



FEROS CARE'S MY HEALTH CLINIC AT HOME PILOT FINAL REPORT

EVALUATION BY: **SOUTHERN CROSS UNIVERSITY**
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We wish to acknowledge the 200 seniors and their families who enthusiastically participated in the pilot.

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MHCAH Monitor Features

Clear Loudspeaker:
audio announcements guide the person through the health interview

Large Colour Display:
presents the person with clear text and visual messages.

Internet Communications:
ability to link MHCAH to the National Broadband Network

Large Touch Screen Buttons:
customised, easy to use touch screen options.

The **MHCAH** portable monitor



Blood pressure monitor



Thermometer



Weighing scales



Pulse oximeter



Blood glucose monitor

Measuring Devices

A selection of vitals measuring devices is used to assist in monitoring the client's chronic conditions and associated symptoms. The devices communicate to the MHCAH's telehealth monitor, without messy cables, using wireless technology.

■ EXECUTIVE SUMMARY

INTRODUCTION

This report details the findings of the evaluation of the Feros Care, National Broadband Network (NBN) enabled telehealth pilot of My Health Clinic at Home (MHCAH). The project was funded by the Australian Government Department of Health and Ageing (DoHA) under the National Digital Economy Strategy.

The initial target population for the pilot was residents of Coffs Harbour who have a chronic illness and access to the NBN. The pilot was subsequently expanded to residents of the Gold Coast in Queensland (QLD) and the Far North Coast of New South Wales (NSW) who did not have access to the NBN.

Coffs Harbour was selected as an appropriate pilot site because early installation of the NBN corresponded with identified population health needs. In particular, the population of Coffs Harbour has an older average age than the NSW average; a greater proportion of low household income; is home to some of the largest numbers of Indigenous Australians in NSW; and experiences a disproportionate burden of illness compared with metropolitan counterparts. However, the health workforce has not kept pace with the growth in health needs in Coffs Harbour. Consequently, the area has been classified as a District of Workforce Shortage by the DoHA.

A higher proportion of North Coast residents have reported difficulties accessing health care when needed (compared to the NSW average), reflecting a range of barriers to health care in a rapidly growing rural area. Specifically for Coffs Harbour, 15.3 per cent of respondents reported problems with access to medical facilities and services due to cost, location of health campuses and opening hours. There are few bulk-billing GPs in the Coffs Harbour Local Government Area (LGA) and long waiting periods for access to Local Health District (LHD) services. Additionally, 6.8 per cent of respondents reported difficulties accessing health information.

This pilot project explored the ability for telehealth to meet some of the health service needs of the population. In particular, MHCAH aimed to leverage the benefits of ubiquitous NBN technology to provide a virtual case management model to 200 seniors with chronic diseases and/or social isolation.

The MHCAH pilot involved the daily monitoring by clients of vital-signs which were transmitted wirelessly to a customised touchscreen tablet. The results were then uploaded to a secure database where they were observed and triaged daily by a registered nurse. Clients also had access to video conferencing (VC) which could connect them directly to telehealth nurses, their general practitioner (GP), case managers, family and friends, facilitated group meetings and other services.



AIMS AND OBJECTIVES

The aim of MHCAH was to provide a scalable platform for increasing productivity, efficiency, cost effectiveness and access to improved health and social outcomes for clients. It aimed to increase client access to health services regardless of their social or geographical isolation, transport, income, culture or service opening hours.

The project objectives were to:

- Improve access to health services
- Facilitate daily monitoring of health status
- Provide information from vital signs monitoring to help manage and improve medical decisions
- Provide early intervention
- Reduce social isolation

The MHCAH pilot was originally designed to operate solely in the Coffs Harbour LGA with clients connected to the NBN. However, following the change of government in 2013, the pilot was extended to clients outside the NBN region, using other technology platforms, including 4G and ADSL. Consequently, the project included Feros Care clients from the Gold Coast in QLD and Far North Coast of NSW using 4G internet connections.

The goals of the evaluation were to:

- Capture the extent to which the ubiquitous, high capacity, reliable connectivity of the NBN increased the benefits of access to high-quality healthcare services, and enables health services to be delivered in the home;
- Explore the productivity impacts of NBN-enabled telehealth services; and
- Describe the way that high-quality healthcare services in the home influenced the health outcomes of participants.





EVALUATION METHODOLOGY

The overall evaluation framework involved testing propositions that were based on the evaluation objectives. The evaluation objectives were to explore the extent to which MHCAH:

1. Improved access to health;
2. Impacted on daily monitoring of health conditions;
3. Improved data for GPs and other health professionals to manage and improve medical decisions;
4. Enhanced early intervention;
5. Reduced social isolation;
6. Improved health outcomes;
7. Influenced health system outcomes such as health related transport costs or number of hospitalisations/ hospitalisation rates.

And to explore:

8. The overall effectiveness of the telehealth service/s provided in the project;
9. The effectiveness of the NBN in enabling telehealth service delivery.

Multiple sources of data were used to address the objectives, specifically:

- a. Detailed activity-based audit data, including: participation data; IT service request data; number of home visits; referral statistics;

timeframes recorded for new installations; client specific demographic data; health data; interventions per client; and GP specific data.

- b. Surveys with participants, specifically: NBN Client Survey (including the Stanford Chronic Disease Self-Efficacy tool [1] and the Self-Rated Health Questionnaire [2]); NBN Friend and Family Survey; NBN Physician/GP Survey; Client Experience Questionnaire (developed from interviews with clients).
- c. Interviews with participants representing all stakeholder groups.
- d. Case studies of exemplars of specific aspects of the MHCAH pilot drawing on the data collected above.
- e. Documentary analysis of meetings and reports, such as incident reports.
- f. A 'sociogram' completed by participants at the start and finish of the evaluation to measure the level of social connectedness of the client.
- g. Literature reviews to underpin each of the propositions.

RESULTS

PARTICIPANTS

Two-hundred clients were enrolled in the trial of MHCAH between 1 April 2013 and 30 June 2014. Of these participants, 181 were included in this longitudinal evaluation (the remainder were excluded as they were not recruited until late in the trial period). The majority of clients were connected to the NBN and recruited from Coffs Harbour / Sawtell region (n = 139). (See Table I)

Clients ranged in age from 49-93 years (mean 74.4, SD 7.816). The majority were female (57%), lived with their partner or family (63%), were non-indigenous (88%), and

spoke English as a first language (97%). The single most commonly reported chronic condition was high blood pressure (56%) followed by heart problems (33%). Clients reported up to six different health conditions, with the majority of clients (30%) reporting two health conditions.

During the intervention period, clients performed a total of 32,540 vital sign readings and participated in 4,888 video conferences.

Table I: Age and chronic disease characteristics of participants

participants

AGE CATEGORY	NO CLIENTS	DIABETES	COPD	ASTHMA	HEART PROBLEMS	HIGH BP	LOW BP	CHF	CANCER	PAIN
<60	6	2	4	1	0	1	0	2	1	1
61 - 70	56	12	10	4	18	38	2	2	4	1
71-80	88	30	21	12	29	48	3	9	9	2
81-90	44	12	13	6	11	14	3	4	6	1
>90	5	1	1	0	1	4	0	1	0	0
Total	199	57	49	23	59	105	8	18	20	5

REFERRAL SOURCES

Due to the very tight timeframe for the pilot and the limited geographic coverage of the NBN, trial participants were recruited directly from the Coffs Harbour senior community rather than through traditional referral sources such as hospital, health professionals and GP's.

Consequently, the majority of referrals to the pilot were from client self-referral (64%). Other referral sources

included Feros Care (12%), GP's (8%), community-based health services (10%), family and friends (5%) and other agencies.

Hence, the participants did not necessarily reflect the ideal target group for the pilot (i.e. participants at high risk of hospitalisation due to their chronic condition).

OUTCOMES OF PARTICIPATING IN MHCAH

From the Client Experience Questionnaire, the most common reason clients gave for choosing to participate in MHCAH was to monitor their own health (68%). In particular, clients participated in the pilot to:

- help them identify problems before they became serious **65%**

- facilitate better self-management of their health **58%**

- have better information about their health **52%**

These goals were largely achieved with equal numbers of participants (48%) reporting that they better managed their own health and had better information about their health as a result of participating in the MHCAH trial.

Overall, trial participants experienced an improvement in their self-rated general health (mean improvement 0.300, SD= 0.80, 95% CI 0.16 – 0.44, 119 df, p=0.000), with more participants reporting their health as “excellent” or “very good” at the end of the trial compared to the beginning.

Participants also experienced an improvement in their levels of self-efficacy for managing their chronic disease, as measured by the Stanford Patient Education Research Centre “Self-Efficacy for Managing Chronic Disease 6-item scale” (p=0.045).

Other benefits of participating in the trial included the clients’ perception that they:

- Had better information to help the doctor with the ongoing management of their health condition **44%**

- Had greater confidence discussing health issues with their doctor **25%**

- Worried less about their health **31%**

- Liked being monitored and knowing that someone was keeping an eye on them **51%**

- Had a better understanding of vital sign monitoring **48%**

- Went out more **15%**

- Changed (increased, decreased or otherwise altered) medication **17%**

- Increased physical activity **33%**

- Made positive dietary changes (better understood the impact of diet on health) **34%**

- Ate more fruit and vegetables **28%**

- Drank more water **39%**

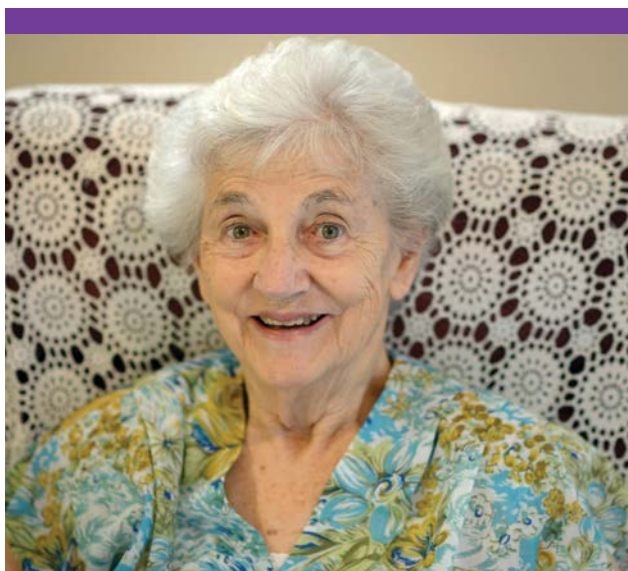
HEALTH SERVICE USE

Changes to health service use were based on client self-report collected from two sources: surveys administered before and after the pilot and the Client Experience Questionnaire. Over the duration of the trial, clients reported:

- Fewer visits to the doctor (24% of clients), which was supported by the comparative data at baseline and discharge ($p < 0.001$);
- Fewer visits to the emergency department at the local hospital ($p = 0.021$)

- Fewer non-local hospital admissions ($p < 0.001$) compared with the preceding year.
- No statistically significant reduction in local hospital admissions ($p = 0.171$).

Detailed anecdotal data captured by the Telehealth Registered Nurses (THRN) activity log identified 19 clients who may have avoided hospital admission; six clients whose length of hospital stay may have been reduced; and 53 clients who changed their medication as a result of their participation in MHCAH.



CLIENT USE OF TECHNOLOGY

Few participants reported any difficulties with the MHCAH technology in the Client Experience Questionnaire. Nearly two thirds of all participants described themselves as unconfident (35%) or moderately confident (27%) computer users prior to engaging in the trial. One third (34%) reported that participating in MHCAH increased their confidence using a computer; one-fifth (23%) were more confident using video-conferencing; and 7 per cent started to use a computer for other purposes as a result of participating in the trial.

More than half of all clients (52%) expressed a willingness to video conference with their doctor. They were also prepared to video conference with their specialist (37%) and pharmacist (37%), however the opportunities to connect with these practitioners during the trial was restricted due to limited practitioner engagement.

During the trial, 1,061 technical incidents were reported. The most common incident was missed client interviews ($n = 964$), followed by service level breaches ($n = 64$) and failed video conferences ($n = 33$). Equipment fault was the most common cause of incidents ($n = 474$), followed by client error ($n = 177$). Internet faults accounted for a small number of all faults (NBN fault $n = 75$ and 4G fault $n = 72$), the majority of which were installation faults.



Simple touch screen user interface initiates a video call at one press of a button/icon





SERVICE PROVIDER ENGAGEMENT

Regional engagement of health service providers was difficult to achieve, particularly GP support. Only one GP and seven case managers from the Local Health District (LHD) participated in the study. Interview and survey data suggested that barriers to participation included lack of interest due to the short timeframe for the pilot, financial barriers, and difficulties fitting the technology into the daily routine of the clinic.

Lack of service provider engagement limited the ability of clients to use MHCAH to its full potential because of a lack of opportunities to use video-conferencing with a range of providers. It also limited the ability of the pilot to specifically target those seniors most at risk of hospitalisation. This, in turn reduced the ability of the trial to fully demonstrate the effect of MHCAH on those clients who would most benefit.

The service providers who did engage with MHCAH could see the potential for the use of telehealth. In particular, they

perceived that it could reduce the amount of travel required by the client and/or the service provider. They reported that video-conferencing provided a realistic window into the client's life, allowing practitioners to observe behaviours that may not be displayed during a face-to-face visit and would not be observable by telephone. However, the practitioners acknowledged that different processes and protocols would be required to engage with clients using video-conferencing. In particular, they acknowledged the need to use headphones and ensure visual privacy.

Practitioners perceived that good change management and leadership was required to implement the use of telehealth to fully realise the benefits. They also acknowledged that the service users were more at ease with the technology than the service providers.

IMPACT ON SOCIAL CONNECTEDNESS

Feros Care implemented a range of strategies to increase client engagement with video-conferencing and to showcase the benefits and potential of the NBN. Video-conferencing interventions included one-to-one contact with the THRN, GP, LHD or Care Manager; Skype connections to family and friends; a chat club; and structured group health literacy sessions. Overall, client

satisfaction with their level of communication improved across all participants ($p=0.000$), irrespective of whether they used video-conferencing to communicate or not. This may be due to the social support that is implicit in the ongoing surveillance by the THRN through the vital sign monitoring, and/or the easy, 'one-touch' access to a telehealth nurse at any time.

PRICING AND SUSTAINABILITY

The majority of clients (48%) said they were happy to finish using MHCAH at the completion of the trial because their health was stable. One third (34%) said they would like to continue to use the technology indefinitely, and a smaller proportion (9%) would like to continue using the technology for a short period of time to address a specific health need. The package of delivery preferred by clients incorporated: support from a THRN during business hours; technical support during business hours; daily vital sign monitoring; and video-conferencing (either facilitated or to access a range of services). However, the majority of clients (57%) said they would not have the service if they had to pay for it. Only one third (31%) of clients were prepared to pay up to \$10 per week, and 10% would pay up to \$20 per week.

At the time of preparing this report, the true cost of delivery of MHCAH, including overheads, was \$111.76 per week or \$15.97 per day per client (\$85.97 per week or \$12.28 per day, excluding overheads).

The pilot identified substantial potential to increase service efficiency through the use of telehealth. The efficiency of the THRN increased as the number of clients recruited to MHCAH increased. The first seven clients required an average of 20 minutes of THRN time per client, per day. However, when the service capacity reached 100 clients, the THRN provided, on average, 1.6 minutes per client per day for

all triage, assessment and treatment requirements. After this, the amount of THRN input remained approximately constant as the number of clients increased. In contrast, current Feros Care community case managers who undertake home visits are only able to see an average of four clients per day, and spend approximately 25 per cent of their time travelling. A model of case management that combines telehealth with home visits has the potential to improve efficiency by increasing the number of clients that can be case managed by each provider.



NBN PERFORMANCE

Throughout the pilot we were able to compare the performance of NBN, 4G and ADSL2 accessibility and internet connection speeds on the implementation of MHCAH. Of the 200 participants, 148 were connected via “fibre to the door”, the remainder were 4G connections. The rollout of the NBN connection to homes was slow, particularly for multi-dwelling units, delaying recruitment in many cases. However, once the NBN was available in an area, it was easily connected. There were no failed video conferences due to connectivity and data transfer was consistent, high quality and reliable across all premises. Typical average download speed was 20 to 25 Mbps, typical average upload 4 to 5 Mbps using a 25 Mbps/5 Mbps plan.

4G internet connectivity was not as reliable as NBN. The signal strength was inconsistent, resulting in unexplainable dropouts during video conferences, although reconnection was possible. Speeds dropped at certain times of the day in some areas. 4G coverage and accessibility was available throughout the majority of the project area. Speed testing showed greater variability depending on the area. Typical download speed ranged between 2 to 19 Mbps and upload speeds were between 1 to 4 Mbps.

ADSL2 connections had additional connection and installation costs and up to a six week wait for installation. Service providers required a minimum connection period for ADSL2 connections which made this option prohibitive for the pilot period. 4G and NBN were more cost effective than ADSL2 due to the way the services were packaged.





CONCLUSIONS

This was a longitudinal study, without a control group so our ability to draw causal links was limited. However, the findings showed that MHCAH was easy for clients to use, with low incident rates. Despite the older age of the clients, and their varying levels of technological experience and literacy, there were very few barriers to the uptake of the technology. MHCAH gave clients a sense of security and better information to manage their own health and facilitated communication with their health practitioners. Consequently, clients were more empowered and had a better understanding of their health conditions. However, the opportunities to exploit the benefits of MHCAH were not fully realised because of the lack of services to which clients could be referred. There is potential for models like MHCAH to drive client-centred models of care and self-management which enable them to broker direct contact with other service providers. However, for this to happen there is a need for new models of engagement with health practitioners.

The data suggest that the use of MHCAH reduced the frequency of visits to GPs, hospitals and emergency departments, and while this is difficult to quantify accurately, the high quality clinical notes and anecdotal feedback highlighted several areas in which early interventions may have averted a more serious consequence later on. The findings suggest that the reasons for these effects were multifaceted, but can be brought back to two key mechanisms. Firstly, client self-monitoring of their vital signs led to better understanding of their health conditions, resulting in

positive behaviour changes which improved their health outcomes. The second mechanism was the external monitoring (surveillance) of clients by the THRN which resulted in early intervention when a potential health problem was identified. This was likely to have reduced more serious consequences resulting from a delayed intervention. There was also a likely interaction between the self-monitoring and external surveillance, resulting in reinforcement of client self-monitoring behaviour, and a perception of social support for the clients. Further research is required to test these assumptions.

The current pricing of MHCAH is a barrier for broader deployment to the community care and private market. The recurrent costs of telehealth seem high; however these need to be examined in the context of the potential to keep seniors independent in their own home, reduce hospital admissions, and increase workforce efficiencies. Further modelling is required to determine the appropriate mixture of face-to-face and telehealth interventions for particular client needs to achieve optimum outputs for the client and the service. There is an optimal level of service capacity above which new efficiencies cannot be achieved. However once the service has achieved the optimal level of efficiency, there is enormous capacity for service delivery and triage.

The true benefits of telehealth will not be achieved without the engagement of GPs and/or other health service personnel. This is going to require a move from short term pilot models to a whole-of-industry transformation to integrate technology-based service models with policy, financial incentives and infrastructure to support telehealth service provision.

RECOMMENDATIONS

RECOMMENDATION 1:

That telehealth services become embedded as a mainstream component of service delivery to community dwelling older people. This would involve changes to current Health Care and Aged Care funding models, guidelines and service models to ensure telehealth and emerging technologies are considered a standard service option available to clients and patients in all community care programs (e.g. for all Home Support, Care Packages, Hospital in the Home, Chronic Disease Management, Early Discharge, Palliative Care, Transitional Care and ComPacks programs). This would enable telehealth to be more widely available to many senior Australians and those requiring care and support, and to reorientate service providers to ensure that technology is seen as an approved intervention and a fundamental approach to care delivery, not an “add on”.

RECOMMENDATION 2:

That the NBN “fibre to the door” is made widely available to the home. This study demonstrated that for telehealth to be effective, it needs to be delivered using a stable, high-speed internet platform to the home. With almost 5000 video calls delivered during the pilot, the NBN was the only uniformly reliable platform for the delivery of telehealth across this pilot. New innovations and the constantly increasing demand on capacity are likely to put further pressure on the ways that people connect to the internet. Fibre to the door will “future proof” the ability to provide high speed broadband that will keep up with the advancement in technology.

RECOMMENDATION 3:

The introduction of new Medicare Benefit Schedule (MBS) items for secure video-conferencing for client-to-GP, client-to-allied health and group video-conferencing to facilitate integrated telehealth service models. This will enable service providers to deliver responsive and timely health care “virtual” consultations to clients in their own home. It will also provide access to GPs and allied health support for housebound and palliating clients in the

community. A sustainable funding model will be the key driver for GP’s to seriously consider the adoption of Telehealth.

RECOMMENDATION 4:

The provision of funding support for clients to access telehealth services. This, and other studies, indicate that telehealth has the potential to reduce GP and hospital use. However, there are ongoing costs associated with delivering and supporting telehealth, and clients have demonstrated a low willingness or ability to pay for the services. The potential cost savings for health services mean that it is likely to be cost effective to subsidise telehealth services for the client, however further research will be required to establish this.

RECOMMENDATION 5:

Widespread change management strategies developed to support the uptake of telehealth by GPs and other service providers. This is likely to include changes to professional training and organisational support to implement the culture change required to introduce telehealth services to service providers. The clients demonstrated high willingness and adaptability to the NBN enabled technologies, suggesting that uptake of telehealth interventions will not be limited by service user capability.

RECOMMENDATION 6:

The introduction of a national policy agenda to drive a more co-ordinated and strategic approach to the research, funding and deployment of telehealth and emerging smart and digital technologies in health and aged care delivery. In particular, these should support new service delivery models; using technologies in the areas of security and safety (telecare smart homes, communication, social support); diagnosis and treatment (telehealth, nanomedicine) and assistive technologies (mobility systems, biorobotics etc). This includes key policy statements on enabling technologies in National Reform agendas.



RECOMMENDATION 7:

The establishment of “Demonstrator Services/Sites” which are funded to build awareness and capability of the use of telehealth and emerging technologies in health and aged care delivery models. These service demonstrators would build the knowledge, awareness, capacity and capability of aged care and health providers on the application and benefits of telehealth, smart and digital technologies.

RECOMMENDATION 8:

Research into the cost-benefit of telehealth provision for different stakeholders. Service users, providers and health care funders all stand to benefit from the introduction of telehealth. However, under existing funding models, the costs of telehealth are likely to be borne largely by the service user. A greater understanding of the cost-benefit of different models of telehealth to different stakeholders will support the more equitable allocation of resources to support the implementation of telehealth for those most likely to benefit from its introduction.

LIST OF ABBREVIATIONS

NBN	National Broadband Network
THRN	Telehealth registered nurse
GP	General practitioner
MHCAH	My Health Clinic at Home
Mbps	Mega-bits per second
DoH / DoHA	Department of Health
TCMS	Telehealth Client Management System
RSP	Retail Service Provider
LHD	Local Health District
VC	Video conference



1. INTRODUCTION

Telehealth, telecare and telerehabilitation interventions are increasingly popular in Australia [3, 4] to help address the needs of ageing and dispersed populations, reduce healthcare costs and enhance independence. Several high profile projects have taken place using telehealth interventions internationally [5-7]. The rollout of the Australian National Broadband Network (NBN) provided an ideal opportunity to pilot telehealth technology as a way to keep older people independent in their own homes longer [7], and with the potential to reduce emergency admissions to hospital [5].

FerosCare is a community-owned, not-for-profit organisation which has been offering quality care and lifestyle support for older Australians since 1990. Feros Care's mission is to be an ambassador and partner in the lives of seniors, with a focus on creating a range of lifestyle options that support independence, social connectedness and healthy ageing. Feros Care provides a range of residential and in-home services for seniors.

To support their mission, Feros Care developed a virtual case management model, My Health Clinic at Home (MHCAH), designed to support seniors who have chronic conditions, are socially isolated and/or have limited access to adequate health support services due to remoteness. Based on the MHCAH model, Feros Care was a successful applicant for funding under the National Broadband Network Enabled Telehealth Pilot, introduced by the Australian Government Department of Health and Ageing (DoHA) in 2012. The purpose of the pilot was to demonstrate the innovative use of NBN enabled telehealth technologies in keeping seniors linked and connected remotely to their health professionals, community support, families and friends, with daily monitoring of their condition and wellbeing from their own home.

The vision of the MHCAH pilot program was to showcase the use and demonstrate the benefits of how NBN and telehealth can offer a complementary virtual health service model for seniors. Specifically, the MHCAH pilot aimed to:

- Provide a virtual case management model that would assist key stakeholders to remotely support seniors at home; and



- Demonstrate the innovative use of the NBN enabled telehealth technologies to keep clients easily linked and connected remotely to their health professionals, community support, family and friends, with daily monitoring of their condition and wellbeing in their own home.

