	-	-	1	-	1	*IMS+*
2022	-	-	-	1	-	1	*IMS+*
2023	-	-	-	7	-	7	*IMS+*

Across the six years there were only twelve incidents reported associated with children's healthcare and telehealth or virtual care. Over the same period there was a total of 461 incidents associated telehealth/virtual care for all ages of patients as well as staff and visitors, and 8,374 for NSW. All the twelve (12) child health related incidents were categorised as Severity Assessment Code (SAC) or Harm Score (HS) level 4. A score from 1 to 4 is applied to clinical and corporate incidents based on the outcome and additional treatment and/or resources required. A score of 4 is associated with incidents that caused *'no harm'* or were a *'near miss'* as defined by the CEC (Clinical Excellence Commission, 2020). Within NSLHD complaints were routinely captured within the IIMS and IMS+ incident management systems.

6.4.2. Clinical Outcomes using Telehealth Compared to In-Person Delivery

Discharge from hospital occurs when a child's clinical condition is stable enough to no longer require hospital level care. The Length of Stay (LOS) is a measurement of the period as an inpatient. It is measured in days and factions of days. The Average Length of Stay (ALOS) is the mean of the LOS for all patients during a defined period. ALOS for an episode of care in paediatrics can be divided into subgroups: paediatric ward or short stay care only, paediatric hospital in the home (P-HITH), or a combination of the two. The percentage of paediatric hospital episodes in NSLHD that included P-HITH as either part or whole of an episode increased from 11.1% in 2017/18 to 22.8% in 2023/24.

In 2017, in the Paediatric Ward only, the (mean) average length of stay (ALOS) was 58.25 hours and 66.51 hours in 2023. The P-HITH only average length of stay showed a different pattern with a slight increase from 47.73 to 49.15 hours between 2017 and 2020 pre pandemic. There was a notable spike in P-HITH only ALOS increasing to 161.70 hours, in the 2021-22 financial year when the pandemic waves occurred. During this time P-HITH provided a virtual COVID hospital service for children and families. This returned to pre-pandemic ALOS in 2023-24 at 44.08 hours. Over the same period the Short Stay Ward, Paediatric Ward & HITH combinations increased year on year as the use of telehealth increased from 41.35 hours to 52.36 hours, and 91.76 hours to 120.92 hours, respectively. See Table 6.09.

Table 6.09: Paediatric Hospital Services Average Lengths of Stay (ALOS)

ALOS (hours)	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Mean	Standard Deviation	Standard Error
P-HITH Only	47.73	45.42	49.15	59.18	161.70	52.34	44.08	65.66	42.65	16.12
Short Stay Ward & P-HITH	41.35	45.35	44.18	47.17	56.72	52.23	52.36	48.48	5.45	2.06
Paediatric Ward & P-HITH	91.76	91.28	95.30	122.18	125.65	111.22	120.92	108.33	15.24	5.76
Paediatric Ward Only	58.25	63.77	62.97	66.23	63.82	64.99	66.51	63.79	2.77	1.05
n	5,773	11,865	10,831	10,261	10,215	9,918	5,128	-	-	-
% admission that include P-HITH	11.1%	11.8%	10.3%	11.7%	19.8%	20.1%	22.8%	-	-	-
Total	**59.49**	**64.6**	**63.83**	**68.47**	**74.07**	**68.19**	**69.29**	**66.85**	**4.67**	**1.77**

6.4.3. Age Distribution for Children Referred to Paediatric Allied Health

The age distribution for Paediatric Allied Health patients receiving care in NSLHD showed that 96% to 98% of patients were 5 years old or less (Figure 3.01). Referral data to identify delays in accessing or identifying the need for paediatric allied health services was not available.

6.4.4. Referral Rates to Specialist Services for Child Development Concerns

The child and family health services are provided as part of the primary and community health services for children in NSLHD. The outcomes planned to be captured were the number of child development checks completed; the number of referrals for developmental concerns; number of sessions attended per child or length of treatment or intervention; and referral waiting times.

The NSW Health Child Developmental Milestone checks are available for families when a child is approximately 1-to-4 weeks old; 6-to-8 weeks old; 6 months old; 12 months old; 18 months old; 2 years old; 3 years old; and 4 years old. See Table 6.10 for the Child and Family Health Child Health checks undertaken in NSLHD as per the NSW Health 'My personal health record' (Blue Book) (NSW Ministry of Health, 2023). Data for the 1-to-4-week checks were unavailable as the mode of care for 1-to-4-week check appointments offered during 2020 and 2022 pandemic periods, varied between virtual and in-

person components, resulting in inaccurate data. This was due to clients often having an initial telehealth appointment and then a short clinic-based appointment to complete all components of the 1-to-4-week check, resulting in potentially two occasions of service being captured if the appointments occurred on different days. The data were only available as absolute number of checks. A denominator was not provided by NSLHD to facilitate calculations as a percentage. This was due to the fluidity of populations across district boarders and some babies being born outside the district but residing within.

Table 6.10: Number of Child Health Checks conducted by Child and Family Health

Developmental Check	2020-2021	2021-2022	2022-2023
1-to-4-week check	*Not available*	*Not available*	*Not available*
6-to-8-week check	4,641	4,562	3,935
6-month check	2,410	2,202	2,146
12-month check	1,499	1,176	1,270
18-month check	994	655	684
2-year check	1,033	676	744
3-year check	698	481	443
4-year check	395	376	318

6.4.5. Paediatric Allied Health Treatment Time and Therapeutic Progress

The total completion rates, the average Patient Attributed Time (PAT) and appointment duration times were reported, and were regardless of the modality of care, e.g. in-person or telehealth. The total completion rates, for the following paediatric allied health services, physiotherapy, occupational therapy, speech pathology and social work demonstrated a year-on-year decline in completion rates before, during and after the pandemic, from 85.9% in 2018/19 to 75.9% in 2022/23. Physiotherapy consult completion rates demonstrated the greatest decline from 82.7% in 2018-19 to 47.2%in 2022/23. By 2022/2023 post-pandemic completion rates had not returned to pre-pandemic levels. See Table 6.11: Paediatric Allied Health Completion Rates. The significant decline in completion rates between 2018/19 and 2020/21 onwards was statistically significant.

Between 2018 and 2023 the Paediatric Allied Health average PAT per patient and the average duration of appointments showed variations that were different for each discipline (see Table 6.12: Paediatric Allied Health Average Patient Attributed Time).

Table 6.12: Paediatric Allied Health Average Patient Attributed Time (PAT)

Discipline	Year	n	% of OOS as Telehealth (audio/audiovisual)	Confidence Interval	Average No. OOS per patient	Average Appointment Duration (Mins)	Average PAT (Mins)	Year-on Year Percentage Change Average Appt Duration (%)	Year-on Year Percentage Change Average PAT (%)
Occupational Therapy	2018	1,934	17.5%	(CI 15.8, 19.2)	9.02	53.84	55.41	-	-
	2019	2,094	16.5%	(CI 14.9, 18.1)	8.87	51.31	61.35	-4.70%	10.70%
	2020	2,355	21.9%	(CI 20.2, 23.6)	8.97	36.04	55.54	-29.80%	-9.50%
	2021	2,009	27.8%	(CI 25.8, 29.8)	8.48	34.72	56.33	-3.70%	1.40%
	2022	1,692	27.8%	(CI 25.7, 29.9)	8.02	38.39	63.09	10.60%	12.00%
	2023	1,564	21.7%	(CI 19.7, 23.7)	7.48	41.80	72.22	8.90%	14.50%
Physiotherapy	2018	3,150	7.0%	(CI 6.1, 7.9)	4.56	34.11	41.3	-	-
	2019	3,446	6.6%	(CI 5.8, 7.4)	4.51	38.46	45.43	12.70%	10.00%
	2020	4,056	11.8%	(CI 10.8, 12.8)	5.43	33.36	47.31	-13.30%	4.10%
	2021	3,661	20.8%	(CI 19.5, 22.1)	5.28	34.40	51.57	3.10%	9.00%
	2022	3,062	14.3%	(CI 13.1, 15.5)	4.52	41.23	60.99	19.90%	18.30%
	2023	3,272	6.7%	(CI 5.9, 7.5)	4.62	39.64	58.58	-3.90%	-4.00%
Social Work	2018	448	6.2%	(CI 4.0, 8.4)	4.39	56.22	84.27	-	-
	2019	291	7.2%	(CI 4.2, 10.2)	4.31	60.86	79.27	8.30%	-5.90%
	2020	319	2.2%	(CI 0.6, 3.8)	5.36	73.47	95.76	20.70%	20.80%
	2021	199	1.2%	(CI -0.3,2.7)	4.47	81.38	118.32	10.80%	23.60%
	2022	233	11.2%	(CI 7.1, 15.2)	4.91	101.33	132.85	24.50%	12.30%
	2023	195	2.4%	(CI 0.2, 4.5)	5.13	122.38	142.29	20.80%	7.10%
Speech Pathology	2018	6,808	13.4%	(CI 12.6, 14.2)	10.82	55.74	91.36	-	-
	2019	6,132	15.7%	(CI 14.8, 16.6)	9.69	55.79	91.46	0.10%	0.10%
	2020	6,451	53.1%	(CI 51.9, 54.3)	11.44	56.83	103.44	1.90%	13.10%
	2021	6,200	56.8%	(CI 55.6, 58.0)	11.10	52.71	87.47	-7.30%	-15.40%
	2022	5,952	56.7%	(CI 55.4, 58.0)	11.24	55.51	85.32	5.30%	-2.50%
	2023	5,286	35.3%	(CI 34.0, 36.6)	10.45	52.33	79.56	-5.70%	-6.70%

An increase in the average PAT between 2018 and 2023 from 55.41 minutes to 72.22 minutes (30.3%), was found for occupational therapy. Over the same period there was a decrease in the average appointment duration time from 53.84 minutes to 41.80 minutes (a decrease of 22.4%). Additionally, the average number of occasions of service per patient decreased from 9.02 to 7.48. For physiotherapy, an increase in the average PAT between 2018 and 2023 from 41.30 minutes to 58.58 minutes (41.8%) was found with a smaller increase in average appointment duration time from 34.11 minutes to 39.64 minutes (16.2%).

Over the same time the average number of occasions of service per patient remained relatively stable from 4.56 in 2018 to 4.62 in 2023 with small increases to 5.43 and 5.28 in 2020 and 2021, respectively. Speech pathology, which accounted for over half of the Occasions of Service (OOS), demonstrated a decrease in the average PAT from 91.36 minutes in 2018 to 79.56 minutes in 2023 (-12.9%), with a peak of 103.44 minutes in 2020. There was a decrease over the same period in appointment duration time from 55.74 minutes to 52.33 minutes.

The Confidence Intervals (CIs) for PAT for Occupational Therapy, Physiotherapy and Speech Pathology indicated significant increases from 2019 to 2020 and then decreases from 2022 to 2023. By 2023, only Physiotherapy had returned to pre-pandemic levels, with Occupational Therapy and Speech Pathology remaining higher than pre-pandemic levels.

The greatest changes over the 2018 to 2023 period were found for social work, with an increase in the average PAT from 84.27 minutes to 142.29 minutes (68.8%), as well as an increase in the average appointment duration time from 56.22 minutes to 122.38 minutes (117.7%). The number of OOS for social work decreased from 450 to 125 between 2018 and 2023. The use of telehealth for social work remained low throughout this period, with the average number of occasions of service per patient fluctuating between 4.31 and 5.36. The lowest OOS for social work occurred in 2020 and 2021, although the smaller sample size for social work compared to the other Allied Health disciplines meant greater uncertainty in the estimates.

6.4.6. Levels of Developmental Vulnerability in Children

NSLHD has consistently reported high numbers of children who are developmentally on track for all domains within the high performing State of NSW (Australian Early Development Index (AEDI), 2013). The number of children with valid scores (*n*) in the AEDC data for each year with a range from 8,504 to 10,855 between 2009 and 2024 in NSLHD (refer to Table 6.13). The variability across the censuses and domains was minimal. Scores are flagged as invalid for children who may have been in the class for less than one month; are less than four years old; or where teachers complete less than 75% of the items in any given domain.

The AEDC Suppression Rules stated that AEDC data are not reported for locations in which three or fewer children had been assessed. That suppression of AEDC data also occurs when one or more of the following have not been met: fewer than fifteen children had valid AEDC scores; less than two teachers had completed instruments for children in that location; instruments were completed for less than 80% of all non-special needs children. Additional minor suppressions occur where necessary to preserve confidentiality. None of these applied to the AEDC data for NSLHD.

The AEDC provides details for the use of Physical Health and Wellbeing sub-domains and uses a 'critical difference' tool to identify the minimum level of change, in percentage points, required between any data collection period (2009, 2012, 2015, 2018, 2021 and 2024) for the results to be significant, and a level of certainty that the change did not occur by chance. At the time the data were accessed, some of the sub-domains had not yet been validated to the same extent as the AEDC domain. This applied the data related to: Vulnerable - Physical readiness for school day over time; Vulnerable - Physical independence over time; and Vulnerable - Gross and fine motor skills over time. Refer to Table 6.13: AEDC Domains 2009-2024 and Table 6.15: AEDC Vulnerabilities 2009-2024.

The AEDC data collection years were in 2009, 2012, 2015, 2018, 2021 and 2024. Data and data reports were published each following year. As the COVID-19 pandemic commenced in Australia in early 2020 with major outbreaks in 2020, 2021 and 2022, the comparison of data from 2018 to 2021 and 2024 provides a potential insight into any effects of the pandemic years on child development. The 2021 AEDC National Report summarised the COVID-19 impact on the data as a reflection of the challenges

and benefits for children and families during the pandemic period, with any increases in vulnerability between 2018 and 2021 largely constrained to the 'Early Literacy' domain, although most evident where developmental disadvantage already existed (Australian Early Development Census (AEDC), 2022).

The 2024 AEDC Report noted a percentage increase in the number of children developmentally vulnerable in each of the five AEDC domains. At the same time, the number of children developmentally on track decreased by almost 2% in all five domains nationally (Australian Early Development Census (AEDC), 2025). These national trends for developmental vulnerability were also found in the NSLHD trends. The significant increase in developmental vulnerability in NSLHD were Physical Health and Wellbeing, Communication Skills, and General Knowledge. The Physical Health and Wellbeing domain in NSLHD increased by 2.5 percentage points whereas a national increase of 0.2 percentage points between 2021 and 2024 was noted. Similarly, the Communication Skills and General Knowledge domain in NSLHD increased by 1.6 percentage points compared to 0.5 percentage points nationally between 2021 and 2024.

This concludes the quantitative results chapter as summarised in Figure 6.04 below. The rapid rise in telehealth utilisation at the start of the pandemic is detailed. The evidence to support the safety of telehealth as an option for healthcare delivery, and the comparable clinical outcomes before, during and after the pandemic are also detailed. The next chapter provides details of the qualitative results.

Figure 6.04: Summary of Quantitative Results

Consumer Questionnaire	• Limited responses (*n* = 19) • High levels of satisfaction with telehealth
Telehealth Utilisation Data	• With exception of social work, overall trend was increase in telehealth use in response to pandemic restrictions • P-HITH only service that continued to increase use post COVID • Other services decreased after COVID but not to re-pandemic levels • Consistent use of telephone before, during and after pandemic
Clinical Outcomes	
Safety of Services	• Comparable low clinical deterioration rates with telehealth • Only 12 SAC/HS score 4 (no harm) incidents reported over 6 years
Compare to In-Person	• hospital episodes that included P-HITH as either part or whole of an episode increased from 11.1% (2017/18) to 22.8% (2023/24)
Age Distribution	• 96% to 98% of patients were 5 years old or less (Figure 3.01)
Referral Rates	• Data limitations
Patient Attributed Time	• year on year decline in completion rates before, during & after COVID • variations in PAT for each discipline
Developmental Vulnerability (AEDC)	• 2018-21 - increases mostly in Early Literacy domain • 2021-24 – increases in Physical Health and Wellbeing, Communication Skills, and General Knowledge domains • most evident where developmental disadvantage already existed

7. Qualitative Results

7.1. Chapter Introduction

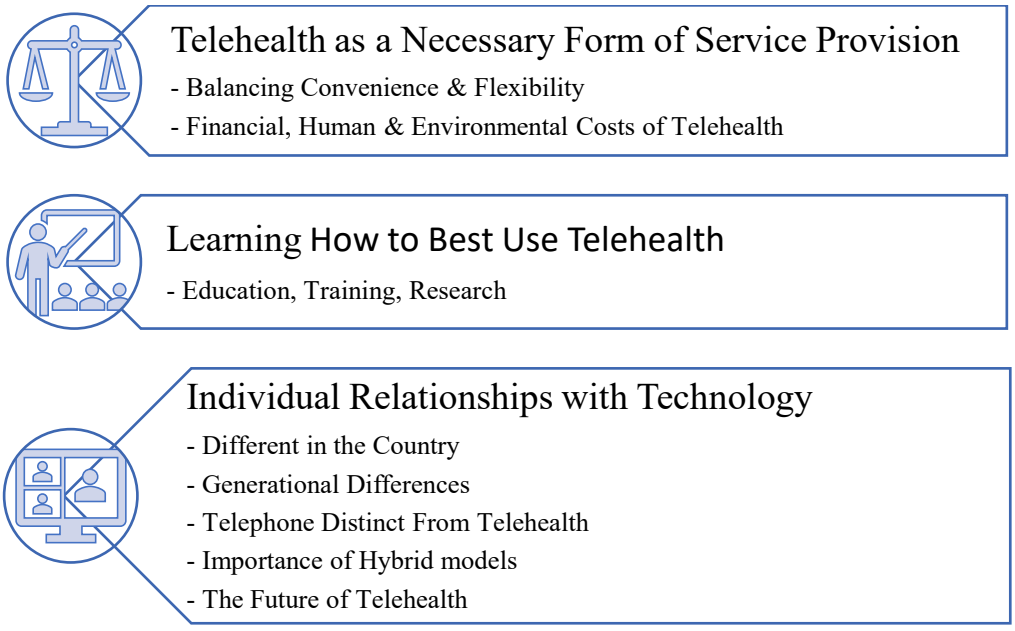
In this chapter, results from the thematic analysis of the interviews conducted with both consumers and providers of telehealth for children's healthcare in NSLHD are presented. The characteristics of the interview participants is detailed in Table 5.02. The qualitative research question explored in this section was; RQ3. W*hat were the experiences of telehealth from the perspectives of consumers and providers?*

This was explored through the semi-structured interview questions (see Figure 5.05). The themes and subthemes generated from the interviews are described and illustrated with verbatim quotes from the interview transcripts. The Quantitative Results are presented in Chapter 6 Quantitative Results.

7.2. Qualitative Data – Themes

The interview transcribing and the notes from the Interview Log in Table 7.01: Interview Journal Notes were part of the data familiarisation of the first phase the analysis. The codes and themes were generated, from the interview transcripts and detailed in Table 7.02: Codes & Themes Created from Thematic Analysis (Phases 2 to 5). The refining, defining, and naming of themes, resulted in the following final themes and sub-themes (Figure 7.01). These are detailed separately in the following sections.

Figure 7.01: Qualitative Data - Final Themes and Subthemes



7.2.1. Theme - Telehealth as a Necessary Form of Service Provision

Both healthcare providers and consumers highlighted the rapid adoption and use of telehealth at the onset of the COVID-19 pandemic. With restrictions in place, there was a clear need for a way to continue delivering and receiving healthcare services, and telehealth emerged as the solution.

> *"There was a zero phase before COVID. It was 100% telehealth during COVID and now it's an item that's used that works depending on the situation" (Child and Family Health 3).*
>
> *"A way of healthcare that was born out of necessity with COVID" (Consumer 2)*
>
> *"We started using it mainly during COVID of course…. to keep giving care when we weren't allowed to bring people into the hospital" (Acute Paediatrics 5)*

This was accompanied by the swift adoption of telehealth as a method of healthcare delivery, largely driven by the fear of severe illness or death from contracting COVID-19, as well as the need to comply with mandatory pandemic restrictions.

> *"Accepted it during COVID because there was no alternative" (Child and Family Health 4)*
>
> *"We did telehealth…. which was great actually…to have the option to have appointments specially [at] the height of COVID where we knew it was going to be so dangerous, going to a hospital for us" (Consumer 3)*

The rapid adoption of telehealth was fuelled by both urgency and necessity, driven by fear and restrictions. People feared the pandemic, the risk of infection, and ultimately, the possibility of severe illness or death from contracting COVID-19.

> *"I think there was an unusual sense of urgency that motivated the implementation of telehealth…. I do wonder if the fear of death wasn't there or significant illness wasn't there, whether people would have been quite as energised to just get [telehealth] to happen" (Child and Family Health 4)*
>
> *"We were able to do hospital at home to keep our little one safe, but he was still monitored" (Consumer Questionnaire)*

This widespread fear impacted both healthcare providers and families, prompting both groups to adopt telehealth. The value and appreciation for telehealth were closely tied to COVID-19, as it enabled the continuation of healthcare services while minimising virus exposure risks for everyone involved.

> *"They valued telehealth it seems more during COVID because they were fearful of infection for them or their child" (Child and Family Health 4)*

> *"That was one of the huge pluses and because it's, it's just so hard to get an appointment anyway in the public" (Consumer 1)*

These fears were not necessarily a sustained driver of change, because once the fears subsided so did the motivation to use telehealth instead of in-person healthcare delivery. Families needed more convincing to use telehealth once the necessity of a pandemic had gone. However, a consistently sustained use of telehealth across all areas has been in situations where a child or family member is sick. In such cases, telehealth is widely embraced as a convenient alternative for accessing healthcare.

> *"If circumstances suddenly change and they've got a bit of respiratory symptoms, for example, they will flip and change to do telehealth" (Child and Family Health 4)*

Many clinicians detailed with pride how they had maintained almost a full service via telehealth or virtual care, and how necessity was 'the mother of invention' for them. The pride was in how they rose to the occasion and achieved more than they thought possible remotely.

> *"I mean, I have done everything from clinic appointments to kind of diagnostic assessments via telehealth during the main COVID year" (Child and Family Health 5)*

The uptake of telehealth and virtual care at the start of COVID was at a time when technology was also being rapidly used for other virtual communications such as virtual classrooms and working from home. So, familiarity with using telehealth was part of a wider learning to be familiar with using videoconferencing for all aspects of social and professional lives.

> *"But they got more used to it, and I think you know, obviously when they were doing school, you know, they were doing Google Classroom or something like that. So, as they got used to that more um, they were better at doing telehealth there" (Child and Family Health 2)*

Another lasting impact of the pandemic was the shift toward remote work, driven by the need to access services and connect with others remotely. This concept, commonly known as working from home (WFH), became a widespread practice.

> *"I think not just telehealth itself, but also video conferencing I think has revolutionised the way we work in healthcare like you are able to be working from home today because you don't need to be physically in the office. Five years ago, there's no way I could have ever done any clinic appointment from home" (Child and Family Health 5)*

WFH was again initiated by the necessity of pandemic to maintain social distancing as much as possible and was not in any way exclusive to healthcare. It was a way of working that had a rapid increase during the pandemic years and a continuation post pandemic due to the convenience for employees. That acceptance of WFH was associated with the acceptance of telehealth.

> *"There is another association and it's about that working from home…that wouldn't be possible if people had to come into work. So, there is another factor I believe influencing the acceptance of telehealth from staff members point of view and that if it enables them to work from home, there's also more of an acceptance than if it's in the workplace or for those" (Child and Family Health 4).*

7.2.1.1. Subtheme - Balancing Convenience and Flexibility

Telehealth was expressed as almost synonymous with convenience and flexibility. It was very convenient for both consumers and professionals which has advantages and disadvantages. The advantages were associated with improved access to healthcare such as easy-to-get appointments; can fit into a normal day easily so don't have to miss work or school or can quickly get what you need. The disadvantages were the potential impact on clinician workload and their wellbeing, as well as the potential for complacency.

Convenience was a theme generated from both the perspectives of the providers and consumers of telehealth. This convenience was associated with ease of access to consultations online rather than the personal logistics to attend an appointment in-person, especially with multiple children.

> *"It's definitely more convenient rather than having to actually pack every man and his dog into the car and like a backpack that could sustain you in a zombie apocalypse…. It's definitely a lot more convenient to just be able to book a time and have a phone call or have a video call home" (Consumer 1)*

> *"As a parent with young children, it's made our life so much easier by immeasurable amounts, not just from the convenience aspect but or sorry, from the aspect that if you're trying to juggle multiple children" (Consumer 3)*

> *"I think it's great that they don't have to get out of their pyjamas and Skype for the appointment and find the parking and pay for the parking. And you know all the rigmarole, especially with a small baby, which is difficult" (Child and Family Health 8)*

> *"I don't have to wait in the waiting rooms. I can schedule it while I'm on the roads or and even just I will go and pick up the kids a little bit earlier and sit in the car and do schedule a telehealth … and it works out really well" (Consumer 1)*

The perceived advantages of convenience and telehealth was an important consideration in the acceptance of telehealth as an effective healthcare delivery option.

> *"There's that convenience factor; I think for families that drives their acceptance of telehealth and not having to take my child" (Child and family Health 4).*

> *"A positive alternative to going up to the centre in the rain. I may have cancelled the appointment if I had to go out in inclement weather" (Consumer Questionnaire)*

Convenience was often associated with a child being too sick to attend regular therapy session in-person, or a sibling was sick preventing the family attending an appointment. Telehealth was a way for families to not have to cancel or reschedule appointments and maintain continuity.