The project **objectives** were to:

- **Improve access to health services** – Providing timely and efficient access for general practitioners (GPs), case managers, allied health personnel and other health professionals, through virtual consultations with seniors in their homes.
- **Facilitate daily monitoring of health conditions** – Assisting seniors to successfully better manage their condition(s) by daily remote vital signs monitoring and personalised support remotely by a THRN.
- **Improve data** – Providing extensive trending data of vital signs over a continuous period for GPs and other health professionals to manage and improve medical decisions.
- **Enable early intervention** – Facilitating early detection of changes in health condition, enabling early intervention and triage, thereby reducing avoidable hospital admissions.
- **Reduce social isolation** – Assisting seniors to build and maintain regular support networks of family and friends, whilst providing socialisation opportunities to reduce isolation and improve support structures.

The scope of the MHCAH pilot was limited to 200 clients, recruited from the 1 April 2013 until 30 June 2014. The MHCAH pilot was originally designed to operate solely in the Coffs Harbour LGA with clients connected to the NBN. However, following the change of government in 2013, the scope of the pilot extended to clients outside the NBN region, using other technology platforms, such as 4G. Consequently, the project included Feros Care clients from the Gold Coast, QLD and Far North Coast of NSW using 4G internet connections.



feros care
lifelink telehealthcare

A free service to “help put you back in the driver’s seat of your health” care.
NBN Enabled Telehealth Pilot

**My Health Clinic
at home**

**National
Broadband
Network**

1.1 BACKGROUND AND CONTEXT

The MHCAH pilot using the NBN aimed to address these five critical trends affecting the provision of health care nationally, which were particularly amplified at the selected trial site of Coffs Harbour:

- Increased demands on health services from an ageing population.
- Increased incidence of chronic disease.
- Health impacts of social isolation.
- Ease of access to health services.
- Viable GP workforce.

1.1.1 CHRONIC DISEASE MANAGEMENT

The Hon Mark Butler MP's address at the 2011 Primary Health Care Research Conference in Brisbane clearly stated the priority that government must place on chronic disease. "...the burden of disease has altered significantly. Chronic diseases and mental health have replaced acute infectious diseases and acute vascular events as the leading cause of morbidity and mortality" (Mark Butler MP, Speech 2011 Primary Health Care Research Conference, 13 Jul 2011, Pg. 3). Not only is the incidence of chronic disease increasing, but a large number of people suffer from more than one chronic health condition at the same time [8]. In the population aged over 65, 80 per cent have at least three chronic conditions [9]; 88 per cent take at least one prescription medication, and polypharmacy is common [9]. Chronic health conditions significantly impact on a person's quality of life and consume a large proportion of health and social care resources [10]. Increasing rates of chronic disease will place greater pressure on health expenditure as well as reduce future labour participation rates and productivity, thereby affecting economic growth.

1.1.2 THE COFFS HARBOUR LOCAL GOVERNMENT AREA (LGA) CONTEXT

Coffs Harbour is a regional centre on the Mid North Coast of NSW with a population of 73,296 people. The population grew by approximately 14 per cent following the 2001 ABS Census, without a concomitant increase in the health workforce. Consequently, the region was classified by DoHA as a District of Workforce Shortage

(2010). Workforce shortages mean the community experiences difficulties accessing primary care services, which contributes to health inequalities.

The Mid North Coast Local Health District (MNCLHD), of which Coffs Harbour is the major urban centre, has a total population of 217,013. This is projected to increase by 10 per cent (to 239,745) by 2020. During this time, the population aged between 65-85 years is projected to increase from 48,178 to 62,671 (23%). The MNCLHD has the highest proportion of low household incomes of all rural LHDs in Australia, with 36.9 per cent of the population having a household income of less than \$600 per week. Areas of excess health risk in the region include hospitalisation for alcohol-related conditions (948.9 vs 794 per 100,000 in MNCLHD vs NSW state average for males); less physical activity and a higher proportion of people who are overweight or obese (see Table 1). Coffs Harbour is also one of the largest centres of Indigenous Australians' usual residence, after Sydney and Brisbane [11]. In the 2011 ABS Census data, 4.5 per cent of the Coffs Harbour LGA population self-identified as Indigenous. [11]

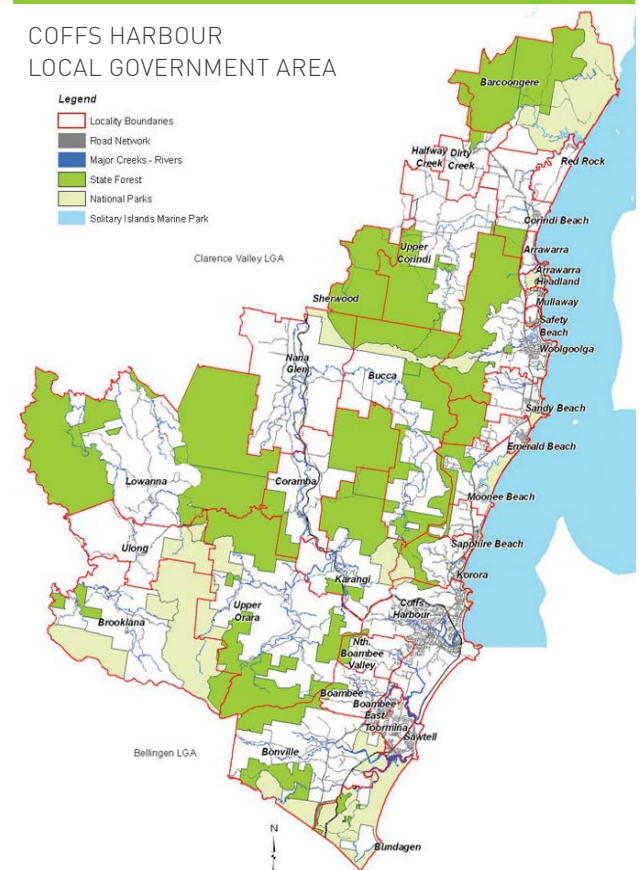


Table 1: Key health Indicators – A comparison of Mid North Coast NSW with the NSW State average

KEY HEALTH INDICATORS	MID NORTH COAST	NSW STATE
Current smoking, persons aged 16 yrs and over (2011) ^[12] • those who smoked daily or occasionally	18.2%	16.0%
Alcohol consumption at levels posing lifetime risk to health, persons aged 16 yrs and over (2011) ^[12]	32.4%	29.0%
Alcohol attributable hospitalisations (2011-12). Rate per 100,000 ^[12]	948.9 (males) 538.6 (females)	794.0 (males) 534.0 (females)
Harmful use of alcohol. (NSW Public Health survey 2010) ^[13]	44.1 % (males) 21.0 % (females)	NSW State 40.2 % (males) 19.9 % (females) NSW Rural/ Regional 42.0 % (males) 22.3 % (females)
% of adults who do not have adequate Physical Activity (150 minutes /week over 5 separate occasions) (2010) ^[13]	35.1 % (males) 49.1 % (females)	NSW State 40.0 % (males) 49.3 % (females) NSW Rural/ Regional 41.6 % (males) 51.1 % (females)
Overweight or Obese, persons aged 16 yrs and over (2011) ^[12]	55.8%	51.7%
Diabetes or high blood glucose, persons aged 16 yrs and over (2011) ^[12]	9.6%	7.9%
Cardiovascular Disease deaths, persons aged 25-74 yrs (2006-7). Rate per 100,000 ^[12]	116.9 % (males) 49.5 % (females)	110.3 % (males) 48.9 % (females)
High or very high psychological distress, persons aged 16yrs and over (2011) ^[12]	10.4%	10.4%
Intentional self-harm hospitalisations, All ages (2011-2012). Rate per 100,000 ^[12]	174.1 % (males) 265.7 % (females)	101.1 % (males) 154.5 % (females)



Feros Care held workshops in Coffs Harbour for stakeholders who were involved in the Pilot.

The health service needs of the Coffs Harbour population are exacerbated by: people living in remote and rural locations; the high proportion of low income households; the large proportion of the population on disability/sickness and unemployment benefits, all of which present particular clinical and service delivery challenges to the GPs working in the region. For example, the hospital admission rate of potentially avoidable admissions for Indigenous residents was 2.7 times higher than the rate for non-Indigenous residents (a group which exemplifies the issues listed above). A higher proportion of Mid North Coast residents (27%) report difficulties accessing health care when needed (compared to NSW average 18%), reflecting a range of barriers to health care in a rapidly growing rural area [14]. Specifically for Coffs Harbour, 15.3 per cent of respondents reported problems with access to medical facilities and services due to cost, location of health campuses and opening hours. There are few bulk-billing GPs in the Coffs Harbour LGA and long waiting periods for access to LHD services [14]. Additionally 6.8 per cent of respondents reported difficulties accessing health information.

The limited supply in the health workforce compounds the population demographics, high chronic disease rates and physical access to health services. Over 60 per cent of the GPs in the Mid North Coast region of NSW are aged 46 years or over. The relatively static workforce level and ageing GP workforce has serious implications for succession planning and retaining a viable GP workforce. These issues are relevant to much of regional, rural and remote Australia.

In summary, there is a compelling need in the Coffs Harbour LGA to improve health outcomes in the context of limited resources and a rapidly increasing need, or in other words, to

do more with less. One solution is to leverage technology. The MHCAH pilot aimed to leverage the benefits of ubiquitous NBN technology to provide a virtual case management model to 200 seniors with chronic diseases and/or social isolation.

This trial will determine the extent to which the NBN and MHCAH technology can provide a scalable platform for increased productivity, efficiency, cost effectiveness and access to improve health and social outcomes for residents.

1.1.3. STRUCTURE OF THIS REPORT

This report aims to present a complete picture of the experience of Feros Care in the implementation of the NBN enabled telehealth pilot of MHCAH. Therefore we have included the details of the technology, experiences of the service users and providers and an analysis of costs. To achieve this end, the report is structured as follows:

- **Section 2** describes the MHCAH technology and establishes the context for the project.
- **Section 3** describes the evaluation approach and presents the propositions addressed by the evaluation which reflect the initial project objectives.
- **Section 4** presents a review of the published literature which is structured to address the evaluation propositions.
- **Section 5** describes the results of the evaluation. The results are synthesised in a way that aim to most easily support the implementation of other telehealth interventions, and are based around the processes of recruitment, client outcomes, scaling and sustainability and learning (what was done well and what could be improved).
- **Section 6** presents the discussion, which addresses the evaluation propositions, reflecting on the strengths and limitations of the approach and the evaluation methodology.
- **Section 7** presents the project conclusions.
- **Section 8** discusses the recommendations of the project.

2. MY HEALTH CLINIC AT HOME TECHNOLOGY OVERVIEW

2.1 FEROS CARE'S MY HEALTH CLINIC AT HOME (MHCAH) HARDWARE

All clients recruited to the study were provided with and trained in the use of My Health Clinic At Home (MHCAH). This consisted of a tablet or all-in-one computer fitted with high definition 720p cameras for video conferencing. Customised patient care peripherals were attached to these devices using short-wavelength radio transmissions (Bluetooth over 2400-2480MHz frequency).

The peripheral devices included one or more of the following:

- blood pressure monitor
- pulse oximeter
- glucometer
- thermometer
- weight scales

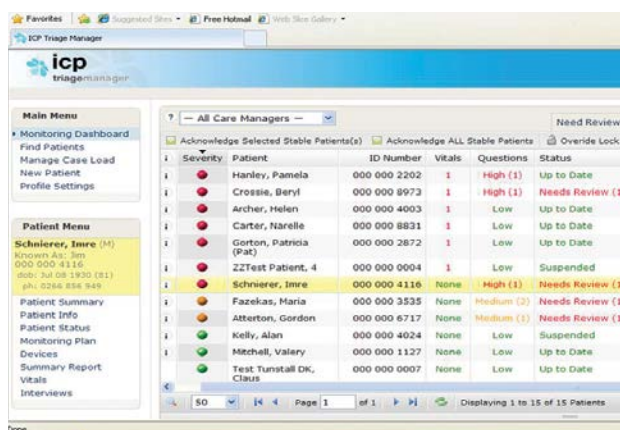
Feros Care connected a Wi-Fi router to the network termination device to deliver wireless internet connectivity to the home using 802.11n working on both 2.4GHz and 5GHz frequencies.

2.2 MHCAH SOFTWARE

The hardware described above interacted with desktop software to monitor client vital signs and wellbeing using a routine client 'interview' (usually daily).

The interview consisted of a prompted script directing the client to take their vital signs, and respond to a set of 'wellbeing' questions. The client interview was then uploaded to a secure database for triage by Feros Care's THRN, using the ICP Triage Manager™ software where a traffic light (green/amber/red) array expedited client triage.

Figure 1: ICP Triage Manager™ software



Some of the peripheral devices used as part of MHCAH



Telehealth RN video conferencing a client

2.3 USER INTERFACE

The MHCAH pilot used a personalised tablet displaying at least three large, touch-screen icons for easy access to applications specifically; “My Vitals”, easy single touch video calling to “Telehealth RN” and “help” to call the technical support team. Additional customised icons could be added to call other stakeholders including family, friends and case manager. The tablet was personalised by the onsite installer or remote IT staff to accommodate the client’s needs, such as different vital monitoring setups or helping clients to video conference their family members or access health education sessions; adjust volume control; or install a larger unit for vision impaired clients.

The desktop environment was left in a frozen state, meaning that the end users could not change or configure the MHCAH themselves. Only authorised Feros Care staff could reconfigure the device. The MHCAH was secured with anti-virus and firewalling to enable secure access to the NBN and the internet. Remote IT help was enabled on the MHCAH pilot to provide training and any IT support that the end user may need.

2.4 INFRASTRUCTURE AND INTEROPERABILITY

Secure video-conferencing (VC) platform:

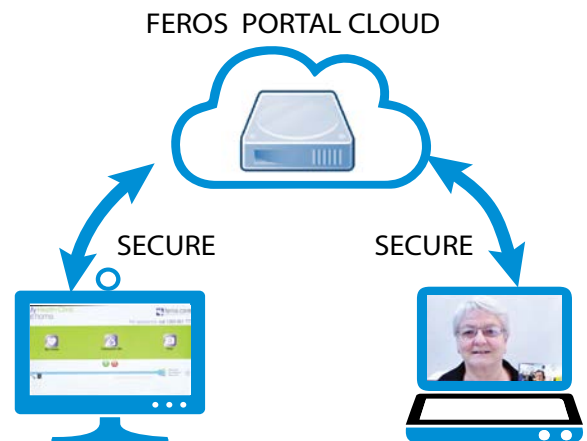
Lifesize®ClearSea™ was used to deliver high definition (HD) clinical consultations with clients. Feros Care’s VC adheres to interoperability standards such as H.323 and SIP for interfacing with other providers VC units. Desktop software is compliant with Windows/Mac/IOS/Android.

Feros Care’s bridging unit is housed in a secure datacentre located in the southern Brisbane area, offering a dedicated high bandwidth connection to the internet. The datacentre is environmentally monitored and staffed 24 hours a day.

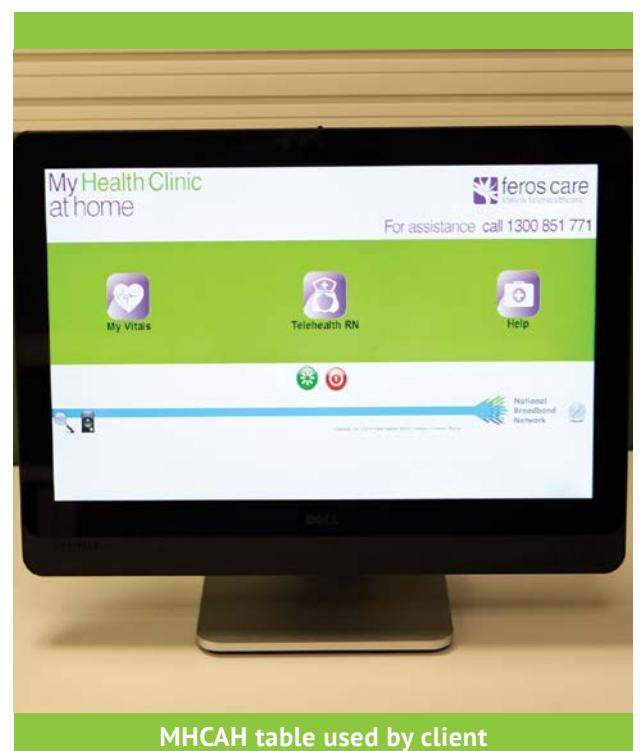
VC with family and/or friends was made available through public accessed VC solutions and was not centrally controlled through Feros Care’s secure infrastructure. This solution was compliant with all common operating environments.

Access to the ICP Triage Manager™ website for monitoring of client vitals was via a secure 2048-bit

SSL encrypted connection. This connection is secured and enforced by strong password policies. Access to client records on the triage monitoring server was restricted to bona-fide clinicians.



Client records were stored in Feros Care’s client management database, The Care Manager™ (TCM), and are compliant with PCI SSC Data Security Standards. TCM is housed in Feros Care’s secure private cloud running common technologies such as Windows server and Microsoft SQL services.



MHCAH table used by client

2.5 SUPPORT

Technical installation and support involved a combination of onsite and remote support. The client’s central point of contact was via Feros Care’s Community Gateway in Coolangatta which provides 24/7, 365 day/year access for clients, families, staff and all other key stakeholders through a centralised 1300 number.

2.6 FEROS CARE SUPPLIED EQUIPMENT

Samsung Slate XE-700T1A-A03AU Tablet



Nonin Onyx 11 Pulse Oximeter



Taidoc TD-1261 Thermometer



AND UC-321PBT Weight Scales



Omron 708-BT Blood Pressure Monitor



Myglucohealth MGH-BT1 Glucometer



2.7 NBN AND RSP SUPPLIED EQUIPMENT

Network termination device



Premises connection device



NBN battery backup AND UC-321PBT



Fibre internal wall connector



Cisco Linksys EA2700 router



Telstra WI-FI Netgear 4G advanced router



2.8 VIDEO-CONFERENCING

A range of approaches were introduced during the trial to increase service user engagement with video-conferencing. These included:

1. Connection to the THRN using video-conferencing.
2. Virtual consultations with GPs and case managers from three different organisations (Local Health District, Community Options and Feros Care).
3. Introduction of a 'chat club': an informal session, facilitated by a local media personality (Mick O'Regan) and made available to clients via video conference in morning and afternoon sessions. The sessions incorporated different themes and invited guests. For instance, one of the sessions was *Margaret Fisher: Fit and fabulous at 83*. Margaret Fisher is a tennis champion, who has had a career in education and politics. Other sessions explored sporting heroes and comparisons between the past and present.
4. Specialist telehealth sessions: Feros Care invited a range of health professionals, including a pharmacist, physiotherapist and nutritionist to talk to clients about their health and medication use.
5. Telehealth literacy sessions: facilitated by PhD student, Annie Banbury as part of her PhD, the telehealth literacy sessions involved a series of workshops facilitated via video-conferencing, with groups of participants (up to 7 connected at one time) with an emphasis on enhancing health literacy and self-management skills.
6. A *Virtual Bingo* event which was video conferenced to three residential villages and clients participating in the pilot.
7. Introduction of a telehealth 'help' button onto the client's computers so that clients could press a single button and connect via video conference to a member of the Feros Care team.



3. EVALUATION METHOD

In February 2013, Southern Cross University was engaged to evaluate the MHCAH project. The overall purpose of the evaluation was to explore:

- the extent to which the ubiquitous, high capacity, reliable connectivity of the NBN increased the benefits of access to high-quality healthcare services, and enabled health services to be delivered in the home, the productivity impacts of NBN-enabled telehealth services, and
- the extent to which access to high-quality healthcare services in the home has improved the health outcomes of participants.



Annie Banbury & Prof Susan Nancarrow
Southern Cross University

3.1 OBJECTIVES

The evaluation objectives were derived directly from the tender document and have been re-stated as propositions as outlined in column 2 (Table 2).

Table 2: Objectives and Propositions of the Evaluation

OBJECTIVES (DERIVED FROM THE FINAL REPORT)	PROPOSITIONS
<p>1. Improved access to health services – Providing timely and efficient access to GPs, Case Managers, Allied Health personnel and other health professionals, through virtual consultations in the seniors’ homes.</p>	<p>P1. Telehealth increases access to health care staff for seniors by providing a home based communication portal linked directly to a pre-determined range of health professions.</p>
<p>2. Daily monitoring – Assisting seniors to successfully self-manage their condition/s by daily remote vital signs monitoring and personalised support remotely by a THRN.</p>	<p>P2. Seniors will be able to use the telehealth technology, on a daily basis, to monitor their vital signs with the support of a THRN.</p>
<p>3. Improved data – Provide extensive trending data of vital signs over a continuous period for GPs and other health professionals to manage and improve medical decisions.</p>	<p>P3. Access to telehealth in the home provides the potential for continuous and regular data arising from the monitoring of vital signs which can be used to improve medical decision making.</p>


OBJECTIVES (DERIVED FROM THE FINAL REPORT)	PROPOSITIONS
4. Early intervention – Early detection of changes in health condition, facilitating early intervention and triage thereby reducing avoidable hospital admissions.	P4. Having access to regular, ongoing data from vital signs monitoring provides a trigger for early intervention which can reduce the likelihood of emergency sequelae.
5. Reduced social isolation – Assisting seniors to build and maintain regular support networks of family and friends, whilst also providing socialisation opportunities to reduce isolation and improve support structures.	P5. Seniors trained to use video-conferencing technology will use the technology to build or reinforce social networks.
6. Whether health outcomes were improved for patients involved in the project.	<p>P6. Access to telehealth improves health outcomes by:</p> <ul style="list-style-type: none"> - increasing overall wellbeing by reducing social isolation - increasing accessibility to health services - empowering people to take control of their disease/condition
[Whether access to health services was increased (see Objective 1)] .	Addressed in objective 1
7. Health system outcomes such as any reduction in health related transport costs or number of hospitalisations/hospitalisation rates.	P7. Access to telehealth reduces health system costs by reducing unexpected or unanticipated hospital admissions through early identification of risks; and reduces transport costs due to the ability to receive health care at home.
8. The overall effectiveness of the telehealth service/s provided in the project.	Formative, no proposition
9. The effectiveness of the NBN in enabling telehealth service delivery.	P9. Access to high speed broadband increases the opportunities for access to technology that would not otherwise be available.
10. Any barriers, real or perceived, to the uptake of the Service, including ways in which these were overcome or could be overcome.	Formative questions - no proposition
11. Any other lessons learnt or recommendations for future implementation.	Formative question - no proposition
12. Any other significant findings of the Project.	Formative question - no proposition


3.2 METHODS

A recent discussion paper, ‘Measuring the success of telehealth interventions’, suggests that high quality randomised controlled trials (RCTs) are needed to address several of the policy related questions pertaining to the benefits of telehealth [15]. However, the majority of RCTs are small, and challenged by pragmatic variations within the study setting, such as variations in installation procedures, staffing, context in which the technology is applied, and organisational interactions. In the majority of situations, these variables cannot be controlled, and so a more pragmatic, descriptive evaluation design is likely to be more appropriate. One approach that is able to take the variations in context into account is realistic evaluation” [16]. Realistic evaluation examines what intervention works for whom, and under what circumstances. It enables the evaluator to draw on a range of data sources to examine how different mechanisms impact on specific outcomes, and in particular contexts.

This evaluation draws on the principles of realistic evaluation [16], using an approach called Inductive Logic Reasoning [17] to address a range of propositions using formative and summative approaches and multiple data sources. This approach cannot provide definitive answers to comparative questions such as changes in the rates of hospitalisations or emergency department presentation due to telehealth, as these questions ideally require RCT methodology. However, given the tight timeframe for the project and the challenges of recruiting a control group it was acknowledged that it would be unlikely that these questions could be addressed conclusively within this study. Instead, the methodology examined different sources of primary and secondary data to test empirically several of the assumptions underpinning telehealth interventions.

For the purpose of this evaluation, a series of testable propositions was developed, based on the assumptions underpinning the introduction of the NBN telehealth pilot, and embedded in the objectives of the program.





My Health Clinic At Home Pilot
Client Experience Questionnaire

We need your help!

It is an important time for Feros Care and we would like to hear about your experience during the **My Health Clinic At Home** pilot. Your feedback will assist us in developing future telehealth services for people in your region and all over Australia. Would you please spend 20 minutes completing the survey questions and return your completed survey in the enclosed Reply Paid envelope by **Friday, 11th April 2014**?

If you have any questions or would like assistance please contact our Telehealth team by pressing the HELP button on your device or ring 1300 851 771.

Section A

Tick ALL relevant answers

1 Why did you decide to participate in the *My Health Clinic At Home* pilot (select all that apply)?

2 What did you hope to achieve as part of your involvement in *My Health Clinic At Home* pilot (select all that apply)?

- I was interested in monitoring own health
- I wanted support with my health care
- I was interested in getting the NBN Broadband Internet connected
- I wanted to support the evaluation (ie for the greater good)
- I was curious about the project / NBN
- My friends / family wanted me to
- My GP or another health professional suggested it
- Other (please specify).....

- To identify health problems before they become serious
- So I could better manage my own health
- To have better information about my own health
- To only go to my doctor when I really need to instead of having regular check-ups
- To take the pressure off my carer/family
- To help my doctor with the ongoing management of my health condition
- So my carer would worry about me less
- So I would worry less about my health
- So I know that there is always someone keeping an eye on me
- Other (please specify).....