> *"Primarily when families wanted and to use it, and that often would be when there was illness in the family and, you know, they didn't want to come into the hospital because one of them was unwell" (Acute Paediatrics 3)*

> *"And they also know that if they say that one of the kids are sick, then they don't have to come in and they can do it over telehealth and exactly right" (Acute Paediatrics 5).*

For many clinicians, telehealth was not necessarily an easy option. They described how telehealth was a more strenuous option than in-person care. For example, they described telehealth as requiring more planning to undertake an assessment or provide therapy using telehealth and the amount of preparation for the appointment in terms of having medical, imaging, pathology records to hand. Harder work was also related to the ability to undertake more appointments in a day for example. Many clinicians referred to be tired or exhausted when doing telehealth appointments.

> *"I think telehealth can be exhausting somehow though. I think it's maybe it's the sitting and the fact that you have to sort of be bit more performative or you know there's and it's just the talking over in the sound like for you and me to talk or something bad. So, I'm doing most of the talking" (Paediatric Allied Health 2)*

> *"I find it much more difficult to focus on a TV screen for a long time talking, interacting. But [in-person] I can talk to people for much longer without feeling exhausted. You went home feeling far more exhausted after a clinic day full of telehealth. Whether it was just the way you have to focus your eyes and you get headaches because you're seeing screens all the time, I don't know. But it was far more tiring" (Child and Family Health 2)*

> *"I think one of the things is that you do telehealth and then you'd have to get off and email the parent lots of home program, worksheets or information sheets and all of that sort of stuff, and that that's quite sort of clunky and onerous cause you can forget to do it or get distracted or and it's very time consuming" (Paediatric Allied Health 2)*

Consequently, the potential impact on clinical workload from telehealth was a risk to clinician health and wellbeing. This wellbeing risk was expressed as something healthcare managers need to be aware of the way telehealth changes clinical work, and therefore how clinician's welfare is maintained.

> *"I think that really looking after the clinicians, health, and wellbeing like it's, you know, exhausting wearing these things. There's a lot of not moving. It's easy to put on weight, really.*

> *So, I think looking after the clinician doing a lot of this technology would be helpful" (Paediatric Allied Health 2)*

The remote accessibility of telehealth enables clinicians to provide consultations from their home or office. This blurring of lines between home and work can be burnout risk for staff.

> *"One thing that we've learned from COVID is how it is easy for clinicians to burn out. And I think if you start to blur the border between home and work too much, then that makes it, so you are more likely to burn out. Now we all do on calls and we kind of do monitor patients from home. I think you do need to be able to disconnect. My sense is that there's a lot of discontent with the even outside the medical world with how work is now and I'm intruding into personal lives" (Acute Paediatrics 5)*

Although working from home was also expressed as an advantage though for some providers.

> *"What that has meant to them and the organisation allowing us to work flexibly in terms of working from home, both of an evening when we're running our group, that was a bit of a logistical nightmare, getting staff and security and everybody on site" (Paediatric Allied Health 1)*

Another disadvantage of the convenience and flexibility of telehealth raised was the potential for complacency. For example, consumers might avoid in-person appointments, leading providers to opt for telehealth even when an in-person visit would be more clinically appropriate. Additionally, some participant reports highlighted concerns that families might prefer telehealth to avoid in-person visits, potentially neglecting or delaying the addressing of certain health issues.

> *"Though I think we've all kind of noticed that there are certain families who prefer it, and it can be difficult to get those families to come in at times which is less than ideal. In some cases, it's often those families where, and perhaps you know they would benefit from coming in where you're not quite sure what's going on in the home setting or where, you know, perhaps it's something that they don't want you to see weight management and that kind of stuff, where you know if they come in, they have to be weighed or that kind of stuff" (Acute Paediatrics 5)*

Similarly, the potential for misuse both from a consumer and provider perspectives was mentioned during interviews. Example provided included its ease of use and convenience of not having to travel or interrupt your daily activity. Misuse was described as potentially clinicians using telehealth when an in-person consultations would have been more clinically appropriate, but they did not want to travel to a rural location for example, or a way of managing more challenging patients who are reluctant to leave the consultation room. This could lead consumers and services outside of metropolitan areas feeling under served by clinicians and colleagues. There were concerns that consumers may misuse telehealth to get repeat prescriptions quickly and conveniently without understanding the importance of in-person appointments to ensure the appropriateness of their ongoing treatment. That convenience and speed may outweigh clinical appropriateness when choosing telehealth, putting consumers potentially at risk.

"It's helpful, but again, like anything, it can be abused" (Acute Paediatrics 5)

7.2.1.2. Subtheme - Financial, Human & Environmental Costs of Telehealth

Participants felt that the influence and impact of cost on the successful and sustained implementation of telehealth and virtual care should not be underestimated. These direct and indirect costs included financial, time, and environmental costs, which were often intertwined.

Financial and time costs were strongly related with some of the inconvenience of in-person appointments including travel or transport costs, car parking, and time off work.

"I don't have to travel and then I suppose you're going into the realms of the cost of petrol to get there" (Consumer 1)

"Time saved for travel" (Consumer Questionnaire)

"So many parents now work full time and coming into the clinic is, you know, you have to take a morning off or an afternoon off" (Child and Family Health 1)

"If it's just an appointment that you've gotta travel an hour for, maybe as a telehealth would be good" (Consumer 3)

"Easier childcare and ease of access" (Consumer Questionnaire)

> *"When I actually go for an in-person, I have to time give myself an extra 20-30 minutes in case of parking problems" (Consumer 1)*

> *"We've got a few mums who've gone back to work, so they'll log in in their lunch hour so they do it like that because they have no option, but it means that they can continue with the service for longer than if it had to be in-person appointment" (Paediatric Allied Health 1)*

Other consumer financial costs that put limitations on telehealth were access to the technology needed to access telehealth. These costs included the purchasing the technology itself, such as smart phones, and laptops, as well as the costs to use the technology, such as data and internet costs.

> *"That's frustrating that it's an extra level of complexity, particularly amongst the vulnerable families where they're not gonna have the latest phone. Other than they're not gonna have a nice laptop at home that that will work for them" (Acute Paediatrics 5)*

Perceived financial and time costs were not restricted to consumers. The clinicians providing healthcare services also acknowledged the influence of this on decisions to use telehealth or not. There were concerns that time, travel, and convenience could adversely influence decisions to use telehealth when an in-person appointment may be more clinically appropriate. The reduced fiscal costs to consumers are potentially a motivator for telehealth use, but only if they also perceive the value of telehealth to be equivocal to in-person. That the consumer gains from the telehealth appointment what they seek, for example a repeat prescription, a follow-up on test results, but not a physical examination. The benefits must overweigh any deficits, perceived or real for individuals.

> *"It felt very strange at first, but I feel like you got just the same experience, same level of care. I didn't really find a difference. Plus, you're in the comfort of your own home and you're not having to go to an appointment and wait. It's very convenient" (Consumer 3)*

> *"I think that families will choose that if they knew it was equally effective. If it saves time, money and just coordination time off work, blah, blah…. So, I think for some people in the future, they will consider the cost to get to an appointment in time and money and angst and other people will always want to come in" (Child and Family Health 4)*

Costs associated with telehealth were often intertwined. For example, travel, transport and parking were expressed as time costs, financial costs, and environmental costs. Travel and parking costs to go to in-person appointments and the savings resulting from an alternative telehealth appointment were expressed in terms of convenience, time saving and the monetary costs of public transport, petrol, and parking fees. The costs of taking time off work to take a child to an appointment again was seen as a combination of convenience and potential loss of earnings. For their children missing school or childcare was a higher cost for in-person meetings, and therefore a perceived lesser cost with telehealth.

> *"When families start to add up the cost of travel, the cost of having to get potentially childcare for other children if they can't take their child, taking time off work, even petrol costs are some people" (Child and Family Health 4)*

> *"I suspect that it probably is a bit cheaper than bring them in in-person. I think that you have time benefits from that which they would make it cheaper. I don't see that as a negative thing. I see that as a positive thing for me for most cases. I think if you only offer telehealth because it's cheaper than I think that's a problem, but if you can, if you can have telehealth as something to be used in a in an appropriate setting, then you can use the same resources to go further all that's great" (Acute Paediatrics 5)*

In addition, travel and transport costs were intertwined with environmental costs. These environmental costs were expressed in terms of increased or decreased emissions associated with travel and transport. Avoidable reductions in travel were therefore expressed positively with a potential reduction in environmental costs.

> *"From a sustainability point of view, we need to think about this lower carbon impact, then people travelling in their cars" (Child and Family Health 4)*

7.2.2. Theme - Learning How to Best Use Telehealth

The most reported finding regarding clinical training, education and research around telehealth or virtual care in this study was the lack of. When directly asked, the common response from clinicians was that they learned on the job or were self-taught when it came to using telehealth in their clinical practices.

> *"A lot of it was hit and miss to begin with of how to deliver it" (Child and Family Health 6)*

> *"It's just a self-taught thing. By necessity, I think" (Paediatric Allied Health 2)*

The learning and education at the start of the pandemic appeared to be driven by necessity. The necessity to continue services, which resulted in a steep learning curve for many clinicians. A phase of learning sometimes described as "*chaotic"* or a "*mad scramble."*

> *"It was really rapid learning on the spot from any clinician who was around you who knew what they would doing or just randomly going can some in the corridor. Can somebody help? I can't get this to connect" (Paediatric Allied Health 2)*

Some of the providers perceived learning how to use telehealth was more of an adaption of the care they provide routinely, more of a modification of practice rather than a whole new skillset. The principles of their specialist care were maintained but the delivery of it amended into a new model of care with telehealth delivery modality.

> *"But otherwise, we are just talking to the family, it's kind of just a clinical history. Great. You know not quite as good observation of their facial expressions and nonverbal language but with observations of that I think it's more the things I probably learnt more were around hard to do like a play-based assessment over telehealth which is like quite specifically looking for children's and levels of development and social communication I and repetitive behaviours in the like." (Child and Family Health 5)*

Clinicians described how they quickly needed to adapt their practice to provide what was traditionally done in-person. This now needed to be done online to maintain services and continuity of care for children and families.

> *"Pretty early on that was one of the recommendations was that we had to see the baby on the screen, so rather than just talking to the mum: (Child and Family Health 6)*

The clinicians learned how to best use telehealth and described some of the unexpected advantages and disadvantages of telehealth such as gaining an insight into family homes to provide a clearer picture of

the health context for the family. Although the use of digital backgrounds in video calls could negate this.

> *"I guess the one thing that that I have noticed is that some families I do actually get more of an insight to what's going on in their home when I'm on telehealth in their home and because you can sneakily look behind them and see what the house looks like, whether it's chaotic or clean or, you know, that kind of stuff" (Acute Paediatrics 5)*

Experiential learning with telehealth highlighted key areas of concern, particularly its use with neurodivergent children, domestic violence, and child protection cases. These areas underscored an urgent need for updated training and education to ensure appropriate care and the responsible use of telehealth. There were mixed views and experiences with the self-taught use of telehealth for neurodivergent children or children with behavioural concerns. Some found telehealth helped with attentiveness during appointments and others found in challenging and inappropriate.

> *"But a lot of those children are coming to say is for language therapy will often have comorbid attention and behaviour or components to their communication difficulties, and that's really hard to manage online" (Paediatric Allied Health 1)*

> *"Often if you have a child with ADHD, they're constantly talking over everybody. And so that's very exhausting actually" (Paediatric Allied Health 2)*

> *"A large amount of our clinics are managing kids with behavioural developmental problems and a lot of that ends up being ADHD. We found things that tend to be quite chaotic [using telehealth]" (Acute Paediatrics 5)*

This reinforced the need for individualised care in all aspects and that a one size fits all approach would not necessarily be suitable for telehealth practice or telehealth practice recommendations.

> *"To conduct an assessment with a child on telehealth, the issue can be with a child who has autism or suspected autism. Sometimes they're social communication skills are better on telehealth than in in-person because I'm on a screen" (Paediatric Allied Health 2)*

> *"One thing that we see with the younger kids in have autism is it it's not just about, you know, being unfriendly or aloof from people. It's actually being over familiar, and you know if you've got a four year old who meets me as a first time and tries to climb up on my lap, all that's telling you that there's something wrong and you can't assess that over telehealth and but patients that you know well where there's no diagnostic dilemma that or you know, diagnostic question to be answered during the consult" (Acute Paediatrics 5)*

There were differing opinions on conducting clinical assessments or making diagnoses for neurodivergent children via telehealth. While some clinicians were comfortable with this approach, others did not recommend it.

> *"But I wouldn't like to sort of say I think your child's autistic based on a telehealth [appointment] myself" (Child and Family Health 2)*

> *"During COVID we did do autism diagnosis via telehealth" (Child and Family Health 5)*

Clinicians quickly raised concerns about the appropriateness of the use of telehealth in cases where child protection or family violence were suspected or known. The need to learn how best to use telehealth or not in these scenarios was key. Their concerns were common and related to confidentially and privacy, as well as concerns about not knowing who else was in a room or able to listen when undertaking telehealth appointments. That the presence of other people in the room with a consumer could influence their responses to the clinician, or concerningly that the conversations could have detrimental consequences for a consumer. The use of telehealth when child protection or family violence concerns were raised was learned to be limited in the interest of consumer safety.

> *"The other issue is we don't always know if there's a domestic violence risk and if somebody is monitoring and doing that sort of, you know that digital device surveillance, there's always that consideration when doing something by telehealth as opposed to a woman coming to the centre with a child by herself" (Child and Family Health 4)*

7.2.2.1. Subtheme - Education, Training, Research

As with anything new, people need to be shown how to do it. The use of telehealth was no exception. There was expressed need for initial as well as ongoing education and training associated with delivery care via telehealth, as well as concerns for training of the next generation of clinicians.

> *"I think everyone can do with some training to do telehealth" (Paediatric Allied Health 2)*

> *"I can't see young physicians getting terribly experienced in reading people and working out what's happening" (Child and Family Health 2)*

Although, some clinicians expressed their assumptions that younger generations, as digital natives who had grown up with technology, would instinctively know how to navigate telehealth.

> *"I think the younger generation is, on the whole just coming out with the know-how comfortably" (Child and family Health 4)*

The education and coaching of families were important aspects of telehealth for the acute and community child health services. This was not just about the provision of parent education or healthcare information. It also included coaching and coaxing parents and carers to engage with the assessments or therapy, and to provide this at home with the support of online clinicians. This coaching and supporting parents to provide care or therapy at home via telehealth was seen as potentially empowering to families.

> *"One of the one of the barriers for me was actually parents going no, no. Look, you know, like, say, a 6-year-old with ADHD doesn't like handwriting. And they're like, no, I really don't wanna do telehealth because I really don't think they'll sit and concentrate for that long. And so, and I'd go. No, no, it's fine. Just give it a go like and so I would have a few props. So that's the only other thing that you know a little bit like the play school. ... props to keep the child interested in you and then to keep them on track or to make them feel happy" (Paediatric Allied Health 2)*

> *"I'll coach you as you go. And so, we did that. And she [parent] actually said to me, oh my goodness, this is like a light bulb moment for me because, you know, I can really, you know,*

because she'd been doing it herself …. Parent coaching program for a lot of their work with parents and they video them on an iPad in their session. So, and then they play it back through the parent can see and they talk about it. But anyway, it's just highlighting the benefits of telehealth actually" (Paediatric Allied Health 2)

Beyond the frontline clinician training and education needs for telehealth, there was an expressed need for the training and development of managers and leaders so they can consider telehealth, and technology more broadly, and how it can be effectively sustained as an option for families.

"Leadership has to be a consideration just like any organisational change, if they're not on board and they don't have the skills to walk their team through the process, it stops there" (Child and Family Health 4).

7.2.3. Theme - Individual Relationships with Technology

There were a lot of emotions expressed regarding telehealth by consumers and providers highlighting the very personal nature of telehealth. These emotions were both positive and negative, and included amazement, appreciation, excitement, frustration, gratitude, love, scared, stress surprise, and trust.

"I love telehealth, so I'm probably one of those people that I like to do things on telehealth more so than in-person.… telehealth is a godsend for me" (Child and Family Health 1)

The clinician interviewees often drew on their personal experiences of telehealth from outside of work as well as their professional experiences. During the pandemic, the use of online platforms expanded across various aspects of life, including social, educational, and professional interactions. As a result, their relationship with technology was potentially shaped by a broader digital shift during this time, rather than being limited to their experiences with telehealth.

"And yeah, even just thinking about in my own private life just with, you know, GP appointments, there's a sense in which there's easier quick access at times when telehealth is available rather than needing to be in-person" (Child and Family Health 9)

"I mean even for myself, I have my GP appointments if I can do it by telehealth … because it's a bit of an inconvenience when you physically got to go in" (Child and Family Health 8)

> *"In lock down time everybody's doing their zoom catch up with their friends and all that kind of stuff. So, I don't think it was particularly uncomfortable and yeah, I don't think I ever felt really uncomfortable with it" (Acute Paediatrics 1)*

Participants noted that while telehealth appears to be as effective as other healthcare delivery methods, its use was often shaped by individual preferences. Noting that clinicians tend to determine when and where to use telehealth based on their own comfort with technology and their level of experience with it. Some clinicians demonstrated integrating telehealth more comprehensively than others into their practice, with others reporting caution with its use. This suggested an individual approach to telehealth adoption rather than a more standardised approach.

> *"I'm getting more comfortable with it than before and I will suggest it at times it if there are families, for instance, if I'm seeing them, and I make a change and it can't wait until the next scheduled appointment, then I'll sometimes, so why don't we do a telehealth in a couple of weeks just to check in and see what's going on?" (Acute Paediatrics 3)*

> *"Is my thought that if you feel comfortable with telehealth, you will be more comfortable and have more success with getting your clients to have confidence and the vast majority of the nurses didn't want to use it unless they had fear in the picture as well" (Child and Family Health 4)*

The comfort level of some clinicians with telehealth was evident in their confidence and enthusiasm for the delivery option. They spoke freely with the researcher about the different interactions, or applications they adopted into their clinical practice.

> *"It's a face like a direct interaction between me and the child. Sometimes it's me asking the parent to interact and ask the child to do things, and I'll observe. It works pretty well the same as if you just had them in the room with you" (Paediatric Allied Heath 1).*

> *"I'm, you know, old fashioned and I do a lot of my work in a sort of person-to-person way rather than doing it" (Child and Family Health 2)*

> *"I did a lot of telehealth over COVID working from home. More than maybe some of the other people in my team. It was fine, and it worked for me" (Paediatric Allied Health 2)*

Some clinicians expressed their confidence and comfort with technology through frustration toward colleagues who were less adept or hesitant to embrace telehealth. They noted that those who lacked enthusiasm or the skills to engage clients in telehealth often struggled with its adoption. That this reflected more on individual attitudes and familiarity with technology rather than telehealth's overall effectiveness.

> *"I'd like to use it more, but I can't convince the clients to" (Child and Family Health 8)*

> *"I was pushing clinicians to have confidence in themselves" (Child and Family Health 3)*

> *"I do believe that there is a lot of clinicians conscious or unconscious bias if they don't feel comfortable or they can't be bothered, there's no way that a client is going to feel comfortable with video conferencing." (Child and family Health 4)*

The relationship and comfort of healthcare managers and leaders with technology influenced their own use of telehealth as well as that of their teams, which influenced the use and perceived values of telehealth in those services.

> *"There's a little there's a big leadership responsibility here. That's certainly what I'm seeing in those managers who have encouraged and supported their staff to go on the digital journey. Those teams are way better off than if the manager is uncomfortable." (Child and Family Health 4)*

An awareness of the impact of an individual's experiences with technology on their comfort with using telehealth was described by one clinician in a strategy to encourage consumers to use telehealth.

> *"What's happening now is when families agree to have a telehealth appointment with lots of discussion with the clinician, then often after they've had the one experience, they go, oh, that was really good" (Child and Family Health 9)*

7.2.3.1. Subtheme - Different in the Country

There was a sense of compassion or empathy with those living or working in rural or regional areas as expressed through comments about it *'being different for those in the country'* or how telehealth may be of greater advantage to those living further from the city and specialist services, from several interviewees, both consumers and clinicians.

> *"And then I like I'm luckily to not live remotely, but I would imagine if you were to live remotely as well, just the shared like distance and travel factor would be, you know, completely solved for want of a better description" (Consumer 2)*

> *"We're lucky we live in Sydney close to great hospitals and great doctors, but I guess people living in rural NSW or that need to travel in it would be a great option" (Consumer 3)*

> *"[telehealth] reduces the isolation of the regional clinicians' (Acute Paediatrics 2)*

> *"We sort of gained confidence in making those assessments, which probably people in the country do all the time where, you know, travel is not so easy" (Acute Paediatrics 3).*

> *"And some improve their access instead of having to take maybe a whole week off work to come into the city to have intensive therapy they can still access weekly via telehealth" (Paediatric Allied Health 4)*

For one family the success of telehealth for them opened the idea of moving to a bigger home in the country as a real option for them. Prior to their telehealth experiences they had felt restricted to living close to the city to access the healthcare they needed.

Telehealth provided a better than not seeing patients at all option if distance or travel were a barrier to accessing care, rather than the ideal mode of care delivery in some circumstances.

> *"I think it is second best, but then I'd much rather go on telehealth and talk to somebody who is out in [name of rural location] than not talk to them at all" (Child and Family Health 2)*

The clinicians' experiences with telehealth and virtual care similarly were not limited to their current positions in metro Sydney. Many had experiences from positions at other hospitals or facilities in

different locations they drew on during the interviews. As a result, they made comparisons between the needs and demands of children's healthcare in the country and the city.

> *"There was this feeling that city doctors who provide telehealth to the country were providing this amazing service, whereas people who lived and worked in the country would prefer that those people actually came out and saw the patients…subspecialist review by telehealth as part of a whole package was good…. but I don't think it would always provide the best care for that patient that they could have got if it was more integrated" (Acute Paediatrics 2)*

> *"Telehealth in terms of though being able to use telehealth to help particularly with the seriously ill child or children with you know end of life care, it was game changer umm to be able to provide good care and just get the support to manage the child as close to home as possible" (Acute Paediatrics 3)*

7.2.3.2. Subtheme - Generational Differences

The theme of age or generations, and levels of comfort with technology emerged strongly. The younger generation were assumed to have an advantage with the technology, and a higher level of mastery and therefore comfort with technology.

> *"Definitely the association. I think there is the age and generation, our level of comfort for people or not, is definitely worth reflecting on" (Child and Family Health 4)*

This mastery was connected to a higher level of understanding about the possible wider implications of telehealth. One provider noted that adolescents who frequently use social media were highly aware of privacy concerns, which can influence their preference for in-person visits rather than telehealth when discussing their health concerns.

> *"I think that's partly because we teach adolescents not to do that, you know, on Instagram and all those things. So, they're loathed to do it, but on when they come here, they often will tell me those sorts of issues that they have" (Child and Family Health 2)*

Acute Paediatric services such as Paediatric Hospital in the Home as a collective expressed a different relationship to community child health service clinicians who often had a more individualistic relationship with telehealth and virtual care technology. This was often influenced by age demographics of the community services as noted by several interviewees who described their experience and observation of older child and family health clinicians not continuing or expanding the use of telehealth after the necessity of COVID had passed. This was a perception of the young generations having an advantage with using technology and therefore not needing the same level of training and education to use telehealth.

> *"I can think of some new staff, you know who, who are many years younger than me,.... Let's say someone in their early 30s. They've got a number of years of experience in nursing but they're new to child and family health. But some of those staff will and take on the telehealth approach quite easily and they're much more tech savvy and they will, can take it on more easily … I mean most of the junior clinicians are younger and they're there's so much more used to technology anyway" (Acute Paediatrics 4)*

> *"Maybe that acceptance of digital stuff and just a comfort with technology, maybe age is an issue" (Child and Family Health 4)*

However, younger, but still very experienced, paediatric clinicians described, at length, their adaptations to continue to expand the use of telehealth and virtual care for their acute paediatric patients and families. There were differences noted between different child ages and the use of telehealth. Telehealth interactions for families with children under the age of 5 years was often with the parent rather than child, to provide education or undertake history assessments.

> *"Interesting that it's a format that works with older kids …You don't have much clinician-child interaction on telehealth and it's mostly with the parents" (Paediatric Allied Health 1)*

7.2.3.3. Subtheme - Telephone Distinct from Telehealth

There was an observed differentiation between telephone and telehealth in the clinicians' perspectives. For many clinicians, the term telehealth was primarily associated with audio-visual videoconferencing communication technology and sometimes referred to as 'full telehealth.'

Clinicians referred to telephone and telehealth often as distinct and separate entities and even when asked directly if they thought phone was part telehealth had to stop and think about it, before concluding 'sort of' or 'suppose so.' Some of this was historical as child health services have used the telephone as a clinical tool for many years, whereas telehealth with videoconferencing was seen as a new thing. Distinction existed between telephone and telehealth in healthcare delivery, which was as much about historical practice in places as practical or preferred applications. For other clinicians though the telephone and telehealth had different but complementary roles used side by side

> *"I got as much information as I could on the phone and then I sent the link to mum and then flicked across to video so that I was able to assess her [the child's] work of breathing on the video" (Acute Paediatrics 4)*

> *"But I mean, I still do a lot of phone calls and emails and things to people saying do this and do that and do the other" (Child and Family Health 2)*

A noted order of preference of modalities was reported among clinicians in the hospital and community settings, but more commonly in the community nursing services. The first preference was for in-person appointments followed by telephone (audio), and then videoconferencing telehealth. Families expressed a similar preference for in-person as their most preferred mode of delivery, followed by phone calls or video conferencing telehealth equally.

> *"Normally if they're sick and they can't come in, they'd rather have a chat, they might chat to me for an hour on the phone, and if I could have seen what the baby was doing and everything, it would have been a lot more meaningful" (Child and Family Health 9)*

> *"I don't think it [telehealth] can replace in-person medicine altogether that I think it certainly something that we should keep and use in you know when appropriate" (Acute Paediatrics 2)*

The videoconferencing was often used as a visual assessment tool to see the child physically or socially to observe their behaviour or interactions. If the visual was no longer required, then clinicians sometimes reverted to the telephone for discussions or consultations with families. For paediatric

hospital-based services such as hospital in the home and outpatients there was a reported change in the use of telephone and videoconferencing before and after COVID.