Sample of NBN Client Experience Questionnaire

The stages of the evaluation were as follows:

1. Developing testable propositions that addressed the research objectives.

For example, the first objective was that the NBN pilot would provide “improved access to health services – providing timely and efficient access for GPs, Case Managers, Allied Health personnel and other health professionals, through virtual consultations in the seniors’ homes.” The matched proposition was “Telehealth increases access to health care staff for seniors by providing a home-based communication portal linked directly to a pre-determined range of health professions”.

2. Mapping of data sources to the propositions.

Each of the propositions were tested using a range of data sources, to look for confirming or disconfirming evidence to support or refute the proposition. Where possible, appropriate, qualitative and quantitative data sources were obtained. Where available, existing validated and piloted survey tools have been used. The data sources are outlined fully in the appendices, and included:

a. Detailed activity based audit data, specifically;

- i. Participation data
- ii. IT service request data
- iii. Number of home visits
- iv. Referral statistics
- v. Timeframes recorded for new installations
- vi. Client specific
- vii. Interventions per client
- viii. GP specific data

b. Survey results;

- i. NBN Client Survey (including the Stanford Chronic Disease Self-Efficacy tool [1] and the Self-Rated Health Questionnaire [2])
- ii. NBN Friend and Family Survey
- iii. NBN Physician / GP Survey
- iv. Client Experience Questionnaire (developed from interviews with clients)

- v. Group interviews with participants representing all stakeholder groups
- vi. Case studies of exemplar examples of specific aspects of the MHCAH pilot drawing on the data collected above
- vii. Documentary analysis of meetings and reports, such as incident reports
- viii. A ‘sociogram’ completed by participants at the start and finish of the evaluation to measure the level of social connectedness of the client
- ix. Literature reviews to underpin each of the propositions

Detailed audit data were collected by Feros Care on an ongoing basis for the duration of the project and analysed descriptively to meet the objectives of the evaluation. The Client Experience Survey was administered to all participants in April 2014, towards the end of the pilot to obtain participant perspectives on the benefits, use and application of the technology. Only the NBN Client Survey was administered at two time points, the start and finish of the project, to measure change in patient related characteristics.

Interviews and focus groups were used to supplement the survey data to address a wide range of stakeholder perspectives on the implementation of the telehealth project. Service users were selected purposively to represent different demographic characteristics and to reflect different lengths of time in the telehealth project.

The NBN Family and Friend Survey and the NBN Physician / GP Survey were developed by Feros Care and have been used with staff and service users as part of a previous study [3]. These tools were found to have good face validity and high utility in terms of informing practice. The NBN Client Survey incorporated two validated tools to measure self-rated health [2] and self-efficacy with respect to chronic disease management [1] and incorporated service use questions developed and used in another telehealth survey [10]. The Client Experience Questionnaire was developed based on the client interviews and consultation with Feros Care staff, to specifically address aspects of the trial to address the propositions.

3. Analysis, collation and synthesis of data.

The results of each of the components of data collection are presented in Section 5. Results of this report. The propositions draw on the results, and form the basis of Section 6. Discussion in this report. The outcome is a statement to support or refute the proposition including a description of nature and strength of the evidence.

All survey data were entered manually into Survey Monkey, then exported into an Excel spreadsheet where they were used directly, or transferred into IBM SPSS Statistics 22. The data were analysed descriptively and changes in paired, continuous data were analysed using the Student T-test with a p value for significance of 0.05. Changes in categorical variables (specifically health service use) were analysed using the Chi Square test.

In addition, the research explored several formative issues arising from the multiple data sources, in particular objectives 8, 10, 11 & 12 which were examined through the collation of the findings and data sources above.

4. Presentation of case studies.

A series of case studies were selected to illustrate specific aspects of the use, implementation and / or application of the MHCAH.

3.3 ETHICS APPROVAL AND RESEARCH GOVERNANCE

Low risk ethics approval was obtained from the Southern Cross University Human Research Ethics Committee approval Number ECN-13-056. The project was managed internally through weekly team meetings with the Feros Care implementation team. An external steering committee of expert stakeholders was established and consulted three times during the project.



3.4 SUMMARY OF DATA SOURCES

DATA SOURCE	DETAILS
NBN Client Survey (Appendix A)	Clients completed the NBN Client Survey at admission and discharge. The survey was completed via interview with a member of the Feros Care staff who was also responsible for providing support and training, and decommissioning the technology at the end of the trial.
NBN Physician / GP Survey (Appendix B)	All GPs who received client trend reports (n=51) were mailed a two page (20-item) survey. Each question response used a 10 point Likert to capture the feedback, with 1 denoting strongly disagree, 10 strongly agree to a series of statements. Additional open ended responses were invited to each question. Surveys were anonymous. All participating practices were followed-up with a single reminder phone-call.
NBN Client Experience Survey (Appendix C)	This client feedback survey was mailed to all MHCAH participants in April, 2014. The Client Experience Survey was developed from the findings of in-depth interviews with 16 clients, the literature and the proposition statements. A single survey was mailed to all clients; non-respondents were followed-up by telephone and, where necessary, the surveys were completed by telephone.
Family and Friends Survey (Appendix D)	All of the Skype contacts registered to the client's account through MHCAH were sent an electronic link to a Family and Friends Survey which was provided on the Survey Monkey platform. One reminder was sent.
Service provider focus groups	Two focus groups were held with service providers, one at the commencement of the project (29 July 2013), then one towards the end of the project (15 April 2014). The first focus group only included Feros Care staff, specifically THRN, operations managers, marketing, and case managers, and technical support staff. The second focus group included 10 participants, including a council representative, LHD care coordinators (2), a telehealth officer for NSW Health, one GP, the Feros Care CEO and project sponsor, a Feros Care telehealth technician, operations manager, a THRN and a care manager.
Client interviews	Individual interviews were held with 20 clients to capture their perspective and experience of MHCAH.

4. LITERATURE REVIEW

A literature review was undertaken to examine the published evidence in relation to each of the propositions. This was not a systematic review but drew, where possible, evidence from systematic reviews and recent published data. Only the key points are presented here.

4.1 Proposition 1:

Telehealth increases access to health care staff for seniors by providing a home based communication portal linked directly to a pre-determined range of health professionals.

- There was good evidence that telehealth improves access to health care professionals, particularly for rural communities who face a number of barriers compared to city dwellers [18-20].
- A review of home telecare suggested that automatically transmitting clinical readings was at least as efficient as conventional care [21].
- In six European assistive technology projects, participants were remotely monitored in and out of their own home 24/7. Telehealth services freed the time of clinicians and other health care workers by automating some of their routine tasks enabling them to focus on more demanding tasks [22].
- Telehealth may enable health care practitioners to work more effectively together which improves patient clinical outcomes [23, 24].

4.2 Proposition 2:

Seniors will be able to use the telehealth technology, on a daily basis, to monitor their vital signs with the support of a telehealth nurse.

- Seniors accepted telehealth technology and could accurately self-monitor their vital signs [25] using a range of devices, such as ECG meters, electric scale and teletonometry system (blood pressure and blood glucose)[25-28]. Particularly those with non-cognitive diseases such as hypertension, heart failure, emphysema, coronary artery disease and diabetes, found the technology helped them to manage their chronic conditions [28].

- Cognitive impairment and learning difficulties reduced the benefits of telehealth [29-31].
- For most telehealth interventions, patients needed to be able to hear and speak to conduct telehealth calls [32].
- The support of a telehealth nurse to seniors was important to ensure the more complicated equipment was used correctly [26]. Personal contact between the patients and a health care provider demonstrated better results compared to studies without personal contact [32].

4.3 Proposition 3:

Access to telehealth in the home provides the potential for continuous and regular data arising from the monitoring of vital signs which can be used to improve medical decision making.

- There was limited evidence on whether telehealth in the home provided data which could be used to improve medical decision making. However there were a number of studies which have found telehealth to be effective for improving health outcomes in specialities such as chronic heart failure and respiratory conditions [21, 25, 33, 34]. Conversely there were studies which have found limited or no effect on health outcomes [35, 36] and there were consistent messages within the literature that more work is required by larger studies before it will be possible to draw firm conclusions [35].
- Regular data from vital signs monitoring has been used to effectively prioritise patient care loads with case managers [37].
- Data management needed to be considered so it facilitated clinician's decision-making and should be presented in a meaningful way. New and efficient methods of visualisation of data will need to be developed to ensure optimum use of monitoring [38].
- Telehealth may improve collaborative working, such as improving trust between practitioners [39].
- Health care providers have reported that telemedicine increased their workload and that workflow needs reorganising to benefit from telehealth [40].

4.4. Proposition 4:

Having access to regular, ongoing data from vital signs monitoring provides a trigger for early intervention which can reduce the likelihood of emergency sequelae.

- Despite the ability of home telemonitoring to provide timely data for health care providers, evidence was inconclusive on the effects on patients' conditions such as early detection of symptoms and reduced mortality [41].
- For chronic heart failure patients there was evidence that remote monitoring not only reduced hospital admissions but may also have been an effective strategy for disease management in high-risk failure patients [34]. There was however a need to identify which patients would benefit most from telehealth [42].
- Other studies have shown that telemonitoring could be associated with lower rates of mortality for patients [5, 25, 43], with good effectiveness in a heart failure programme [25] and diabetes outcomes [7, 44].
- Telehealth provided the potential for patients to increase their knowledge and awareness of their medical condition [41]. Communication between the patient and telehealth nurses about monitored signs and symptoms may have contributed to daily self-care behaviours that minimise exacerbation of chronic conditions [45].

4.5 Proposition 5:

Seniors trained to use videoconferencing technology will use the technology to build or reinforce social networks.

- There was limited published evidence around training seniors to use video conferencing technology to build or reinforce social networks.
- Videoconferencing via Smart TV was used to connect elderly people receiving homecare with care services and family contacts. This resulted in a significant decrease of feelings of loneliness for participants after a year of use [46].
- There was a suggestion that internet use can strengthen social networks with family and friends by email [47].
- Studies that have provided ICT training to seniors to reduce social isolation [48, 49] found that participants who went online more frequently were less lonely and isolated. A greater frequency of internet use was associated with more easily accessible contact with others [48].



4.6 Proposition 6:

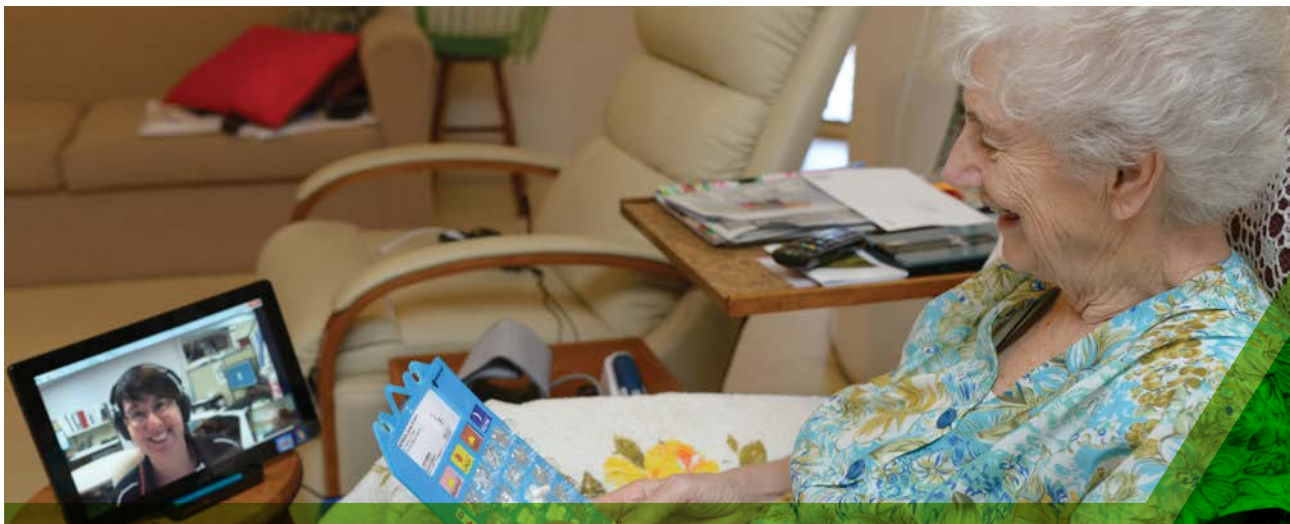
Access to telehealth improves health outcomes by: increasing overall wellbeing by reducing social isolation; increasing accessibility to health services; and empowering people to take control of their disease / condition.

- People with chronic illness and mobility problems can be connected online for social network and peer support. Learning about their condition and developing peer support through sharing concerns and stresses has the potential to overcome feelings of isolation for seniors [22].
- Seniors generally value personal contact, therefore telehealth should be viewed as an aid and not the only solution to the growing demands of an ageing population [31].
- Several studies have investigated the effect of telehealth on participants' quality of life [25, 42, 50-53]. Some reported improved quality of life for participants [25, 42], however others, such as the large scale Whole System Demonstrator study, did not demonstrate improved quality of life or psychological outcomes for participants [51, 54].
- Telehealth can improve patients' knowledge; quality of life; self-care; sense of reassurance and security by having a lifeline to expert care [25]. Other benefits included improved medication adherence, more effective working by healthcare practitioners and improved clinical outcomes [23].

4.7 Proposition 7:

Access to telehealth reduces health system costs by reducing unexpected or unanticipated hospital admissions through early identification of risks; and reduces transport costs due to the ability to receive health care at home.

- A number of studies have found that telehealth can reduce unexpected or unanticipated hospital admissions [5, 7, 32, 37, 55-57]. There were also studies that concluded that telehealth had no significant effect on reducing hospitalisation rates [51, 58, 59]. Studies which have successfully reduced hospital readmissions included those which combined telemonitoring with a case management model [37].
- Studies have shown that remotely monitored patients, when admitted, have shorter stays in hospital compared to those not receiving telehealth care [5, 55, 56].
- There was limited evidence identifying those populations most likely to benefit from telehealth and achieve health service savings [42, 60].
- Telehealth provided cost savings for patients by eliminating travelling time and expenses [28, 61, 62].



5. RESULTS

Due to the range of data sources and breadth of perspectives, the results are structured to best inform project implementation, broadly reflecting the structures, processes and outcomes of the pilot.

Table 3 outlines the data sources used to inform the results, and the response rates for each source of data.

Table 3: Survey and data response rates

DATA SOURCE	RESPONDENT	RESPONSE RATE
NBN Physician / GP Survey	GPs	21/51 (41%)
NBN Client Survey	Clients	181 baseline, 126 discharge*
In-depth client interviews	Clients	20/181 (11%)
Client Experience Questionnaire	Clients	128/181 (70%)
Focus group	Service providers	18 service providers
Family and Friends Survey	Family and friends	4/85 (5%)

*Not all clients were discharged at the completion of the evaluation period

5.1 PARTICIPANTS AND RATES OF RECRUITMENT

In total, 200 clients were recruited to the trial between 1 April 2013 and the 30 June 2014. Follow-up data were available for 125 clients at discharge and these formed the basis of the comparative analysis.

Clients ranged in age from 48-98 years (mean 74.8, SD 8.17) (Figure 2). The majority of clients were female (57%), lived with their partner or family (63%), were non-indigenous (88%), and spoke English as a first language (97%) (Table 4). The single most commonly reported chronic condition was high blood pressure (56%) followed by heart problems (33%) (see Figure 3). Clients reported up to six different health conditions, with the majority (31%) reporting two health conditions (Table 5).

Figure 2: Age distribution of participating clients

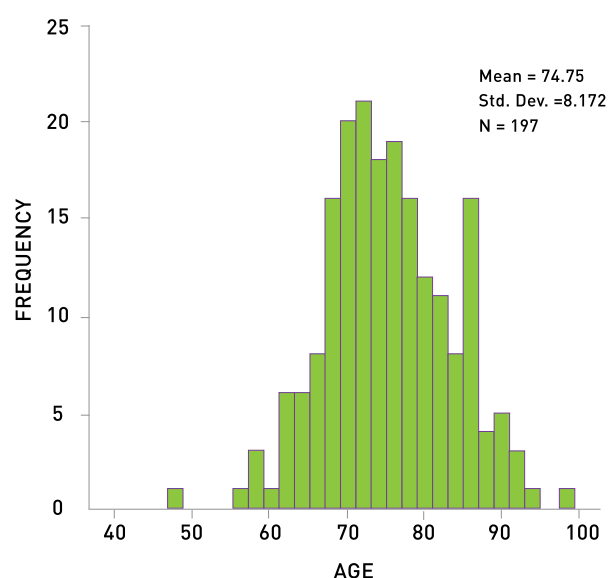


TABLE 4: Demographic characteristics of participants (N=200)

	CHARACTERISTICS	N	%
Gender	Male	83	41.5
	Female	117	58.5
Living arrangements	Lives alone	60	30
	Lives with Family	127	63.5
	Lives with others	11	5.5
	Other	1	0.5
ATSI status	Aboriginal	4	2
	Non-Aboriginal	167	83.5
	Not specified	29	14.5
Language	English	195	97.5
	Dutch / Flemish	1	0.5
	Not specified	4	2

Figure 3: Number of health conditions of participants

“Others” include osteoporosis, infections, vision and hearing impediments, endocrine disorders.

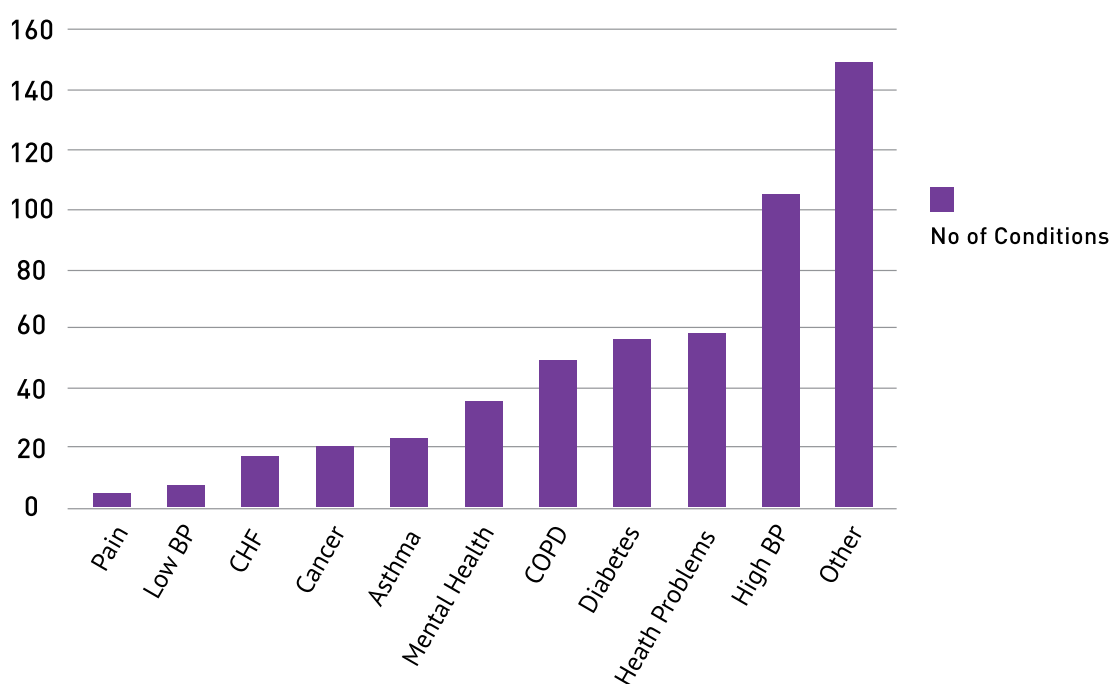


Table 5: Number of conditions affecting participants (n=200)

Number of illnesses/ medical conditions	% of cases (n)
0	2 (4)
1	16.5 (33)
2	31 (62)
3	25.5 (51)
4	14 (28)
5	9 (18)
6	2 (4)



Participants used up to five different types of equipment, the most common being the pulse oximeter and blood pressure monitor (Figure 4). The majority of participants (48%) used three different types of vital sign monitoring equipment (Table 6).

Figure 4: Types of equipment used by Participants

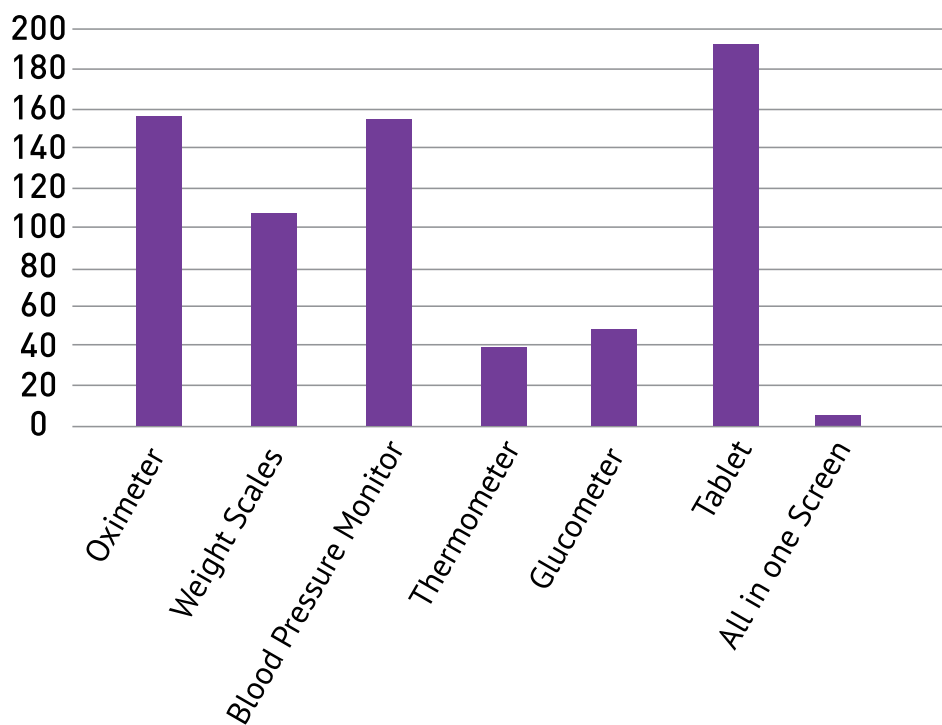


Table 6: Numbers of different types of vital sign equipment used by participants (n=200)

NUMBER OF DIFFERENT TYPES OF EQUIPMENT USED	% OF CASES (N)
1	0
2	7 (14)
3	48 (96)
4	19.5 (39)
5	4.5 (9)
VC only	21 (42)



Overall, 340 clients were referred to MHCAH. Of the 200 enrolled, 148 clients were connected to the NBN in Coffs Harbour or Sawtell; 52 were connected to 4G, including an additional 24 clients from outside the Coffs Harbour / Sawtell area (Table 7). Clients were not recruited to the trial if they failed to meet the inclusion criteria, including lack of NBN access or they did not have at least one chronic disease.

TABLE 7: Regional distribution of MHCAH clients

	REFERRED	CONNECTED TO NBN	CONNECTED TO 4G*	TOTAL CONNECTED
Outside	14	9	0	9
GC/ FNC	24	0	15	15
Coffs 1	56	36	5	41
Coffs 2	29	4	7	11
Coffs 3	17	5	3	8
Coffs 4	40	23	0	23
Coffs 5	25	18	1	19
Coffs 6	15	5	1	6
Coffs 7	15	1	0	1
Sawtell 1	47	16	11	27
Sawtell 2	24	14	2	16
Sawtell 3	20	12	1	13
Sawtell 4	14	5	6	11
Total	340	148	52	200

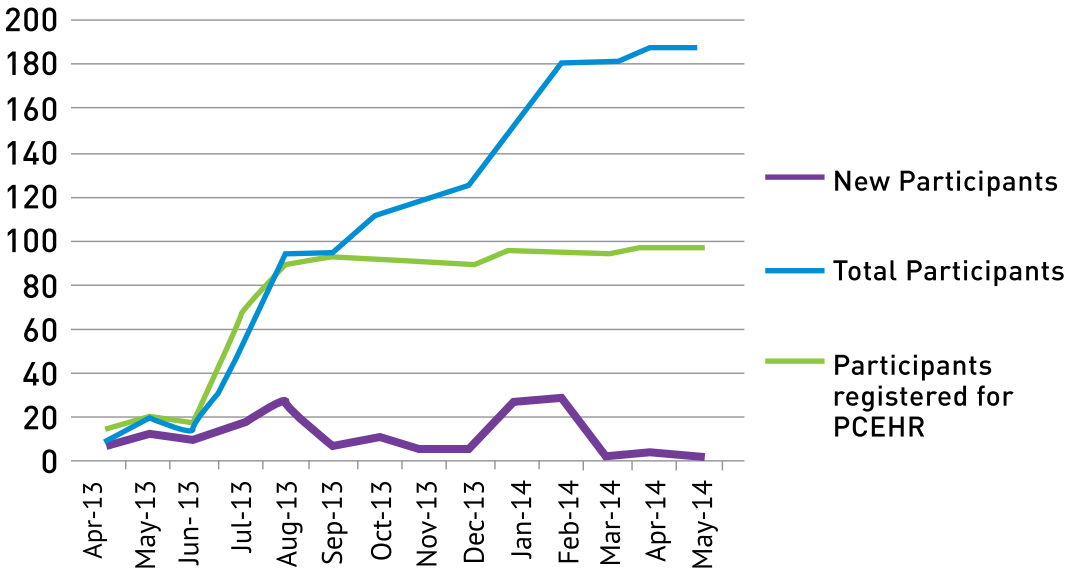
*Four clients who enrolled in the program using 4G were subsequently transferred to the NBN. Three clients used ADSL until the NBN was installed.