> *"I think pre COVID we probably would have been doing a lot more phone calls rather than telehealth. I think having the video component adds a big element" (Acute Paediatrics 1)*

> *"Telehealth could be more helpful at times than phone" (Child and Family Health 9)*

The telephone, however, did not always mean talking to consumers via audio, it included text messaging and chats via messaging. For some consumers, text message conversations were reported as preferrable for some individuals and in some circumstances. This preference for text messaging over voice calls could be financially influenced by consumers, for example, if they have a plan with unlimited text messages but not calls.

> *"They like the telephone, and they often don't like talking on the telephone. Some of them it's by text messaging only, so you can have long conversations by text message, which is difficult, but you know because of their level of anxiety, or they don't wanna, umm, engage in terms of talking on the phone, they'd rather do stuff by text messaging" (Child and Family Health 6)*

7.2.3.4. Subtheme - Importance of Hybrid Models

The importance of maintaining in-person healthcare delivery options was emphasised in various scenarios, particularly when physical assessments or examinations are required. These include measuring height, weight, and blood pressure, as well as the ability to observe more than just a patient's head and shoulders on a screen. Video conferencing was often used as a visual assessment tool to observe a child's physical appearance, behaviour, or social interactions. However, if a visual component was no longer necessary, clinicians sometimes opted for telephone consultations with families instead. Similarly, the limitations of telehealth were frequently associated with the inability to weigh a baby, accurately measure a child's height and weight, or conduct a comprehensive physical developmental assessment.

> *"But there are certainly cases even when there's no physical problem. You know, even when the kid, you know, it doesn't have a medical problem were seeing them in the room and seeing how they engage with the toys and how they engage with you can be really helpful. And you don't get that so much over telehealth" (Acute Paediatrics 3)*

> *"The physical examination stuff is definitely not appropriate. For history taking, it's a really good tool. If you're having a conversation mainly with parents…People are seeing that as very effective" (Child and Family Health 5)*

The clinicians often referred to the in-person appointments as the 'gold standard' or preferring in-person interactions, the human connection, or what they were trained for as clinicians.

> *"I definitely think that human connection is a factor in whether people won't accept or seek telehealth or not" (Child and Family Health 4)*

> *"I do prefer the in-person because that's what I was trained to do" (Acute Paediatrics 4)*

Through experience, consumers, quickly developed an appreciation, and consequently an acceptance of telehealth as an equitable alternative to in-person healthcare delivery.

> *"Initially I was very traditional. I like to be in-person with someone. It felt strange at first, but I feel like you got just the same experience, same level of care" (Consumer 4)*

However, clinicians' experiences in acute paediatric care versus community care for children with chronic conditions shaped their perceptions of telehealth's value. In acute paediatrics, telehealth was routinely used before, during, and after COVID-19, particularly in post-acute phases such as paediatric hospital-in-the-home services, where care focused on a single, well-defined issue. As a result, these clinicians generally viewed telehealth as more valuable compared to those in community paediatrics, where healthcare needs are often more complex and continuous. Consequently, the paediatric chronic conditions managed in an outpatient or community setting found telehealth to be less universally applied.

> *"I think in that setting it's really useful now because you've got a single simple problem that you're trying to address and you're answering one question and I think that's actually really*

> *the strength and that saves a lot of time for the staff, but also a lot of trips back to hospital for the family. That's probably the beauty, the perfect bit of you know, care closer to home if you can't even get out of your home. That's perfect, isn't it?" (Acute Paediatrics 2)*

> *"I think it's effective in terms of being able to get a history from the parents and I think you can still read a lot of emotional cues and things via telehealth if you're watching the screen properly. But I think it is easier to miss those social subtleties and emotional cues and some of the nuances. I think it's easier to miss those than if you're in-person because you might be seeing their face but not seeing their hands" (Child and Family Health 5)*

There were perceived differences between areas or disciplines, with one assuming the other was using telehealth differently or to a greater or lesser extent. Although not all community-based services shared this experience, with clinicians reporting the ability to maintain a comparable service using telehealth during COVID compared to traditionally in-person pre-COVID.

> *"One of the things that I haven't got through to doing is to get some doctors to do a study about the accuracy and reliability of the assessment results during COVID where and seeing them that they followed up in two years later as they came back to show the accuracy and reliability which really be around the 99%" (Child and Family Health 3)*

Telehealth interactions for families with children under the age of five years old was often with the parent rather than child, to provide education or undertake history assessments.

> *"Interesting. So, you don't have much clinician-child interaction on telehealth and it's mostly with the parents" (Paediatric Allied Health 1)*

7.2.3.5. Subtheme - The Future of Telehealth

There was an expressed elevated level of certainty about telehealth e being *'here to stay,'* and being part of the future of healthcare although not sure about how far it would or should go. The future without telehealth as an option for care delivery was almost unimaginable to some, but inevitable to most.

> *"It's definitely got a place." (Child and Family Health 6)*

> *"I think that's the last piece of the puzzle that we've really need to work on for speech pathology is you know, what does is this a valid clinical intervention model because the research to date says no telehealth is not a valid clinical model for delivery of speech pathology services" (Paediatric Allied Health 1)*

> *"I think it's very worthwhile. I don't think it would matter what anyone says. It's gonna stay. And I know that the government are gonna push it hard because it can be more efficient from a business point of view" (Child and Family Health 2)*

The future of telehealth was extrinsically linked with the development of communications technology, with many of its limitations being associated with technology, and access to technology. Its future therefore being linked to technological developments, improvements, and accessibility.

> *"But if that sort of [resolution quality] was improved, it would be more helpful. So, we can get a better idea of what they were trying to show us in in the way of sort of like skin rashes and things like that' (Child and Family Health 2)*

Telehealth and virtual care are widely perceived and expected to be part of routine healthcare delivery (business as usual). However, they are not yet fully integrated into the healthcare system, particularly in terms of best practice guidelines for specific disciplines and specialties. As a result, some clinicians emphasised the need for greater integration into quality and safety monitoring, including routine audits, the development of clinical guidelines, and standardised regulations for health professional bodies.

> *"If we're going to continue to use telehealth and it does have to be discipline specific, context specific and condition specific, that we do need clinical guidelines" (Child and Family Health 4)*

In the consumer questionnaire, the consumers identified scenarios when the use of telehealth could improve their healthcare experience.

> *"Preliminary diagnostics at a local health facility to then facilitate remote appointments with specialists" (Consumer Questionnaire)*

> *"Maybe a 3-way option if a socialist [social worker] had to be involved" (Consumer Questionnaire)*

Participants indicated that the implementation and utilisation of telehealth were frequently influenced by the preferences and decisions of clinicians, managers, and consumers, each operating within their respective spheres of influence. Consumers typically prioritised their personal healthcare experiences, clinicians made decisions based on perceived benefits for their patients, and managers considered the needs of entire services. These preferences, and the resultant decisions regarding the extent and manner of telehealth adoption, were closely linked to individuals' prior experiences with, comprehension of, and comfort in using digital technologies. In other words, their relationship with technology.

> *"I don't think it's gonna replace the doctor, maybe that's my paranoia…although technology might be brilliant in 20 years' time" (Child and Family Health 2)*

Similarly, the past experiences of consumers and providers with telehealth and their comfort with technology influenced their perception of the value of telehealth and the likelihood of them using it in the future.

> *"Families are comfortable, but we have a lot of staff who are still not comfortable with the technology and use it very reluctantly. I think the way that it is offered to families is very dependent on the clinician's level of comfort. There's definitely bias of the person offering or not offering" (Child and Family Health 4)*

> *"There were some members of staff that were more comfortable with using it than others, more confident with the technology" (Child and Family Health 9)*

Rural and regional healthcare facilities were noted to have been using telehealth longer than metro areas, in other words before COVID out of their necessity to provide care. This was described as evidence for how and why telehealth will be used in the future.

> *"Well, I think it will be used more and more …. And you know in [name of hospital] uses it a lot with rural and remote nursing and you know, for consultant appointments and things like that" (Child and Family Health 8)*

Telehealth is one of the options now available for health provision, available for healthcare providers and consumers. However, as the participant's noted, it is not the panacea for all healthcare delivery scenarios.

> *"I think it's a quiver in the bow; it's one tool amongst many. I don't think it can replace in-person medicine altogether that I think it certainly something that we should keep and use in you know when appropriate" (Acute Paediatrics 5)*

> *"I hope that it continues in some format or another, particularly I hope the GPs can continue to be subsidised and specialist appointments and things as well. I do think there's lots of appointments people should attend in-person. I don't think telehealth is an excuse for not going to an in-person appointment when you need to be seen physically. Lots of opportunities to use it as an option in the future" (Child and Family Health 5)*

This concludes the qualitative results chapter. The perspectives of the consumers and providers about telehealth in children's healthcare are detailed. The themes and subthemes generated from the interview data are detailed with supporting quotes form the interview transcripts. The next chapter integrates the quantitative and qualitative data findings in relation to current literature.

8. Discussion

8.1. Chapter Introduction

In this chapter, the study findings are integrated and discussed in relation to the current literature. In this study, Critical Realism provided a robust epistemological and ontological foundation for exploring the underlying structures, views and values that potentially shaped the events and experiences of both consumers and providers in telehealth during and after the COVID 19 pandemic. Telehealth providers' experiences with using telehealth, were examined from the perspective of professional self-efficacy. The three main research questions were used to frame the discussion in the following way. The first section provides discussion of the use of telehealth in children's healthcare (RQ1). Next, outcomes, safety and satisfaction are discussed (RQ2). The influence of individual values and beliefs on the telehealth experience is then considered (RQ3). The future of telehealth services, with recommendations for practice and research conclude the discussion.

8.2. Use of Telehealth in Children's Healthcare (RQ1)

This section aimed to explore the use of telehealth in acute paediatric and community child health services in NSLHD before during and after the COVID-19. The concept of telehealth to conduct consultations via the telephone or video conferencing is not new, and it has been developing for many years (Chen et al., 2018; Frye et al., 2022; McLean et al., 2010; McLean et al., 2011; Nicogossian et al., 2001; Tan & Lai, 2012). The uptake of telehealth in children's healthcare and healthcare more broadly however, had been limited or sporadic until the COVID-19 pandemic. As was reported globally, this study's findings demonstrated a rapid and immediate increase in telehealth use in Northern Sydney Local Health District (NSLHD) at the start of the COVID-19 pandemic in early 2020. This rapid increase in the use of telehealth was demonstrated in most the paediatric and child health services except for social work interestingly. This study reported this increase in telehealth as a necessity to respond to the pandemic restrictions to maintain the provision of healthcare services. A finding that has been well documented in the literature (Atabaki et al., 2024; Galway et al., 2021; Kim et al., 2022; Oliveira et al., 2025). Beyond the necessity to maintain services during the pandemic, telehealth was not necessarily the preferred ongoing delivery option for all paediatric and child health clinicians or the families they

support. Although families in this study expressed much gratitude for the option of telehealth both during and after the pandemic, which was consistent with national surveys of families' experiences with telehealth (The Royal Children's Hospital National Poll, 2021).The study herein is one of few studies to have compared acute paediatric services and community child health and wellbeing services use of telehealth. One of the interesting findings from this study was the variations in the patterns of ongoing telehealth use after the pandemic between these services. Physiotherapy, for example, returned to face-to-face service delivery while others maintained high usage. The rapid uptake of telehealth at the start of the pandemic and the decline that followed as the restrictions were lifted was observed not only at the study site but also nationally and internationally (Bartelt, Piff, Allen, & Barkley, 2023). The NSLHD Paediatric Hospital in the Home service in this study, however, was unique in NSLHD, as it continued to increase its use of telehealth during and after the pandemic. Thus, enabling families to continue to avoid hospitalisation or reduce the child's hospital length of stay through assessment, education and care provided remotely by experienced clinicians beyond the pandemic era. Literature has been noted to be limited regarding the use of telehealth post pandemic in the children's hospital context (Vanelli, Visintin, & Gitto, 2025), and an area worthy of further investigation.

In NSLHD, the volume of paediatric speech pathology assessments and therapy undertaken via telehealth during the pandemic was considerable. This was consistent with reports from the literature of an increase in demand for speech pathology services delivered during COVID, and a rapid transition to virtual care to deliver these services in other parts of NSW (Learnihan, Hogg, & Davis, 2024). Between 2018 and 2023 speech pathology represented more than half (36,829) of the paediatric allied heath occasions of service (OOS) (70,809) in NSLHD, with almost half of these moving from in-person to audio-visual telehealth delivery. At the same time paediatric allied health referral requests between 2018 and 2023 showed a downward trend along with a decrease in referral completion rates. At the same time, the negative impact on children's speech and language development was a legacy of the COVID-19 pandemic (Pejovic, Severino, Vigário, & Frota, 2024), and a small increase in children with language and cognitive skills who were developmentally at risk from 4.4% (2018) to 5.6% (2021) and 6.0% (2024) was reported from the Australian context (refer to Table 6.13) (Australian Early Development Census (AEDC), 2022). The literature attributes decline in child language skills to several factors

including increased screen time, reduced parent-child verbal interactions, access to early childhood education, reduced socialisation during the pandemic, family adversity and geographical disadvantaged locations (Hoffmann et al., 2024; Pejovic et al., 2024; Zacher et al., 2023). The routine use of masks during the pandemic has also been reported as impacting normal language development (Vanelli et al., 2025).

The referral rates to allied health for developmental concerns data were not available to explore this further in NSLHD or in the literature. This was despite reported concerns about the impact of the pandemic on early childhood development prior to starting school (C. Jones et al., 2023; The Royal Children's Hospital National Poll, 2020), and the recognised importance of early intervention for child development (Caporali, Pisoni, Naboni, Provenzi, & Orcesi, 2021; Woolfenden et al., 2015).

The ongoing, and in some cases increased, use of telehealth post pandemic in NSLHD demonstrated the emergence of telehealth as an accepted option for some services rather than just a necessity during the pandemic in this study. A key finding of this study was that this acceptance for telehealth was not service or context specific. Instead, this study found there was an expressed difference in individual clinician approaches and innovations to incorporating telehealth into therapy. Individual clinicians expressed varying perspectives on the appropriateness and their application of telehealth, with some advocating best practice through in-person delivery only and others demonstrating innovative approaches to delivering therapy online. These individual provider patterns of use with telehealth in clinical practice or not, was not highlighted in the literature.

In this study, the acute paediatric services, enthusiastically embraced telehealth by both consumers and providers. Providers described their innovations and adaptations of practice to a virtual format, such as bringing parents in different locations into a virtual appointment for their child or using multiple adjacent screens to view medical records and clinical results as well as the children and their families. Consumers advocated strongly for the service to continue and highly praised the telehealth option. This enthusiasm for telehealth or virtual care services in paediatrics was highlighted in the RCH telehealth poll where parents and families said that telehealth was a convenient option (69%), the telehealth care they received was as good as what they would have received in-person (67%), and they would use telehealth again (92%) (The Royal Children's Hospital National Poll, 2021).

Social work services demonstrated consistently very occasional telehealth use before, during and after the pandemic, and a preference for in-person care delivery. The nature of social work is to offer support and assistance to individuals, children, and families during challenging and traumatic times in their lives. This support is customised to meet specific needs and circumstances, often involving assessments in clients' home environments. Consequently, telehealth may not necessarily be the most effective nor appropriate way to deliver this service (Gilson et al., 2024; Hilty et al., 2023).

The term ‘telehealth’ includes the use of audio-visual, audio only telecommunications and remote monitoring. However, for many clinicians the term ‘telehealth’ was associated almost exclusively with the use of audio-visual via videoconferencing. Prior to the pandemic, the child and family and community paediatric services used telephone (audio only) communications as a significant part of their model of care but did not associate this with telehealth. This use of audio only telehealth remained consistent before, during and after the pandemic demonstrating the embedded preferential nature of audio only telehealth in their practice. The preference for telephone use over telehealth and the distinction between the two for community services was consistent with the literature (Caffery et al., 2024; Snoswell, Haydon, & Caffery, 2025). The tendency to revert to using the telephone when barriers with videoconferencing are encountered was documented in the literature (Phillips et al., 2023). This may be attributed to the reported benefits of telephone compared to video, of greater privacy, feasibility and ease of use for some populations (Chang et al., 2021). In this scenario, the use of audiovisual telehealth was largely attributed to the pandemic necessity of telehealth and a small post pandemic residual use.

The different patterns of telehealth use between the paediatric and child health services can in part at least be explained part by the distinctive characteristics of each service. The social work service with its counselling and crisis support are perhaps better suited to in person care. Similarly, the physical assessment and therapy provision of some paediatric allied health and child and family health is also better suited to in-person care delivery. The follow-up appointments and education aspects of these paediatric allied health services are well suited to telehealth. They comprise of interactions with the parent or carer rather than with the child directly. Speech therapy is a good example where the model uses parents as therapists. Some services may be better suited than others to telehealth, such as those

that do not routinely require physical assessments or therapies. However, the rate of adaptation of telehealth within these services maybe more dependent on the inclination of individual to adopt and adapt telehealth into their practice as demonstrated in this study.

8.3. Comparing Telehealth Safety, Outcomes & Satisfaction (RQ2)

The study herein aimed to compare telehealth with other modalities of healthcare delivery and to explore if telehealth was superior, inferior, or equivocal. This was explored through comparisons of safety measures, clinical outcomes, and satisfaction with telehealth from both consumer and provider perspectives.

The analysis drew on both quantitative safety data and qualitative interview findings to explore patient safety. There was no evidence to suggest an increase in reported clinical incidents or missed instances of clinical deterioration associated with the use of telehealth, although the limited number of events recorded limited the ability to conclude with absolute confidence. Patient safety with telehealth was examined through analysis of clinical incident reports and deterioration response data, which supported growing evidence in the literature indicating no significant adverse events linked to telehealth use suggesting that telehealth does not have adverse effects or harm patients (Forster et al., 2023; Janjua, Carter, et al., 2021). Similarly, both healthcare provider and consumer participants did not report any concerns regarding patient safety when telehealth was employed as a mode of care delivery, pointing to telehealth as at least equivocal to traditional in-person care delivery when physical assessments or procedures are not required (Janjua, Carter, et al., 2021).

The study further demonstrated the equivalence of telehealth to in-person health delivery with no compromised clinical outcomes. Findings were consistent with the literature reviewed in section 2.3. The different paediatric allied health disciplines demonstrated different patterns of average Patient Attributed Time (PAT) per patient and average duration of appointments before, during and after the pandemic. PAT is a critical consideration in the delivery of effective and family-centred care, and some of these inter-disciplinary differences are inherent to the distinct scopes of practice, patient needs, therapeutic interventions, and documentation requirements for each discipline. Patient complexity, goals of therapy, and specific treatment modalities contribute to variations in how time is allocated for

patients. Except for social work, these results painted a picture of service delivery adaption as a necessity during COVID but not necessarily one of telehealth as a preferred option post pandemic. They did not suggest the inferiority or superiority of telehealth during that time.

Social Work had the lowest uptake of telehealth, and highest PAT compared to other allied health professions. The average duration of appointment and the average PAT for social work has increased year on year before, during and after the pandemic, with post pandemic average PAT about double that of pre pandemic. This may be attributed to social workers typically engaging in more holistic, complex social and emotional long-term care that requires extended patient interaction and comprehensive documentation (Hilty et al., 2023). A higher demand during the pandemic for family crisis intervention and counselling may explain this, and the inability or inappropriateness of doing so using telehealth. Telehealth can raise concerns about privacy. There is risk in delivering complex care in particular where family violence or other family characteristics that require privacy exist, and a lack of privacy is a barrier to disclosure for family violence victims (Heron & Eisma, 2021). An ongoing increased need for social work is possibly a pandemic legacy, and as such would warrant future research.

Speech pathology demonstrated relative consistency with average appointment durations and average number of OOS per patient have been relatively consistent before, during and after the pandemic. This was despite having the largest increase in telehealth use during the pandemic and a continued use two or three times that of pre pandemic use. The use of telehealth has seemingly been endorsed and integrated into routine models of care with potential benefits of clinical goals being met in a shorter duration of time (Speech Pathology Australia, 2022).

In acute paediatrics, the use of telehealth as part of the NSLHD paediatric hospital in the home and virtual care services was explored through their lengths of stay, bed days, and the number of reviews per day. However, the average length of stay of a child in hospital is measured in time and is arguably not a clinical outcome *per se* but an operational one, demonstrating the efficiency of a service model rather than its clinical effectiveness (Stone, Zwiggelaar, Jones, & MacParthalain, 2022), and as such of limited value as an outcome measure.

Child and family health and the early childhood screening and interventions were explored using the AEDC census data, and the incidence of developmental vulnerabilities in the population of children starting primary school following the pandemic in the 2022 AEDC report. For the local government areas within NSLHD there was no significant change in the incidence of developmental vulnerabilities before and after the pandemic when many child screening services moved to a virtual service, and some continued with a hybrid option after the pandemic (Australian Early Development Census (AEDC), 2022). There was very little change in vulnerability rates in NSLHD, and more widely in NSW and Australia, suggesting consistency in child development screening services outcomes during the pandemic years. The AEDC 2024 data published in mid-2025 provided a further insight into any longer-term impacts on child development screening and identified vulnerabilities, as well as any delayed effects of children's healthcare provision during the pandemic years. Nationally, an increase in developmental vulnerability was reported in all five domains, especially for the socio-economically disadvantaged (Australian Early Development Census (AEDC), 2025). In NSLHD there were significant increases in developmental vulnerability in the physical health and wellbeing, and the communication and general knowledge domains. This highlights the importance of maintaining child developmental screening and paediatric allied health assessment and therapies during and after a pandemic through telehealth to prevent a potentially greater developmental impact on a young generation. The literature reports a potentially greater and wider reaching impact on child development and wellbeing than the AEDC data suggests (C. Jones et al., 2023; The Royal Children's Hospital National Poll, 2020). Some of the impacts reported concerned older school age children and teenagers, and therefore beyond the scope of the AEDC data. If there was an impact on the growth and development of older children, then change to the age distribution of children referred to allied health would be expected, but this was not the case (Figure 3.01).

The literature reviewed after the COVID-19 pandemic, reported that a significant proportion of the negative impacts of pandemic restrictions on children were mental health related. In this study, mental health was excluded from the scope of the research but is an area that warrants future research.

The consumer questionnaire aimed to provide satisfaction data to complement the qualitative interview data. However, the limited responses from families limited the ability to infer much from the findings.

The descriptive statistical analysis still offered some insights into consumer satisfaction with telehealth that was consistent with larger national survey results about telehealth experiences in the child and adult healthcare (Bureau of Health Information, 2023; The Royal Children's Hospital National Poll, 2021).

Initial motivations for the widespread adoption of telehealth were associated with mortality fears from the COVID virus and the necessity to continue healthcare services during the pandemic restrictions. Despite these motivators acceptance and satisfaction with telehealth were extremely positive. Consumers and providers expressed amazement, gratitude, excitement, and a love for telehealth, albeit with some frustration and stress often with the technology itself. The literature has emphasised that technology including telehealth reduces consumer satisfaction and its adoption is therefore limited by these concerns (Bull et al., 2016; Hah et al., 2019; Odendaal et al., 2020; The Royal Children's Hospital National Poll, 2021). At the same time convenience and flexibility emerge as primary drivers of high satisfaction, coupled with meeting their healthcare needs from telehealth appointments. This is again consistent with the literature (Agency for Clinical Innovation, 2023; Bureau of Health Information, 2023; The Royal Children's Hospital National Poll, 2021). However, there were some contradictions with clinicians who on the one hand reported that consumers preferred in-person appointments but also recognised high levels of consumer satisfaction with the convenience of telehealth. Consumers recognised the value of telehealth for themselves in some scenarios beyond just the necessity of a pandemic and beyond the flexibility and convenience. The value was having an equally effective way to receive healthcare with the addition of flexibility, convenience, and reduced costs to the consumer. Costs were measured in time and money.

This study highlighted that delivering services via telehealth can be the harder option for clinicians that require a lot of preparation time prior to the appointment, along with the temptations to schedule an increased number of appointments in a day. These have the risks of job dissatisfaction and burnout for clinicians. The welfare and wellbeing of clinicians is therefore an important consideration for health service policies and planning. This was contrary to some of the literature suggesting efficiencies with clinician’s time when using telehealth (Balinsky & Marie, 2001; Snoswell et al., 2020).

8.4. Influence of Individual Values and Beliefs on the Telehealth Experience (RQ3)

By exploring telehealth through the lens of critical realism the study aimed to appreciate that there are deeper, often less visible structures and mechanisms that impacting the success and integration of telehealth. These are beyond what we can observe and measure, such as the views, values, and beliefs of individuals. In this study, the influence of the values and experiences of individual consumers and providers were greater than the influence of the nature of individual services on the successful and continued utilisation of telehealth in children's healthcare.

During the study design phase, variations in telehealth utilisation were anticipated to be context associated, for example a greater utilisation in one allied health discipline more than other, or in community rather than acute settings. Indeed, the literature provided evidence for the successful implementation of telehealth across a wide range of children's healthcare settings (Carroll et al., 2022; Casemiro, Lopes-Junior, Jardim, Sulino, & de Lima, 2022; Forster et al., 2023; Hall, Luechtefeld, et al., 2021; Kim et al., 2022; McLean et al., 2011; Peterson et al., 2021). But as the study progressed, variations in the application of telehealth, along with the corresponding experiences and outcomes, were found to not be inherently linked to the context or type of service provided. Instead, the variations were more specific to individuals especially to individual providers of telehealth, with the ontological 'real' structures and mechanisms being influenced largely by individual experiences, values, and beliefs.

A notable association emerged between the successful implementation and outcomes of telehealth and the providers' levels of comfort with telehealth modalities. Levels of comfort were associated with clinician familiarity with technology. Similarly, consumer preferences for telehealth seemed to be shaped by the individuals' relationship with, or proficiency in, technology.

The providers interviewed were all extremely experienced clinicians and experts in their subspeciality areas, with many indicating they had over 20 years' experience in children's healthcare. The iterative interview process enabled the exploration of this and if it were necessary for clinicians to have a high level of experience and expertise before they could provide healthcare via telehealth. The clinicians' instinctive responses were yes but they quickly reflected during their interviews, that this may not necessarily be so. That delivering care via telehealth required a specific knowledge and skill but was not necessarily dependant on the number of years of clinical experience. On the contrary, there were

suggestions that the older clinicians may be less embracing of telehealth and technology, and the younger clinicians and consumers more embracing of it.

The younger generations of consumers and providers were sometimes described as “digital natives”, a term coined by Marc Prensky in 2001. It is an expression of their perceived innate familiarity with digital technology, facilitating a greater familiarity and appreciation for the convenience and accessibility offered by telehealth, compared to previous generations who had to adapt to it later in life, and therefore less inclined to use it (Prensky, 2001). The nature of child health and paediatric healthcare means that the consumers, both children and their parents/carers, are often of a younger generation, creating potential generational disparities between the consumer and provider. Incorrect assumptions by individual clinicians about consumer preferences, generational differences in comfort levels with technology and differing perspectives of the value and appropriateness of telehealth could impact the delivery options available to consumers. The inability to participate in the online world due to a lack of skills and confidence as well as the digital tools and data is part of a digital poverty phenomenon that is creating access inequities to telehealth for families (Yao et al., 2022).

The impact of an individual's relationship with, or comfort level regarding, technology on the availability and delivery of telehealth introduces important implications for the clinician-patient partnership, particularly in the context of shared decision-making in care. If the influence of a clinician’s comfort and proficiency with technology outweighs that of the consumer’s, it has the potential to undermine the collaborative nature of the care partnership, with telehealth utilisation being determined primarily by the clinician’s preferences rather than the patient’s needs or preferences. This dynamic is often reflected in clinical variations among practitioners within the same discipline or specialty, such as paediatric speech pathology or child and family health nursing. Consequently, the resulting differences in practice may be attributed to individual clinician preferences, experience, or technological comfort, rather than being grounded in divergent clinical evidence or standardised best practices. Thus, raising concerns about the ability of consumers to make truly informed choices regarding telehealth if they do not have a thorough understanding including risks, benefits, and potential outcomes (Elmore, Ganschow, & Geller, 2010; Lewis & Pignone, 2011). By integrating one mandatory telehealth appointment into a standard schedule of therapy sessions, one allied health service

successfully enabled patients to experience telehealth and to make informed choices about future telehealth appointments.

The Oxford philosophers Andy Clark and David Chalmers have described the human relationship with technology. They argue that technology becomes an extension of ourselves. In their 'Theory of Mind' this relationship is part of the external cognition of the Extended Mind theory (Clark & Chalmers, 1998; Robson, 2024). Therefore, it is necessary to understand our relationships with technology, how much we are each entwined if we are to understand the uptake of technology such as that used in telehealth or virtual care. Our co-evolution, as humans and our individual relationships with technology has developed from our earliest tools to the internet (Chatfield, 2024). Therefore, to understand these variations in the application and outcomes of telehealth, we need to explore the relationships of individuals, both providers and consumers in this case with technology. To understand these individual motivations to use telehealth, the degree to which technology is adopted and utilised by an individual can be related to their self-efficacy (Bandura, 1982, 1994).

8.5. Professional Self- Efficacy

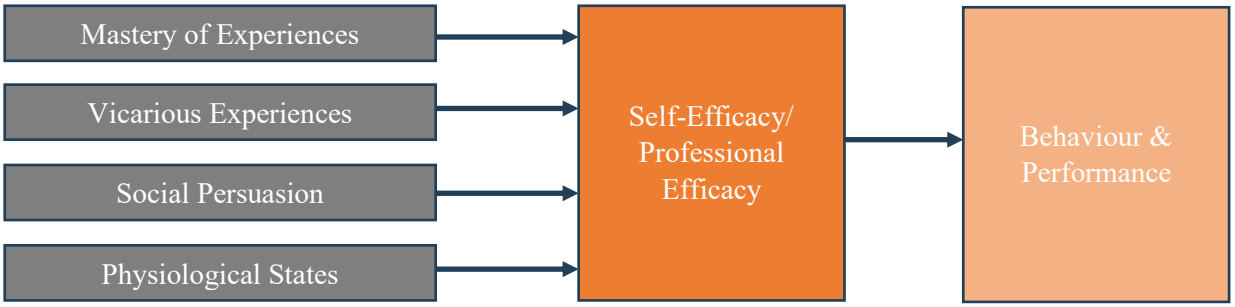
Self-efficacy refers to an individual's belief in their capacity to execute behaviours necessary to produce specific performance attainments and reflects their confidence in the ability to exert control over their own functioning, behaviour, and events that affect their lives (Magon et al., 2023). It can be the foundation of an individual's motivation, well-being, and sense of achievement (Bandura, 1977, 1978, 1982, 1994). Despite the criticisms of the concept of self-efficacy theories and consequently of findings from empirical studies, particularly with regard to outcomes and efficacy in relation to fear and avoidant behaviours (Eastman & Marzillier, 1984). A high sense of self-efficacy is associated with positive attributes of resilience, healthy lifestyle choices, educational and professional accomplishments making it of relevance to consumer choices about telehealth and professionals use of telehealth.

When exploring self-efficacy of healthcare professionals research leads to the related subset concept of professional efficacy, which refers to an individual's belief in their professional ability and competency to perform their role effectively. It includes confidence, skills, and the conviction to meet profession expectations. Self-efficacy has been studied in healthcare professionals (Magon et al., 2023).

Professional efficacy has been demonstrated to influence an individual's job performance through engagement with their work; their resilience to challenges; and a key protective factor with psychological stress (Magon et al., 2023; Panc, Mihalcea, & Manea, 2012). Burnout and life satisfaction were the other key influences on work performance, emphasising the importance of staff health and wellbeing (Bernales-Turpo et al., 2022; Yiming, Shi, Kayani, & Biasutti, 2024). Self-efficacy in the workplace has been demonstrated to be influenced by ethical leadership and innovative work behaviour (Uppathampracha & Liu, 2022), and a key factor in fostering innovation in organisations (Hu, Wu, & Yu, 2023; Kumar & Uzkurt, 2010; Mumtaz & Parahoo, 2019).

Like self-efficacy or people's beliefs in their efficacy, professional self-efficacy is influenced by; a) mastery of experiences (actual experience), b) vicarious experiences (observation of other), c) social persuasion (verbal or otherwise), and d) physiological states (Artino, 2012). In turn, self-efficacy and professional efficacy influence their behaviour and performance, as summarised in Figure 8.01. These sources of influence are explored further in the next sections.

Figure 8.01: Primary Sources of Influence for Self and Professional Efficacy



8.5.1. Mastery of Experiences

Of the four sources of self-efficacy, mastery is described as the most influential (Bandura, 1994). Gaining mastery over an activity, like telehealth, through experience and persistence not only boosts one's self-efficacy but simultaneously reduces one's resistance and defensive or evasive behaviours (Artino, 2012; Bandura, 1977). Conversely, repeated failure can undermine self-efficacy, especially if one believes the failure is due to a lack of ability rather than external factors or insufficient effort. The familiarity or lack of familiarity, with one form of online communication can positively or negatively impact familiarity with other modes, which can influence behaviour related to their use or not of telehealth (Eklund, 2024).

The rapid installation and uptake of telehealth in NSLHD, and across the world, was driven by the necessity to adapt to social restrictions imposed during the pandemic. Many providers quickly adopted the modality, and consumers welcomed the telehealth modality as an alternative option for receiving their healthcare. This rapid implementation of telehealth across the breadth of children's healthcare services was reported in this study as being accompanied by a steep learning curve for providers and consumers. In particular, providers who needed to quickly become the experts who could deliver care seamlessly via telehealth but also coach consumers to use telehealth at the same time.

Providers in this study described how they learned to best use telehealth through trial and error. Their learning required both how to use the technology they had been given for telehealth but also how to adapt their practice to delivering online instead of in-person. There were some very practical lessons learned as clinician experience grew, around the need for multiple screens for example, so they could use one for the telehealth videocall and another to view patient notes or clinical test results. The learning to use telehealth was accompanied by learning when to use telehealth, and the limitations of telehealth. Domestic violence and child protection were two areas that were strongly expressed as not appropriate for the telehealth. As was any occasion when a physical examination is required. There were some contrary opinions about neurodiverse children and telehealth. In some scenarios families with neurodiverse children had challenges with telehealth but made it work through adaptations to appointments such as only needing the child and parent/carers to be online some of the time. For others telehealth made healthcare appointments for their neurodiverse child possible where they had previously struggled for them to attend and engage in-person.

There were implications for education when considering education needs of clinicians about telehealth and virtual care in their practice (Artino, 2012). Self-efficacy has been demonstrated to be influential in acquisitions of motor skills (McAuley, 2024), as well as the academic and learning achievements of both adults and children (Pajares, 1997). Bandura (1986) discusses the relation between self-efficacy and learning through self-reflection and considers self-reflection an important contributor to an individual's ability to positively alter their own thinking and behaviour (Bandura, 1977, 1982, 1994; Yost, 2006). Reflective practice is regarded as an important skill for healthcare professionals. It is considered part of good practice strengthening patient safety and quality, along with work engagement

and professional self-efficacy (Koshy, Limb, Gundogan, Whitehurst, & Jafree, 2017; Mantzourani, Desselle, Le, Lonie, & Lucas, 2019; Zarrin, Ghafourifard, & Sheikhalipour, 2023). This is an important consideration for inclusion in future education to also include self-reflection about using telehealth as part of healthcare professionals' reflective practice.

Families in this study reported their appreciation of telehealth during the pandemic to maintain child health services but preferred in-person appointments in some circumstances once available routinely again after social restrictions eased. The preference for in-person or telephone appointments as opposed to telehealth was expressed more in the community child health or early intervention services, as well as in other literature (Phillips et al., 2023; Yang et al., 2021). Child health clinicians have used the phone routinely to communicate with their patients or clients for decades which contributes to their dissociation with the telephone and the term telehealth. For child and family health a quick reversal to the familiar pre-pandemic in-person and telephone models of care followed the lifting of pandemic restrictions was noted. On closer examination however, this was less of a reversal from videoconferencing to telephone, and more of a case of telephone continuing to be used before, during and after the pandemic. Whilst the videoconferencing telehealth rose and fell during and after the pandemic, this continued use of telephone instead of videoconferencing telehealth was despite the evidence that outcomes from videoconference were equal or better to telephone consultations. That videoconferencing was more effective clinically when visual information is required, compared to audio only over the telephone (Caffery et al., 2024). The tendency to revert to telephone when barriers to audio-visual telehealth were encountered were noted in services outside of NSLHD (Phillips et al., 2023). Although a study in Italy of paediatric services and telehealth suggested that audio-video calls should be referred over phone when possible (Vanelli et al., 2025). In this study, there were contradictions about consumers preferences as expressed by consumers and providers. For example, the community child healthcare providers expressed that consumer preference for in-person appointments was a barrier to increased telehealth use in their services. However, consumers interviewed, although only a small number, expressed an openness and welcoming of telehealth as an option. This high level of satisfaction with telehealth was also demonstrated by large scale telehealth consumer surveys in NSW and Australia (The Royal Children's Hospital National Poll, 2020).

The use of telehealth was described many times in this study and in the literature, as necessary or essential to maintain services during the pandemic, where in-person consultations were simply not possible or permitted (Galway et al., 2021; Kim et al., 2022; Oliveira et al., 2025). The pride of clinicians in their ability to adapt so quickly and master new skills to maintain a high or equal level of service was voiced in their interviews in this study. An appreciation and a reinforcement of the importance of in-person consultations between families and clinicians was a strong theme. It was often reported as associated with the need for physical assessments or examinations such as height, weight, or blood pressure measurements for example, as well as seeing beyond the head and shoulder's view on screen. Similarly, limitations to telehealth were often associated with not being able to weigh a baby or accurately measure the height and weight of a child or complete a physical developmental check, or with concerns about domestic violence, child abuse or mental health. This study found that there were differences in the application and therefore the mastery of telehealth effectively between paediatric allied health, acute paediatrics, and community child health. However, all described the emergence of hybrid models of care but with an emphasis on the importance of in-person within those models. The clinicians often referred to in-person as the 'gold standard' for performance, interactions, and the human connection. This expressed importance of in-person was often linked with concerns and fears of telehealth completely replacing the in-person modality, rather than be an option alongside it.

The introduction of digital technology can create stress on individuals when their existing skills or competency of a skill are insufficient to maintain a technology or perform their work in a new model of care. An example of this from an industry unrelated to healthcare, ship engineering, demonstrated that the instruction of more digital technology in that workplace increased the overall confidence in communication technology that facilitated the successful implementation of a new digital technology in the workplace (Pareliussed, AEsoy, & Giskeodegard, 2022). Through the mastery of technology more broadly, self-efficacy among the staff increased and extended to a new digital technology system being introduced.

The experience of individuals to rapidly master using telehealth or not during the pandemic is particularly important for self-efficacy because it directly impacts individuals' confidence in their ability to perform tasks and the reinforced their ability to handle future difficulties. However, negative mastery

experiences can undermine an individual's self-efficacy by reducing confidence, increasing doubts, and fostering avoidance. Individuals can rebuild and strengthen their self-efficacy with supportive strategies, such as reframing experiences, and celebrating small wins.

8.5.2. Vicarious or Observed Experiences

Vicarious or observed experiences involve developing self-efficacy by observing others succeed at a task. This helps the observer believe they can achieve similar success. Therefore, it is important to ensure consistency and appropriateness in what is being observed in clinical practice using telehealth, by defining what is best practice. Alongside this, systems beyond self-regulation are required for telehealth use, as they are in every aspect of healthcare delivery, to ensure when telehealth is used is driven by best practice rather than determined by individual clinicians.

There are multiple examples in NSW alone of providing clinical guidance to improve professional self-efficacy from the observed experiences of others to create a consensus on best practice (Agency for Clinical Innovation, 2024; Clinical Excellence Commission, 2022; Lau et al., 2022; NSW Health, 2024). For example, the NSW Agency for Clinical Innovation (ACI) notes that incorporating telehealth into clinical practice can offer many benefits to patients and families, healthcare professionals and the health system (Agency for Clinical Innovation, 2024). This guidance relays the benefits of convenience; ease of access; access to specialist care or consultation; reduced costs and time associated with travel; less disruption and care closer to home described in the literature and echoed by participants in this study (Agency for Clinical Innovation, 2024). In this study, there were examples expressed by the clinicians of their observed best practice with telehealth. That initial and annual appointments for neurodiverse children should always be in-person, with telehealth as an option for appointments in between. This observed experience to improve practice improved their self-efficacy with telehealth and increased the integration of telehealth into the healthcare options they offered. Similarly, the 2022 NSW Embedding Virtual Care in Safety and Quality Frameworks document emphasised the importance of virtual services as part of the complement of healthcare service options in NSW and provided a resource for health services to plan, implement and review their virtual care services to help achieve this (Clinical Excellence Commission, 2022).

The need for strong clinical governance around telehealth and virtual care integration into clinical practice is highlighted by the ACI (Agency for Clinical Innovation, 2024). This includes the integration of telehealth and virtual care to embed clinical practice into existing clinical governance, as well as for clinical care standards, policies, guidelines, and directives that apply to in-person consultations to also apply to healthcare provided virtually, regardless of the modality and location of care (Agency for Clinical Innovation, 2024). Thereby providing governance of observed experiences to ensure that those that promote best practice improve clinicians' self-efficacy. The ACI also encouraged Local Health Districts 'to embed statewide surveys and patient-reported measures to build on virtual care evidence and data,' for example within the IMS+ incident reporting system (Agency for Clinical Innovation, 2024) to further reinforce the desired experiences for professional self-efficacy and telehealth.

As with any health service, telehealth services need agreed quality indicators for ongoing monitoring of; patient outcome and experience; consumer and staff engagement; clinical incident analysis and unwarranted clinical variation. There are emerging concerns about the under regulation of telehealth services, for example by the Australian Medical Association, and the Royal Australian College of General Practitioners and the need for improved regulation of telehealth medicinal cannabis providers (Sato & O'Toole, 2024), online prescription services, and online medical certificate services (Flemming, 2023).

Clinical variation was reported in this study due to preferences of clinicians and consumers about when and how telehealth can and is used appropriately. The 'best practice' about telehealth seemed to be subjective at times. In NSW and internationally, there are emerging guidelines for clinicians related to telehealth and virtual care based on the vicarious or observed experiences of clinicians with telehealth often during the pandemic and post pandemic years. These guidelines can help to ensure that clinicians have the right vicarious or observed experience through clinical guidance, mentorship, and practice monitoring to inform improved professional self-efficacy with telehealth.

In this study, clinicians reported that training and education was available that focused on how to use the technology and developing virtual skills such as online etiquette and communication. Skills that could be applicable across various online industries, not specifically about telehealth. However, there was a noted lack of clinical or simulation-based training on when and how to use telehealth in a clinical setting

both in this study and in the literature. Given the importance of an individual's relationship with telehealth technology, tailored clinical training could be highly beneficial. It is an area for further investigation and development for healthcare professional training institutions to consider in their course curriculum.

8.5.3. Social or Verbal Persuasion

Throughout 2020 to 2022 there were multiple government mandates in NSW, like many countries, for social restrictions aimed at minimising the spread of the COVID-19 virus. These mandated instructions were a form of verbal persuasion directly from the NSW Government to minimise social contact including contact for healthcare provision. Telehealth was actively encouraged to continue providing healthcare services during the restrictions through several means. The introduction of legislation related to social restrictions for the pandemic management could be described as a ‘hammer’ approach to change management, where change is dictated from above to employees with no room for discussion, compromise, or delay. It is a quick compliance driven approach to change but one that does not necessary result in sustained change (Alsher, 2013). Changes to the Australian Medicare Billing System (MBS) at the start of the pandemic enabled hospital and primary care clinicians to be funded for telehealth appointments, audio only and audio-visual, for all patients regardless of the distance the resided from a healthcare provider or facility (Department of Health, 2020, 2021). In this study, the clinician’s interviewed describe the impact of changes to Medicare billing for telehealth as positively impacting their ability to offer telehealth as an option. Changes to funding models directly impact healthcare service provision decisions and this was no different in the scenario for increased use of telehealth during the pandemic.

The technological ability of healthcare services to be delivered via telehealth already existed and were used by some providers, more commonly associated with regional and rural healthcare. The findings of this study were consistent with this. The catalysts of change were not only a pandemic, but the legislation changes to fund the change. The Australian MBS changes were initially introduced as temporary changes to manage a pandemic but later changed permanently as telehealth became an established part of healthcare delivery options (Department of Health, 2020, 2021).

The pandemic restrictions and fear of the virus in society added social persuasion to the scenario, with demand for healthcare remotely from the consumers of healthcare not just the providers were highlighted in this study. Except for social work, all the paediatric and child health services in this study demonstrated a comparable pattern of telehealth utilisation with little or no telehealth before the pandemic, followed by a rapid increase in use as the pandemic and accompanying social restrictions ensued. Then finally a decrease post pandemic but not to the pre-pandemic lows was observed (Section 4.4). The ability to use telehealth across the spectrum of healthcare environments, community or hospital-based was reported during the pandemic (Snoswell et al., 2023 (republished)). In this study, the rapid use of telehealth was seen in most the child health and paediatric services in NSLHD except for social work. However, the choice of where it was used emerged after the pandemic varied, as opposed to the use as a necessity during the pandemic. The pandemic that reached Australia in early 2020, provided a unique set of circumstances that prevented families visiting healthcare facilities routinely, but at the same time the need for healthcare services to families continued. Telehealth provided a solution to continue services. However, the overnight enactment of social restrictions to manage the pandemic, required the solution of telehealth to be seemingly implemented overnight as well.

Costs, both direct and indirect, were an important theme in social persuasion for consumers and providers of telehealth, with cost effectiveness was an important consideration along with clinical considerations when choosing telehealth. However, telehealth has not been determined to necessarily reduce health system costs (Snoswell et al., 2020). Although, it can eliminate the need for in-person visits, thereby reducing the direct financial costs for families associated with travel as well as the indirect, transactional costs of time, effort and environmental impact (Snoswell et al., 2020). With telehealth, families may experience reduced indirect costs such as travel expenses or time off work to attend healthcare appointments. Healthcare services may be able to provide more appointments each day due to reduced travel time and expenses. A potential motivator to adopt telehealth is reducing these transactional costs, which in turn can potentially maximise capacity in a system to deliver services (The Royal Children's Hospital National Poll, 2021). Although, reducing transactional costs for one side may increase costs for the other (Abimbola et al., 2019). For example, a family self-monitoring a child at home may incur increased transactional costs in terms of time and effort on their part, but there is

reduced transactional costs for the healthcare organisation as the time and effort has been transferred from one to the other. However, the benefit to families being able to remain at home, reduced stress or inconvenience needs to be considered in the cost-benefit analysis for this scenario. These transactional cost equations are also dependent on the functionality within individual families and therefore are of varying value to individual families.

Social persuasion in telehealth enhances self-efficacy by providing positive reinforcement from credible sources, such as peers, clinicians, government legislation and leaders. These affirmations through verbal encouragement, feedback, recognition, or perceived transactional benefits improve individual self-efficacy with telehealth, and consequently, more likely to embrace telehealth as a viable and valuable tool. The influence of leaders needs to be considered within the social or verbal persuasion experiences influencing self-efficacy. The impact and emotional connection between employee and leader are important in self-efficacy and professional efficacy. An employee's motivation to perform better at work or remain an employee for a longer period of time can be influenced by their admiration for a leader or their attraction to their charisma (Barnes, 2024; Rychlak, 1984).

8.5.4. Physiological and Emotional States

An individual's physical and emotional state can influence self-efficacy (Bandura, 1977). For example, feeling calm and relaxed can enhance the belief in one's abilities, while feeling anxious or stressed can reduce them. In the interviews with consumers and providers in this study, one of the earliest emerging themes was that of emotions. A variety of emotions, positive and negative were expressed about their experiences and perceptions of telehealth and virtual care from love to anxiety. Within social change there is an influential role of perceived collective efficacy (Bandura, 1982).

Convenience and flexibility were advantages commonly expressed by consumers and providers in this study. This was consistent with the literature (Bajwa et al., 2024; Bull et al., 2016; Waqar-Cowles et al., 2021). Providers reported convenience for consumers with telehealth, and consumers supported this by reporting convenience for themselves using telehealth. There were differing opinions of whether telehealth is convenient for clinicians. It was often described as harder work and needing more planning to undertake an assessment or provide therapy via telehealth. Working from home was seen as

convenient though for providers. Flexibility was mentioned repeatedly by clinicians and consumers as an advantage and as a perceived value of the telehealth option. It was described in the context of being able to change to a telehealth appointment if their child or a family member were sick, or not able to physically get to an appointment. Convenience was described around the reduced effort and coordination of not physically having to go to an appointment as well as able to fit telehealth appointments easily into their schedule easily. People are more likely to have a higher self-efficacy with telehealth, and a belief in their capabilities when they feel physically and emotionally well-prepared.

8.6. Future of Telehealth & Virtual Care

The COVID-19 pandemic provided a catalyst to demonstrate the benefits, limitations, and potential for telehealth in children's healthcare. The continuation of provision of services via telehealth is in part driven by clinical decision but equally as importantly driven by our personal experiences and personal relationships with technology by both consumers and providers of children's healthcare. Telehealth was perceived and desired as being business as usual for healthcare provision. However, not integrated fully into healthcare system, such as best practice guidelines for telehealth in specific disciplines or specialities. Consequently, there is a need for greater integration into quality and safety monitoring for telehealth, for example through clinical guidelines, routine audits, and standards for health professional bodies. This need for guidelines for telehealth practice moving forward is supported by the literature (Howland, Devardsson, Lees, & Hooker, 2024). There is also a need for further research into telehealth and virtual care, as research is an essential foundation for developing evidence-based policies for clinical practice.

There are differences in the emerging landscape for telehealth in children's healthcare between acute and community-based healthcare services. For example, in January 2024, NSW Health launched the *virtualKIDS Urgent Care Service*, Australia's first paediatric-specific virtual healthcare service, offering families of children with non-life-threatening health concerns an alternative option to presenting to a hospital emergency providing video consultations with a paediatric trained nurse, and a paediatrician as needed (NSW Health, 2024). In the community based children's healthcare services, hybrid models of care with a combination of in-person and virtual care emerged as feasible options (Ghazarian, 2020).

The future landscape of the modalities for children's healthcare also needs to consider the preferences of families, and respect preferences for in-person delivery as well as virtual options (Yang et al., 2021). As well as preferences within telehealth modalities such as telephone or videoconferencing (Caffery et al., 2024). A systematic review of literature about the telephone versus video consultations in telehealth concluded equal or better clinical outcomes and cost efficiencies using videoconference compared to telephone modality for healthcare delivery. Although it did note the improved likelihood of better engagement and retention when using videoconference modalities (Caffery et al., 2024).