A number of clients referred to the trial were residents in multi-dwelling units (MDUs). There were substantial delays installing the NBN to MDUs which limited the recruitment of these people to the trial.

Figure 5 shows the rates of client recruitment. The greatest increase in recruitment occurred in January-

February 2014 when the DoHA enabled the trial to be expanded to non-NBN settings, and client recruitment was expanded to the Gold Coast in QLD and Far North Coast of NSW. Nearly half of all trial participants were also enrolled to use the Patient Controlled Electronic Health Record (PCEHR).

Figure 5: Rates of participant registration



5.2 SERVICE THROUGHPUT DATA

NUMBER OF TELEHEALTH SERVICES PROVIDED BY TYPE

Between April 2013 and the end of June 2014, clients performed a total of 32,540 vital sign readings and participated in 4,888 video conferences (Table 8). Figure 6 shows the rates of video conference use, by type, over the course of the trial. In addition, Feros Care implemented a range of strategies to increase client engagement with video-conferencing. Video-conferencing interventions included one-to-one contact with the THRN, GP, LHD or care manager using an encrypted VC platform; Skype connections to family and friends; a chat club; structured health education/health literacy sessions; and e-bingo (Figure 7).

TABLE 8: Number of telehealth services

TYPE OF READING	TOTAL
Vital Sign Readings	32,540
Video conference – THRN	2,767
Video conference – GP / Specialist	6
Video conference – Care Manager	23
Video conference – LHD	29
Video conference – Education / chat club	230
Video conference – Family & Friends	1,833
Total No of video conferences	4,888

FIGURE 6: Overall number of vital sign readings and video-conferencing performed during the trial

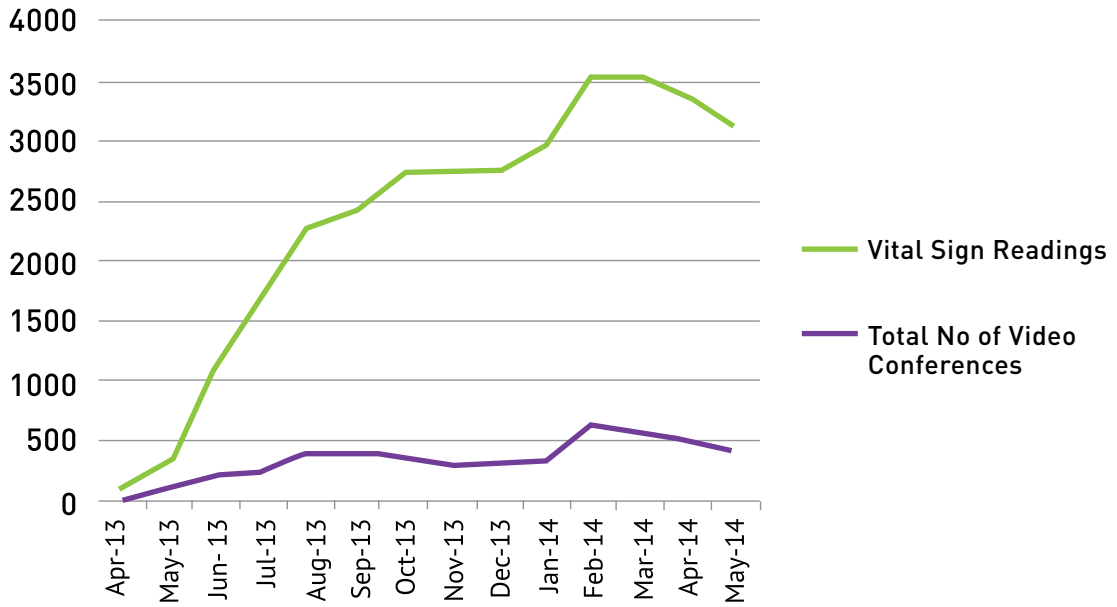
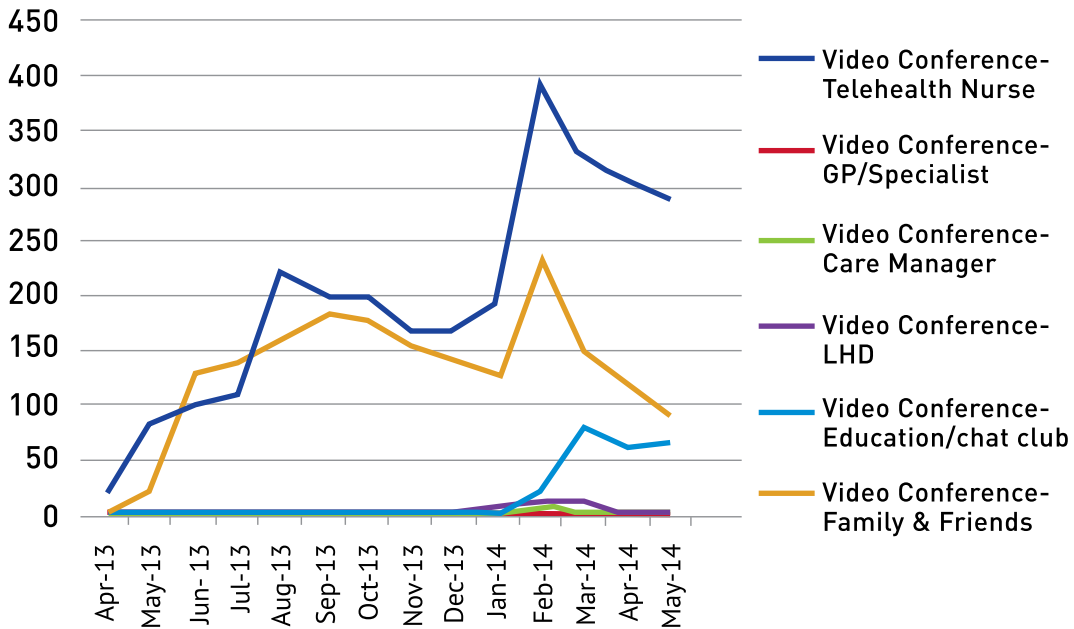


FIGURE 7: Video-conferencing by type during the trial



All clients participated in at least one video conference with the average participation being 24.44 video conferences. The February peak in video-conferencing rates coincided with a rapid increase in rates of installations due to the change in the project protocol which allowed clients to be recruited using the 4G platform.

CASE STUDY OF CLIENT USE OF VIDEO CONFERENCE WITH TELEHEALTH REGISTERED NURSE

Client was referred to the MHCAH pilot in May 2013 by his GP due to recurrent chest infections and difficulty in accessing the GP when ill. As a result, there was a history of the GP providing home visits to client. Client was an 83 year old man who was also the full time carer for his wife. Client suffered from Chronic Airways Limitation, diabetes (NIDDM) with chronic pain due to arthritis and a previous Trochanteric Bursa on his right hip.

The client was assessed by the THRN in June 2013 and commenced monitoring once the NBN was connected in September 2013. Client commenced monitoring on the MHCAH standard CHF/ COPD/ diabetes combination, monitoring vital signs including oxygen saturation (SPO2), blood pressure (BP), weight and glucose levels (BGL and weight).

Initially the THRN provided support and education via video conferences in regards to existing pain relief, suggestions for alternate methods including patches and management of drug side effects such as constipation. The THRN also discussed the association between elevated BP readings that coincided with his moderate to severe pain. This was evident in positive responses to the wellness question 'other illness' when pain was moderate or severe. The THRN encouraged the client to discuss all these matters with his GP to arrive at a balance between pain relief and side effects he could manage. The client did so and advised THRN that they were able to achieve this balance. The THRN continued to have discussions via video conference with the client when his lung function deteriorated, as a result of bushfires in October. The THRN monitored daily vital signs as client was implementing his management plan including a short course of oral antibiotics and oral prednisolone. This also included encouraging him to



see his GP when the management plan was not being effective. The THRN kept the GP informed using regular trend reports during the course of the pilot which were sent to the client's GP each month.

Since beginning the project, the client has been actively utilising video-conferencing to discuss his health with the THRN and has become very comfortable with the technology. As a result, the client agreed to participate in a video consultation with his doctor and gave the following feedback:

"I was impressed with the consultation; it saved a visit to the surgery. It has saved me time and petrol, plus a 2hr waiting time."



5.3 PROCESSES: CLIENT RECRUITMENT INTO MHCAH

The narrow window for implementing and evaluating MHCAH, accompanied by the fact that Feros Care did not have a large existing client base in Coffs Harbour, the NBN trial area, meant that a range of initiatives were used to recruit clients into the trial.

5.3.1 SOURCES OF RECRUITMENT OF CLIENTS INTO MHCAH

The majority of participants interviewed said they found out about the MHCAH trial via direct marketing, including: a presentation at a Probus meeting; stands at the Coffs Harbour Show; pamphlets in the letterbox; a shopping centre display; and displays at other clubs (RSL, Coffs Ex- Serviceman's Club). Two participants reported that their GP had recommended they become involved (Table 9).

Table 9: Referral sources into MHCAH

SOURCE	COUNT	%
Self	216	63.7%
Feros Care	41	12.1%
GP/medical practitioner - community based	27	8.0%
Community Health Service	17	5.0%
Family, significant other	16	4.7%
Other non-government community-based service	16	4.7%
Hospital (Public)	2	0.6%
Other community service – health	1	0.3%
Department of Veteran Affairs	1	0.3%
Community Nursing Service	1	0.3%
Aboriginal health service	1	0.3%
Total	339	



5.3.2 CLIENT REASONS FOR PARTICIPATING IN MHCAH

The Client Experience Questionnaire (CEQ, Table 10) and supporting qualitative data (client interviews) suggested that most people participated in MHCAH to monitor their own health (68%) or to receive support with their existing health care (39%). Around one third of participants (34%) were involved for altruistic reasons (to support the evaluation) or because they were curious about the project (25%).

TABLE 10:CEQ Why did you decide to participate in the My Health Clinic At Home pilot (select all that apply)? (n=128)

ANSWER OPTIONS	%	RESPONSE COUNT
I was interested in monitoring own health	68.0	87
I wanted support with my health care	39.1	50
I wanted to support the evaluation (i.e. for the greater good)	33.6	43
I was curious about the project / NBN	25.0	32
I was interested in getting the NBN Broadband Internet connected	22.7	29
My friends / family wanted me to	20.3	26
Other (please specify)	19.5	25
My GP or another health professional suggested it	12.5	16
Non- respondents	7.8	10

Other reasons clients gave for participating included:

To help monitor wife's/husband's health
Recommended by a case manager
Interested following information provided at a public presentation

These findings were supported by the interview results:

It's good to know that you're within the normal range of things.
I have had a couple of strokes and don't want to have another one.
My husband had kidney problems – it's good to be able to keep track of both of you.

Friends and relatives had little influence over most clients' decisions to participate in the trial. Few interview participants even consulted their friends or family over their decision to participate in the trial.

It's my life, it's none of their business.

BARRIERS TO RECRUITMENT

Participants reported some barriers to recruitment. One interviewee experienced strong resistance to participating in the trial from her peer group, who perceived that the monitoring was unnecessary or a waste of time.

I have had a lot of negative feedback from various groups. They think that the monitoring is unnecessary – “you’re being over-cautious”.

GPs were a barrier to recruitment in a number of cases, with one client reporting that her GP suggested that self-monitoring would make her worry unnecessarily about her health. Another client who lives alone and visits her GP regularly said that her GP felt that her participation in the pilot was unnecessary. The Feros Care staff reported three clients who had agreed to trial MHCAH but their GP persuaded them not to participate.

One couple provided the following feedback on their GP’s involvement in MHCAH:

My doctor wouldn’t have a videoconference for that reason, because he thinks it’s just a show thing, it’s not going to keep going. He wouldn’t do the videoconference for that reason.

A: How did you feel about that?

D: A bit disappointed, but we can understand.

B: I can understand how he felt because he’s really busy.

D: If it’s a permanent thing...

B: He doesn’t need it if it’s a pony show. If it was going to be a permanent thing he’d be all for it.

D: I think he might be all for it.

B: But not being permanent, just being a trial thing, he’s not got the time.

D: He’s just so happy because when he gets the report from you guys he goes, “Everything’s going good with your Feros.” He might say, “Your sugar’s a bit high, Barry. We’ll have to look into that.” He might say, “Your blood pressure has dropped. Your weight’s up and down like a yo-yo.” He knows everything when we go in now.

B: He reckons everyone should have it.

D: He said everyone should be on it.

There were also some community misconceptions about the level of access that clients would have to the internet and the purpose of the study. For instance, Feros Care staff reported receiving the following feedback:

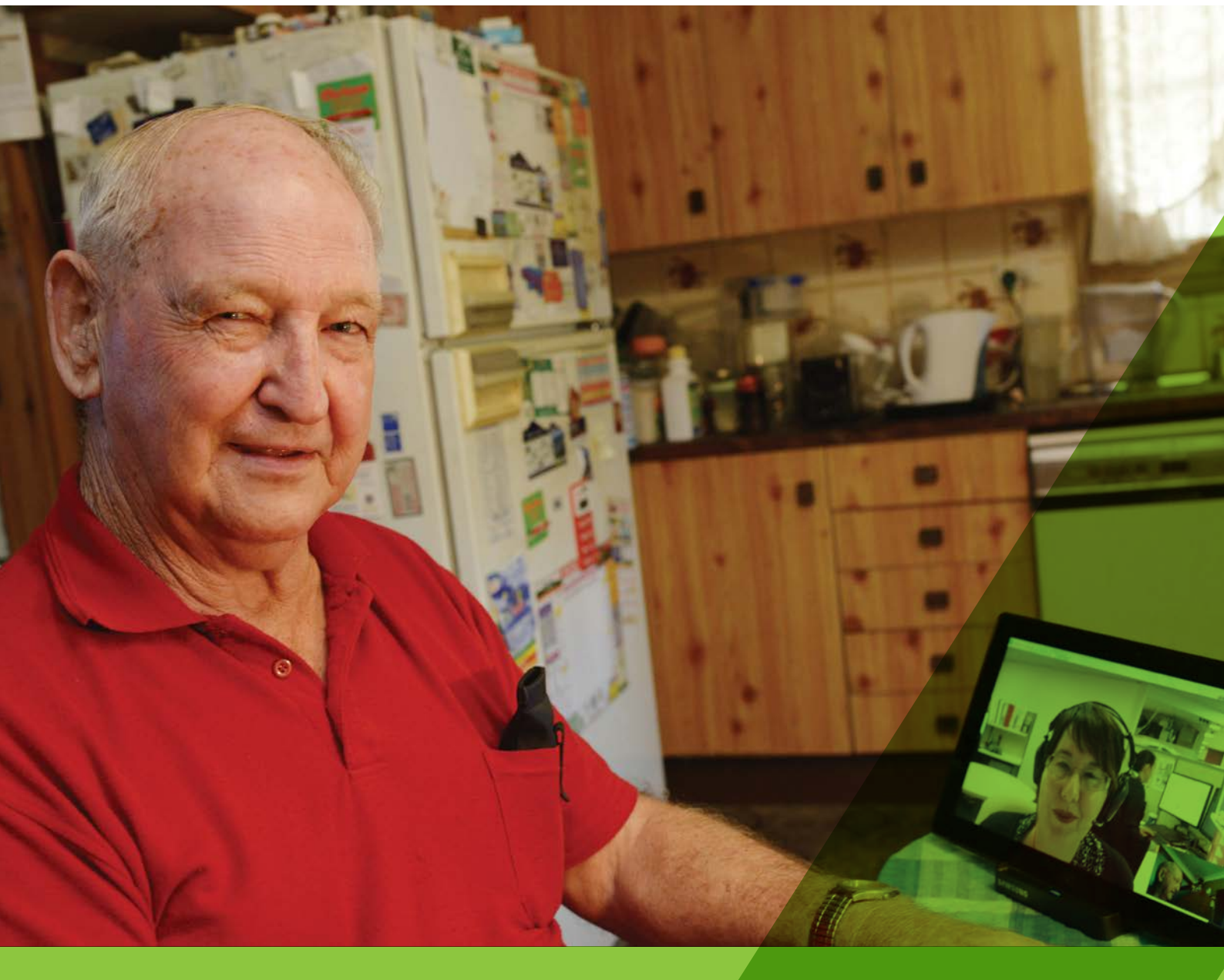
What a huge waste of money people using you for free internet, wasting Commonwealth money for people who don’t need monitoring

They just want free computers

We’re not paying for them to surf the net

There was some initial confusion about the installation processes with clients confusing the installation of the NBN with the installation of the Feros Care equipment. This was, in part, because Feros Care always arranged to attend the client's house on the day the NBN was scheduled to be installed. Four agencies were involved in the NBN installation, which created inefficiencies in the installation process. Feros Care clients were not given priority access to the NBN for the pilot study. The NBN installers also created some concerns for clients by implying that clients needed to have the NBN installed to keep their telephone connected and using this as a way to recruit clients on the basis of telephone packages.

Additionally, there was a significant delay in connecting to multiple-occupancy dwellings, (e.g retirement villages and unit blocks), with priority given to single dwellings (ie. stand alone houses). This caused significant delays in the first five months of the pilot, as many referrals came from seniors living in these multi-occupancy dwellings.





5.4 SOCIAL SUPPORT AND THE USE OF VIDEO-CONFERENCING

The impact of MHCAH on client social support was captured through the use of a sociogram completed by clients at the commencement of and discharge from the pilot project. The sociogram asked clients about the nature of and level of satisfaction with their social networks (Appendix F). Specifically, clients were asked to name the people with whom they have regular contact, their relationship to that person, contact method, distance from that person, and their satisfaction with the contact. Additionally clients were asked about their use of and satisfaction with video-conferencing in the Client Experience Questionnaire (Appendix C), and in the one-to-one interviews.

5.4.1 SATISFACTION WITH SOCIAL CONNECTIONS

Comparative (baseline and discharge) data from the sociogram were available for 81 clients, whom identified a total of 165 contacts between them (mean 2.03 contacts, range 0-4). Overall, client satisfaction with their

communication with the allocated contacts improved during the pilot, with the exception of three interactions. The average overall improvement (on a 5 point scale) was 1.55 ($p=0.000$). Of the 81 clients, 40 used Skype to communicate with their contacts and 41 did not. There was no difference in the level of improvement in communication between those who used Skype and those who did not. The average improvement in communication across the Skype users and non-Skype users was 1.55 (SD 1.42) and 1.63 (SD 1.51), ($p=0.82$) respectively.

Prior to participating in MHCAH, 70 per cent of respondents reported that they had never used video-conferencing, 15 per cent had used it infrequently (5 or fewer times); 9 per cent said that they were frequent users of video-conferencing.

Respondents were asked if they would consider video-conferencing with a range of potential service providers (Table 11). The highest 'Yes' response was for doctors, specialists and pharmacists.

Table 11: Would you consider video-conferencing with any of the following health service providers?

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
Doctor	52.3	67
Specialist	36.7	47
Pharmacist	36.7	47
Physiotherapist	17.2	22
Occupational therapist	18.0	23
Podiatrist	18.8	24
Speech pathologist	10.2	13
Other	29.7	38
Missing	44.5	57

Open ended responses to this question:

- Twenty-one respondents said that they would not choose to see any of their health practitioners using video-conferencing

No as Dr comes for [visits] even on public holidays
I am very old fashioned. I like to look into the eyes of the medical people to get a better result
No, like one-on-one with doctor.

- Three respondents said that they would like to have video conference access to a THRN

Healthworker nurse - I would once I know how to do it. This is a great idea.

- One respondent said that they would only be happy to use the ClearView interface

Yes on "clear view" - don't know about the ordinary/normal view?

Participants were asked to nominate other services that that would consider accessing using video-conferencing (Table 12). Overall 62 people responded to this question. Participants were open to the idea of receiving health talks, chair tai-chi, yoga, virtual museum tours, and bingo.

Table 12: Which of the following services would you use if it could be delivered with video-conferencing on your computer (select all that apply)? (n=128)

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
Chair tai chi	17.2	22
Yoga	13.3	17
Bingo	11.7	15
Virtual museum tour	11.7	15
Health talks	35.2	45
Other	25.0	32
Missing	48.4	62

In the open ended (other) responses, 21 participants said that they would not be interested in accessing any other services.

CASE STUDY USE OF VIDEO-CONFERENCING

GROUP VIDEO-CONFERENCE EDUCATION SESSIONS: THE TELEHEALTH LITERACY PROJECT

The Telehealth Literacy (THLP) Project was a five week group education program focused on developing health literacy and self-management skills.

The THLP was a mixed methods nested study within the MHCAH study and formed part of a PhD by Annie Banbury, who developed and delivered the program. More detailed evaluation will be published in journal articles and a thesis.

Evaluation of the THLP was pre and post intervention using the Health Literacy Questionnaire [63], Health Education Impact Questionnaire [64], a concentric circles social network analysis and a questionnaire developed to assess the acceptability of using video-conferencing with seniors living at home. Three focus groups and 16 additional interviews were undertaken.

MHCAH clients (n=139) were invited to take part in the THLP from February 2014 to May 2014. Using the Health Literacy Questionnaire, clients were grouped together with people of similar health literacy levels. Clients were connected to a virtual room, where they could see and hear all group members and the course leader. Each week different aspects of health literacy and chronic disease management were discussed. Topics included:

Week 1 – Active Self-Managing

Week 2 – Self-Monitoring and Insight

Week 3 – Communicating with Health Professionals

Week 4 – Finding, Understanding and Using Health Information

Week 5 – Being Medicine Wise & Advance Care Planning

The sessions were designed to be highly interactive, with the course leader sharing slides and videos. Clients were encouraged to contribute to discussions by sharing knowledge and their experience of living with chronic conditions. A technical support person remotely

connected clients to the virtual room and during the session was in the same room as the course leaders to troubleshoot any technical difficulties.

Post intervention data will be collected three months after the completion of the program to provide an indication of the long term effects.

INITIAL EVALUATION

Fifty-two participants (37%), forming nine groups, opted-in to take part in THLP. Groups consisted of between three to seven clients and were allocated regular times each week to meet. They valued the different, interesting topics (n=5), speaking with other people and sharing their experiences and differing opinions, being able to see the other participants, understanding how the equipment works, and being able to talk to the course leader and nurses. The health literacy programs were valued for their breadth of content and interaction.

Annie had good content, broad range of things, very confident. Approachable to everyone. All nice people. Interaction with others very good.

These sessions, are good because you hear other people's opinions and thoughts. It makes you stop and think.

Clients valued being able to meet in a group from home, rather than travelling to a venue. For those that lived alone being part of a video conference group provided social contact. The group education added value to MHCAH by demonstrating that clients are willing and able to participate in group health education sessions designed to improve health literacy.

But when you see people getting on with their life and coping with a chronic condition, that sort of thing makes you realise you're not in isolation.

5.4.2 SOCIAL CHAT CLUB EVALUATION

In addition to the telehealth literacy project outlined above, Feros Care introduced a range of interactive social initiatives using VC to increase engagement with and between clients. These included social chat clubs facilitated by a local radio broadcaster (Mick O'Regan), that covered a range of topics and included guest speakers; VC bingo; and the delivery of talks by health practitioners, including a pharmacist and dietician.

Initially staff were concerned about client willingness to interact using VC, however in every case they had a challenge finishing the session at the end of the allocated time due to the high levels of client engagement and interaction. Client's responses to their participation in the Social Chat Club were captured using the CEQ and in-depth interviews.



CASE STUDY: ONLINE BINGO (PRESS RELEASE)

AGED CARE PROVIDER FEROS CARE LAUNCHES ONLINE BINGO LEGS ELEVEN!

Online bingo is about to become the latest craze for seniors thanks to leading aged care provider Feros Care who hosted Australia's first virtual bingo game for seniors from its head office in Coolangatta, this week.

The bingo game was hosted live linking 23 residents from three Feros Care residential villages in Northern NSW and three MHCAH clients living in Coffs Harbour.

Feros Care upgraded all of its residential aged care villages to Gigabyte 802.11ac WiFi standard, earlier this year. Since then, Feros Care has been busy planning new initiatives for residential sites to encourage residents to embrace the new technologies available, including virtual games like bingo and trivia using high definition video and multiparty rooms using up to 16 video conferencing sessions at once.

"It's a way to use gamification and getting our seniors excited about connecting with each other socially using technology and at the same time having a little fun," said Feros Care Chief Information Officer, Glenn Payne.



"To my knowledge it's the first time online bingo has ever been played in an aged care facility in this format - across three aged care villages and into the homes of clients. This is a major milestone for Feros Care and a great way to utilise technology within the aged care sector."

Feros Care is always looking for new and smart ways to use technology to help seniors maintain their independence and stay connected.