The role of telehealth and virtual care in the healthcare systems of the future is yet to be determined but it is likely to remain in some shape or form as evidenced by the increasing descriptions of models of care as hybrid (Hawke et al., 2021; Hentati et al., 2021; Kenney et al., 2021; Scott et al., 2021; Sharma & Daniel, 2020)). The term hybrid refers to services providing a combination of telehealth and in-person options to deliver care, and is integrated into public health guidelines and procedures on telehealth and virtual care (NSW Agency for Clinical Innovation, 2021a, 2021b; NSW Health, 2022a, 2022b), as well as tertiary postgraduate training offered in telehealth (Lubman, 2021). The pandemic saw the full swing of the pendulum from in-person to telehealth. However, a post pandemic era will potentially have a more integrated approach with telehealth just one of the delivery options (Le Grice, 2021; Siwicki, 2021).

The future of telehealth and virtual care is extrinsically linked with the development of communications technology. The application and direction of telehealth will be strongly influenced by, if not determined by, the technology and software that is developed and improved more widely in society. It is not health specific technology that will drive any changes but technology we use in our everyday lives that can be applied to the healthcare context. Telehealth has the potential to significantly enhance paediatric healthcare by improving access, continuity of care, and health outcomes, while also reducing costs. However, the successful implementation of telehealth requires overcoming barriers related to technology access, clinical limitations, privacy concerns, and provider readiness.

8.7. Strengths and Limitations

Key strengths and limitations of the study are discussed in this section. The strengths included the theoretical framework used, the mixed method design and the use of available data. The limitations were specific to the questionnaire response rate and gaps in the outcomes data. Using a single Local Health District has strengths and limitations associated with it.

This study makes a valuable contribution to the evidence for telehealth use in children's healthcare services. A strength of the study was using a critical realism framework that allowed for a deeper exploration of the underlying mechanisms, experiences and values driving the observed outcomes. Not only did it provide a strong framework but allowed for the complexity and nuance of the issues. For example, it allowed for examination of the concept of professional self-efficacy leading to a better understanding of its importance to clinician use of, and relationship with, telehealth. In addition, the mixed methods design integrated both quantitative and qualitative data, providing a more comprehensive and reliable understanding of the research questions. The mixed methods employed in this study provided an opportunity to examine in more detail the reasons why digital health interventions such as telehealth work better in some scenarios.

The longitudinal time-series design was made possible by having access to large existing datasets held by the Northern Sydney Local Health District. This meant that trends and changes over time could be examined including the period of the pandemic restrictions. Importantly, this quantitative data included highly valued and comprehensive outcome measures such as clinical outcomes, quality, and safety outcomes. These provided rich and multi-faceted insights into the utilisation of telehealth and outcomes from its use over the period including before, during and after the COVID-19 pandemic restrictions.

At the same time, it is acknowledged that study limitations need to be considered. Consumer recruitment for the questionnaire and subsequently the consumer interviews was low. The nature of telehealth providing care from a consumer's home meant they were not in the facilities to see the posters promoting the questionnaire and the research. Clinicians were permitted after the ethical amendment to message consumers directly about the questionnaire, however, the researcher had no indication as to the extent that this occurred. The limited number of consumer interviews meant that they could not be representative of the wider population of NSLHD.

Questionnaire participation was anonymous. This participant anonymity meant that the potential for participation by persons with telehealth experiences outside of NSLHD existed, for example families who received care both within NSLHD and with private providers or at one of the Specialist Children's Hospitals located in another Local Health District. However, excluding the experiences of families with children's healthcare services outside of NSLHD would have been futile and unnecessary. Their experience across facilities is reflective of current models of care in NSW for children, and as such relevant to this study.

There were limitations of the available data. Firstly, the review of data collected at milestone developmental checks revealed a lack of detailed clinical data compared to other services such as inpatient services. Electronic records for child and family community services need to be improved so that the numbers of children for whom child developmental milestone checks were undertaken can be made available for monitoring and service improvement. Secondly, the incidence of developmental vulnerabilities in children would be expected to correlate to referral rates to child health services, such as paediatric allied health to address them. However, referral data were not available to explore this further. This study highlighted the challenges in collecting referral data due to the numerous private and public health options available to families for the differing services they may require addressing their child's developmental concern. Options include paediatrician (public or private); child and family health nurse; general practice; allied health providers (public or private); non-government organisations; specialist hospital services e.g. ophthalmology or orthopaedics; charities or community groups; and education, childcare, or early learning services. This proved to be a limitation of the study.

A further limitation was that the consumer questionnaire response rate was disappointingly low and unable to provide any statistically significant results. However, it did fulfil its secondary role of consumer recruitment for the interviews, although a higher number of consumer participants was aimed for. The consumers interviewed were all mothers. No fathers, co-parents or other family members were volunteered to be interviewed. This may reflect the primary parenting role predominantly played by mothers in childcare and their children's healthcare in Australia. It does not however, reflect the key or primary role provided by many fathers, grandparents, and extended family members. In 2016 the census data suggested that the number of stay-at-home fathers was around 4.6% of couple families with

children (Baxter, 2018) and more than 35,200 children in Australia were living with one or more grandparents as their primary care giver (Australian Institute of Health and Welfare, 2020). A larger number of consumer participants would therefore be required to ensure representation from fathers, co-parents, or other family members

The study was only conducted in Northern Sydney Local Health District with strengths and limitations. A strength was that it provided the opportunity to research the use of telehealth across a spectrum of community and hospital-based children's healthcare services. An area of research lacking in the current literature as much of the research has been undertaken in adult healthcare on in specialist child health services rather than general paediatric and child health services. Using a single Local Health District also had the advantage of access and the ability to consider context. The unique demographics and characteristics limit the generalisability of the findings. However, a limitation was that these cannot be representative of all populations and does not allow for comparisons across different population or geographical contexts nationally or internationally. On the other hand, the advantages of exploring the contextual characteristics may in fact outweigh these limitations.

The conclusions and recommendations for practice and research from this study's findings are discussed in the following chapter.

9. Conclusion

This study was able to explore the patterns of telehealth use, the clinical outcomes using telehealth as well uncover the deeper influences of individual values, their experiences, and their relationships with technology on their use of telehealth. This was enabled through a critical realist approach which provided the freedom to do so. In addition, the rapid adoption of telehealth services in the face of a pandemic provided the unique opportunity for this study to research the use of telehealth in paediatric and child health services compared to traditional in-person healthcare service delivery.

In response to the social restrictions imposed during the 2020-22 COVID-19 pandemic, telehealth was rapidly adopted and expanded to ensure what the providers described as a necessity for the continuation of healthcare services. However, as the pandemic waves subsided and managing the virus became integrated into routine healthcare practices, the true perceived value of telehealth as a care modality began to emerge. Prior to the pandemic, telehealth usage was limited, with most telehealth interactions occurring over the phone. However, during the pandemic, there was a significant surge in the use of video conferencing for audio-visual telehealth as a substitute for in-person appointments. Post-pandemic, while the use of telehealth had decreased, it had not returned to the low pre-pandemic levels overall. This led to the emergence of a new model of care. A hybrid healthcare delivery model using combinations of telehealth and in-person appointments during the consumer's healthcare journey, based on their clinical needs and personal preferences (Curran, Bauer, Mittman, Pyne, & Stetler, 2012; DeHart et al., 2024; Elliott et al., 2024).

The convenience, ease of use, efficiencies, and improved access to healthcare services for both consumers and providers, in an environment of increasing demand for healthcare services makes it hard to ignore and seems to ensure its continued use as a healthcare delivery option. The telehealth and hybrid models of care delivered comparable outcomes for children and families and were clinically acceptable to clinicians. Telehealth was clinically comparable to in-person care for aspects of healthcare delivery that did not require physical assessments, treatments, or surgery. There were limitations for mental health as well as potential child protection and domestic violence situations due to privacy and safety concerns.

The greatest influence on telehealth use was self-efficacy. Individual consumers and providers were more likely to adopt and persist in using telehealth technologies when they believed in their ability to effectively navigate and manage it. This confidence or mastery in their skills reduces anxiety, increases engagement with telehealth platforms, and promotes the successful integration of telehealth into routine use or practice. This mastery or comfort was not just with telehealth but with technology more broadly. Without a base knowledge of communications technology and familiarity with navigating it, telehealth technology is not intuitive or user friendly to an individual. Therefore, training about telehealth use needs to consider the level of an individual's technology user skills first so you do not have a teach someone to run before they can walk scenario.

The relationship between both the consumer and provider plays a critical role in the use of telehealth as the power dynamics within the provider-consumer relationship can influence the availability of telehealth as an option. Consumers expressed appreciation for having telehealth as an option but felt they lacked the ability to request or demand it. Providers, on the other hand, viewed telehealth as an option they could offer, often at their discretion or when circumstances suited them, such as when a family cancels an appointment due to illness in the household or difficulty traveling to the healthcare facility. It is essential for consumers to be provided with comprehensive information about telehealth options or to have the opportunity to experience for themselves, so they can make informed decisions about their healthcare delivery.

Without standardised guidance or protocols, explanations about telehealth can vary based on the clinician's perspective and experience, rather than reflecting best practices. To minimise such variation, standardised consumer information, education, and clinician guidance are essential. It is crucial that the future integration of telehealth into clinical practice does not undermine the core principles of healthcare delivery that ensure high-quality, safe care, and ensure consumers can make informed choices about the healthcare and how it is delivered. The future landscape of the modalities for children's healthcare also needs to consider the preferences of families, and respect preferences for in-person delivery as well as virtual options.

There was an expressed prominent level of certainty about telehealth being 'here to stay,' and being part of the future of healthcare although not sure quite sure about how far it would or should go. The future of telehealth and virtual care are extrinsically linked with the development of communications technology, with limitations being associated with technology, and access to technology. The application and direction of telehealth will likely be strongly influenced by, if not determined by, the technology and software that is developed and improved more widely in society. It is not health specific technology that will likely drive any changes but technology we use in our everyday lives that can be applied to the healthcare context. The ongoing use of telehealth is intertwined with the uptake of online modalities in our work and social lives more generally, not just in healthcare.

9.1. Recommendations

Based on the findings of this study a number of recommendations for both practice and research can be made. This chapter presents the recommendations for future practice and future research. The future practice recommendations concern; safety and quality in telehealth; clinical education and training; self-efficacy and technology; and equity of access to virtual healthcare. The future recommendations for research concern; hybrid models of care that include telehealth; critical realism in telehealth research; influences of past experiences of clinicians' self-efficacy with technology; and ensuring the wellbeing and welfare of clinicians in a virtual care era.

9.1.1. Future Practice

The literature and the experiences of consumers and providers expressed in this study demonstrated the increasing prevalence of telehealth and hybrid models of care that include telehealth or virtual care as a part of healthcare delivery options (Bento et al., 2023; Curran et al., 2012; Davis et al., 2021; E. Elliott et al., 2024; Proudfoot, 2022). These models of care, however, were introduced rapidly during a unique chapter in history as a necessary response to managing a pandemic. These new and emerging models of care require the same attention to ensure their quality and safety. The foundation of this is defining what is evidence based best practice for the use of telehealth in the different children's healthcare services. This study recommends best practice with telehealth is clearly defined to minimise unnecessary practice

variation and enable effective monitoring of practice. Ensuring that telehealth and hybrid models of care are regularly and routinely monitored and audited, should be a priority for healthcare provision.

Concerns were raised in this study that telehealth could be misused in the interest of convenience particularly, when in person appointments were more clinically appropriate. Similar concerns have been voiced in the media about online prescription and medical certificates services putting convenience before clinical care (eClinical Medicine, 2025; Flemming, 2023; Heaney, 2024; McKenna, 2020). Therefore, a recommendation is to strengthen the role of healthcare professional registration and regulatory bodies in ensuring the appropriate clinical application of telehealth by healthcare providers. The consequences for misuse of telehealth as a modality for healthcare delivery are comparable to other breaches of clinical and professional misconduct.

This study explored professional self-efficacy in the use of telehealth and the importance of self-reflection as a contributor to an individual's self-efficacy and their own thinking and behaviour. In the light of this it is recommended that future education and training programmes that include the use of telehealth or virtual care, should consider incorporating self-reflection into the programmes. It is important to develop clinician's self -efficacy with telehealth technology and its appropriate use, for example developing familiarity with using different devices, technology, and platforms. The evidence supports the experiences expressed in this study, that low self-efficacy could hinder the success of telehealth initiatives (Artino, 2012; Bandura, 1982; Hu et al., 2023; Zarrin et al., 2023).

This study demonstrated the different mastery levels of individual clinicians with telehealth and the impact this had on their differing levels of advocacy for telehealth in their area of clinical practice. With this in mind, it is important for healthcare providers to continue to ensure consumers can make informed choices with care delivery options including telehealth. This requires high self-efficacy for providers to be able to ensure patients are fully informed about the benefits, applications, and potential outcomes of all options. Personal experiences of individual clinicians should not influence or impact equitable access to care delivered virtually. In addition, providing opportunities for consumers to experience telehealth for themselves can positively contribute to consumers making informed choices about their use of telehealth for appointments or not.

In summary, it is recommended that future integration of telehealth into clinical practice ensures high-quality, safe care, as well as equity of access to services and the right to make informed choices about their care. As technology advances in telehealth, virtual and remote care, it is important for healthcare professionals and healthcare services to assess the appropriateness of the adoption of these innovations with the same rigor applied to all new healthcare technology, including future research into the use of telehealth.

9.1.2. Future Research

The findings of this study have highlighted potential areas for further research in the use of telehealth in children's healthcare. These are detailed in this section. Firstly, based on the finding that there is an increasing use of hybrid delivery models that include telehealth, it is recommended that the integration of hybrid delivery into all aspects of healthcare delivery, including clinical governance, clinical effectiveness and best practice be further researched. This would contribute to a better understanding of the role of telehealth in the future of healthcare.

The capacity for Critical Realism to move beyond surface-level observations and to explore deeper influences on consumer and provider decisions around the use of telehealth was exposed. This makes it a valuable approach to employ in future research in this field.

Self-efficacy had a strong influence on the adoption and adaptation to telehealth for the individual consumers and providers who participated in this study. It is therefore recommended that a greater understanding of consumer and provider with experience is examined in future studies of telehealth. The relationship between this experience and self-efficacy is recommended for future research.

This study's focus on the experiences of providers with telehealth has highlighted concerns about the wellbeing and welfare of clinicians and the way telehealth is changing the way clinicians work. An examination of how health systems can support staff who are delivering care via telehealth is recommended area for further research.

10. Appendixes

Figure 2.04: Discussion Paper: A sledgehammer to crack a nut: weighing up the rights of children in a pandemic. (C. Jones, Fraser, Davies, & Randall, 2023)

Discussion paper

A sledgehammer to crack a nut: weighing up the rights of children in a pandemic

Abstract

This paper explores the impact of the COVID 19 pandemic (https://covid19.who.int/) on children and examines the extent to which their rights were taken into account compared to the rights of others. Decisions that impact children so significantly need to be proportionate to the impact and weighed against the rest of the population. The primary consideration of authorities needs to be in the best interests of the child, ensuring the voice of children is heard and their experiences considered in future responses to and recovery from such events.

Keywords child rights, pandemic, child wellbeing, paediatric care

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Introduction

The World Health Organization (WHO) announcements in December 2019 about an atypical virus of global concern (WHO, 2020) was the beginning of the COVID 19 pandemic, an historic event that has lasted several years and impacted the lives of millions across the world. By May 2023, WHO reported that there had been 765 million confirmed cases and 6.9 million reported deaths attributed to the pandemic. Governments around the world, including in Australia, responded to the pandemic outbreaks with strategies designed to minimise the spread of the virus and reduce the incidence of disease and ultimately preserve life. Under these extenuating circumstances, limitations on human rights, including the rights of children, were justified. That is, proportionality required that limitations to children's rights were outweighed by the disadvantages of exercising these rights at a time when COVID 19 outbreaks posed risk of death, particularly for older Australians but not for the children themselves[1-3].

In November 1989, the United Nations General Assembly adopted the Convention on the Rights of the Child. These rights have been ratified in 120 countries, including Australia.[4-6] The parties of the United Nations Convention agreed to 54 articles on the rights of the child with the overarching principles of the convention being: non-discrimination; the consideration of the best interests of children; the right to life, survival and development; and respect for the views of children. The articles cover the child's right to life, protection from abuse and exploitation, safety, family, respect, education, health and the right to freedom of expression regardless of their nationality, race, colour, gender, faith, language, politics, culture or disability.[6] As a society it is necessary to consider if the right balance was struck between the inherent human rights to life and upholding other rights such as those of our youngest generation, and if the rights of children were weighed up in proportion to the rights of others.

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The COVID-19 pandemic

When social restrictions to manage COVID-19 were first introduced to Australia, it was not clear that children and young people were at low risk for contracting COVID-19 and passing it on. But this soon became well understood. Few deaths and milder symptoms were reported in children compared to adult populations with much higher mortality and morbidity rates.[7–12]

The social distancing, school and childcare centre closures and stay at home strategies of the Australian government in response to the pandemic had the desired effect of reducing the incidence and fatalities from the virus. However, the COVID-19 pandemic restrictions, before the development and rollout of vaccinations, had the risk of inflicting indirect effects on children by providing adverse environments for parenting, children's health and wellbeing as well as education outcomes. In particular, the home environment where families were socially isolated as part of the infection control measures increased unemployment, increased mental health concerns and consequently created increased stress for families and increased opportunity for child protection concerns.[13-17] The effects of adversity in childhood when parents experience the cumulative effects of parenting stress are known to have potentially lifelong impacts for individuals.[18]

The pandemic has been discussed as an event of historic significance that deeply affected the health and wellbeing of children and families in multiple ways, including: mortality and morbidity; community stress such as unemployment and food insecurity; trauma and mental health; delays in care; obesity; and incomplete immunisation. Advocates argued for the shoring up of support systems to support children and help them thrive during the pandemic.[19]

School and childcare centres closures became a key characteristic of the social restrictions for children and adolescents in Australia. This resulted in closures at schools and pre-schools[20–23], with children and adolescents staying at home during what would normally be school terms. Families received some limited schooling and learning assistance virtually or remotely. The online and remote education strategies were aimed at maintaining access to education for children.

During the first waves of the early variants of the virus, children were identified as a low epidemiological risk and the transmission of COVID-19 was deemed extremely low in schools and early childhood education centres.[1,15,24] This resulted in the re-opening of schools and childcare centres in 2020 and had no impact on the incidence of respiratory pathogens, including COVID-19.[25,26] The later variants of the virus, including the Delta variant, painted a very different picture for children and young people, with significantly higher incidence and transmission in the young population, resulting in extended school and childcare centre closures for up to 17 weeks out of approximately 40 weeks schooling for the year. The schedules for the reopening of schools and childcare centres were associated with reaching the desired community vaccination rates in children as well as in the wider population.

Negative effects of the pandemic

The increase in online, remote or virtual schooling from home via online platforms accompanied the school closures and was controversial based on unequal opportunities to access education. Remote or virtual learning became associated with issues of inequity of access to internet and internet devices such as laptops, and therefore was challenging as a mode of delivery for vulnerable children. This has added to the prevailing risk of long-term disengagement with education and the education system[27], and the associated mental health concerns of depression and anxiety for children and young people.[28] It is estimated that up to one in four young people are affected by anxiety and depression, and schools are an important influence and resource for their mental health. Young people spend a significant portion of their time at school and often their most significant relationships outside of family are connected with education.[29] In addition to mental health, there were concerns about a generalised disconnect with the socialisation associated with school or social isolation[1,17,27,30,31] as well as neuropsychological or sensory concerns.[32,33] However, for some children, home schooling or remote learning was positive, in particular for children with behavioural issues such as ADHD.[34] Concerns were held for parents, in particular for women who normally worked outside the home, struggling to retain their own jobs, manage households and school their own children. The added parenting stress posed risks for family discord and even family violence.[35]

Evidence suggests that school closures negatively impacted the learning outcomes of children, with children making less academic progress in 2020 than in previous years; this was particularly obvious for disadvantaged pupils with an enlarging attainment gap.[1,15,36] The closures were also associated with negatively impacting mental health and physical health of students, child protection concerns as well as their impact on learning.[30,37] The closing of schools in the United Kingdom has been described as an intergenerational transfer of harm from oldest to youngest generations, in particular from the socioeconomically advantaged elderly to the socioeconomically disadvantaged children, and as such questions the concept of proportionality with regards to the rights of children.[1] Children had seemingly the least to gain and most to lose from school closures, with concerns associated with risks already mentioned. The disproportionate affects on children and young people of COVID-19 restrictions and school closures was a sentiment shared in Australia.[17]

Accompanying the closure of schools was the loss of extra curricula activities such as excursions, celebrations, performing arts and sports, and the right to engage in play and recreational activities. Children and adolescents found themselves with reduced access to school sports, community sports, organised physical activity and performing arts that were also suspended during school closures.[20,38] This reduced access to organised physical and recreational activities didn't remove all opportunities for physical activity. A survey in Western Australia investigated the impact of the pandemic's social restrictions on the level of physical activity undertaken by children (mean age 6.9 years old). It concluded that the level of organised physical activity

decreased significantly during restrictions such as school closures and staying at home; however, the total minutes of physical activity did not change as organised activity had been replaced with unstructured physical activity such as playing at home or at a park.[38]

The rapidly imposed social restrictions saw associated health behaviour change and led to mostly detrimental health behaviours. Health and social behaviour changes observed for children and families due to pandemic restrictions included: reduced physical activity[20]; reduced outdoor recreation[20,21]; reduced access to social and community events[39]; reduced interaction with extended family and close friends[39]; more time being spent on screens (phones, tablets, laptops, gaming devices) for entertainment (51%); doing less exercise (42%); and eating more unhealthy food (25%) during the pandemic.[40] Although not all reported social behaviour changes during the pandemic restrictions were negative, for example increased family time, with immediate family and increased parent–child interaction time have been suggested as possible benefits to the social restrictions and changes in work patterns.[39,40]

The school and childcare closures and the subsequent use of remote learning for many children in Australia put children and adolescents at increased risk of mental health concerns such as anxiety and depression, as well as potentially impacting their physical and social wellbeing. Schools play a key role in children's mental health, especially during such social disruption as a pandemic.[29,37,41] A significant increase in emotional and mental health issues was observed in both the adult and child population in 2020.[17,22,39,40] The Australian Human Rights Commission *Impacts of COVID-19 on children and young people who contact Kids Helpline* report in 2020 identified an increased number of calls to the Kids Helpline during the first few months of the pandemic in Australia particularly for mental health related issues as well as concerns about social isolation, education and family stress.[17] This sudden increase in mental and emotional health issues was particularly evident among adolescents and young adults.[42,43] Although similar concerns of increasing trends in the prevalence of mental health issues in Europe during the pandemic were raised, there were noted challenges of capturing an accurate picture of this.[44]

Increased unemployment and reduced household incomes was an immediate effect of the social restrictions for many families with the closure of businesses, temporarily and permanently. The resulting financial stress for many families was a risk factor for increased family violence, child abuse and mental health issues.[5,13,14,22,45] The rights of children include governments needing to take all appropriate legislative, administrative, social and educational measures to protect children from all forms of abuse and neglect. But under the conditions of a pandemic, these responsibilities were balanced in proportion to the rights of those at most risk of death and disability from COVID-19.

During 2020 an increase in the incidence of reported child abuse and domestic violence was reported.[20,22] The challenges to gaining an accurate account of the incidence of child maltreatment increased during the management of the pandemic and associated increased social isolation. The actual incidence is not at all likely to be lower but likely to be higher than the reported incidence.[13,14,46] The disproportionate impact of COVID-19 on minority communities, in terms of incidence and deaths, heightened concerns about the welfare of children during the pandemic for families living in poverty or under the threat of violence.[45]

In some parts of the USA and New Zealand a decline of 40–70% in the number of reports to child protection services of suspected child abuse and neglect were noted during COVID-19 lockdowns.[13,47] This decline in reports during a period of increased and social and financial stress in households was not regarded as an indication of reduced prevalence but instead, more concerningly, as reflecting a decline in the visibility of child abuse and neglect concerns during lockdowns. The nature of the restrictions to manage the outbreaks reduced the opportunities for mandatory reporters of suspected child abuse or neglect such as teachers, childcare and sports coaches to have contact with and therefore visibility of children at risk.[13]

Healthcare providers were inundated with presentations and hospital admissions related to the pandemic, particularly for adults including parents of children. As a result of the necessary focus on pandemic healthcare response, there were concerns about reduced attendance to health and wellbeing services for children and families, and the potential impacts this may have. For example, reduced child development screening, reduced or delayed presentations to emergency departments[22,40,48], and delays to the routine childhood immunisation schedules for some.[49]

Child development and screening services in Australia are available to families through primary health services, including general practice and child and family health services. An online consumer preference survey (n=719) of parents of children aged up to 5 years old in Australia indicated that families with young children obtain primary health services, including child development screening, through a range of providers.[50,51] General practice was frequently consulted for immunisation and medical concerns, and dedicated child and family health nurses for parenting advice and well-child checks.

During the COVID-19 pandemic, changes in patterns of hospital presentations for paediatric patients were recorded. Emergency departments in the UK noted a 57% decrease in attendance in April 2020 compared to April 2019, before the pandemic.[22] A similar trend was noted in Australia.[52,53] A 70% decline in paediatric hospital admissions from 2019 to 2020 was reported in Italy, but there was no significant referral delay by caregivers.[54] There was a reduced incidence of common childhood respiratory pathogens[25] causing conditions such as bronchiolitis, with hospital presentations and admissions for bronchiolitis across Australia decreasing significantly in 2020 compared to pre-pandemic years.[52] Similar trends were noted across the globe. Although the lack of exposure to pathogens in childhood could potentially adversely affect their immune system development.[55]

At the same time, however, a significant and concerning increase in hospital presentations for psychological distress in young people was reported internationally.[16] In NSW

presentations for self-harm and suicidal ideation increased by 50%, and mental health by 32% among 12–17 year old adolescents to the Sydney Children's Hospital Emergency Department between Jan and Oct 2020.[43]

The use of virtual care platforms

Virtual care or telehealth or remote care is the use of technology to provide healthcare when professionals are geographically distanced from patients/clients/consumers. During COVID-19 there was a dramatic increase in the use of virtual healthcare in a variety of clinical settings to maintain access to services[56-66] as the pandemic provided an unexpected motivator for consumers and providers to adopt virtual care. In NSW, during the third wave of the pandemic in 2021, much COVID-related care was provided virtually for children and families as well as leveraging existing home-based care services and acute hospital inpatient services for more acute cases.[67]

Virtual care has been demonstrated to be both clinically appropriate and a mode of healthcare delivery that is well received by consumers and providers, with convenience being a common advantage, and technology issues and security concerns a common disadvantage.[63,68-71] It has been demonstrated to be successfully implemented in a multitude of children's healthcare environments, including: virtual home visits for families with new babies[72]; home ventilation[73]; mental health[16,74]; children's hospital outpatients[61,75]; paediatric medical specialist consultations[69,76]; telephone support[77]; school based health[78]; paediatric allied health[58]; and adolescent or youth health.[79]

Systematic reviews have identified a limited pool of research on virtual care and improved health outcomes for adults and children[80-99], and recommended that further quality research is required into virtual care and patient outcomes. Despite the low level of certainty within the literature about improved outcomes through the use of virtual care, there was some certainty that it did not adversely affect or harm patients[87], and that virtual care could be comparable to face-to-face health delivery with no significant differences in health outcomes between them in some applications.[89,90,100-103]

The use of virtual healthcare technology was greeted with initial scepticism and reservations by clinicians that aspects of care such as physical examinations, some therapies or psychosocial care cannot be delivered virtually, and that consideration needs to be given to the development of hybrid models of care with telehealth as a part not a whole of the model.[66,68,79,104-108] Technology reliability, familiarity and performance, and provider attitudes to the value of virtual care – including concerns about trust and privacy and controllability – were important factors to the success of virtual care.[66,70,109-113]

The role of virtual healthcare in the future is yet to be determined but it is likely to remain in some shape or form as evidenced by the increasing descriptions of models of care as hybrid, a term used for services using a combination of face-to-face and virtual care delivery options.[65,67,68,79,104-107,114,115] The pandemic appeared to see the full swing of the pendulum from face-to-face to virtual care, but in a post-pandemic world there will potentially be a more integrated approach with virtual care as one of the healthcare delivery options available to families.[116,117]

The actions taken by Australian authorities to manage the pandemic outbreaks through social restrictions focused on reducing the mortality and morbidity associated with the virus for country's population and in particular for vulnerable groups such as the elderly. However, these actions had seemingly detrimental consequences for others, such as the health, wellbeing and education for children and adolescents. Health and education are intrinsically linked for children's health and wellbeing, as demonstrated by the impact of school and childcare centre closures on the mental, physical, social and emotional health of children. An impact with a potential developmental and wellbeing legacy for a generation of 'pandemic children'.

The pandemic, and the social restrictions to manage it, provided an unexpected motivator to consumers and providers to rapidly implement virtual healthcare and virtual education for children and their families in Australia. These social restrictions had an unpredicted and unprecedented predominantly negative indirect impact on children's educational, physical, social and mental health in Australia, with similar effects also reported in other countries. There are potentially longer lasting impacts or repercussions for health, wellbeing and education of children beyond the pandemic which are likely to be revealed as the pandemic generation grow.[1,15]

Virtual education and virtual health, or the hybrid use of them are an emerging legacy of the pandemic, and the rapid upscaling during the pandemic was described as a major achievement in NSW.[118] The literature suggests that virtual care may be of equivalent clinical effectiveness as usual care; however, the need for further studies into the use of virtual healthcare in a post-COVID era is highlighted in the literature[68,69,71,76,87-90,95,104,119], as well as the impact on children's education.[30,37] There is a need for research that explores beyond staff and consumer satisfaction with virtual care, or if it is a viable alternative. Instead, research should delve into the effectiveness of virtual care as a delivery option and the unexpected benefits or detriments of this modality.

The rights of the child

The United Nations Convention on the Rights of the Child warned of the potential ill effects of COVID-19 on the physical, emotional and psychological wellbeing of children and young people, and called on all countries to protect the rights of children, as set out in the UN Convention on the Rights of the Child. In particular, the health, social, educational, economic, and recreational impacts of the pandemic on the rights of children.[120]

As a society we contend that there is a need to consider if strategies to ensure that every child's inherent right to life and survival are proportionate to the preservation of the other rights of children. In the case of the COVID-19 pandemic, were the social and schooling restrictions for children proportionate to the health aims for children during the pandemic or did we as a society use a sledgehammer to crack a nut. Potentially a sledgehammer with implications for our future generation that are still emerging.

Children have the right to freedom of expression, and with such significant impacts on children, the perceptions and opinions of children on the closures of schools, reduced access to recreation and socialising should arguably have been considered seriously here. However, when decisions of best interest are made by adults, there is usually a consideration of due weight being given to children's views versus an assessment of their competence to make decisions.[121] Decisions are then made in the name of protection, as children are often viewed as not knowing what is in their own best interest. Socially constructed ideas of children as incomplete adults, in need of protection against their own flawed decision-making capabilities, means that children's voices are often overruled or overlooked. Paternalistic and adultist attitudes are often at the core of these decisions, as well as a belief that children must be controlled to be protected as they are irrational and incapable of making safe decisions. Consequently, issues of competence assessment can become inseparable from issues of power over children's lives.[35,122–125]

The WHO convention, in response to what it called the "catastrophic failure of the International community... in response to COVID-19"[126(p.1)], drafted an agreement on pandemic prevention, preparedness and response with a view to international adaptation. Its general principles included respect for human rights, and it identified infants, children and adolescents as among individuals and groups at higher risk and vulnerability during pandemics.[126] However, this international pandemic treaty has been criticised as being "watered down" and "toothless" to enforce change or improved cooperation between nations in response in any future pandemics.[127,128]

Conclusion

To ensure decisions that impact children so significantly are proportionate to the impact for others, and that authorities' primary consideration is the best interests of the child[35,122–125], the voice of children needs to be heard and their experiences considered.[17] Children and young people need to be involved in the responses to and recovery plans of events that impact them significantly or even disproportionately.[17] We must remember that "Children share the same values as everyone else, and Australia must learn to listen to children's opinions" in response to any future pandemics or disasters.[129]

Conflict of interest

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Table 4.01: PICO Framework for Research Question Development

Population *What are the characteristics of the patient or population?* *Which condition or disease are you interested in?*	• Families with children under the age of 5 years old accessing healthcare services for children in Northern Sydney Local Health District in NSW • Child Health Services; paediatric hospital in the home; paediatric outpatients; child and family health child development checks; and paediatric allied health in Northern Sydney
Intervention *A defined event, experience, activity, or process patients will be exposed to*	• Telehealth as a health care service delivery option for paediatric hospital care and child wellbeing community care
Comparison *The patient's setting characteristics; barriers to health interventions; usual care*	• Before COVID-19 pandemic social restrictions that was a catalyst for a broader increase in the use of telehealth • Different child health services (hospital, community, allied health) • Different population groups • Different modes of delivery audio vs audio-visual • Families who have experienced virtual & usual care delivery modes • Usual paediatric and child health care
Outcome *How will the outcome be measured? (e.g., questionnaires, interviews)*	• Child health outcomes measurements • Questionnaire of consumers telehealth experience • Semi-structured interviews with healthcare staff and managers • Semi-structured interviews consumers

Table 4.02: Program Logic Model - Research Defining Process

What is problem we are trying to solve?	• Continuing to provide child health and paediatric healthcare services to families when in-person consultations are not always possible. • Provide alternative options for child healthcare delivery in an era of advancing technology and communications
What is the existing literature or evidence about the problem?	• Existing research has focused on the experience of telehealth and the viability as a healthcare delivery option. • A gap in the literature related to the clinical effectiveness of telehealth compared with in-person delivery. • Adverse Childhood Experiences are known to impact the long-term health and wellbeing of individuals into adulthood.
Who is affected?	• Families with children (under 16 years of age) • Primary and secondary child health services • Potential impact of COVID-19 as a mediator of childhood adversity during pandemic restrictions
What is the nature of the problem?	• COVID-19 pandemic restrictions in Greater Sydney and NSW • Need to identify early problems in children's health and development. • Maintain early interventions to improve child health and wellbeing. • Provide ongoing healthcare for families isolating at home with COVID. • A significant portion of paediatric and child health services in NSW were delivered via telehealth/virtual care due to restrictions reducing ability to provide in-person consultations and therapy for families.
What is the size of the problem?	• Healthcare services for children in Northern Sydney LHD • Relevance to child health services Nationally & Internationally

Figure 4.01: Online Questionnaire Questions

Note: The questionnaire is referred to as a survey in the online tool.

The online survey is titled Telehealth in Children's Healthcare. To start the survey, you may use either of the two choices (the Survey Access Code or the QR code), whichever you find easiest or quickest to use.

1. Enter the Survey Access Code Start the survey by following the steps below.
   - Go to this web address: https://redcap.sydney.edu.au/surveys/
   - Then enter this code: 4CFR34MRC.

2. Scan the QR Code
   - Alternatively, if you have a device that has an app capable of reading QR codes, you may scan the QR code below, which should take you directly to the survey in a web browser.

Telehealth in Children's Healthcare

Please complete the survey below. Thank you!

You are invited to take part in a research study evaluating the effectiveness of telehealth and virtual care for children in various child healthcare settings across Northern Sydney Local Health District. It is an approved PhD study with the University of Sydney. You are invited to participate in this study if you have received child health services via telehealth.

I am the parent/carer of a child/children who has received healthcare in Northern Sydney Local Health District via telehealth in the past 2 years and have read the Participant Information Sheet (PIS) and agree to participate in this survey.

Participant Information Sheet *[Attachment]*

- Yes
- No

Demographics

What is your age in years? _____

What is your gender?

- Male
- Female
- Prefer not to answer

What age is your child in years? _____

Do you identify as Aboriginal or Torres Strait Islander?

- Yes
- No

(If yes, additional question will display) Did you access?

- Aboriginal and Torres Strait Islander Health Services
- Mainstream Services

What is your highest educational qualification?

- Year 11 or below (includes Certificate I/II)
- Year 12
- Certificate III/IV
- Advanced Diploma and Diploma
- Bachelor's degree
- Graduate Diploma and Graduate Certificate
- Postgraduate Degree

Do you speak a language other than English at home?

- No English only
- Yes Italian
- Yes Greek
- Yes Cantonese
- Yes Arabic
- Yes Mandarin
- Yes Vietnamese
- Yes, other _____

Your Telehealth Experience

Which of these services have you used in the past 12 months for your child's health and wellbeing with telehealth? (tick as many as apply)

- General Practice
- Child and Family Health Nurse (Early Childhood Centre)
- Paediatrician
- Paediatric Nurse Specialist
- Paediatric Hospital in the Home
- Hospital Admission
- Emergency Department

- Physiotherapist
- Occupational Therapist
- Outpatient Clinic
- Speech Therapist
- COVID-19 Virtual Hospital
- Other _____

Approximately how many times have you used telehealth for your child's healthcare?

- Only once
- Up to 5 times
- Up to 10 times
- More than 10 times
- Use regularly e.g., weekly therapy

Based on your most recent experience with telehealth for your child, did you achieve everything you wanted through your telehealth appointment compared to an in-person appointment?

- Completely
- Mostly
- Not Really
- Not At All

Based on your most recent experience with telehealth for your child, how would you rate telehealth in terms of the following?

Convenience for you

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Ability for you to stay at home

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied

- Extremely Dissatisfied
- Not Applicable

Not having to come into a healthcare facility

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Reduced transport or parking required

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Access to healthcare services

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Availability of appointments

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Quality of healthcare provided

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Communication between different healthcare professionals

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Links to pharmacy

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Monitoring your child's condition remotely

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Time away from work or school/childcare

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Confidentiality

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Being comfortable discussing issues with your healthcare professional

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Ability to provide treatment or therapy

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Ease of use of technology

- Extremely Satisfied
- Mostly Satisfied

- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Overall satisfaction with the outcome of your telehealth experience

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not Applicable

Did you need to have an in-person appointment after your telehealth appointment to complete your child's care?

- Yes
- No

Which children's healthcare services do you think should offer a telehealth/virtual care option? (tick as many as apply)

- Child and Family Health Nurse (Early Childhood Centre)
- General Practice
- Paediatrician
- Paediatric Nurse Specialist
- Paediatric Hospital in the Home
- Hospital Admission
- Emergency Department
- Physiotherapist
- Occupational Therapist
- Outpatient Clinic
- Speech Therapist
- COVID-19 Virtual Hospital
- Other _____

How satisfied were you with the following health services and the use of telehealth for your child? *(only relevant services will display based on early response to services used)*

General Practice

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Child & Family Health Services (Early Childhood Centres)

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Paediatrician

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Paediatric Nurse Specialist

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Paediatric Hospital in the Home (Home care)

- Extremely Satisfied

- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Hospital Admission e.g., paediatric ward/day surgery

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Emergency Department

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Physiotherapy

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Occupational Therapy

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied

- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Outpatient Clinic

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Speech pathology

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

COVID-19 Virtual Hospital

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied
- Extremely Dissatisfied
- Not applicable

Other child health service you used

- Extremely Satisfied
- Mostly Satisfied
- A Little Satisfied
- A Little Dissatisfied
- Mostly Dissatisfied

- Extremely Dissatisfied
- Not applicable

What factors made telehealth successful or unsuccessful for you and your child?

(free text answer) _____

Were there any unexpected benefits to using telehealth?

(free text answer) _____

Are there any services for your child's health and wellbeing you would like to have accessed via telehealth/virtual care?

(free text answer) _____

What would you do differently if you next have a telehealth appointment?

(free text answer) _____

How can telehealth/virtual care be improved in the future?

(free text answer) _____

Anything else you would like to say about your experience with telehealth for your child?

(free text answer) _____

Would you be willing to be contacted to provide further details about your experiences through an interview (online or in-person) with a researcher? If yes, please provide your name and your preferred contact (email and/or phone number) so we can arrange a suitable time.

- Yes
- No

Your Name _____

Your Preferred Contact Details (email and/or phone number) _____

[end of survey]

Figure 4.02: Participant Recruitment Poster

Note: The questionnaire is referred to as a survey in the online tool.

Figure 4.03: Participant Invitation via Email or SMS Message

Note: The questionnaire is referred to as a survey in the online tool.

Telehealth & Children's Healthcare Survey

As a parent/carer of a child who has received healthcare in Northern Sydney via Telehealth, you are invited to participate in a research study survey about your experience.

The research is conducted as part of the PhD with the University of Sydney.

Your participation is voluntary but would be much appreciated to better understand telehealth.

You may open the survey in your web browser by clicking the link below:
Telehealth in Children's Healthcare

If the link above does not work, try copying the link below into your web browser:
https://redcap.sydney.edu.au/surveys/?s=JCKKWMRHJEK7KW4M
or alternatively you can use the QR code:

Figure 5.01: Participant Information Statement (PIS) – consumer

The effectiveness and patient experience of child health and paediatric virtual care services on children's health outcomes following widespread implementation in response to COVID 19 pandemic in Northern Sydney.

PARTICIPANT INFORMATION STATEMENT

1. **What is this study about?**

You are invited to take part in a research study evaluating the effectiveness of telehealth and virtual care for children in various child healthcare settings across Northern Sydney Local Health District.

The study aims to evaluate the effectiveness of telehealth in children's healthcare delivery. To determine the benefits and challenges of telehealth/virtual care in child health services. To determine if telehealth/virtual care is better suited to some child health services. As well as identify any gaps in the provision of child health services using telehealth or virtual care.

You have been invited to participate in this study because you have received health services for your child via telehealth or virtual care. This Participant Information Statement (PIS) tells you about the research study. Knowing what is involved will help you decide if you want to take part in the research. Please read this sheet carefully and ask questions about anything that you do not understand or want to know more about.

Participation in this research study is voluntary.

By giving your consent to take part in this study you are telling us that you:
- Understand what you have read.
- Agree to take part in the research study as outlined below.
- Agree to the use of your personal information as described.

You will be given a copy of this Participant Information Statement to keep.

2. **Who is running the study?**

The study is being carried out by the following researchers:
- Catherine Jones, RN, BA (Hons) Paediatric Nursing, M(Phil)

Catherine Jones is conducting this study as the basis for a Doctor of Philosophy at The University of Sydney. This will take place under the supervision of Jennifer Fraser, Associate Professor, Susan Wakil School Nursing and Midwifery, the University of Sydney, Dr Sue Randall, Associate Professor, Susan Wakil School Nursing and Midwifery, the University of Sydney, and Timothy Wand, Associate Professor and Nurse Practitioner, Susan Wakil School of Nursing and Midwifery, the University of Sydney.

Catherine Jones is also the Manager Clinical Redesign and Innovation, Ryde Hospital in Northern Sydney Local Health District.

3. **What will the study involve for me?**

You will be asked to participate in the completion of an anonymous online survey about your experience and perspective of telehealth/virtual care as service delivery option for children's healthcare, via the online survey tool REDCap.

At the end of the online survey, you will be asked if you interested in attending a semi structured interview with the investigator, Catherine Jones only, and asked about your experience with telehealth in greater detail. If you state 'yes' then you will be asked for your name and a preferred contact (phone and/or email). This information will be used to arrange a suitable interview time only and these details

will be deleted and not stored. You are not obliged to be interviewed, but participation would be welcomed.

The interviews will be audio recorded for transcription purposes. Once an accurate deidentified transcript is obtained the audio recordings will be deleted.

If you wish to review the transcript of your interview, you may request to do so via Catherine Jones. The data collected during the interview is anonymous and all attempts to ensure you cannot be identified will be taken.

4. **How much of my time will the study take?**

Completion of the online survey should take about 10 to 15 minutes.

It is estimated that the interview should take approximately 30 minutes. It will be conducted at a time and location (in-person or remotely online) negotiated with you to minimise any inconvenience to you.

5. **Who can take part in the study?**

The study is related to telehealth provided to families by child health services in NSLHD. Only parents/carers of families who have received child health or paediatric services using telehealth or virtual care are included in the study.

The child health/paediatric services in NSLHD involved in this study are:

- Paediatric Hospital in the Home
- Paediatric Outpatients
- Paediatric Virtual Hospital (COVID-19)
- Child and Family Health Nursing
- Child Development Service
- Community Paediatrics
- Paediatric Physiotherapy
- Paediatric Speech Pathology
- Paediatric Occupational Therapy
- Paediatric Social Work

6. **Do I have to be in the study? Can I withdraw from the study once I have started?**

Being in this study is completely voluntary and you do not have to take part. Your decision whether to participate will not affect your current or future relationship with the researchers or anyone else at the University of Sydney or Northern Sydney Local Health District.

You will be asked to indicate your consent to participate in the online survey before you can proceed to any of the survey questions. Once you have completed your responses to survey questions for a section of the online survey your responses cannot be withdrawn due to the anonymous nature of the survey and therefore, we will not be able to tell which responses were provided by you.

If you decide to agree to be interviewed, you will be free to stop the interview at any time. You can simply tell the interviewer you no longer wish to continue with the interview before or during the interview. Unless you say that you want us to keep them, any recordings will be erased and the information you have provided will not be included in the study results. You may also refuse to answer any questions that you do not wish to answer during the interview.

If you decide to take part in the interview part of the study and then change your mind later, you are free to withdraw at any time. You can do this by requesting this in writing to Catherine Jones, at

Catherine.Jones3@health.nsw.gov.au or verbally during the interview. We will not collect any more information from you. Any information that we have already collected via the online survey, however, will be kept in our study records and included in the study results.

7. **Are there any risks or costs associated with being in the study?**

Aside from giving up your time, we do not expect that there will be any risks or costs associated with taking part in this study. Participants to this study will not be reimbursed for taking part.

8. **Are there any benefits associated with being in the study?**

We cannot guarantee that you will receive any direct benefits from being in the study.

9. **What will happen to information about me that is collected during the study?**

The data collected from the surveys are collected anonymously via an online survey platform called REDCap. The REDCap account will be specific to the study and not available or accessible by anyone other than the investigator. The data and data analysis from REDCap will be utilised and included in the thesis submitted by the investigator. Collective data maybe used and published in journal publications related to the study, but individual responses and respondents will not be identified.

The information obtained from the interviews will be collated and analysed as a collective and not as an analysis of individual experiences or performances. The interviews will be audio recorded for transcription purposes. The deidentified transcripts will be stored securely for 5 years then deleted.

If you wish to review the transcript of your interview, you may request to do so via Catherine Jones prior to the interview. The data collected during the interview will be anonymous and transcribed to deidentify participants (i.e., remove any reference to names, or personal information that could identify who you are). All attempts to ensure you cannot be identified will be taken. Once an accurate deidentified transcript is obtained the audio recordings will be deleted.

The transcripts and the analysis of them will be stored securely by the investigator. Part or your entire interview transcript may be included in the final thesis submitted for the Doctorate degree. Any journal publications based on this study may reference information provided during your interview and the subsequent analysis but will not publish your identity or the transcript in part or in its entirety.

By providing your consent, you are agreeing to us collecting personal information about you for the purposes of this research study. Your information will only be used for the purposes outlined in this Participant Information Statement, unless you consent otherwise.

Your information will be stored securely, and information will be kept strictly confidential, except as required by law. Study findings may be published. Every effort will be made to protect your identity, through the anonymous survey and deidentified interview transcripts.

We will keep the information we collect for this study, and we may use it in future projects. By providing your consent you are allowing us to use your information in potential future projects. We do not know at this stage what other projects will involve, or if there will be any future projects. We will seek ethical approval for the re-use of data before using the information in any future projects.

Any information obtained during the study that suggests malpractice or unsafe clinical practice by staff will be referred to NSLHD management, as per section 2.4 of the NSW Health Code of Conduct (PD2015_049).

10. **Can I tell other people about the study?**

Yes, you are welcome to tell other people about the study.

11. What if I would like further information about the study?

When you have read this information, Catherine Jones will be available to discuss it with you further and answer any questions you may have. If you would like to know more at any stage during the study, please feel free to contact Catherine Jones, at Catherine.Jones3@health.nsw.gov.au or on 0423 302067.

12. Will I be told the results of the study?

You have a right to receive feedback about the overall results of this study. You can tell us that you wish to receive feedback by contacting Catherine Jones at Catherine.Jones3@health.nsw.gov.au

This feedback will be in the form of a one-page lay summary. You will receive this feedback after the study is finished.

13. What if I have a complaint or any concerns about the study?

Research involving humans in Australia is reviewed by an independent group of people called a Human Research Ethics Committee (HREC). This protocol has been approved by Northern Sydney Local Health District HREC (REGIS Reference Number 2022/ETH01828). As part of this process, we have agreed to carry out the study according to the National Statement on Ethical Conduct in Human Research (2007). This statement has been developed to protect people who agree to take part in research studies.

If you are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact the university using the details outlined below. Please quote the study title and protocol number.

The Manager, The Research Office, Northern Sydney Local Health District:

- **Telephone:** +61 2 9926 4590
- **Email:** NSLHD-research@health.nsw.gov.au

This information sheet is for you to keep.

Figure 5.02: Participant Consent Form – consumer

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The effectiveness and patient experience of child health and paediatric virtual care services on children's health outcomes following widespread implementation in response to COVID 19 pandemic in Northern Sydney.

PARTICIPANT CONSENT FORM (Interview)

I, ... [PRINT NAME], agree to take part in this research study.

In giving my consent, I state that:

- I understand the purpose of the study, what I will be asked to do, and any risks/benefits involved.
- I have read the Participant Information Statement and have been able to discuss my involvement in the study with the researchers if I wished to do so.
- The researchers have answered any questions that I had about the study, and I am happy with the answers.
- I understand that being in this study is completely voluntary and I do not have to take part. My decision whether to be in the study will not affect my relationship with the researchers or anyone else at the University of Sydney or Northern Sydney Local Health District now or in the future.
- I understand that I can withdraw from the study at any time.
- I understand that I may stop the interview at any time if I do not wish to continue, and that unless I indicate otherwise any recordings will then be erased and the information provided will not be included in the study. I also understand that I may refuse to answer any questions I do not wish to answer.

- I understand that personal information about me that is collected over the course of this project will be stored securely and will only be used for purposes that I have agreed to. I understand that information about me will only be told to others with my permission, except as required by law.

- I understand that the results of this study may be published. Although every effort will be made to protect my identity, and that publications will not contain my name, I may be identifiable in these publications due to the nature of the study or results.

I consent to:

- **Audio-recording** YES ☐ NO ☐·
- **Being contacted about future studies** YES ☐ NO ☐·

Would you like to receive feedback about the overall results of this study?

YES ☐ **NO** ☐·

If you answered **YES**, please indicate your preferred form of feedback and address:

☐ Postal: _____

_____

☐ Email: _____

.....

Signature

.....

PRINT name

.....

Date

Figure 5.03: Participant Information Statement (PIS) – provider

The effectiveness and patient experience of child health and paediatric virtual care services on children's health outcomes following widespread implementation in response to COVID 19 pandemic in Northern Sydney.

PARTICIPANT INFORMATION STATEMENT

(1) What is this study about?

You are invited to take part in a research study evaluating the effectiveness of telehealth and virtual care for children in various child healthcare settings across Northern Sydney Local Health District.

The study aims to evaluate the effectiveness of telehealth in children's healthcare delivery. To determine the benefits and challenges of telehealth/virtual care in child health services. To determine if telehealth/virtual care is better suited to some child health services. As well as identify any gaps in the provision of child health services using telehealth or virtual care.