Feros Care has made it a priority to ensure the provision of high quality and reliable internet access is a key feature of each of its residential villages. Feros Care's video conferencing forms the communication backbone for Feros Care's pilot telehealth program, which uses video conferencing with GPs and specialists for residents with complex needs. The same infrastructure enables the residents' social connectedness via internet access, video-conferencing and phone calls with friends and family and online bingo. The new WiFi infrastructure also enables better communications between staff and better resident care.

Bingo was broadcast live from Feros Care's Business Centre in Coolangatta, on Thursday, June 12. The 26 seniors – some well into their 90s – took part in the 90 minute virtual bingo game.

The game, called by Feros Care's LifeLink Support Officer Michael Scurrah, was a big success. All involved expressed enthusiasm and were keen to play virtual bingo again.

"We hosted the game from the Feros Care boardroom, using secure video conferencing technology in a multi-chat style session," he said.

"We also had volunteers and Feros Care staff on hand at the three Feros Care Villages to assist when required and to hand out prizes."

Feros Village at Bangalow was connected to the game using a portable video conferencing unit that can be used anywhere in the village to enable video calls for residents. Feros Village at Byron Bay participated from the facility's dedicated video conferences room and Feros Village Wommin Bay residents joined from the facility's activities room using a dedicated video conferencing unit. Coffs Harbour clients at home were connected via the NBN using Feros Care My Health Clinic At Home that Feros Care had installed into their homes.

All participants were sent game cards and marker pens to mark off their numbers prior to the event. Mr Scurrah said everyone who played "had a ball".

"The bingo session ran seamlessly with no technical issues encountered - largely due to the experience we have gained during the last 18 months of trialling our video conferencing technologies in different situations and on various platforms in the Coffs Harbour region during the MHCAH pilot," he said.

Feros Care client, Lorraine Capararo, of Coffs Harbour said she had so much fun catching up with old friends through the virtual game, it didn't matter that she didn't win.

"It's not about winning, it's just so much fun. I liked seeing fellow clients Ed and Tina again as they are the nicest people. You don't realise that you can build friendships over this type of thing," she said.

Ed, also from Coffs Harbour, joked that he didn't think he was old enough for bingo.

"But I really loved it," he said.

"The sound and the picture were very clear and everyone seemed to be having a really good time."

John, a Feros Village Byron Bay resident, wanted to know when he could play again and Bangalow residents said they would play virtual bingo every day if they could.

Super-fast WiFi has given Feros Care the ability to provide high-definition video conferencing and Telehealthcare to every village bedside. Also residents can now enjoy free internet access which will allow

residents to use cloud-based products like Skype, Facebook and Google+ to keep in touch with their families in the comfort of their own rooms.

Glenn Payne said Feros Care will also offer "silver surfer" training to get the residents on-board and using these technologies to connect.

Feros also plans to provide virtual tours for less mobile residents through live streaming with one event already organised this year at the Byron Bay Writers Festival. Mr Payne said, "We will be using high definition cameras to enable two-way interactions at this event." Feros is looking to expand its virtual tours with museum and other cultural events using similar technology to Go-Pros.

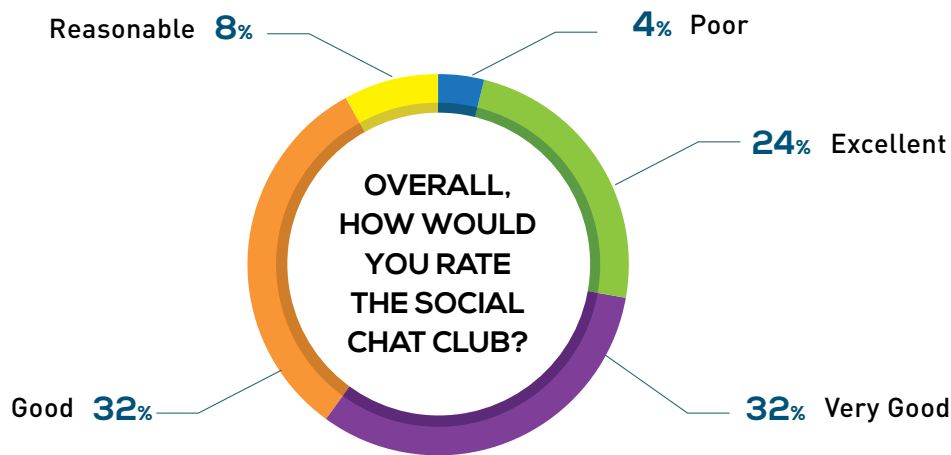
WHAT WERE THE BEST ASPECTS OF THE SOCIAL CHAT CLUB?

88 per cent of participants who were involved in the social chat club rated it as good, very good, or excellent (Figure 8). Clients provided written feedback on the chat club. They valued the different, interesting topics (n=5), speaking with other people and sharing different opinions, being able to see the other participants, understanding how the equipment works, and being able to talk to the nurses.

One interview respondent said:

I think it's one of the government's best inventions. It keeps people like me in touch. When we have our little meetings – God, that was good. I loved listening to them.

Figure 8: Overall how would you rate the social chat club?



WHAT ASPECTS OF THE SOCIAL CHAT CLUB COULD BE IMPROVED?

Clients were asked to identify any aspects of the social chat club that could be improved. They made suggestions around improvements to technical issues (n=8) and meeting dynamics (n=9).

Technical issues related to problems with speed of the internet connection, creating access problems for some participants. Some respondents reported that the picture dropped out, and the sound was not coordinated with the picture.

Suggestions around meeting dynamics included changing the timing (from 9am to 11am); introducing some sort of screening of participants to ensure they are suitable; facilitating more conversation amongst participants to increase their familiarity with each other and with the system, for instance:

Encouraging members to share an anecdote from the previous week.

Another suggestion was:

No animals and better lighting.

Participants were asked to feedback suggestions for other topics to cover in the chat club.

One respondent said:

Everything, anything just to feel like I am a person and not just a prisoner.

Thirteen open ended responses were received to this question. The majority of suggestions related to the content of health talks (general health, exercise, disease-specific such as diabetes, managing pain), and including specialists as presenters. Other topics suggested were information about the stock market and computers for beginners:

A topic on starting "What a computer can do" for someone who has never used one.

and

How their health is impacting on their social life and where they can go for help - not only for themselves but also for people who are not part of this pilot.

CASE STUDY: CLIENT WHO ATTENDED THE CHAT CLUB

The client was a 74 year old lady who lived alone. She suffered from high blood pressure and had Type 2 diabetes. Prior to joining the MHCAH telehealth pilot, she had never used a computer but was very keen to learn. She participated in the chat club in which clients were connected in a group video conference and given the opportunity to participate in a group conversation with 83-year-old tennis champion Margaret Fisher. Client made the comments below:

What was it like taking part in the chat club?

It was really nice, Margaret is lovely - I remember her from when I was younger. I am so proud of people like her that "just do it"; she is a wonderful person who just enjoys life. It was great learning all the little things about people. I find it interesting and I love talking so I just love it!

Was the process simple?

To me it really is, I am dyslexic with some things but I do understand people. I used to find it hard to understand things like this and my husband actually taught me to read. I found this easy to understand and I enjoy this way of talking.

How does something like this benefit you personally?

I am lucky because I do a lot of walking and I usually enjoy it but it is very inspiring when you see people like Margaret. It is great to find out that people are doing things like this, I think back and it used to be that after 60 life was pretty much over but now it feels like we are all still learning and trying new things.

Is it something that you would like to take part in again?

I like this sort of thing; it broadens your mind and it's great to meet people on your level. Some people are more active and others are less but it's nice because you learn the opinions of others. I think that the best thing is to keep active and alive and this is what the chat club does because we get to talk to other people and be inspired.



5.4.3 FAMILY AND FRIENDS SURVEY

The Family and Friends survey was sent to every client's Skype contact list as an electronic survey link. The survey aimed to elicit perspectives on MHCAH of people who were close to the client. Only four responses were received to the Family and Friends Survey and the results are presented descriptively in Table 13.

Table 13: Family and friends' survey responses

QUESTION	RESPONSES	COMMENTS
The client's chronic condition and well-being are better managed with Home Monitoring.	3x Strongly agree	she needs somebody to be there to make sure she is monitored.
I am personally less anxious about the client's wellbeing with Home Monitoring.	2 x Strongly agree 1 x Agree	I was very worried about her and now I can see for myself that she is doing well and we can talk about things that worry her.
The client will be able to remain living at home for longer with this technology.	3 x Strongly agree 1 x Agree	yes...she will especially if she can talk to me from time to time and face to face.
Video conferencing has allowed me to be in closer contact with the client.	2 x Strongly agree 1 x Agree	I miss my sister very much and it is great to be able to talk to her face to face. Not sure haven't used it.
GP consultation using video conferencing is valuable to the client.	3 x Strongly agree	her doctor can check on her every day to make sure she is well. Haven't done that yet.
Video conferencing has reduced social isolation for the client.	2 x strongly agree 1 x agree	She loves to talk to me and talk about our past together... I am sure she would miss me very much.
I would recommend the use of Home Monitoring to others who have chronically ill or isolated family members.	3 x strongly agree 1 x agree	They can keep in touch with relatives when they live a long way away from them.
I would like this service to continue	3 x strongly agree	She is very excited when she talks to me... I am her older sister and I know she misses me terribly. Brilliant service and has been a huge boost to [client's] wellbeing.

5.4.4 CLIENT USE OF TECHNOLOGY

Approximately equal numbers of experienced (35%) and novice (35%) computer users participated in the trial (Table 14). The remaining participants (27%) reported a moderate level of confidence with computer use. Most clients had never used video-conferencing facilities prior to the trial (74%). One third of participants (34%) reported an increase in their computing confidence, and 23 per cent reported increased confidence with video-conferencing (Table 15).

Table 14: CEQ Before your involvement in My Health Clinic At Home pilot, how confident were you using a computer? (n=128)

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
Unconfident (never used a computer before)	35.2	45
Moderately confident (used a computer, but not a regular user)	27.3	35
Confident (have a computer)	35.2	45
Missing	2.3	3

Table 15 CEQ As a result of participating in My Health Clinic At Home pilot, has your confidence in using a computer changed? (select all statements that apply)? (n=128)

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
I am more confident using a computer	33.6	43
I am less confident using a computer	4.7	6
I am more confident using video-conferencing	22.7	29
I do not like using video-conferencing	12.5	16
I have now started using a computer for other purposes (please specify)	7.0	9
No change	40.6	52
Other (please specify)	10.9	14
Missing	3.9	5

Open ended responses from participants:

Use for pleasure

Family History

Tablet

Am very confident using numerous computer systems.

Using Tango to keep in touch with family and friends

I bought my own laptop


Learning to use Skype

Had slight hiccups with internet access not been able to use Skype

Not experienced video conferences - two phone calls to enquire as to measurements helpful.

I don't like issues as annoyed and stressed when problems with video and online

Viewing photos from holidays, lost interest and confidence a long time ago and forgot all.



Vital signs monitoring took an average time of 6.17 minutes. Participants had some difficulties with the blood pressure cuff (27%) and the computer (24%). The thermometer was the least problematic piece of equipment (4%) (Table 16). The short battery life of the equipment was problematic for many clients.

Table 16: Have you had any problems with any of the equipment associated with My Health Clinic At Home pilot (please tick any that you have had trouble with)? (n=128)

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
Blood pressure cuff	27.3	35
The computer (tablet)	24.2	31
The pulse oximeter (finger probe)	18.8	24
The NBN Broadband internet connection/4G	17.2	22
Video-conferencing (video calling)/Skype	13.3	17
Blood glucose monitor	10.9	14
The scales	9.4	12
The thermometer	3.9	5
Other (please specify)	30.5	39
Missing	34.4	44

The open ended responses provided more detail around the issues:

- Four participants reported that their batteries had a short life, but were replaced quickly
- Learning to use video conferencing technology presented a challenge for two clients

Skype - when I talk to your operator "ClearView" extra sharp picture. When I talk to my contacts - ordinary view so prefer to use my own computer with bigger screen. Minor problems with touch screen freezing. Easily solved with your 1300 number.

- One participant reported that the connection dropped out when they were video-conferencing and uploading their vital signs
- One client reported wide variability in the scale readings



5.4.5 TECHNICAL ISSUES

INCIDENTS

Every technical incident was recorded on the Total Client Management System spreadsheet using the format outlined in Table 17.

Table 17: Excerpt from incident reporting spreadsheet (names and dates removed for anonymity)

DETAILS	INCIDENT TYPE	STATUS	CAUSE
BP skipped today and thermometer skipped last two days. Unsure if equipment error or user error. THT to visit and investigate. THRN 10/01/14 Additional training conducted. THT 14/1/14 All results received. THRN	Missed Interview	Resolved	Due to Client Error
Oximeter skipped over weekend. Discussed with client and oximeter flashing and then turns off. Confirmed batteries to be changed and would request THT to attend this afternoon. Called THT who confirmed they were on his list for scheduled battery change for all devices. Will contact client this afternoon to attend. THRN	Missed Interview	Resolved	Due to Equipment Fault
BP skipped today and yesterday and weight skipped today. Client said that it wouldn't take her BP but all equipment worked for her husband. Discussed making sure cuff was on properly, hose down centre of arm and plugged into machine correctly. Assured me all of things were correct. Did BP manually on own machine and was 147/67 with pulse 64. Has appointment to see GP on Thursday. Will try interview again this afternoon to see if any errors received. THRN 17/09/13 All results received. THRN	Missed Interview	Resolved	Due to Client Error

In total, 1061 incidents were reported over the duration of the project (1/4/2014 - 31/6/2014). The average number of incidents per client was five (median 5), with a range of 1 – 19 incidents.

The causes of incidents were coded into categories at the time of entry and summarised in Table 18. The majority of faults were predominantly caused by equipment faults followed by client error.



Table 18 Types of incidents recorded

INCIDENT TYPE	COUNT
Missed Interview Total	964
- Missed Interview Due to Equipment Fault	455
- Missed Interview Due to Client Error	174
- Missed Interview Due to Client Not Available	158
- Missed Interview Due to 4G Fault	62
- Missed Interview	59
- Missed Interview Due to NBN Fault	23
- Missed Interview Due to Environmental Factors (i.e.: power off, computer off)	12
- Missed Interview Due to Feros Staff Fault	8
- Missed Interview Due to RSP Fault	8
- Missed Interview Due to Tunstall Fault	5
Failed Video Conferences Total	33
- Failed Video Conferences Due to Equipment Fault	16
- Failed Video Conferences Due to 4G Fault	10
- Failed Video Conferences Due to Client Error	2
- Failed Video Conferences Due to RSP Fault	2
- Failed Video Conferences Due to Client Not Available	1
- Failed Video Conferences Due to Environmental Factors (i.e.: power off, computer off)	1
- Failed video conferences Due to Feros Care Staff Fault	1
Service Level Breach Total	64
- Service Level Breach Due to NBN Fault	52
- Service Level Breach Due to RSP Fault	5
- Service Level Breach Due to Equipment Fault	3
- Service Level Breach Due to Client Error	1
- Service Level Breach Due to Feros Care Staff Fault	1
- Service Level Breach Due to Tunstall Fault	2
Total Incidents	1061

In addition, a search on the word 'battery' identified 38 potential battery-related issues which highlighted issues outside of the normal battery rotation routine.

INTERVENTIONS

Every client interaction was recorded and logged in an intervention file. An excerpt of the type and level of detail logged for each intervention is illustrated in Table 19. In particular, this table highlights the level of ongoing monitoring, guidance and referrals provided by the regular interventions with the THRN. It was difficult to determine the impact of these regular and timely interventions on changes in client health service use, however having access to this high level of input is likely to have downstream effects on client outcomes.

Table 19: Excerpt of documented interventions (names and dates removed)

DETAILS	TELEHEALTHCARE INTERVENTION. INTERVENTION TYPE	TELEHEALTHCARE INTERVENTION. STATUS
<p>Phone call to client re: trend of increasing temp, SOB and dizziness, SpO2 93%. Also had elevated HR yesterday. Client states that her 'breathing is not great and lungs are sore'. She saw GP and had chest x-ray last week which indicated emphysema and scar tissue, no acute illness. States she feels she is on the decline, had shivers yesterday, infection brewing. Client has appt booked with GP 28/05 but encouraged her to f/u sooner due to present symptoms. Client states she will call and make appt to see GP this week. Will continue to monitor.</p>	<p>Client Support Phone Call - Out</p>	<p>Resolved</p>
<p>Phone call to client's husband re: hypotension. Client states that she has had some difficulty with equipment as well. She will try to change batteries in BP machine and thermometer. She continues to have cough but seems to be loosening with use of expectorant. She has been taking Panadol regularly and drinking more water. Client needed to ventilate. Provided support and reassurance. Suggested that client and husband f/u with GP if no improvements in symptoms.</p>	<p>Client Support Phone Call - Out</p>	<p>Resolved</p>
<p>Phone call to client re: elevated temp and HR. Client states she had been sitting in the sun and then was rushing around getting ready to go out when she remembered to do her interview. Feels like she might be getting a cold. No productive cough at time. Usually start Fess nasal spray when cold/cough starts progressing with good effect. She takes Panadol qam and hs. States she does get SOBOE - needs to remind herself to pace activity, relax and do deep breathing. Encouraged client to take more rest periods and push fluids. Discussed increased vulnerability of cold/flu/infection with underlying respiratory disease. Will monitor temp. If continues to be elevated and she becomes symptomatic for infection, advised for her to f/u with GP. She will log interview this afternoon to r/a temp and HR. Also scheduled for colonoscopy 06/06.</p>	<p>Client Support Phone Call - Out</p>	<p>Resolved</p>

DETAILS	TELEHEALTHCARE INTERVENTION. INTERVENTION TYPE	TELEHEALTHCARE INTERVENTION. STATUS
Phone call to client re: skipped BP and oximeter today. Unsure if upload button pressed for BP reading, BP 138/82, HR 71 as per son. Batteries have been changed in devices as reported by son. He will plan to assist client tomorrow with interview, will f/u if data fails to transfer to monitor. Client saw GP yesterday. Has been encouraged to push fluids for dehydration. Has also been having blood in stool, for colonoscopy next week. Inquired about anaemia or blood count but son said that it was 'ok'. Client continues to have dizzy spells throughout the day. Will monitor.	Client Support Phone Call - Out	Active

Table 20 summarises the types of interventions provided to clients. Initially, Feros Care had planned to log all activity, but this was not sustainable. The data below reflects an activity log of items of note or follow-up from the video conference.

TABLE 20: Summary of intervention by type

INTERVENTION	COUNT
Care plan change	2
Health Provider ad hoc request for trend report	3
GP Appointment	4
Reduced Bed Days	6
GP ad hoc request for trend report	9
Hospital Save	19
Phone call to Case Manager	26
GP request for regular trend report	38
Video Call – Out	39
Medication Change	63
GP provided vital sign ranges for client	98
Goals achieved	114
Phone call to family	136
Other referral	205
Video Call – In	393
Referral Follow up Phone Call	407
Client Support Phone Call – In	431
Client Support Phone Call – Out	1973

5.5 THE IMPACT AND OUTCOMES ASSOCIATED WITH PARTICIPATING IN MHCAH

The impact and outcomes associated with participating in MHCAH was captured using multiple sources of data (see Section 3.4 for details). This study did not use a control group which meant that any measurable changes in client health status may be attributable to causes other than participation in MHCAH. However, to augment the pre-post test results, clients were asked specific questions about their perception of the impact of participation in MHCAH on their health and behaviour. Additionally, several qualitative sources of data have been accessed to provide a basis for triangulation.

5.5.1 CLIENT EXPECTATIONS OF PARTICIPATING

Client expectations of participating in MHCAH included a desire to identify health problems before they become serious (65%); better management of their own health (58%); receipt of better information about their own health (53%); and reassurance that someone is keeping an eye on them (51%) (Table 21).

Based on the results of the Client Experience Survey, client expectations were largely met by the trial (Table 22), with 48 per cent of clients reporting that they can better manage their own health; 48 per cent reporting access to better information about their own health; 24 per cent reporting less frequent doctor visits; and that their doctor had better information to help with the ongoing management of their health conditions (44%) as a result of participation in the trial. In addition, nearly one third of clients (31%) said that they worried less about their health, and 25 per cent were more confident discussing their health conditions with their doctor as a result of their experiences in the MHCAH pilot (Table 23).

Other benefits that participants attributed to their involvement in MHCAH included (Table 23): going out more (15%); medication changes (17%); positive dietary changes and understanding (better understanding of the impact of diet on health 34%; eating more fruit and vegetables; 28% drinking more water 39%); increased physical activity (33%); and a better understanding of vital signs monitoring (48%).

Table 21: What did you hope to achieve as part of your involvement in My Health Clinic at Home pilot (select all that apply)? (n=128)

ANSWER OPTIONS	%	RESPONSE COUNT
To identify health problems before they become serious	64.8	83
So I could better manage my own health	57.8	74
To have better information about my own health	52.3	67
So I know that there is always someone keeping an eye on me	50.8	65
To help my doctor with the ongoing management of my health condition	35.2	45
So I would worry less about my health	27.3	35
To only go to my doctor when I really need to instead of having regular check-ups	26.6	34
So my carer would worry about me less	18.8	24
To take the pressure off my carer/family	17.2	22
Other (please specify)	4.7	6
Missing	2.3	3

Other reasons offered by participants included:

Interested to find out

To help medical practitioner

To encourage my husband to measure sugar

To check my medication is right

Mainly to help family as I live on my own

Enjoy the contact and Feros Care



Table 22: How has your involvement in My Health Clinic at Home pilot impacted on you and your care (select all statements that apply)? (n=128)

ANSWER OPTIONS	%	RESPONSE COUNT
I can better manage my own health	47.7	61
I now have access to better information about my own health	47.7	61
My doctor has better information to help with the ongoing management of my health condition	43.8	56
I worry less about my health	31.3	40
I am more confident discussing my health with my doctor	25.0	32
I go to my doctor less frequently	24.2	31
It helped identify a major health problem before it became serious	23.4	30
No change	23.4	30
My carer/family are less concerned about me	15.6	20
My carer/family are more concerned about my health	4.7	6
I go to my doctor more frequently	3.1	4
Other	3.1	4
I worry more about my health	2.3	3
Missing	1.6	2

Other reasons offered by participants included:

My blood pressure has radically changed
It was great to be the first client in Coffs Harbour
When it works I can manage my blood pressure



Table 23: As a result of participating in My Health Clinic at Home, have you made any changes to:

	RESPONSE	%	N
Your daily activities	I go out more	14.8	19
	I go out less	1.6	2
	No change	77.3	99
Medication use	Increased my medication	5.5	7
	Decreased my medication	10.9	14
	No change	74.2	95
The way you eat	I have a better understanding of how my diet effects my health	33.6	43
	I eat more fruit and vegetables	28.1	36
	I drink more water	39.1	50
	No change	46.9	60
Your physical activity	I do more physical activity	32.8	42
	I do less physical activity	3.1	4
	No change	60.2	77
The way you understand your vital signs	No change	46.9	60
	Yes (please specify)	48.4	62



CASE STUDY

CLIENT MEDICATION CHANGE AS A RESULT OF MHCAH

Client was referred to the project by his case manager in the Connecting Care Team at MNCLHD. At the time of his referral the client was living alone following the death of his wife and had a history of genetic heart disease, asthma, anxiety/depression and uses PRN oxygen therapy. Shortly after his referral, the client's daughter moved in with him and he commenced monitoring at the end of June.

During an appointment with his GP on 8 August, the client discussed the monthly trend report results that were sent by the THRN on 22 July. It showed an average Blood Pressure (BP) 148/87, pulse 84 and SPO2 97 per cent. After reviewing these results the GP discussed the need for lowering his BP and reducing his total regular daily medication from seven to four. This involved ceasing his regular Tritace (ACE Inhibitor), Cardizem (vasodilator) and Lipitor (statin) and commencing Candesartan HTCZ (angiotensin II blocker and diuretic). The GP warned that his lower leg oedema would increase in the early stages until the new medication took effect. During a discussion with the THRN on 23 August the client confirmed the oedema was reducing in his lower legs and he had been using less oxygen therapy.

Since beginning the project the client had been actively utilising video-conferencing to discuss his health with the THRN and had become very comfortable with the technology. As a result the client agreed to participate in a video education session which was facilitated by a pharmacist from the Gold Coast outlining safe medication use and finished with a general question and answer session. While the client was already well educated in most of the content of the session, he felt the video conference was a good platform for learning new information and asked to participate in the next session on mobility and falls prevention.

Open ended responses included:

Changes to medication

Dr has changed medication due to reports

Betta Blocker has been stopped.

Changed type of medication (x5)

More conscious what effect lifestyle and diet has on health

This was supported by in-depth interview data with a number of clients:

Cheryl: Yes, well, talking about blood pressure: when I did it, my blood pressure was usually up but then, when I went to the doctor and he did it, it was usually down. The last time I went to the doctor's Feros Care had sent my readings to him, so he decided to put me on half a tablet at night-time and I think it's helped. So I must've had a bit of high blood pressure but I'd not realised it because every time I went to him it was virtually okay.