You have been invited to participate in this study because you have provided health services for children and their families via telehealth or virtual care. This Participant Information Statement (PIS) tells you about the research study. Knowing what is involved will help you decide if you want to take part in the research. Please read this sheet carefully and ask questions about anything that you don't understand or want to know more about.

Participation in this research study is voluntary.

By giving your consent to take part in this study you are telling us that you:

- ✓ Understand what you have read.
- ✓ Agree to take part in the research study as outlined below.
- ✓ Agree to the use of your personal information as described.

You will be given a copy of this Participant Information Statement to keep.

(2) Who is running the study?

The study is being carried out by the following researchers:

- Catherine Jones, RN, BA (Hons) Paediatric Nursing, M(Phil)

Catherine Jones is conducting this study as the basis for a Doctor of Philosophy at The University of Sydney. This will take place under the supervision of Jennifer Fraser, Associate Professor, Susan Wakil School Nursing and Midwifery, the University of Sydney, Dr Sue Randall, Associate Professor, Susan Wakil School Nursing and Midwifery, the University of Sydney, and Timothy Wand, Associate Professor and Nurse Practitioner, Susan Wakil School of Nursing and Midwifery, the University of Sydney.

Catherine Jones is also the Manager Clinical Redesign and Innovation, Ryde Hospital in Northern Sydney Local Health District.

(3) What will the study involve for me?

You will be asked to participate in a semi structured interview with the investigator, Catherine Jones only, and asked about your experience with telehealth in greater detail.

The interviews will be audio recorded for transcription purposes. Once an accurate deidentified transcript is obtained the audio recordings will be deleted.

If you wish to review the transcript of your interview, you may request to do so via Catherine Jones. The data collected during the interview is anonymous and all attempts to ensure you cannot be identified will be taken.

(4) How much of my time will the study take?

It is estimated that the interview should take approximately 30 minutes. It will be conducted at a time and location (in-person or remotely online) negotiated with you to minimise any inconvenience to you.

(5) Who can take part in the study?

The study is related to telehealth provided to families by child health services in NSLHD. Only clinical providers of child health or paediatric services using telehealth or virtual care are included in the study.

The child health/paediatric services in NSLHD involved in this study are:

- Paediatric Hospital in the Home
- Paediatric Virtual Hospital (COVID-19)
- Paediatric Outpatients
- Child and Family Health Nursing
- Child Development Service
- Community Paediatrics
- Paediatric Physiotherapy
- Paediatric Speech Pathology
- Paediatric Occupational Therapy
- Paediatric Social Work

(6) Do I have to be in the study? Can I withdraw from the study once I've started?

Being in this study is completely voluntary and you do not have to take part. Your decision whether to participate will not affect your current or future relationship with the researcher or anyone else at the University of Sydney or employment in Northern Sydney Local Health District.

If you decide to agree to be interviewed, you will be free to stop the interview at any time. You can simply tell the interviewer you no longer wish to continue with the interview before or during the interview. Unless you say that you want us to keep them, any recordings will be erased and the information you have provided will not be included in the study results. You may also refuse to answer any questions that you do not wish to answer during the interview.

If you decide to take part in the interview part of the study and then change your mind later, you are free to withdraw at any time. You can do this by requesting this in writing to Catherine Jones, at Catherine.Jones3@health.nsw.gov.au or verbally during the interview. We will not collect any more information from you.

(7) Are there any risks or costs associated with being in the study?

Aside from giving up your time, we do not expect that there will be any risks or costs associated with taking part in this study. Participants to this study will not be reimbursed for taking part.

(8) Are there any benefits associated with being in the study?

We cannot guarantee that you will receive any direct benefits from being in the study.

(9) What will happen to information about me that is collected during the study?

The information obtained from the interviews will be collated and analysed as a collective and not as an analysis of individual experiences or performances. The interviews will be audio recorded for transcription purposes. The deidentified transcripts will be stored securely for 5 years then deleted.

If you wish to review the transcript of your interview, you may request to do so via Catherine Jones prior to the interview. The data collected during the interview will be anonymous and transcribed to deidentify participants (i.e., remove any reference to names, or personal information that could identify who you are). All attempts to ensure you cannot be identified will be taken. Once an accurate deidentified transcript is obtained the audio recordings will be deleted.

The transcripts and the analysis of them will be stored securely by the investigator. Part or your entire interview transcript may be included in the final thesis submitted for the Doctorate degree. Any journal publications based on this study may reference information provided during your interview and the subsequent analysis but will not publish your identity or the transcript in part or in its entirety.

By providing your consent, you are agreeing to us collecting personal information about you for the purposes of this research study. Your information will only be used for the purposes outlined in this Participant Information Statement, unless you consent otherwise.

Your information will be stored securely, and information will be kept strictly confidential, except as required by law. Study findings may be published. Every effort will be made to protect your identity, through the anonymous survey and deidentified interview transcripts.

We will keep the information we collect for this study, and we may use it in future projects. By providing your consent you are allowing us to use your information in potential future projects. We don't know at this stage what other projects will involve, or if there will be any future projects. We will seek ethical approval for the re-use of data before using the information in any future projects.

Any information obtained during the study that suggests malpractice or unsafe clinical practice by staff will be referred to NSLHD management, as per section 2.4 of the NSW Health Code of Conduct (PD2015_049).

(10) Can I tell other people about the study?

Yes, you are welcome to tell other people about the study.

(11) What if I would like further information about the study?

When you have read this information, Catherine Jones will be available to discuss it with you further and answer any questions you may have. If you would like to know more at any stage during the study, please feel free to contact Catherine Jones, at Catherine.Jones3@health.nsw.gov.au or on 0423 302067.

(12) Will I be told the results of the study?

You have a right to receive feedback about the overall results of this study. You can tell us that you wish to receive feedback by contacting Catherine Jones at Catherine.Jones3@health.nsw.gov.au

This feedback will be in the form of a one-page lay summary. You will receive this feedback after the study is finished.

(13) What if I have a complaint or any concerns about the study?

Research involving humans in Australia is reviewed by an independent group of people called a Human Research Ethics Committee (HREC). This protocol has been approved by Northern Sydney Local Health District HREC (REGIS Reference Number 2022/ETH01828). As part of this process, we have agreed to carry out the study according to the National Statement on Ethical Conduct in Human Research (2007). This statement has been developed to protect people who agree to take part in research studies.

If you are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact the university using the details outlined below. Please quote the study title and protocol number.

The Manager, The Research Office, Northern Sydney Local Health District:

- **Telephone:** +61 2 9926 4590
- **Email:** NSLHD-research@health.nsw.gov.au

This information sheet is for you to keep.

Figure 5.04: Participant Consent Form - provider

CHIEF INVESTIGATOR – JENNIFER FRASER RN PhD

Associate Professor

Susan Wakil School of Nursing,

Health & Medicine

The University of Sydney, NSW 2006

jennifer.fraser@sydney.edu.au

0423 176 464

The effectiveness of child health and paediatric virtual care services in Northern Sydney before and after its widespread implementation in response to a pandemic, and patient experiences.

PARTICIPANT CONSENT FORM (Interview)

I, ... [PRINT NAME], agree to take part in this research study.

In giving my consent, I state that:

- ✓ I understand the purpose of the study, what I will be asked to do, and any risks/benefits involved.
- ✓ I have read the Participant Information Statement and have been able to discuss my involvement in the study with the researchers if I wished to do so.
- ✓ The researchers have answered any questions that I had about the study, and I am happy with the answers.
- ✓ I understand that being in this study is completely voluntary and I do not have to take part. My decision whether to be in the study will not affect my relationship with the researchers or anyone else at the University of Sydney or employment in Northern Sydney Local Health District now or in the future.

- ✓ I understand that I can withdraw from the study at any time.
- ✓ I understand that I may stop the interview at any time if I do not wish to continue, and that unless I indicate otherwise any recordings will then be erased and the information provided will not be included in the study. I also understand that I may refuse to answer any questions I don't wish to answer.
- ✓ I understand that personal information about me that is collected over the course of this project will be stored securely and will only be used for purposes that I have agreed to. I understand that information about me will only be told to others with my permission, except as required by law.
- ✓ I understand that the results of this study may be published. Although every effort will be made to protect my identity, and that publications will not contain my name, I may be identifiable in these publications due to the nature of the study or results.

I consent to:

- **Audio-recording** YES ☐ NO ☐
- **Being contacted about future studies** YES ☐ NO ☐

Would you like to receive feedback about the overall results of this study?

YES ☐ **NO** ☐

If you answered **YES**, please indicate your preferred form of feedback and address:

☐ Postal: _____

_____

☐ Email: _____

Signature

.....

PRINT name

....

Date

.....

Figure 5.05: Semi Structured Interview Questions

INTRODUCTION

Welcome and thank you for agreeing to be interviewed today, it should take about 20-30 minutes of your time. The use of telehealth (either via phone or video conferencing or virtual hospital) for healthcare services has increased recently especially during and following the COVID-19 pandemic. This includes the option of telehealth to provide care, therapy and support for children and their families by nursing, medical and allied health staff.

The purpose of the interview it to seek your perspective on the use telehealth and your recent experience/s with telehealth or virtual healthcare for child/ren and their families. The interview will be recorded for transcript purposes and be used as part of my PhD Research Thesis with the University of Sydney. The information you provide in the interview will be treated confidentially and the transcribing recorded anonymously.

The interview can be stopped at any point, and you don't have to answer any questions if you don't want to. There will be no consequences for you and your position from the answers you provide me. Are you happy to proceed with the interview? Are you happy for me to record the interview for transcription?

INTERVIEW - CHILDREN'S HEALTHCARE CLINICIANS (Providers)

1. What is your role in children's healthcare? How long have you been in this role?
2. What is your experience of healthcare provision for children? Describe scenarios when you have used telehealth.
3. What services do you provide via telehealth? How long have you used telehealth/ virtual care?

Probing question: What impact did COVID have on your use of telehealth?

4. How did you feel the first time you used telehealth for your child health service?

Probing question: Has this changed over time?

5. Describe your (typical) telehealth experience?

Probing question: How does this differ from any other healthcare provision experiences?

6. Do you achieve what you want to from telehealth appointments?

Probing question: Is there anything you are not satisfied with or missing, with telehealth?

7. Do you prefer telehealth or in-person appointments?
8. What do you think of criticism that telehealth is a cheap alternative?
9. Does it improve access to healthcare?

10. Are there advantages to telehealth for you and your patients/clients?
11. Are there disadvantages to telehealth for you and your patients/clients?
12. Is there anything that surprised you about telehealth?
13. Do you think that telehealth is a good alternative or option for child healthcare services?
14. Is it as effective as face-to-face?
15. How do you think telehealth should be used in the future?

Extra Questions

- *Do you see telephone as part of telehealth?*
- *What training/education did/do you have about Telehealth?*
- *How do you monitor best practice with Telehealth?*
- *Do you have best practice guidelines or protocols for care via telehealth?*

INTERVIEW - PARENTS (Consumers)

1. What services have you received for your child via telehealth?
2. What have been your previous experiences of healthcare for your child? For example, has your child been in hospital or receives regular therapy, or routine child health checks?
3. How did you feel at first about using telehealth for your child?

Probing question: Has this changed over time?

4. Describe your telehealth experience?

Probing question: How did this differ from any other healthcare experiences?

5. Did you achieve what you wanted from the telehealth appointment?

Probing question: Was there anything you were not satisfied with or missing, with telehealth?

6. Would you have preferred a telehealth or in-person appointment?
7. Were the advantages to telehealth for you and your family?
8. Were the disadvantages to telehealth for you and your family?
9. Was there anything that surprised you about telehealth?
10. Do you think that telehealth is a good alternative or option for child healthcare services?
11. How do you think telehealth should be used in the future?

Table 6.01: Occasions of Service (OOS) by Modality of Care & Allied Health Discipline (2018-23)

Modality Of Care	Discipline	2018		2019		2020		2021		2022		2023	
		(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%
Audio Only	Occupational Therapy	337	17.5%	344	16.5%	393	16.7%	411	20.5%	428	25.3%	324	20.7%
	Physiotherapy	222	7.0%	227	6.6%	21	0.6%	365	10.0%	277	9.0%	215	6.6%
	Social Work	28	6.2%	21	7.2%	7	2.2%	2	1.2%	9	5.9%	3	2.4%
	Speech Pathology	894	13.4%	951	15.7%	1,136	17.7%	874	14.2%	952	16.0%	855	16.3%
	Audio Only Total	**1,481**	**12.1%** (CI 10.4,13.8)	**1,543**	**13.0%** (CI 11.3,14.7)	**1,557**	**12.3%** (CI 10.7,13.9)	**1,652**	**13.8%** (CI 12.1,15.5)	**1,666**	**15.4%** (CI 13.7,17.1)	**1,073**	**10.5%** (CI 8.7,12.3)
Audio-Visual	Occupational Therapy	0	0.0%	0	0.0%	123	5.2%	147	7.3%	42	2.5%	16	1.0%
	Physiotherapy	0	0.0%	0	0.0%	403	11.2%	395	10.8%	162	5.3%	1	0.0%
	Social Work	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Speech Pathology	0	0.0%	0	0.0%	2,269	35.4%	2,623	42.6%	2,416	40.7%	1,001	19.0%
	Audio-Visual Total	**0**	**0.0%**	**0**	**0.0%**	**2,795**	**22.0%** (CI 20.5,23.5)	**3,165**	**26.4%** (CI 24.9,27.9)	**2,620**	**24.2%** (CI 22.6, 25.8)	**1,018**	**10.0%** (CI 8.1, 11.8)
In-Person	Occupational Therapy	1,404	72.7%	1,473	70.4%	1,335	56.7%	905	45.0%	858	50.7%	920	58.8%
	Physiotherapy	2,707	85.9%	2,999	87.0%	2,735	76.1%	2,577	70.4%	2,321	75.8%	2,759	85.0%
	Social Work	318	70.7%	157	53.6%	230	72.1%	159	94.6%	126	82.9%	105	84.0%
	Speech Pathology	5,238	78.5%	4,700	77.6%	2,291	35.7%	1,943	31.5%	1,953	32.9%	2,978	56.6%
	In-Person Total	**9,667**	**79.2%** (CI 78.8,80.0)	**9,329**	**78.5%** (CI 77.7,79.3)	**6,591**	**52.0%** (CI 50.8,53.2)	**5,584**	**46.5%** (CI 45.2,47.8)	**5,258**	**48.5%** (CI 47.1, 49.8)	**6,762**	**66.3%** (CI 65.2, 67.4)
Other	Occupational Therapy	116	6.0%	142	6.8%	284	12.1%	353	17.6%	228	13.5%	129	8.2%
	Physiotherapy	8	0.3%	10	0.3%	250	7.0%	139	3.8%	95	3.1%	103	3.2%
	Social Work	3	0.7%	4	1.4%	0	0.0%	1	0.6%	0	0.0%	5	4.0%
	Speech Pathology	227	3.4%	119	2.0%	299	4.7%	270	4.4%	234	3.9%	128	2.4%
	Other Total	**354**	**2.9%** (CI 1.1,4.6)	**275**	**2.3%** (CI 0.5, 4.1)	**833**	**6.6%** (CI 4.9, 8.3)	**763**	**6.4%** (CI 4.7,8.1)	**557**	**5.1%** (CI 3.3,6.9)	**365**	**3.6%** (CI 1.7,5.5)
No Client Contact e.g. case conference/ planning	Occupational Therapy	73	3.8%	132	6.3%	220	9.3%	193	9.6%	135	8.0%	175	11.2%
	Physiotherapy	213	6.8%	210	6.1%	183	5.1%	185	5.1%	207	6.8%	166	5.1%
	Social Work	101	22.4%	111	37.9%	82	25.7%	6	3.6%	17	11.2%	12	9.6%
	Speech Pathology	315	4.7%	283	4.7%	421	6.6%	450	7.3%	381	6.4%	299	5.7%
	No Client Contact Total	**702**	**5.8%** (CI 4.1,7.5)	**736**	**6.2%** (CI 4.5,7.9)	**906**	**7.1%** (CI 5.4,8.8)	**834**	**7.0%** (CI 5.3,8.7)	**740**	**6.8%** (CI 5.0, 8.6)	**652**	**6.4%** (CI 4.5,8.3)

Table 6.02: Consumer Questionnaire - Telehealth Satisfaction Ratings

	Extremely Satisfied	Mostly Satisfied	A Little Satisfied	A Little Dissatisfied	Mostly Dissatisfied	Extremely Dissatisfied	Not applicable
Convenience For you	7 (70.0%)	3 (30.0%)	0	0	0	0	0
Ability for you to stay at home	8 (80.0%)	2 (20.0%)	0	0	0	0	0
Not having to come into a healthcare facility	7 (70.0%)	2 (20.0%)	1 (10.0%)	0	0	0	0
Reduced transport or parking required	7 (70.0%)	1 (10.0%)	0	0	0	0	2 (20.0%)
Access to healthcare services	7 (70.0%)	2 (20.0%)	1 (10.0%)	0	0	0	0
Availability of appointments	7 (70.0%)	3 (30.0%)	0	0	0	0	0
Quality of healthcare provided	5 (50.0%)	4 (40.0%)	1 (10.0%)	0	0	0	0
Communication between different healthcare professionals	6 (60.0%)	3 (30.0%)	0	0	0	0	1 (10.0%)
Links to pharmacy	1 (10.0%)	1 (10.0%)	1 (10.0%)	0	0	0	7 (70.0%)
Monitoring your child's condition remotely	4 (40.0%)	4 (40.0%)	1 (10.0%)	0	0	0	1 (10.0%)
Time away from work or school/childcare	7 (70.0%)	1 (10.0%)	0	0	0	0	2 (20.0%)
Confidentiality	7 (70.0%)	3 (30.0%)	0	0	0	0	0
Being comfortable discussing issues with your healthcare professional	7 (70.0%)	3 (30.0%)	0	0	0	0	0
Ability to provide treatment or therapy	3 (30.0%)	4 (40.0%)	1 (10.0%)	0	1 (10.0%)	0	1 (10.0%)
Ease of use of technology	6 (60.0%)	4 (40.0%)	0	0	0	0	0
Overall satisfaction with the outcome of your telehealth experience	5 (50.0%)	4 (40.0%)	0	1 (10.0%)	0	0	0

Table 6.03: Consumer Questionnaire - Satisfaction with Telehealth Providers

	Extremely Satisfied	Mostly Satisfied	A Little Satisfied	A Little Dissatisfied	Mostly Dissatisfied	Extremely Dissatisfied	Not applicable
General Practice	3 (60.0%)	1 (20.0%)	0	0	0	0	1 (20.0%)
Child & Family Health Services (Early Childhood Centres)	0	1 (100%)	0	0	0	0	0
Paediatrician	1 (50.0%)	1 (50.0%)	0	0	0	0	0
Paediatric Nurse Specialist	0	0	0	0	0	0	0
Paediatric Hospital in the Home (Home care)	4 (100%)	0	0	0	0	0	0
Hospital Admission e.g. paediatric ward/day surgery	1 (33.3%)	0	1 (33.3%)	0	0	0	1 (33.3%)
Emergency Department	0	1 (50.0%)	0	1 (50.0%)	0	0	0
Physiotherapy	0	0	0	0	0	0	1 (100%)
Occupational Therapy	0	0	0	1 (50.0%)	0	0	1 (50.0%)
Outpatient Clinic	0	1 (100%)	0	0	0	0	0
Speech pathology	0	2 (50.0%)	1 (25.0%)	1 (25.0%)	0	0	0
COVID-19 Virtual Hospital	0	1 (100%)	0	0	0	0	0
Other child health services you used	0	1 (100%)	0	0	0	0	0

Table 6.04: Consumer Questionnaire - Free Text Responses

Question	**Responses**
What factors made telehealth successful or unsuccessful for you and your child?	• The nurse was able to observe my child playing and talking. She could see my concerns. • He needed to do speech-sound therapy. This was very hard over Telehealth. • Internet connection • Challenges of online with deaf child • Time saved for travel. • Able to question anything of concern. • The ease and knowledge of the nurse • OT due to gaining the child's interest as a 2nd party interpreter of the OT techniques. • Able to use video to allow nurse to conduct visual assessment of breathing in my daughter. Grateful to be able to have the comforts of home with small baby (<2 months) while still receiving high quality care and support. • Ease of access
Were there any unexpected benefits to using telehealth?	• Having a cup of tea at home while on the "call" • Hospital in the home was invaluable; never used this service before but it meant we could manage at home while still receiving review and support from the hospital. • A positive alternative to going up to the centre in the rain. I may have cancelled the appointment if I had to go out in inclement weather. • Easier childcare and ease of access. • We were able to do hospital at home to keep our little one safe, but he was still monitored
Are there any services for your child's health and wellbeing you would like to have accessed via telehealth/virtual care?	• GP, speech pathology if update to care plans. • Unsure due to his age • Outpatients - Growth Clinic
What would you do differently if you next have a telehealth appointment?	• Maybe a 3-way option if a socialist [social worker] had to be involved. • Nothing.
How can telehealth/virtual care be improved in the future?	• Preliminary diagnostics at a local health facility to then facilitate remote appointments with specialists. • Technology clearer sound. • More availability/ advocation for it
Anything else you would like to say about your experience with telehealth for your child?	• Was convenient but hard to do speech sound therapy over Telehealth. • Thank you for this help. • Our HITH doctor was wonderful

Table 6.05: Child and Family Health Occasions of Service and Modality of Care in NSLHD

	2017/2018		2018/2019		2019/2020		2020/2021		2021/2022		2022/2023	
	n	***%***	***n***	***%***	***n***	***%***	***n***	***%***	***n***	***%***	***n***	***%***
Child and Family Heath Nursing	**101,894**		**89,150**		**91,587**		**89,970**		**80,401**		**75,686**	
In-person	77,193	75.8 (CI 75.5, 76.1)	65,398	73.4 (CI 73.1,73.7)	61,357	67.0 (CI 66.6,67.4)	57,156	63.5 (CI 63.1,63.9)	41,271	51.3 (CI 50.1, 51.8)	48,841	64.5 (CI 64.1, 64.9)
Telehealth - Audio only	18,660	18.3 (CI 17.7, 18.8)	17,611	19.8 (CI 19.2, 20.4)	20,971	22.9 (CI 22.3, 23.5)	19,890	22.1 (CI 21.5, 22.7)	20,706	25.8 (CI 25.2, 26.4)	14,348	2.2, 3.4.0 (CI 18.4, 19.6)
Telehealth - Audio-Visual	2	0.0*	2	0.0*	2,609	2.8 (CI 2.2,3.4)	6,347	7.1 (CI 6.5,7.7)	11,372	14.1 (CI 13.5,14.7)	4,738	6.3 (CI 5.6,7.0)
Other	6039	5.9 (CI 5.3, 6.5)	6139	6.9 (CI 6.3,7.5)	6650	7.3 (CI 6.7,7.9)	6577	7.3 (CI 6.7, 7.9)	7052	8.8 (CI 8.1, 9.5)	7759	10.3 (CI 9.6, 10.1)
Community Paediatric Medicine	**2,573**		**3,135**		**2,558**		**1,602**		**1,840**		**1,570**	
In-person	2,549	99.1 (CI 98.7,99.5)	3,035	96.8 (CI 96.2, 97.4)	2,026	79.2 (CI 77.5, 80.1)	1,282	80.0 (CI 77.8, 82.2)	1,393	75.7 (CI 73.5, 77.9)	1,439	91.7 (CI 90.3, 93.1)
Telehealth - Audio only	24	0.9*	99	3.2 (CI -0.3, 6.7)	177	6.9 (CI 3.2, 10.6)	72	4.5 (CI 0.3, 9.3)	216	11.7 (CI 7.4, 16.0)	32	2.0 (CI -2.8, 6.8)
Telehealth - Audio-Visual	0	0.0*	1	0.0*	355	13.9 (CI 10.3, 17.5)	248	15.5 (CI 11.0, 20)	231	12.6 (CI 8.3, 16.9)	99	6.3 (CI 1.5, 11.1)
Other	133	5.2 (CI 1.4, 8.9)	180	F5.7 (CI 2.3,9.1)	241	9.4 (CI 5.7, 13.1)	325	20.3 (CI 15.9, 24.7)	251	13.6 (CI 9.4, 17.8)	240	15.3 (CI 10.7, 19.8)
Grand Total	**104,467**		**92,285**		**94,145**		**91,572**		**82,241**		**77,256**	

**CI not calculated due to extremely low sample size*

Table 6.06: P-HITH Referrals and Method of Review

	P-HITH Referrals from Paediatric Ward (n)	P-HITH Referrals from Paediatric Ward (%)	P-HITH Referrals from Emergency Dept (n)	P-HITH Referrals from Emergency Dept (%)	P-HITH Referrals from Clinics (n)	P-HITH Referrals from Clinics (%)	P-HITH Referrals from Other (n)	P-HITH Referrals from Other (%)	Method of Review - Telehealth (n)	Method of Review - Telehealth (%) per P-HITH patients	Method of Review - Home Visit (n)	Method of Review - Home Visit (%) per P-HITH patients	Method of Review - Clinic (n)	Method of Review - Clinic (%) per P-HITH patients
2017	419	91.9%	30	6.6%	3	0.7%	4	0.9%	173	37.9% (CI 30.7, 45.1)	3	0.7%	279	61.2%
2018	782	91.7%	59	6.9%	5	0.6%	1	0.1%	536	62.8% (CI 58.7, 66.9)	6	0.7%	311	36.5%
2019	776	91.6%	51	6.0%	2	0.2%	17	2.0%	505	59.6% (CI 55.3, 63.9)	34	4.0%	308	36.4%
2020	509	85.7%	68	11.4%	6	1.0%	11	1.9%	403	67.8% (CI 63.2, 72.4)	15	2.5%	175	29.5%
2021	420	80.0%	81	15.4%	11	2.1%	13	2.5%	365	69.5% (CI 64.8, 74.2)	14	2.7%	146	27.8%
2022	736	74.6%	230	23.3%	8	0.8%	13	1.3%	841	85.2% (CI 82.8, 87.6)	13	1.3%	133	13.5%
TOTALS	3,642	85.5%	519	12.2%	35	0.8%	59	1.4%	2,823	63.8%	85	2.0%	1,352	34.1%