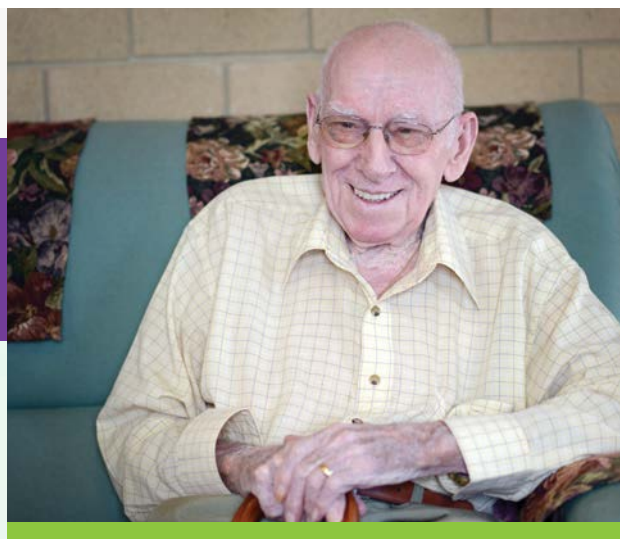
Lorraine: My doctor didn't know what was going on and my blood pressure went down. We got in touch; they told me...

Yes, well they rang me and they said, "Your blood pressure's too low, Lorraine. Can you get in touch with your doctor?" And I did and he rang me at night. He's a good doctor. He told me to go off my Micardis, my medication. I've only got a couple but this was for the blood pressure. I did and I feel a lot better since. It only goes up sometimes a little bit but that's about all. But, to see my sister on that, to be able to know what my blood pressure is and sugar...

David: Well, this week, I went to a doctor for yearly tests, etcetera. I took with me my last six weeks of blood pressure. That - yeah, I said, now there you are. That's what's happened this last six weeks.

Interviewer: Okay. Was he interested in it?

David: Oh yes. Yes. He has adjusted my medicine.



Interviewer: kay. So is that the monitoring that you've done? Or is this the reports that..?

David: No, that's the one from Feros. Which I've been doing myself manually for – every day, yep.

Changes to diet

"The monitoring brings the consciousness of my diet to the foreground. I think it has made me more aware, I have lost weight, I have been making better diet decisions and trying to eat more vegetables. I feel wonderful!"

Now know gout can be caused by salt so reducing salt in the diet

Add Lite n' Easy to encourage my husband to reduce amount eaten

Eat less, check sugar

Cut back on red meat

Monitored health before joining "my clinic"

Always been careful of diet and test sugar everyday

Avoid sweet foods as much as possible doing exercises more often

Changes to understanding vital signs monitoring

This question attracted a large number of open-ended comments which fell under four themes:

- Clients had a better understanding of their blood pressure (n= 26 responses)

"Now understand the relevance of different readings i.e. High, low"

"I am amazed at how my blood pressure changes daily"

"Noticing the different levels of blood pressure at various times when I eat more or stress or drink more"

- Clients had a better understanding of the variations in their readings, and the factors that influenced their readings (such as weight and fluid intake) (n = 6 responses)

"Learnt a lot regarding weight and how fluid can increase your weight"

This findings was supported by interview feedback:

It's made me more – believe it or not, – more aware of the need to lose weight. I'm talking about the readings we do each day now. I mean, I wouldn't get on the scales because I was scared of seeing what they said. Now I have to. I notice that everybody's weight fluctuates during the day. It also makes me more aware of my high blood pressure. So I need to keep that under control, which I am trying to do most of the time anyway. But this session, and these sessions, are good because you hear other people's opinions and thoughts. It makes you stop and think. So yeah. That's it.

Interviewer: Do you think you tested yourself more regularly with this equipment than what you had done previously?

L: Yes. I was really slack. I was told to do it when I first got diagnosed with the diabetes. I was really slack. No, this made me do it. Not made me – I was happy to do it. I loved it.

It made me interested, whereas, before, I couldn't have given a care.

It was like someone cared. Do you know what I mean? Someone cared. I cared more. With doing the readings every day, it made me feel, "I have to look after my health. I've only got me."

- Clients managed their body weight better (n = 4 responses)

"I have lost weight"

- Better understanding of blood oxygenation (n = 4 responses)

"What level the blood is oxygenated"

CASE STUDY

CLIENT BEHAVIOUR CHANGE AS A RESULT OF DAILY MONITORING

A 60 year old female client commenced monitoring with the MHCAH on the 31st May. Client, who lived with her husband, self-referred to the pilot after attending a display at the Coffs Harbour Ex-serviceman's Club. She had a history of Chronic Obstructive Pulmonary Disease with lupus erythematosus and had an episode of pneumonia in April 2013 resulting in a collapsed lung. During her initial contact and assessment, Client advised the THRN that she had been trying to give up smoking, unsuccessfully, for the last three years. She took her daily vitals which were monitored by the THRN including; blood pressure, oxygen saturation, temperature and weight.

Client worked part time in the morning at a local nursing home and completed her MHCAH interview after returning home from work. Early in her MHCAH participation, Client expressed to the THRN that she was surprised by how low her oxygen saturations readings were. She commented that as a result she has found more determination to give up smoking regardless of the side effects she has previously experienced by medication such as Champix.

These side effects were discussed with Client and she was encouraged to disclose these to her GP.

After a visit to the GP, Client contacted the THRN and conveyed that her doctor was interested in her daily oxygen saturation results. Previous O₂ readings taken at the doctor's surgery were always 98 per cent whereas she advised him during the check-up that her daily readings had been between 90-94 per cent. Consequently the THRN compiled a trend report of a full month's daily oxygen saturation results and faxed this to Dr X prior to the client's follow-up appointment. The following day, Client contacted the THRN via video conference and relayed that the doctor had said 'I wouldn't have believed it if I hadn't seen the results'.

As a result, Dr X has prescribed a course of oral antibiotics for a chest infection to reduce the risk of developing pneumonia again. Dr X also told her that he was very happy with her daily blood pressure readings and her participation in the project. At the end of her course of oral antibiotics, Client's daily oxygen saturation readings returned to 98 per cent.



5.5.2 SELF-EFFICACY FOR MANAGEMENT OF CHRONIC DISEASE

Client self-efficacy in their management of chronic disease was captured at baseline and discharge using the Stanford Patient Education Research Centre “Self-Efficacy for Managing Chronic Disease 6-Item Scale” [65]. Participants are asked to score each of the questions in column two of table 25 “On a scale of 1 (not at all confident) to 10 (totally confident)

please mark what is closest to how you feel about the following statements”. As Table 25 illustrates, there was a significant difference between the baseline and follow-up scores for the self-efficacy for the overall summary score, and in the domains of emotional distress (Pair 3) and Pair 6 (How confident are you that you can do things other than just taking medication to reduce how much your illness affects your everyday life?). A higher number indicates a higher level of self-efficacy.

Table 25: Self-efficacy for management of chronic disease

PAIRED SAMPLES TEST									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Interval Difference	Confidence of the			
					Lower	Upper			
Pair 1	How confident are you that you can keep the fatigue caused by your disease from interfering with the things you want to do?	.417	2.818	.257	.926	.093	1.620	119	.108
Pair 2	How confident are you that you can keep the physical discomfort or pain of your disease from interfering with the things you want to do ?	.273	2.849	.259	.786	.240	1.053	120	.294
Pair 3	How confident are you that you can keep the emotional distress caused by your disease from interfering with the things you want to do?	.655	2.895	.265	1.181	.130	2.470	118	.015*
Pair 4	How confident are you that you can keep any other symptoms or health problems you have from interfering with the things you want to do?	.314	2.937	.270	.849	.222	1.160	117	.249
Pair 5	How confident are you that you can do the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?	.327	2.720	.259	.841	.187	1.262	109	.210
Pair 6	How confident are you that you can do things other than just taking medication to reduce how much your illness affects your everyday life?	.935	2.962	.285	1.500	.370	3.282	107	.001*
Pair 7	Summary scores	.467	2.348	.230	.925	.011	2.032	103	.045*

*Significant at the 0.05 level

These findings were supported by the qualitative feedback. Clients reported that they were better able to understand their vital signs readings, and relate these to their behaviour change, as the following quotes from the THRN show:

I think the biggest impact was the increasing confidence of clients to discuss and understand their health conditions. When they first came onto the trial, they would say to us I take my BP but I don't know what the numbers mean. Just that general education about what their vital signs mean, and how they relate to their activity, what they eat. There is a varying level of knowledge of health and wellness in diet, and even fluid intake.

Well I played bowls all day and it was 36 degrees in Coffs Harbour and I only had 2 glasses of water and explaining to them the relationship between their activity, their medication and their health. Then getting them to talk to their GP about it. Nine times out of 10 they wouldn't talk to their GP about it because they hadn't wanted to bother them about it or didn't think it was important. Giving them the confidence to have those discussions and make the interactions more meaningful, and be in more control.

Feedback from one of the clients suggests that she liked to take responsibility for her self-management:

I have lots of fluctuations with my blood pressure and chronic pain. My blood pressure fluctuates with the pain. I find that looking after myself is really important. I like to take responsibility for my own health. I have to go to the doctor a lot, so I'm grateful for anything that helps me understand my health and keep on an even keel.

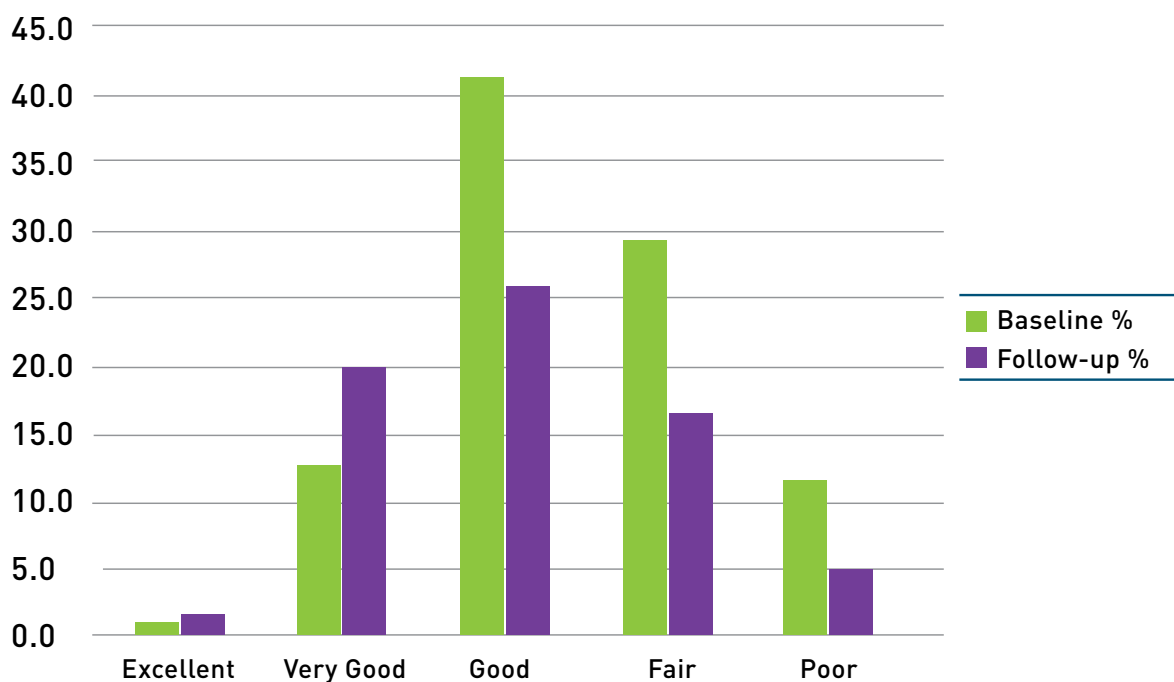


5.5.3 GENERAL HEALTH QUESTIONNAIRE

The Single General Self-Rated Health Question is a single question which asks clients to rate their health as “excellent”, “very good”, “good”, “fair” or “poor”. It is a widely used tool and is a strong predictor of mortality [66] (Figure 7). The difference in scores between baseline and follow-up was measured using paired samples T-test.

Overall, there was a significant improvement in the general health score across the cohort of 0.300 (SD= 0.80, 95 per cent CI 0.16 – 0.44, 119 df, p=0.000), with more participants reporting that their health was “excellent” or “very good” at the end of the trial (Figure 9).

Figure 9: Change in general health scores from baseline to follow-up



5.5.4 HEALTH SERVICE USE

A chi-square test was performed to test the hypothesis that there was no difference between the level of health service use at baseline and follow-up. There was a significant difference in the number of visits to the GP (Figure 10) (chi square 52.851, n=122, 12df, p = 0.000), the number of admissions to the emergency department (Figure 11) (chi square 14.950, n=122, 6 df, p=0.021), and the number of admissions to other (non-local) hospitals

(Figure 13) (chi square 61.44, n = 118, 12 df, p=0.000), but no significant difference in admission rates to the local hospital (Figure 12) (chi square 21.190, n = 122, 16 df, p=0.171). Overall there were fewer visits to the GP, emergency department and other hospitals.

Figure 10: Change in GP Use: comparison between baseline and follow-up (%)

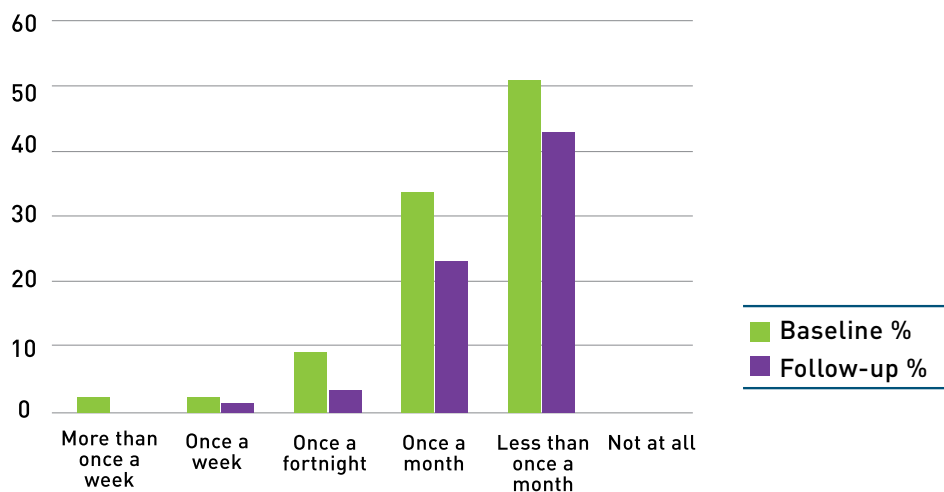


Figure 11: Change in number of visits to the emergency department at the local hospital (%)

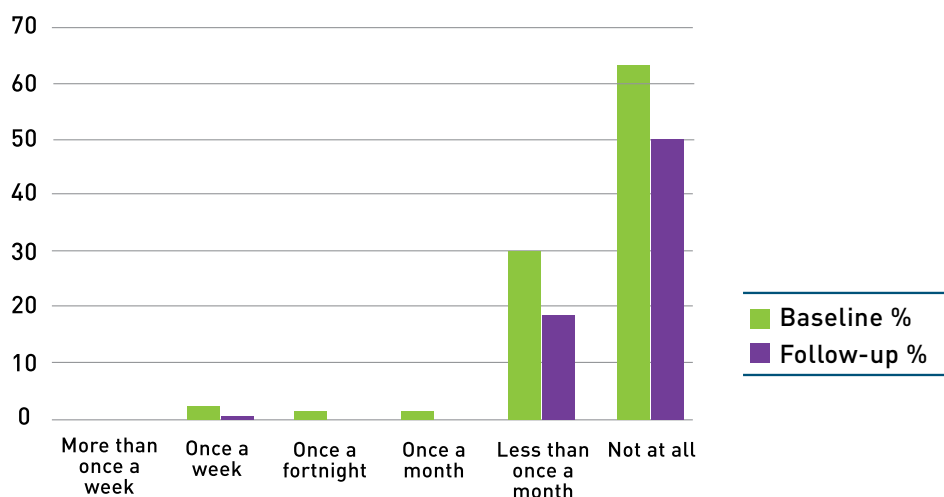


Figure 12: Change in number of admissions to the local hospital (%) (In the last year, how often were you admitted to your local hospital?)

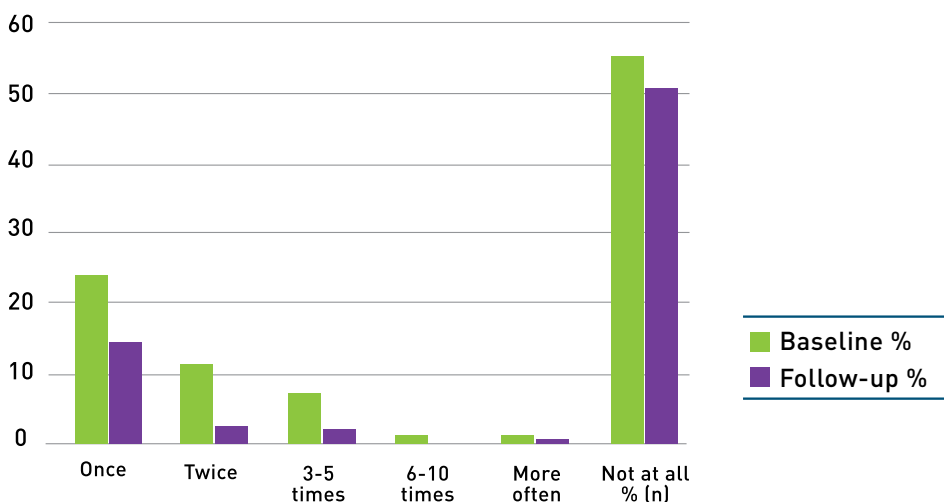
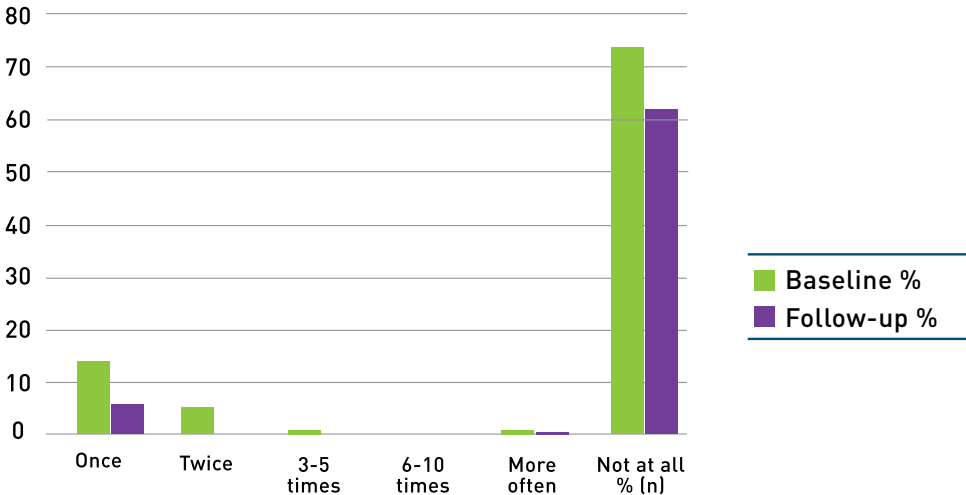


Figure 13: Change in number of admissions to any other hospital (%)



5.5.5 ANECDOTAL EVIDENCE OF AVOIDANCE OF HOSPITAL ADMISSION, REDUCED BED DAYS AND CHANGED MEDICATION FROM INTERVENTION DATA

The THRN maintained an activity log of interventions of note within the Telehealth Client Management System (TCMS). These activities were coded by the THRN according to the type of intervention (see Table 20). The evidence of avoidance of bed days, hospital save, and medication changes

were entered and coded respectively by the THRN. The direct extracts are provided below in Table 26 and have been edited only to protect client and practitioner privacy. Based on the reports below, the THRN estimated that as a result of their participation on MHCAH: six clients experienced reduced hospital bed days (Table 25); 19 clients avoided hospital admission (Table 26); and 53 clients underwent a medication change (Table 27).

Table 25: Anecdotal evidence of hospital avoidance or reduced bed days (identifying information removed)

1	Client spent two nights in hospital after THRN advised client to go straight to hospital due to poor vital signs and symptoms of lethargy. Identified that client had very low sodium levels and was now on fluid restriction of 1.5L.
2	Client spent one day in hospital after THRN recommended investigation of cerebrovascular symptoms. Initially reluctant to see GP or go to hospital. Client cleared of any acute episode and referred to neurologist for follow up.
3	THRN advised client to go to hospital following symptoms of AF and chest pain on night of 9/1. Client also advised she had recently had change in dose to INR and digoxin ceased. Initially was waiting for cardiologist to call. THRN advised not to wait. Client subsequently spent two nights only in hospital and returned to work on 14/1.
4	Client went to emergency department on 25/2 and was given pain relief. Was not admitted and returned home that evening.
5	Client started on antibiotics and saw GP while at home. Was hospitalised for IV antibiotics then discharged home. Hospital bed days likely reduced due to client seeking early interventions for pneumonia.
6	Client has been monitoring her vitals and was having elevated BSL readings. GP was made aware of elevated readings and visited client in her home. He sent her to hospital that day and she was discharged home five days later. This quick action by GP consequently resulted in less complications and a shorter hospital stay.

Table 26: Evidence of hospital save from intervention data (Names removed)

EVENT TYPE	EVENT DATE	INTERVENTION TYPE	DETAILS
Telehealthcare Intervention	18/07/2013	Hospital Save	Previous admission to hospital for pneumonia. Interventions by THRN led to doctor diagnosing chest infection and prescribing antibiotics despite appearing asymptomatic.
Telehealthcare Intervention	29/08/2013	Hospital Save	8/8 THRN discussed persistent elevated BP and client confided in high level of stress. Discussed effect on BP and ways of managing stress. Trend report sent to GP highlighting issue and that client would discuss at appointment the next day. GP elected to prescribe anti-anxiety medication as client already on 3 three different anti-hypertensive. This resulted in genuine drop in BP and reduction in symptoms within 3 weeks.
Telehealthcare Intervention	10/09/2013	Hospital Save	THRN contacted client to discuss elevated BP and client admitted to persistent headaches for previous 3-4 days. Client initially wasn't concerned and wanted to wait to see GP. THRN encouraged her to see GP and explained linked between headaches and BP and possible risk of stroke. Client saw GP the next day and management plan put in place. BP returned to within normal ranges and headaches subsided.
Telehealthcare Intervention	25/09/2013	Hospital Save	Client having elevation in BP with no known cause. Discussed with THRN and encouraged to speak with GP. GP reviewed trend report data and changed medication resulting in reduction of diastolic and symptoms of headaches and 'fuzziness'.
Telehealthcare Intervention	9/10/2013	Hospital Save	Intervention by THRN led to client commencing treatment and having intervention by GP early to prevent hospitalisation.
Telehealthcare Intervention	8/11/2013	Hospital Save	Elevated BP & wellness questions led to THRN contacting client. Client admitted to being unwell with episodes of coughing blood. Had not seen GP but had appointment the following day. Trend report sent to GP raising issue of client's symptoms. GP arranged series of tests including colonoscopy to investigate.
Telehealthcare Intervention	11/11/2013	Hospital Save	THRN contacted client regarding elevated BSL, BP and pulse. Client expressed worry over level of fatigue. Appointment made to see GP next day and interim trend report sent. GP ceased oral glycaemic medication and performed ECG and blood tests. Client then prescribed new oral glycaemic and in conjunction with trend report data, GP successfully titrated appropriate dose of oral glycaemic medication as well.

EVENT TYPE	EVENT DATE	INTERVENTION TYPE	DETAILS
Telehealthcare Intervention	22/11/2013	Hospital Save	PC from client re follow up from GP appointment yesterday. Client has been put on Ab's and prednisone as GP believes she may have bronchitis? Pneumonia. Reducing dose of prednisone commencing with 30mg, Doxycillin 100mg, Amoxil and Clav acid 850/125 mg BD. Client saw GP Chez Smith as usual GP away. Ventolin 2x puffs 2nd HRLy. To be reviewed again today at 1230 by GP.
Telehealthcare Intervention	29/11/2013	Hospital Save	THRN identified potential for infection base on elevated temp. Client high risk of infection due to immuno-supression from chemotherapy. Client initially wanted to wait few more days before seeing GP but after discussion with THRN she went next day and was diagnosed with tonsillitis and bronchitis. Prescribed oral antibiotics with instructions for follow up by GP. Would have required admission to hospital if not for early intervention.
Telehealthcare Intervention	6/12/2013	Hospital Save	Client contacted by THRN as diastolic elevated. Client admitted to stopping anti-hypertensive medication one week ago after registering one low BP reading. Did so with no advice from GP or THRN. Education provided of causes of episodic low BP (weather, dehydration etc.) and potential risk of elevated diastolic. Had GP appointment that afternoon and encouraged to discuss. Client recommenced medication and BP returned to within normal ranges.
Telehealthcare Intervention	28/01/2014	Hospital Save	GP contacted THRN regarding client who had high levels of anxiety regarding management of health now she was home alone. Wanted client to have support and supervision, preferably in hospital. Arranged ACAT assessment with help of THCM and client assessed for community care and residential respite within 24hrs. Secured respite for three weeks so client's medication and health could be stabilised. Client returned home with monitoring & support from THRN.
Telehealthcare Intervention	30/01/2014	Hospital Save	THRN discussed elevated BP with client. During regular GP appointment, client and GP discussed trend report including elevated BP. GP increased medication.
Telehealthcare Intervention	02/04/2014	Hospital Save	Client spent five hours in A&E after identification of extremely high BP which responded to treatment. Client said she was thankful for being on pilot as felt that if she hadn't then she may not have been aware of high BP issue and not sought medical help, resulting in far more serious outcome such as stroke or hospitalisation.