Notes:
**clinic review may also include phone review*
**phone review was without clinic attendance*
**home visit included clinic/phone and was only for children who had at least one home visit*
**telehealth = combination of telephone & videoconference*

Table 6.11: Paediatric Allied Health Completion Rates 2018-2023

Referral FY	Type of Referral	Sum of # Received Referrals	Sum of # Completed Referrals	Completion Rates
2018/2019	Consult A.H. Inpatient Occupational Therapy	87	77	88.5%
	Consult A.H. Inpatient Physiotherapy	191	169	88.5%
	Consult A.H. Inpatient Social Work	185	161	87.0%
	Consult A.H. Inpatient Speech Pathology	26	25	96.2%
	Consult Physiotherapy	365	302	82.7%
Total		**854**	**734**	**85.9% (95%CI 83.6, 88.3)**
2019/2020	Consult A.H. Inpatient Occupational Therapy	116	102	87.9%
	Consult A.H. Inpatient Physiotherapy	154	128	83.1%
	Consult A.H. Inpatient Social Work	149	139	93.3%
	Consult A.H. Inpatient Speech Pathology	20	19	95.0%
	Consult Physiotherapy	311	251	80.7%
	Consult Speech Pathology	2	2	100.0%
Total		**752**	**641**	**85.2% (95%CI 82.5, 87.6)**
2020/2021	Consult A.H. Inpatient Occupational Therapy	109	95	87.2%
	Consult A.H. Inpatient Physiotherapy	111	97	87.4%
	Consult A.H. Inpatient Social Work	118	109	92.4%
	Consult A.H. Inpatient Speech Pathology	33	30	90.9%
	Consult Physiotherapy	255	180	70.6%
Total		**626**	**511**	**81.6% (95%CI 78.4, 84.5)**
2021/2022	Consult A.H. Inpatient Occupational Therapy	113	101	89.4%
	Consult A.H. Inpatient Physiotherapy	85	64	75.3%
	Consult A.H. Inpatient Social Work	103	98	95.1%
	Consult A.H. Inpatient Speech Pathology	19	16	84.2%
	Consult Physiotherapy	169	96	56.8%
Total		**489**	**375**	**76.7% (95%CI 72.7, 80.2)**
2022/2023	Consult A.H. Inpatient Occupational Therapy	102	93	91.2%
	Consult A.H. Inpatient Physiotherapy	117	99	84.6%
	Consult A.H. Inpatient Social Work	108	97	89.8%
	Consult A.H. Inpatient Speech Pathology	22	22	100.0%
	Consult Physiotherapy	163	77	47.2%
	Consult Social Work	1	1	100.0%
	Consult Speech Pathology	1	1	100.0%
Total		**514**	**390**	**75.9% (95%CI 72.0, 79.4)**
Grand Total		**3235**	**2651**	**81.9%**

Table 6.13: AEDC Domains 2009-2024 - NSLHD Local Government Areas

Domain Over Time	Number of children with valid scores (n)						Developmentally on track (%)						Developmentally at risk (%)						Developmentally vulnerable (%)					
	2009 (n)	2012 (n)	2015 (n)	2018 (n)	2021 (n)	2024 (n)	2009 (%)	2012 (%)	2015 (%)	2018 (%)	2021 (%)	2024 (%)	2009 (%)	2012 (%)	2015 (%)	2018 (%)	2021 (%)	2024 (%)	2009 (%)	2012 (%)	2015 (%)	2018 (%)	2021 (%)	2024 (%)
Physical health and wellbeing	9,209	10,152	10,685	10,854	9,766	8,547	83.5	84.2	82.0	83.4	84.0	81.0	10.9	10.5	11.8	11.0	10.1	12.6	5.6	5.3	6.1	5.6	5.9	6.3
Social competence	9,207	10,143	10,683	10,852	9,769	8,546	83.1	83.4	80.5	81.3	80.7	79.6	11.2	10.7	12.9	12.4	12.9	13.4	5.7	5.9	6.6	6.3	6.3	7.0
Emotional maturity	9,159	10,099	10,642	10,808	9,734	8,504	84.5	85.2	82.0	82.6	82.6	81.0	10.9	10.4	12.5	11.9	11.9	12.6	4.6	4.4	5.5	5.5	5.5	6.4
Language and cognitive skills (school-based)	9,207	10,160	10,680	10,855	9,751	8,545	91.8	94.1	93.7	93.3	92.1	91.2	5.8	4.1	4.1	4.3	5.6	6.0	2.5	1.8	2.2	2.4	2.3	2.8
Communication skills and general knowledge	9,209	10,149	10,685	10,855	9,769	8,548	82.6	82.7	81.7	82.6	82.3	80.0	11.8	12.0	13.1	12.3	12.5	14.1	5.6	5.2	5.1	5.1	5.2	6.0

Table 6.14: AEDC Vulnerabilities 2009-2024 - NSLHD Local Government Areas

Description	Number of children with valid scores (*n*)						Developmentally vulnerable (%)					
	2009	2012	2015	2018	2021	2024	2009	2012	2015	2018	2021	2024
Vulnerable on one or more domains over time	9,177	10,087	10,663	10,822	9,735	8,509	14.6	13.9	15.2	14.9	14.9	16.2
Vulnerable on two or more domains over time	9,198	10,134	10,670	10,845	9,753	8,542	5.7	5.7	6.4	6.0	6.4	7.1
On track on all five domains over time	9,187	10,115	10,677	10,837	9,744	8,528	64.2	65.9	61.8	63.4	63.2	60.3
Vulnerable – Physical readiness for school day over time	9,208	10,147	10,684	10,852	9,764	8,543	5.7	6.3	7.1	7.0	6.7	7.6
Vulnerable – Physical independence over time	9,209	10,152	10,685	10,853	9,766	8,547	5.6	4.5	6.1	5.2	6.1	6.0
Vulnerable – Gross and fine motor skills over time	9,209	10,139	10,685	10,854	9,749	8,546	4.6	4.6	4.9	4.9	4.5	5.4

Table 7.01: Interview Journal Notes

General Interview Notes
• Before each interview was recorded, I took a few minutes with each interviewee (whether I had met previously or not) to build a rapport (asked about the weather or how their day was going) and explain how the interview would work (I switch on recording, do an introduction before we start the questions). • Used videos for all interviews - enable use of body languages to encourage and demonstrate active listening by myself as interviewer. Also used probing and clarifying questions. tried to use pauses to give them opportunity to talk further - sometime difficult if there was a time delay. • Interviewees often relaxed once told this is the last question and then proceeded to talk further - as if the pressure is off and can speak more freely. Used different techniques with different interviewees. Sometimes included more controversial questions about telehealth criticised as a cheap alternative - to provoke a reaction. • I used the interview questions planned as a guide but would often miss or modify questions based on previous answers. some questions unique to one or two interviews depending on the discussion and if I wanted to probe or clary further about a point they raised. • Interviews allowed to come to a natural end and no minimum or maximum time pressures required. • All clinicians were quite senior and very experienced (20+ years) • Access to telehealth - limitations for CALD (English as second language) and vulnerable families (no data). Overcoming language barriers with interpreters on the call (3-way). But reduced access to technology or data is a limiting factor for some families. • Distance from home to hospital/clinic etc was more of a motivator than a barrier for both consumers and providers to use telehealth whenever possible. • Clinicians talked about using telehealth as what the families would want/prefer/most convenient for them - not about what worked best for them necessarily.
Individual Interview Notes
Consumers
1. Mother of two. Born overseas and family located overseas. Both children have complex and ongoing healthcare needs. Mum also neurodiverse. So has a lot of lived experience of children's healthcare. Challenging to get children to appointments so telehealth really helps her to attend all appointments. Doesn't work in all circumstances and important to have relationship with clinician (i.e. seen in-person at least once) prior to telehealth. talked about challenges of telehealth and neurodiverse children. Got a sense of isolation at times and that she seemed to enjoy simply having someone to talk to about her children and experiences. Was a fun interview with friendly banter. Talked in terms of working with clinicians, a partnership to provide care using telehealth. Interesting that telehealth was seen as opening up the possibility for her and her family to be able to move to country and still meet her children's healthcare needs. Access to a better lifestyle in the country with more space to do therapy at home. Skys the limit with future of telehealth - very excited about possibilities including AI in the future.
2. Young Mum with very young infant and toddler. Recent experience with HITH and infant. Could not talk highly enough about the experience and just wanted to share this. Talked a lot about partnership with the HITH nurse in particular and enjoyed working together to care for child. Seemed to acquire observation skills related to respiratory assessment of infants that she was proud of. Her main motivation for the interview seemed to be to try to ensure that virtual services for children continue into the future and does not want to lose this option for her family. Tended to give shorter answers and needed more prompts and reinforcement umms and nods.
3. A little distracted by her children in the room and keeping an eye on them. So consequently, a relatively short interview. Positive experience and surprised about how effective it had been in different scenarios (HITH, genetic counselling, GP). Convenient for her and family. Achieved everything they wanted.

Appendices

Providers	
A.	Experienced paediatric nurse (20+ years). Passionate about virtual care and loves her job. Has learned to use telehealth as a clinical tool and the learning progression was event e.g. calling parents first on the phone to have a chat in detail before switching to video to see the child physically, need for two screens (one with patient notes and one with video). Putting video on too early can be distractive to child and can't get the same level on conversation with parent alone. Adamant the telehealth was not a "cheap alternative". It is a mode/option of healthcare delivery that stands on its own and has its own unique place in healthcare.
B.	An experienced and senior Paediatrician (20+ years) as well as MoH advisor for paediatrics (including HITH and virtual care). Worked in rural and metro hospitals. Had interesting perspectives and comparisons of the two. Firstly, that rural have been using telehealth/virtual for much longer than metro and it is part of routine practice both to connect to families as well as to other clinicians. Talked about having used the telephone to follow-up with patients for decades and debated if that is or isn't telehealth. Distances necessitated the development of telehealth in rural areas, but pandemic drove the development in particular for metro areas. This was a long interview (almost an hour), and I got the sense we could have carried on for another hour if time permitted. Offered to be interviewed again if helpful. Was very frank and honest about many aspects of telehealth including the ability for some clinicians (esp. in metro areas outreaching to rural) to use telehealth to provide an inferior service, or lip-service to rural communities out of convenience - when in-person is required. On the whole very positive about telehealth and a strong advocate) to the point of not really seeing what the big deal was and that it is just a natural extension of options to provide right care, in the right way for the right family. Experience with Telehealth dominated conversations at times and had to consciously bring themselves back to NSLHD experience at times. Gave examples of when it works well.
C.	An experienced and senior Paediatrician (20+ years) - including HITH, outpatients, and child weight management. Was harder to Acute Paediatrics times with short responses and took more time to open up. Telehealth (video) can provide a 'window' into families at home providing clues to lifestyle that maybe impacting their health or need for healthier habits. limitations with physical examinations but great for follow up. Talked about the dangers of overuse and how the convenience can make you use it instead of in-person when perhaps in-person should be used e.g. children with ADHD are required to see Paediatrician 1 or 2 a year not just get repeat prescriptions. Telehealth can make an easier and more convenient way to do this for both families and doctors but a physical/unperson appointment is required as well as some of the time. The convenience for children with chronic or complex needs was raised - i.e. not missing part-day/whole day of school to see Paediatrician- instead, taken out of class for 20-30mins and telehealth done in the car. Much less impact on education which is also important part of child's health and wellbeing.
D.	Very experienced paediatric nurse (20+ years) including 8 years in HITH. Uses telehealth in HITH daily (many times a day). Loves the job and the relationships with families. Very passionate about telehealth. examples of linking families including when one parent was overseas or culturally in confinement period post birth. Expanded and learned how to get most out of telehealth e.g. sleep studies/oxygen monitoring at home. Adjust to family needs - may call 2 or 3 times in one day. If parents don't want to talk it is often that everything is OK, and child is better rather than necessarily a red flag. Gave lots of examples of cases and typical day. Telehealth not what traditional nursing is. Not what were originally trained to do. New concept/way of doing nursing. Less pressure to discharge from telehealth services - can do just one more call. Surprise - almost slightly offended at idea the telehealth was a cheap option. It is just an option. So proud of what can achieve remotely through telehealth and the benefit to families.
E.	Very experienced community nurse 20+ years (child and family health nurse). Embraced (video) telehealth at start of the pandemic out of necessary and concern for vulnerable and new families being isolated and unsupported through difficult times. Needed to reach them and telehealth provided that. Strong advocate for virtual care and sense of frustration at colleagues who do not share the same vision for virtual care. Colleagues who have reverted to not using telehealth unless really have to in post pandemic times. Although contrary to this talked about how telephone and CFH has been a feature of care for decades. Had a mental hierarchy on when and where to use telehealth. In-person was the 'gold-standard' as an initial thought but then thought of examples when telehealth was more appropriate. dangers of telehealth and DV raised.
F.	Very experienced speech pathologist (mostly with under 5-year-olds). Change in practice with COVID to maintain service but not seeing it continuing. Clinicians went back to old ways - almost back to a place of comfort and clinical confidence in what they are doing. Parents indicating, they don't want to have sessions via TH. 90% said in their survey they preferred in-person. Describe very defined scenarios when TH did work e.g. parent sessions, and stuttering therapy. Thought the initial experience of staff with

	'clucky' TH technology and lack of access to specific TH software for speech pathology may also be barriers. Was unsure about future of TH. A sense of mystified why parents don't want to see more TH options. Needs to be better researched and promoted as valid option to families. Is a good option from clinician perspective as enables flexibility such as providing parent education in the evenings.
G.	Very experienced paediatrician. Forced to adopt telehealth during COVID - was surprised how well it worked. Has reservations about it and when it should be used. Not suitable for all scenarios. Need relationship with families. Good for distances and better than not seeing them at all. But firm believer in in-person and the importance of not moving everything to in-person. Something you can't assess online.
H.	Experienced paediatrician. See telehealth as one of the tools available for clinicians. F2F still preferred but telehealth has a definite place in certain/relevant circumstances. Clear in own min as to what is 'relevant & appropriate' for telehealth. interesting though on not blurring the lines between home and work with telehealth - danger of clinician burnout if boarders come too blurred and clinicians unable to switch off at home as able to monitor patients. Very matter of fact about telehealth - it is just a normal part of the day/ option to use.
I.	Experienced community paediatrician - specialised in child development. Has embrace telehealth as part of practice and delivery options. very proud of the level of service maintained during COVID by embracing telehealth. See Hybrid as the future and has clear 3 scenarios when telehealth is appropriate.
J.	Candid discussion about telehealth and community child health services. The rapid uptake of telehealth driven by fears of illness and death from COVID. Now that driver has gone so had the drive to do telehealth in some areas, but not all. Discussed the generational impact on telehealth uptake, use and ultimately effectiveness - with younger providers more comfortably with video and virtual than sectors with an older workforce. Again, clear distinction between phone and video. Phone is an established tool for clinicians but not so much the video. Seen as separate and that telehealth is with a video. When asked directly put phone and video in the same category but spoke about them as distinctly different. The consumers are a younger generation and their comfort and familiarity with technology may drive/force changes in services to offer more online in the future. The need for guidelines on which specific patient groups/diagnosis telehealth is suitable for was raised. That currently practice guidance is mostly based on what they learned through covid or on how to use the technology rather that more specific about best clinical practice.
K.	Interview with a newly qualified paediatrician in the community, whilst at home caring for a child. Some interruptions for childcare but still a valuable interview. Clear difference between phone and telehealth and discussed scenarios for each. Telehealth was convenient for them as for the families. enables them to work from home at times and work when mild sickness doesn't allow to go into hospital/clinic. Talked about types of patients and scenarios that did and didn't suit telehealth. Again, a lot of learning as you go with when and how to use telehealth over the COVID years. Discussed clinical guidance and how not really didn't for them now but will be useful for next generation of clinicians. Doesn't feel it exists at the moment but useful in the future. surprise how healthcare has progressed and changed over last few years. Wants telehealth to stay and continue to be subsidised for GPs.
L.	CFH Nurse and educator. Reflected on the education and training side of TH for a while during interview which was interesting as they reflected on some questions and thought about how maybe they need to change their teaching about TH. CFH was very adaptive to Covid with TH but seem to have reverted back to old practices and not really taken much forward that they learned or used with TH during COVID. But interestingly finished with CFH needing to be more hybrid in the future to meet needs of modern/working families i.e. early mornings, late afternoons, weekends with TH options. Only really use phone for booking appointments - so no change there either.
M.	Unusual Interview because it was around a new service that hasn't started yet. So, the interview focused on what they are planning to do and why? Therefore, couldn't follow the question plan easily. Tried to ask about AEDC data and what trends they had seen with child readiness for school - limited input as new to the new role/service. In parts was more like a consumer interview of their personal experiences of telehealth. raised questions about training and best practice which seemed to generate more ideas form them rather than answers for me.

N.	no show on 4-4-24. Rescheduled for 24-4-24 Email correspondence: We do offer telehealth services, but families don't seem to take it up, post Covid I think they are over Zoom type meetings. We try to sell virtual appointments as it would give us opportunities to see the child and maternal infant interaction, however, when offered they always say no a phone call is fine thank you. About 50% of our work is done by telephone which they prefer if they can't make it into the centre or don't want a home visit. Alot of sickness in our cohort with children 0-2 of which many attend daycare or have siblings in daycare so many cancelled in-person appointments which end up being phone follow up as well. A good interview with an experienced CFHN who has recently moved from one LHD to NSLHD. provides secondary CFHN services - families seem to generally prefer in-person but can see a lot of use for TH in the future. Sense of frustration at times that TH is not used more in NSLHD. Previous experience of TH is very positive and sees as key in the future with limited resources and increasing demand for healthcare.
O.	Experienced OT, who is very pro TH., Has found a real positive using TH - parents doing the therapy at home under the coaching of the OT - more engagement when in context of own home and using own toys etc... more likely to continue exercises at home. When in the clinic parents often took more of a back seat but on TH they can't.
P.	Experienced speech pathologist. Telehealth was started out of necessity at start of COVID. Is a supporter of TH but mentioned wanting to see it continued and funded into the future. Noted that TH is expensive and hence concerns about funding and continuity. Has very much learned from experience when and how to use TH. No guidelines or specific training for speech pathology about using TH. Predominantly sees under 5-year-olds and describes how under 2s suit TH as it is really about coaching parents. 4yo are good online but 3yo are not well suited to TH. The advantage of continuity of care was mentioned multiple times. How a program of care isn't interrupted due to illness in a family or inability to get to an appointment instead switch to TH to ensure continuity was a major advantage. fears about having quotas for TH such as MoH KPIs for how much of their work is via TH. Advocate for clinician judgement preference for when to use TH - which maybe a reflection of how they self-taught when to use it during COVID. Digressed into interesting discussion about recording sessions and how could possibly use in future instead of writing out all that was discussed into a separate email - ironically, the interview transcription failed for this interview. was surprised how much was achievable online but still prefers in-person - possibly that where they are most comfortable and familiar still. Acknowledged clinical variation between clinicians due to personal or preferences or experience. Thought next generation of speech therapists are so familiar with tech/online that won't really need much training per se in TH. But that training is always helpful.
Q.	Experienced CFHN but not recently in nursing as started role as educator. Similar themes to other interviews about high use of TH in COVID and reduced to very little post-COVID in CFHN. Clear distinction between phone and video. There are some guidelines and monitoring of TH practice. Spoke about use for TH could be for initial assessments instead of phone - thought the video could help with rapport building. Sense of data saturation. Similar theme about individual clinician's comfort levels influencing TH uptake.
R.	Wonderful interview with a young and enthusiastic speech pathologist. Spoke about with humour and enthusiasm about how she loves telehealth and loves using it - about all the online games, animations, and activities she had developed during COVID to adapt her practice to online. The results she saw were comparable with in-person in terms of children reaching their goals with a couple of exceptions (lisp and shhh sounds) that took a couple more sessions online. referred to studies about stuttering and telehealth and their excellent results - but have been using this for decades not just since COVID. Her relationship with telehealth was clearly a very positive one that has led her to look at innovative ways of making TH work. Did note that this is not reflective of all clinicians, and she is perhaps an exception in her team with the level and enthusiasm she has for TH. talked about the need to 'sell' it to families. That she sells it better because of her positive experiences and tools she has developed to make it work. Needs to sell it to colleagues as well families. Does raise questions about equity if the option of telehealth is so influenced by the clinician's perspective of telehealth rather than what is best for the family best practice. Families can select on a registration form if they want to do telehealth, but her thought is that most don't really know what they are agreeing to or not so stick to what they know - her experience was to encourage early appointments online to show families the benefits, then they can make choice - more informed choice at that point.

Table 7.02: Codes & Themes Created from Thematic Analysis (Phases 2 to 5)

Initial Codes (Phase 2)	Initial Themes (Phase 3)	Reviewing Themes (Phase 4)	Named Themes (Phase 5)
COVID	Impact of COVID	Convenience	Balancing Convenience and Flexibility
After COVID	Accessibility	Impact of COVID & after effect of pandemic	(Costs of Telehealth)
Accessibility	Access to care	Advantages of telehealth	(Impact of a Pandemic)
Access to care	Advantages	Disadvantages of telehealth	
Easier to attend	Disadvantages	Environment Concerns	
Easier to be seen/get an appointment	Being at home	Financial costs & value	
Advantages	Convenience	Privacy & Confidentiality	
Disadvantages	Environment		
Comfortable	Flexibility		
Convenience	Hospital avoidance		
Costs	Financial Costs		
Environment	Costs & Value		
Flexible	Travel costs		
Not being in hospital	Lifestyle & Convenience		
At home	Positive feedback from families		
Death	Care in the home		
Income	Time		
Infection concerns	Sleep		
Feedback from families	Social care		
Hospital in the Home	School, Childcare & Work		
Lifestyle	Necessity		
Not Rushed	Window into homes		
Not Waiting	Option		
Medicare			
Travel			
Parking			

Value for Money			
Young children			
Work			
Prescriptions			
Prevent hospitalisation			
Effective			
Imaging			
Moving about			
Option/ Optional			
School			
Childcare			
Reassurance			
Respiratory			
Shown it works			
Sleep			
Social care			
Support parents			
Therapy at home			
Insight into homes			
Time			
Time Management			
Confidentiality			
Privacy			
Necessity			
Took longer			
Clinical application	Education & Training	Education & Training	Learning How Best to Use telehealth
Clinical assessments	Clinical Guidelines	Best Practice associated with telehealth	(Education, Training, Research)
Health measurements	Learning how to use	Development of telehealth services	
Patient review	Clinical assessments	Preferred Modes of Care	
Therapy	When to use telehealth	Quality & Safety	

Triage	Best Practice	Horses for courses	
Appropriate level of care	Development of Telehealth	Limitations of modalities	
High level of care	Clinical therapy		
Best practice	Review & Follow-up		
Education	Prioritise		
Can do with telehealth	Level of care		
Can't do with telehealth	Deteriorating Patient Safety		
Differences	Confidentiality & Privacy		
Learning about	Importance of relationships		
Difficult	Building rapport		
Goal of service	Child Welfare		
Guidelines	Choice		
Child Friendly	Chronic and Complex		
Chronic and Complex	Infection concerns		
Quality & Safety	Legislation		
Governance	Quality & Safety		
Legislation	Research		
Neurodivergent children	Neurodivergent children		
Deteriorating Patient Safety	Limitations		
Development of Telehealth	Vulnerable families		
New patients	Clinical Conditions		
Not all circumstances	Language barriers & interpreters		
Domestic Violence			
Child Protection			
Vulnerable			
Mental Health			
Normal practice			
Not all circumstances			
New skills			
Research			

Tips and tricks			
Interpreters			
Language barriers			
Inequity			
Purpose			
Limitations			
Emotions	Here to stay	Emotions associated with telehealth	Individual Relationships with Technology
Amazement	Digital Generation	Partnerships & Importance of Relationships	(Different in the Country)
Appreciation	Rural & Regional	Importance of in-person	Generational Differences
Excitement	Positive Emotions	New Hybrid models	(Telephone Distinct from Telehealth)
Frustration	Negative Emotions	Living in the country	(Importance of Hybrid Models)
Gratitude	Modes of care	Different Generations	(The Future of Telehealth)
Love	In-person is best	Influence of Technology	
Scared	Full telehealth - Video	Underutilised service	
Stress	Hybrid	Telephone vs telehealth	
Surprise	Telephone vs telehealth		
Trust	Natural progression		
Ad hoc	Technology		
Challenging	Experienced clinicians		
Chaotic	Different generations		
Digital Generation	Person dependant		
Future of Telehealth	Part of normal practice		
Building rapport	Isolation		
Choice	Telephone – Routine care		
Mode of care	Building Trust		
In-person	Empowering		
Full telehealth	Patient centred		
Hybrid	Equity concerns		
Telephone	Partners		
Videoconferencing	Partnership		

Experienced clinicians			
Empowering families			
Natural progression			
Change Isolation			
Long Time use			
Older generation			
Unique			
Passionate			
Inferior service			
Proportion Telehealth			
Rural			
Technology			
Met before			
Other virtual communications			
Partners			
Partnership			
Patient centred			
Patient client relationships			
Person dependant			
Prioritise			
Provider			
Young generation			

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