EVENT TYPE	EVENT DATE	INTERVENTION TYPE	DETAILS
Telehealthcare Intervention	06/05/2014	Hospital Save	Client had follow-up with GP after vitals had indicated increased heart rate. Her Atenolol dose was increased and her HR and blood pressure improved.
Telehealthcare Intervention	20/05/2014	Hospital Save	Client had been experiencing episodes of tachycardia and a-fib and went to see GP as a result. An urgent referral was sent to a cardiologist and her medication was increased to help control her heart rate.
Telehealthcare Intervention	22/04/2014	Hospital Save	Potential hospital save for client. She was having episodes of hypotension at home, putting her at increased risk for falls. She saw GP 17/04 and her Micardis was discontinued. Client stated she felt much better as a result.
Telehealthcare Intervention	23/06/2014	Hospital Save	Client received follow-up with GP over for increased shortness of breath and productive cough. He was prescribed antibiotics and was watched carefully post P.E.'s. Client has been more aware of his link between shortness of breath and low SPO2 as well as when to seek assistance from GP to prevent hospitalisation.
Telehealthcare Intervention	24/04/2014	Hospital Save	Client having low BP on MHCAH. Rechecked BP and continued to be low. Advised client to see GP today. He was able to have someone drive him in to see GP. Client states his BP returned to around 100 systolic and GP happy about that. Client being sent for blood tests.

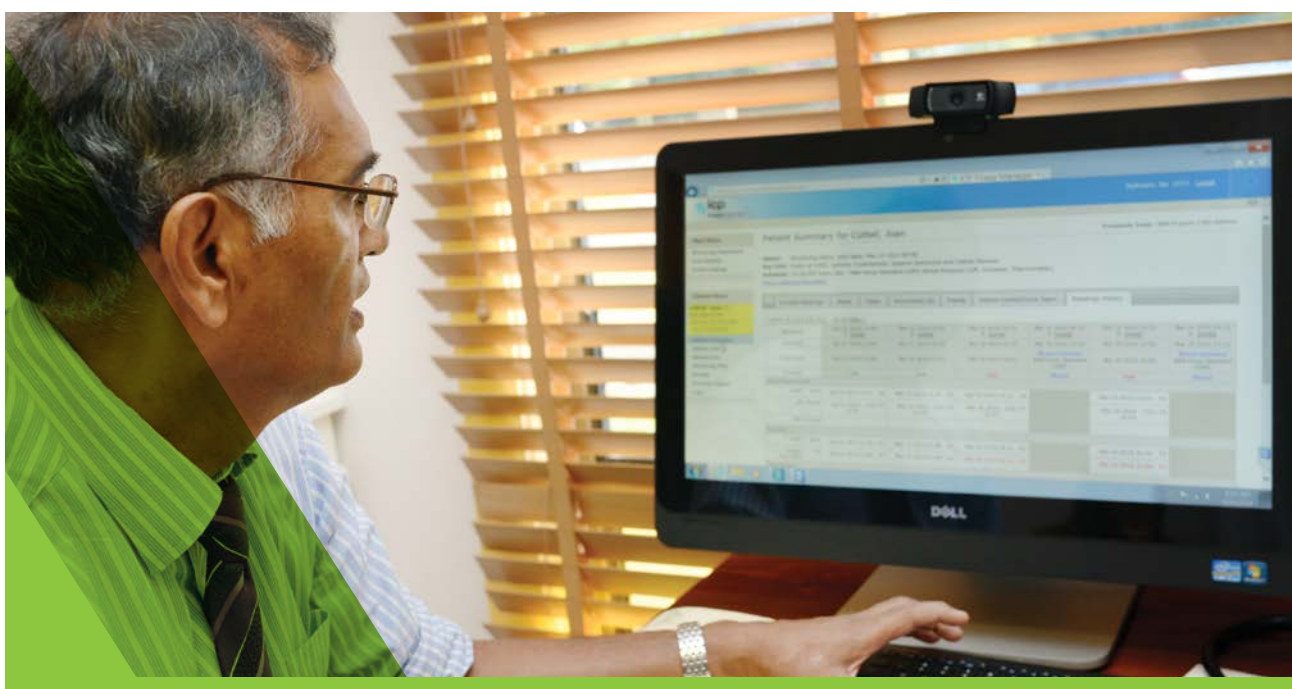


Table 27: Anecdotal evidence of medication change as a result of MHCAH (Names and Dates removed)

EVENT TYPE	INTERVENTION TYPE	DETAILS
Telehealthcare Intervention	Medication Change	Pc to client today re interviews, client stated he has had his Insulin reduced from 30u to 20u per day. RN's will keep a close watch on changes to BSL.
Telehealthcare Intervention	Medication Change	Second letter sent to GP for vital signs.
Telehealthcare Intervention	Medication Change	Client advises the following medication changes: 1. Norvasc 10mg mane change to 5mg nocte2. Avapro 375mg mane changed to nocte3. Ceased Mobic 7.5mg, Lipitor 80mg and Nitro-Dur patch 10mg4. Re started on or 80mg5. Mersyndol PRN for pain relief.
Telehealthcare Intervention	Medication Change	GP has prescribed client Micardis plus which is to start tomorrow. Hoping this will allow for better control of diastolic BP.
Telehealthcare Intervention	Medication Change	Discussed elevated BSL from weekend readings. GP changed medication to Janumet approximately two weeks ago and was taking half a tablet. GP increased this to a full tablet on Friday as client has 'school sores'. Discussed effect wound would have on BSL. Discussed taking BSL prior to breakfast and will go back to this from tomorrow. Client advised she is going away from 19/11 until 29/11.
Telehealthcare Intervention	Medication Change	Client advised GP ceased Micardis Plus and put him back on Micardis.
Telehealthcare Intervention	Medication Change	GP ceased Miacardis.
Telehealthcare Intervention	Medication Change	GP has increased Metoprolol to 50mg BD.
Telehealthcare Intervention	Medication Change	Changes to medication now on Insulin S/C new to attempt to control BSL still taking Metformin BD also. Magnesium BD also. Now taking Coversyl; will continue to monitor BSL with new changes. Also a Trend report will be sent to client as offered.
Telehealthcare Intervention	Medication Change	In call with Client he mentioned that his medication was changed after his last meeting with Dr to a stronger BP medication.
Telehealthcare Intervention	Medication Change	Saw GP yesterday and he ceased her pain patch and recommenced her on Tramadol 200mg x ii TDS PRN.

Clients were asked to report on their use of other health service providers, both at baseline and at discharge. The results are outlined in Tables 28 and 29 below.

Table 28: Service use at baseline (n=181)

In the last year, did you receive any services from the health care providers listed below?

Please tick the Yes box for any that you received services from and in the next box, circle how often you received those services.

TYPE OF SERVICE	HOW OFTEN? (% (N))					
	Tick if Yes % (n)	Every Day	2-4 times a Week	Once a week	Once a Fortnight	Less often
Community Nurse	22 (39)	1 (2)	2 (3)	3 (6)	2 (3)	14 (25)
Physiotherapist	29 (52)		1 (2)	4 (8)	2 (4)	21 (38)
Occupational therapist	11 (19)	1 (1)	1 (1)	9 (17)		
Podiatrist	42 (76)					42 (76)
Naturopath	7 (12)	1 (1)				6 (11)
Massage therapist	16 (29)	1 (1)		1 (1)	2 (3)	13 (24)
Dentist	41 (74)	1 (1)			2 (3)	39 (70)
Other (please specify) *	12 (21)	1 (1)	1 (2)		3 (5)	7 (13)

*Others include optometrists, chiropractor, eye specialist, vascular surgeon, community mental health nurse, acupuncturist, neurosurgeon, community transport, diabetes specialist, hydrotherapy, psychologist, dietician, pulmonary rehabilitation.

Table 29: Service use at discharge (n=122)

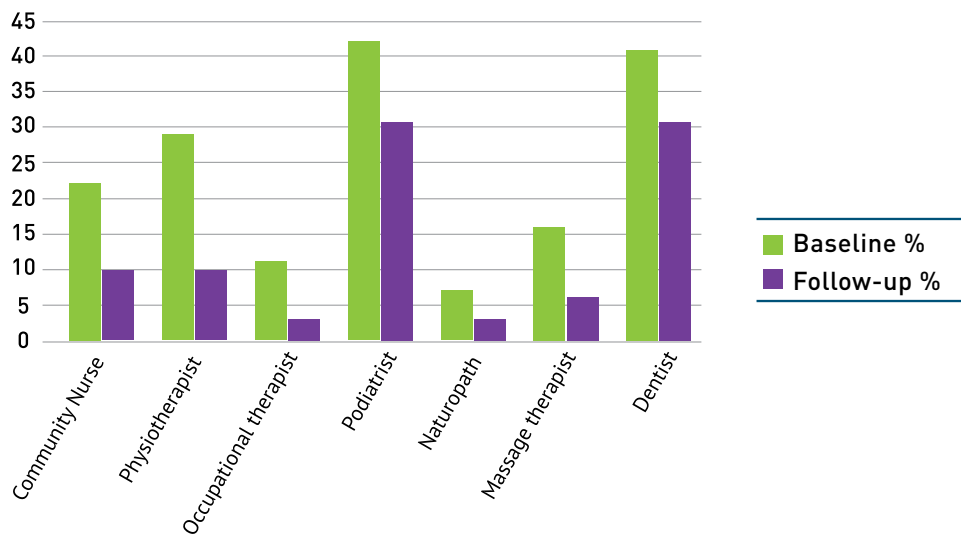
TYPE OF SERVICE	HOW OFTEN? (% (N))					
	Tick if Yes % (n)	Every Day	2-4 times a Week	Once a week	Once a Fortnight	Less often
Community Nurse	10 (19)		3 (6)	1 (2)	1 (2)	5 (9)
Physiotherapist	11 (20)			1 (2)		10 (18)
Occupational therapist	3 (6)					3 (6)
Podiatrist	31 (56)					31 (56)
Naturopath	3 (6)					3 (6)
Massage therapist	6 (11)				1 (1)	6 (10)
Dentist	31 (57)					
Other (please specify) *						77 (139)

*Others include chiropractor, psychologist, dietician, psychologist, acupuncturist, hydrotherapy, community mental health nurse, community transport, diabetes educator, ophthalmologist, urologist, kidney specialist, optometrist, vascular surgeon.

Figure 14 illustrates the change in client reported health service use between baseline and follow-up (% of clients who accessed this type of practitioner). Overall health service use was observed to decline, most notably the reduction in community nurse, physiotherapy and occupational therapy input. However

this was only statistically significant for physiotherapy use (chi square 6.346, n=15, 2 df, p = 0.042). Notably, the frequency of health service use declined from multiple weekly visits at baseline to being predominantly less often than once a fortnight.

Figure 14: Change in rates of overall service use over the duration of the trial (%)



5.5.6 HEALTH PROVIDER ENGAGEMENT

The short-term nature of the trial, and the fact that the majority of the trial was delivered outside a Feros Care service delivery area, created a challenge for the recruitment and engagement of health service providers. Table 30 below illustrates the numbers of health practitioners engaged with the trial for the

duration of the project. The clinicians below are the ones who underwent training and received the equipment, however only one GP actually used teleconferencing with any of the MHCAH clients. The case managers were employees of the LHDs. In addition to the participants below, 51 GPs received trend reports pertaining to their clients on MHCAH.

TABLE 30: Number of health professionals participating in MHCAH pilot

	APR-13	MAY-13	JUN-13	JUL-13	AUG-13	SEP-13	OCT-13	NOV-13	DEC-13	JAN-14	FEB-14	MAR-14	APR-14	MAY-14
GPs	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Nurses	2	2	2	2	2	2	2	2	2	2	2	3	3	3
Allied Health	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Case Managers	2	4	7	7	7	7	7	7	7	7	7	7	7	7
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6	8	11	11	11	11	11	11	11	11	11	12	12	12

5.5.7 GENERAL PRACTITIONER SURVEY

Service provider feedback was obtained by circulating a survey to the GPs who received trend reports for their participating clients (n=51). It is important to note that only one GP actively engaged in MHCAH in terms of video-conferencing clients. The remainder of the GP perceptions were based only on their experience of receiving the trend reports. After one reminder, the General Practitioner Survey response rate was 41 per cent (21/51). One respondent only completed half of the survey. Respondents were asked to rate the extent

to which they agreed with each of the statements in Table 31 on a 10 point Likert scale, where 0 indicated strongly disagreement, and 10 indicated strong agreement. The results are presented in descending order according to their level of agreement with the statement. The only responses with a mean score of five or greater were the extent to which home monitoring had increased the workload of the GP and a perception that patient involvement in telehealth had a positive effect on patient adherence.

Table 31: Results of the General Practitioner Survey

RESPONSE SCALE 1 (STRONGLY DISAGREE) - 10 (STRONGLY AGREE)	N		MEAN	MEDIAN	MODE	SD
	Valid	Missing				
Daily home monitoring of patients has increased my workload	20	1	5.6	7.0	7.0	3.47
Involving patients in their care through telehealth has a positive effect on patient adherence	21	0	5.0	5.0	3.0	3.12
Trend Reports are helpful in the development of my patients' treatment plans	21	0	4.4	5.0	1.0	3.28
Daily home monitoring enables me to receive useful information about the patient that I would not normally receive	21	0	4.0	2.0	1.0	3.22
I would recommend video conferences based consultations to other physicians	20	1	4.0	3.0	0.0	3.59
Daily home monitoring facilitates early detection for my patients	21	0	3.9	3.0	5.0	2.93
Video-conferencing provides an adequate environment to undertake meaningful patient consultation	20	1	3.8	3.5	0.0	3.57
The technical difficulties outweigh the benefits of videoconferencing with my patients.	20	1	3.7	3.0	0.0	3.45
I would like this service to continue	20	1	3.7	2.5	1.0	3.25

RESPONSE SCALE 1 (STRONGLY DISAGREE) - 10 (STRONGLY AGREE)	N		MEAN	MEDIAN	MODE	SD
	Valid	Missing				
Video-conferencing gives the opportunity of housebound and elderly clients to access timely GP support	21	0	3.4	2.0	0.0	3.26
Daily home monitoring has enhanced the standard of services for my patients	21	0	3.2	2.0	1.0	2.66
Daily home monitoring assists in reducing A&E visits	21	0	3.0	2.0	1.0 ^a	2.20
Daily home monitoring assists in reducing hospitalisation	21	0	2.9	2.0	1.0	2.26
I would recommend the use of daily monitoring to other physicians	20	1	2.8	1.5	1.0	2.83
Monetary compensation for video consultations during the pilot was at an appropriate level	20	1	2.7	1.0	0.0	3.39

GPs were able to request the format in which they received the client's trend reports. Their preferences are detailed in Table 32. By far the majority of GPs wanted to receive their trend reports by facsimile. Only one requested their report by email, suggesting a low rate of technology usage amongst participating general practices.

Table 32: Format in which GPs requested trend reports

GP REPORT REQUESTS	NUMBERS
Did not want to participate	4
By Mail	0
By email	1
By Fax	67 – 46 requested this & 21 by default
By secure messaging	0

QUALITATIVE FEEDBACK FROM THE GENERAL PRACTITIONER SURVEY

Practitioners were asked “Please tell us what impressed you about the home monitoring service”. In response, five GPs perceived that MHCAH may have some potential benefits:

*Good results and trends useful for certain, carefully selected patients for time limited period.
It is in its infancy and will develop. Patients need to be seen more often to review the results face to face for it to be meaningful.*

In particular, two respondents perceived that MHCAH could help patients take more ownership of their health problems:

*Helps patients to be more proactive about their health.
Patient ownership of health problems - could help with meeting treatment goals and compliance with treatment through better understanding.*

One could see the potential benefits to enhance access to services:

The rapid access to specialist services that would otherwise require the patient to travel would be expensive for the patient

Six GPs responded that the trial was not relevant or useful to them:

*Not clinically relevant.
Unfortunately I did not learn anything about my patient that I did not already know or assess.*

One GP was unhappy that the client was recruited without their consent, even though the clients self-referred to the project:

The sourcing of the patient was done without my consent. I don't think this is appropriate.

GPs were asked to provide suggestions on how MHCAH could be improved. Suggestions included the use of secure electronic transmission of trend reports rather than facsimile to improve the legibility of the data and having access to the data in ‘real time’. In addition, one GP suggested that more meaningful parameters could be included in the reports.

Client selection was another area for improvement identified by GPs. In particular, one GP suggested that

better patient selection [would] avoid masses of unhelpful data and another suggested that clients should be selected only on referral by GP or provider who is looking at monitoring phone advice service for patients who have concerns about their readings.

One GP commented that they did not perceive that their client had been a suitable candidate for monitoring

His illnesses are stable and not usually those to be monitored.

One respondent suggested that more education was required for GPs around telehealth use. Another recommended extending the reach of the service *so that it is not just for country but can be outer metropolitan.*

5.5.8 SERVICE PROVIDER FOCUS GROUPS

The two service provider focus groups illustrated important insights about the way that MHCAH impacted on their relationship with the client.

IMPACT OF MHCAH ON CLIENT RELATIONSHIP

The GP who participated in the focus group felt that telehealth gave clients alternative options to attending health services:

It gave patients alternative access to the practice. If they were unable to physically be there, they could arrange a video conference; it gave them an alternative contact (GP).

In addition, the use of MHCAH enabled the GP to have a better understanding of health events after they took place by being able to map the vital signs monitoring on the trend reports:

When patients complain of physical disabilities, you only see them after the event, once they are stabilised and you've got no idea what they were talking about. Usually we would say, go to the emergency department if you feel that way. But you don't have any way to see what they were going through. Here I can see they were feeling unwell, and through the vital sign monitoring, I can see a dip in their BP or oxygen saturation, and know that that is probably the event, and may direct me to some medications or whatever. I can also see that if they were really in trouble, then the immediate response is to get an ambulance out rather than go to the GP.

While all health service providers agreed that nothing replaces 'hands on' interactions to be able to make a diagnosis, the ability to see a client, and have access to their vital signs was a useful clinical tool to help guide triage or treatment:

Nothing can replace being able to touch someone, listen to their chest sounds. From a nursing point of view, it's a great triaging tool. Being able to pick up subtle, little things that you just can't get over a telephone call, to be able to see them moving around. You can tell that something isn't right. Being able to see them even if you're not physically in the room, you can make a quicker decision about where to next. (Local Health District Case Manager)

If we see their vital signs, and there is something wrong, like their blood pressure is outside the range, and then we phone them, and they look fine then they tell us they ran up the stairs before they took their vitals. Alternatively, we had a client whose vitals were terrible, and on the video conference he looked terrible and we could say, not that you need to see your doctor, but get an ambulance. So being able to see the client and having their vital signs means you can quickly decide what the next course of action is. (THRN)

There is scope to work out which patients and circumstances it will work well for... unless you make the contact and get the information you can't make the diagnosis. Time is important, so in the spectrum of things we deal with, Telehealth definitely has a place but it can't overshadow or replace all of the face to face visits (GP)

VITAL SIGNS MONITORING

Some of the written and verbal feedback from the GPs suggested that self-monitoring of vital signs made the clients worry more about their health. However the health service providers perceived that having more information gave the clients a moderating effect on their health, reassuring the 'worried well', and informing those who may really be unwell:

Some clients become overly anxious about their health, but they were anxious beforehand. These are the ones who self-monitored all the time and they go for bike rides every day. They are really quite fit. For these clients, it's giving them reassurance that they're actually healthy, and they are reassured that they don't need to worry. For these clients, it makes them less anxious. Then there are the others who didn't worry about their health, but their symptoms are quite serious, and getting them to see the health professional. I had a lady whose blood pressure was very high. The GP had done a lot of tests. This day it was very high and she was having symptoms. I said, I really think you need to see someone. I said if it gets any worse, you really need to see someone or go to hospital. In the end she did. Her blood pressure was 225/95. She could have had a stroke. She went to the hospital. She said that if we hadn't had the discussion she'd have put it down to her RA and gone to bed. (THRN)

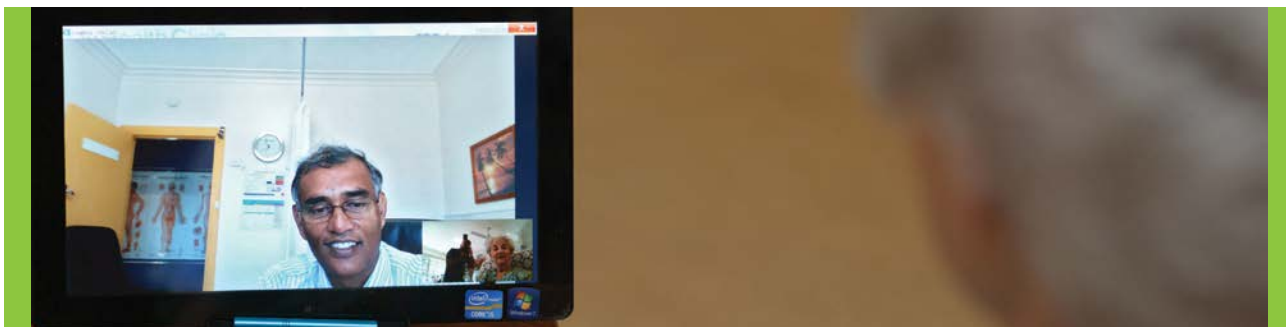
The trends have given the patients a reference point, to start a conversation and I can then investigate. There is now documentation to support the client's conversation (GP)

There were no examples of client anxiety increasing as a result of the daily vital signs monitoring, rather, practitioners perceived that self-monitoring helped the clients to better understand their disease and appropriately self-manage their condition. The LHD care managers perceived that the vital signs monitoring reinforced clients' understanding of their symptoms and illness because they had some objective data to support their subjective experiences of their health or symptoms. In some cases, clients' symptoms were subtle, and they underestimated the extent of their health problems, so the vital signs monitoring provided an earlier, objective trigger for action.

APPROPRIATE USE OF VIDEO-CONFERENCING

Service providers were asked to comment on whether their clients always used the video-conferencing appropriately. The telehealth technician said that there had been 330 VC calls from clients to the THRN in the preceding month. They acknowledged that they developed a personal rapport with the clients, and sometimes had 'social' chats with the clients:

Some do ring up for a chat. There are some who are lonely. Others just call us to share things in their life. There is a bit of a social aspect as well, but that's OK, we develop a bit of a bond with them. We also had to educate them about when we are available, because sometimes they would try to contact us on the weekend or after hours. (THRN)



The use of video-conferencing in clinical interactions required planning on behalf of the service provider, and ideally, some protected time to perform the video-conferencing. Although there was one example provided of a GP who carried his tablet with him and carried out video-conferencing 'on the go':

It does take some time, you have to go through documents, make time to organise the video conference. It requires some effort. If it becomes the main way of doing it, I don't know how it will impact on the practice. At the moment it can be absorbed. The main impact is the time set aside to do the preparation to get something worthwhile out of it. You've also got some loss of control. You've got to realise you've got other things to do that you can't fit in. Wednesdays work well for me because that's the day I set aside for home visits. If it had to be any time during the week, I don't know how it would work. (GP)

In addition, video-conferencing into the home provided health service providers with a more realistic picture of what was happening in the client's home, compared with teleconferencing or even a face-to face meeting:

But also looking into the home and with the carer, they forgot or didn't realise we could see and hear everything going on. It gave us an insight of what's going on in the home when people aren't around. This is really useful when we case manage clients. We can deal with carer stress. We're not just dealing with the client; we're dealing with the whole home situation. There was one situation where we suspected that carer stress was going on, and it just reinforced that suspicion. (Local Health District Case Manager)

However the ability to be seen meant that practitioner behaviour also had to be modified:

Some patients are really challenging, but you need to become really aware. You can roll your eyes when you're on the phone, or pull a particular facial expression but when you're in a video conference you can't do that. So I got caught once, I didn't do it again. I don't know whether the patient actually saw it. (Local Health District Case Manager)

The health service providers also highlighted the need for guidelines regarding client privacy:

The need to have information is good because it helps you to be more aligned to what is really happening, but there is a fine line about privacy. Where do you draw the line? you are going into an area you haven't been invited to. (GP)

Service providers acknowledged the need to inform clients at the beginning of the video conference that everything they say can be seen and heard. Similarly, if the health service provider is not wearing headphones, it is possible that their conversation will be audible within their office space.

Yes, we'll phone a client, and they'll say, "I thought I'd hear from you this morning" because their vital signs were abnormal... I haven't had anyone say that they were concerned by us watching them too much. (THRN)

However the monitoring also extended to the health service providers. When staff from the LHD had technical difficulties and contacted the staff at Feros Care, they were unaware that they could be seen.

Just little technical issues. It did mean maybe phone call to Michael or Anthony. When we got the help button, we pressed the help button. Michael could see what was going on in the office, but we didn't realise he could. (Local Health District Case Manager)

The participating staff also acknowledged that the service users were more technically literate than they were.

There were some technical issues from time to time. None of us are computer savvy. Most of the clients were better educated than we were. Like, they could see us, but we couldn't see them. I thought as long as I could see them, it was ok. It was like doing a phone call. (Local Health District Case Manager)

BARRIERS AND FACILITATORS TO INTRODUCING TELEHEALTH SERVICES

The participants identified four priorities to facilitate the uptake of telehealth services:

1. Ensuring a stable technology platform (such as NBN),
2. Providing appropriate funding / reimbursement models for practitioners,
3. Ensuring the physical environment is appropriate for the introduction of telehealth technologies, and
4. Supporting change management with health practitioners and organisations.

A stable and reliable technology platform was seen as key to the introduction of VC consultations between health service providers and clients.

4G is good, but not reliable enough. You would not want to be setting up a consultation with a GP and client because it just drops out. (Feros Technician)

Participants were asked what would need to change to increase the uptake of telehealth services they are working in. They identified the main barrier to uptake being a lack of Medicare rebate for GPs, and the participants perceived that specific Medicare Benefit Scheme item numbers would be required for telehealth delivery.

Until the Commonwealth recognises that GPs are the absolute key people in this, and pays them accordingly, it is not going to take off. This will be a huge barrier. I would like to see this group make this recommendation. Until GPs are paid to do this, it won't work. (GP)

In particular, there was a recognition that the fixed costs of providing general practice services are very high, but the only income source is from seeing patients. Anything that takes time away from patient care reduces practitioner income. This was seen as a particular barrier for group practices because of the focus on profit margins. Participants perceived that the ability to introduce new technologies would be limited sole practitioners who have sufficient autonomy to experiment.

Confidentiality was raised as another issue by the focus group participants.

Confidentiality is a huge thing. If we're doing any case management, anything with client content shouldn't be undertaken in an open office environment. Or at least use a screen so there is privacy. If you have a headset, people can see what's going on in the room. There is a need to provide privacy/confidentiality from the provider end. (Local Health District Case Manager)

Education of health service providers was also identified as an important mechanism to facilitate the introduction of telehealth.

Whenever there is something new they don't know about it, they focus on the negatives. So what comes out of this is to look at the positives – to show that there are positive sides to this, to crystallise it. How it saves time, how it improves health. (Local Health District Case Manager)

There was also some perceived scepticism by GPs about yet another short-term innovation that may not be sustained.

Look at the models we were presented with before, and doctors would get involved and look at the outcome. They will lump anything like this, like Coordinated Care, if you want to talk to them about a group of doctors with good intention. Where is the Division of General Practice? Where is the Medicare Local going? I don't have time to go through this and find that there is nothing at the end of it, I'd rather do what is tried and proven. (GP)

In addition, some GPs were unwilling to participate because the trial was for a finite period of time.

The LHD staff identified the need for change management to help facilitate the uptake of telehealth technologies and overcome resistance to change by existing staff.

I think in our organisation, like community health, there will always be people who will give this a go, and people who will embrace it, or people who will say, I've been working this way for 35 years and I'm not prepared to change. (Local Health District Case Manager)

Yes – because we're so used to dealing with patients face to face, there was a new concept to take on. You had to be very mindful that this isn't a real situation, so I wasn't all that comfortable with it. I'm very comfortable seeing people one-on-one in their home, but talking to them on technology I found really hard. I think it is a lot about education. I was really challenged. When something didn't work right, it caused a lot of anxiety and put a lot of pressure on to get it rectified, because I'm presenting myself as a representative of our LHD, so if I don't know how to fix things, it's like "what are you guys really doing". (Local Health District Case Manager)

Staff also need to be able to adapt the way they interact with clients and overcome their own fears of using VC technology.

*From a nursing perspective the challenge is that you either talk on the phone, or see them face-to-face so you can touch, listen all those sorts of things. You can see and hear, but you can't touch. Getting nurses to understand that it is a good way to communicate with the patients, it does work really well. We've all got issues with having to see ourselves on a VC. Personally, don't like photos, don't like videos. You have to get over those barriers and run with it. I'm pleased I took up the challenge and got over those issues. I was a sceptic at the beginning, but my attitude coming out the other side is different to my attitude at the beginning.
(Local Health District Case Manager)*

The LHD staff also identified the lack of appropriate physical space as a challenge to delivering telehealth. They had four staff in a single office, which limited client confidentiality.

The fact that we're all sitting there and everyone can listen to the conversation, you became really aware of everything that was happening in the room. (Local Health District Case Manager)

They identified clients with diabetes who would be willing to VC the dietician, however the lack of designated space prohibited this.

*I've got clients with diabetes who have to physically come to see the dietician. The client said it's a shame I couldn't VC with the dietician, and the community options could have helped this. But if this was set up in our room, it's another space that someone has to sit in [ie the dietician to deliver group treatment]. We need a designated area to implement video-conferencing.
(Local Health District Case Manager)*

Again, the participants recognised the willingness of clients to embrace technology.

*The clients don't have an issue with the technology. They're the ones saying we want to do this – I don't want to look at myself, but at the end of the day, they have been open to it. People have a perception that the consumers will have an issue with this, and they don't. They've embraced it. They've said that they want to do this. The client says I wish I could have VC'd the dietitian. We've got 90 year old people doing this who have no issues. Most of them find it empowering.
(Local Health District Case Manager)*

One of Dr [name's] clients was like I don't need my family to take me to the doctor because I can VC. (THRN)

CASE STUDY: CLIENT VIDEO-CONFERENCE WITH GENERAL PRACTITIONER

Client was referred to the MHCAH pilot by her GP in May 2013. The client was a 91 year old widow who lived alone and had no living family although she had a strong group of local friends who provided support. She had a history of pulmonary hypertension, aortic valve disease with mitral stenosis and insertion of coronary artery stents in 2006 and 2009. Client's friends also provided transport to attend appointments and social activities as she was unable to drive.

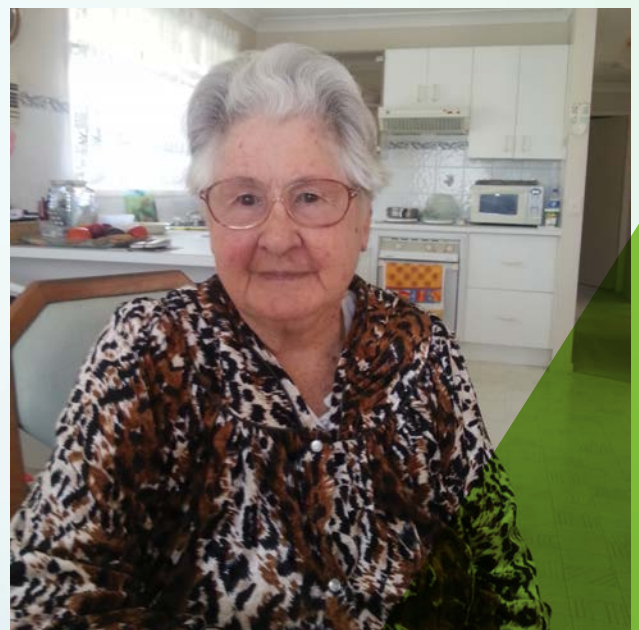
At the end of July, the THCM contacted Client to conduct a full assessment and established that Client claimed no memory of any previous calls regarding participation in the pilot and was reluctant to sign up until speaking with her GP. Following a visit to her GP, Client phoned to advise that they had discussed the pilot and she wanted to participate although she expressed concerns at being able to use the technology. In mid-August the THCM completed assessments with the client and discussed the pilot, benefits of videoconferences and other packaged care services available to assist with managing her health conditions at home without relying on support from friends.

The first planned installation of the MHCAH equipment and NBN connection was cancelled by Client due to her feeling unwell. The THRN phoned to discuss with the Client and she expressed that she was anxious about getting results of an echo cardiogram (ECG) that afternoon. THRN used this opportunity to discuss the benefits of having daily vital signs data to monitor her cardiac condition and Client agreed on a new installation date.

Installation went ahead as planned although Client was reluctant to begin using the equipment, stating she was unwell and did not wish to commence the interviews until she was feeling better. Client's GP attended her residence for a home visit on two separate occasions to check up on her as she was unable to leave the house. The Telehealth Support Officer (THSO) contacted Client on 4 September and offered assistance using remote

access to take her through her interview. Client advised that she had been taking her Blood Pressure (BP) and using oximeter over weekend but was hesitant to use the tablet. THSO provided the same support the next day and from this date the client was able to complete interviews successfully on her own.

At the same time the THSO, following client's disclosure that she had been receiving home visits, discussed a video conference option with client. The client's GP was very supportive of this option and as a result a trial video conference was conducted between the GP and Client on 5 September. Feedback from both the GP and Client was that they found the experience to be "positive" and "beneficial". Client was enthusiastic about attending her interviews on a daily basis and was grateful that THRN's were there to monitor and make contact when she was unwell. Client has also expressed that she was reassured to know that if she becomes unwell another videoconference could be arranged with GP, eliminating the need for friends to drive her or for her GP to make home visits.



5.6 SCALING AND SUSTAINABILITY

5.6.1 CLIENT PREFERENCES FOR THE ONGOING USE OF TELEHEALTH

In terms of ongoing use of telehealth, one third (34%) wanted to continue using the technology indefinitely, however the majority of respondents were happy to finish using the technology when the trial concluded (48%) (Table 33). A further 9 per cent said they would like to continue using the technology for a short period of time. These findings were reflected in the interview data. Some participants wanted the ongoing reassurance

of daily monitoring, while another group felt it was useful for a limited time to help overcome a specific issue or health problem. A third group had participated for altruistic reasons (to support the evaluation) and out of curiosity, and were not interested in ongoing use of MHCAH due to the stability of their condition.

User willingness to pay for the technology was relatively low (Table 34), with most (57%) respondents reluctant to continue using MHCAH if they had to pay for it. Less than one third (29%) of respondents were prepared to pay up to \$20 per week. Only one respondent expressed willingness to pay \$41-\$50 per week.

Table 33: CEQ If you could continue using My Health Clinic At Home pilot, would you choose to do so? (n=128)

ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
No – I am happy to finish when the trial finishes	47.7	61
Yes I would like to continue to use the technology indefinitely	34.4	44
Yes I would like to continue to use the technology for a short period of time	9.4	12
Comments	5.5	7
Missing	8.6	11

Table 34: CEQ If you were to continue with My Health Clinic At Home pilot, how much would you be prepared to pay for the service you received (including internet costs*)? *Internet costs are typically between \$30 - \$60 per month. (n=128)

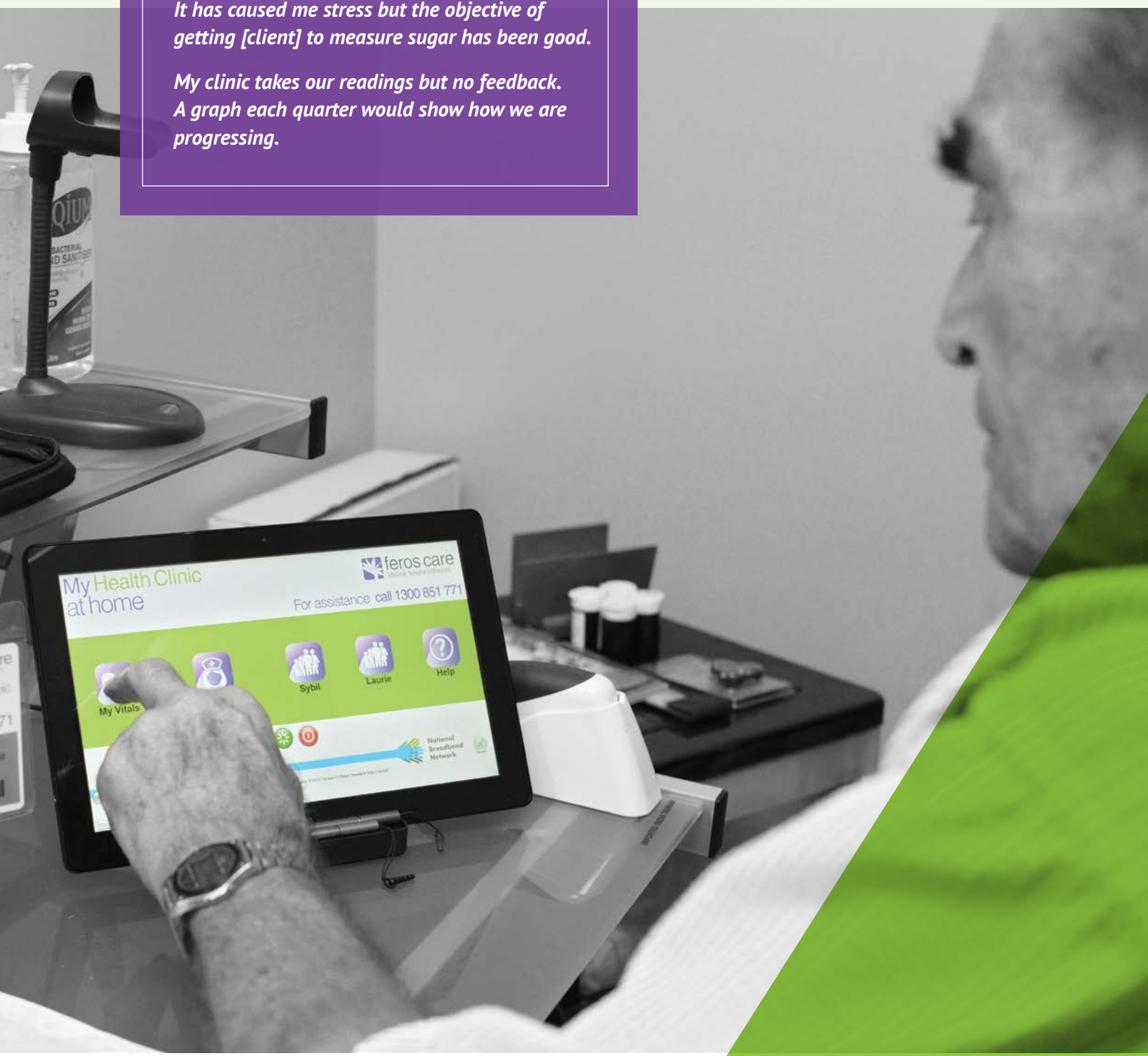
ANSWER OPTIONS	RESPONSE PERCENT	RESPONSE COUNT
I would not have the service if I had to pay for it	57.0	73
Less than \$10 per week	19.5	25
\$11 - \$20 per week	3.9	5
\$21 - \$30 per week	0.0	0
\$31 - \$40 per week	0.0	0
\$41 - \$50 per week	0.8	1
\$51 - \$60 per week	0.0	0
More than \$61 per week	0.0	0
Missing	18.8	24

Other responses included:

If it stays free.

It has caused me stress but the objective of getting [client] to measure sugar has been good.

My clinic takes our readings but no feedback. A graph each quarter would show how we are progressing.



5.6.2 CLIENT PREFERENCES FOR ONGOING SUPPORT PACKAGES

Not all participants completed this section of the questionnaire, so the results are presented as a proportion of the number of respondents to each question. The following questions explored patient preferences for the ongoing use of five components of MHCAH: the level of THRN support; technical

support; vital signs monitoring; video-conferencing; and cost. The package of telehealth that accounted for the majority of client preferences was: access to a THRN during business hours; technical support during business hours; daily vital signs monitoring; no video-conferencing; and free access, or costing no more than \$10. Response data is detailed in Table 35 below.

Table 35: Client preferences for ongoing telehealth support packages

WHAT LEVEL OF CLINICAL (TELEHEALTH NURSE) SUPPORT WOULD YOU LIKE?	RESPONSE PERCENT	RESPONSE COUNT (N=74)
24 hour / 7 day a week access to a nurse	33.8%	25
Access to a nurse during business hours only	43.2%	32
No clinical support	23.0%	17
Other (please specify)	-	4
What level of technical support would you like to receive?		(n=78)
24 hour / 7 day a week technical support	28.2%	22
Business hours only	52.6%	41
No technical support	19.2%	15
Other (please specify)	-	5
What level of vital signs monitoring would you like to receive?		(n=76)
Daily vital signs monitoring (including doctor reports)	43.4%	33
Weekly vital signs monitoring or as needed (including doctor reports)	39.5%	30
No vital signs monitoring	17.1%	13
What level of support would you like with video conferencing?		(n=82)
None thanks I can use it myself	28.0%	23
I do not want to use video-conferencing	35.4%	29
I would like facilitated video-conferencing	20.7%	17
I would like access to a range of services through video-conferencing	26.8%	22

WHAT LEVEL OF CLINICAL (TELEHEALTH NURSE) SUPPORT WOULD YOU LIKE?	RESPONSE PERCENT	RESPONSE COUNT (N=74)
Based on the preferences you have selected above, how much would you be willing to pay to receive ongoing tele-care services (including internet costs*)?		Response Count (n=83)
I would not have the service if I had to pay for it	56.6%	47
Less than \$10 per week	31.3%	26
\$11 - \$20 per week	9.6%	8
\$21 - \$30 per week	1.2%	1
\$31 - \$40 per week	0.0%	0
\$41 - \$50 per week	1.2%	1
\$51 - \$60 per week	0.0%	0
More than \$61 per week	0.0%	0

*Internet costs are typically between \$30 - \$60 per month.

5.6.3 COSTING FOR ONGOING USE

The MHCAH telehealth service has 22 potential cost components to be considered in pricing services for ongoing delivery. It is important to note the costs outlined in Table 36 below do not take into consideration the cost of establishing the telehealth service and are based on the assumption that the service has:

- Recruited and trained personnel with experience in the use of the technology.
- Established telehealth systems including: the policies and procedures involved in operating a service; client management database; video-conferencing infrastructure; and contracts with third parties.

Feros Care had been operating telehealth pilots three years prior to the opportunity of the NBN pilot. During this time, Feros established strong quality management systems certified to ISO9001: 2008. The pricing below does not factor in the efficiencies of experienced telehealth providers.

The pricing provides two different services options:

- 1) Vital Signs, Video-Conferencing & High Speed Broadband (HSB): The MHCAH is used to take daily vital signs, with the client participating in virtual calls with THRN, GP, Case Manager and/or other health professionals. This may also include friends and family video conferences.
- 2) Video-Conferencing & High Speed Broadband (HSB): The MHCAH is used to provide video-conferencing capability only, with the client participating in virtual calls with THRN, GP, Case Manager and/or other health professionals. This may also include friends and family video conferences.

TABLE 36: Cost components of MHCAH Service

COMPONENTS		1. VITAL SIGNS, VIDEO CONFERENCING & HSB*		2. VIDEO CONFERENCING & HSB*	
		ONE-OFF	WEEKLY ONGOING	ONE-OFF	WEEKLY ONGOING
Assessment, Installation & Training					
1	Client assessment & admission	\$106.00		\$53.00	
2	MHCAH configuration including personalised vital sign & wellness interview	\$140.00		\$35.00	
3	Installation and training	\$70.00		\$52.20	
4	Post installation support visit	\$70.00		\$35.00	
Technology					
5	MHCAH tablet, headphones		\$14.74		\$14.74
6	Licence fee - user interface		\$ 2.31		\$2.31
7	Peripherals		\$12.54		
8	Internet		\$16.26		\$16.26
9	Licence fee – vital signs gathering software		\$2.31		
10	Licence fee – triage website		\$4.38		
11	Website hosting fee		\$2.31		
12	Licence fee – video-conferencing		\$3.46		\$3.46
Ongoing Support					
13	Daily Technology Triage		\$2.31		
14	Daily Clinical Triage		\$17.00		
15	Help Desk (virtual & onsite)		\$5.08		\$5.08
16	Reporting to GP, Health Professionals		\$3.27		
Service Completion					
17	De-installation & decontamination	\$70.00		\$52.20	
Sub-total		\$456.00	\$85.97	\$227.40	\$41.85
18	Overheads & Administration	\$136.80	\$25.79	\$68.22	\$12.56
TOTAL		\$592.80	\$111.76	\$295.62	\$54.41

*High Speed broadband

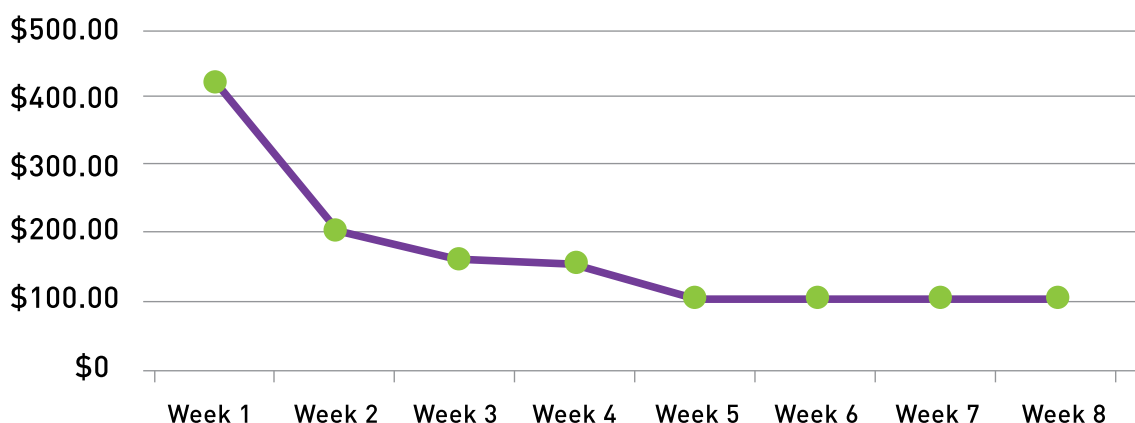
Notes to support Table 36 (left)

1. Assessments: Includes onsite assessment of client, consents and admission documentation, creation of e-record and PCEHR.
2. MHCAH Configuration: Setup & testing laptop, includes accounts for MyClinic, ICP, ClearSea, Skype and Sysaid, pairing equipment to tablet, database, establishing daily vital signs and wellness interview.
3. Installation: Onsite with client, configuring wireless router (if NBN or ADSL2), training client on using equipment, battery change instructions, and test video call to THRN.
4. Post Installation: Budgeting for at least one post installation visit, for further training (based on pilot experience). Some clients may not need any visits; others may need one or two visits.
5. MHCAH Tablet: Cost of tablet and headsets depreciated over 18 months.
6. Licence Fee - User Interface: Touch screen interface client uses to take vital signs and video call.
7. Peripherals: For the purposes of the costing, three peripherals have been chosen, BP, Pulse Oximeter and Scales. Depreciated over 18 months.
8. Internet: Internet cost is based on the current pricing of the NBN 20GB 25/10 plan.
9. Licence Fee - Vital Signs Collection: Paid to third party vendor for the use of the software that runs the daily vital signs interview and transfers information via internet to triage website. Includes software upgrades and support.
10. Licence Fee - Triage Website: Paid to third party vendor for the use of the secure website that collects, stores, triages and reports on the vital signs, wellness data and trends. Also providing portal for health professionals to log and view/report on data. Includes software upgrades and support.
11. Website Hosting Fee: Paid to third party vendor for the cost of hosting website.
12. Licence Fee-Video-Conferencing: Based on the use of a secure encrypted video-conferencing platform (Lifesize ClearSea).
13. Daily Technical Triage: Following up on client readings that have not come through, following up on client to determine if it is technical or human issues around the missing readings (i.e., client not at home for scheduled interview, or transmission error).
14. Daily Clinical Triage: THRN follows up on clients whose vital signs are outside of acceptable ranges or wellness answers are concerning. This may be wellness check, coaching, or contact with GP or other health providers. Costed at an average of 12 minutes per client per week.
15. Help Desk (virtual or onsite): Supporting clients if equipment is faulty, assisting with video conference with health professional, and further training on equipment use.
16. Reporting: Provision of regular or adhoc trending reports to health professionals as requested.
17. De-installation: Collection of equipment, inventory management, decontamination.
18. Overheads: Costs involved in IT infrastructure (video-conferencing, client database, IT equipment, communications, support), vehicle, marketing, quality, premises and utilities, staff training, recruitment, debtors, creditors, payroll, and other organisational overheads.

Figure 15 illustrates the cost curve for a new telehealth client, factoring in the initial assessment, configuration, installation, training and support in the first four weeks. It shows the higher level of upfront costs

in establishing a client, but by week five the costs stabilise at approximately \$100 per week, per client. This suggests that there may be economies in engaging service users with the technology for a longer period.

Figure 15: The cost curve for a new Telehealth client



5.6.4 FUTURE PROOFING FOR SCALABILITY

Telehealth vendors currently operating in Australia are limited in their range of equipment and functionality. The pricing structures are expensive and inflexible which limits the ability for providers to deliver a cost-efficient service.

- There are very few vendors in the Australian marketplace which impacts significantly on competitive pricing for providers (both equipment and licences fees).
- The peripherals supported by vendors are expensive and limited in options. Some peripherals can be difficult for seniors to use, which impacts on support costs.
- The backend setup of the triage website and configuration is cumbersome and adds to the configuration and installation costs.
- Trend Reporting through the vendor triage website is cumbersome, inflexible and does not currently interface with the PCEHR or any secure messaging facilities (e.g. ARGUS, medical objects).

Feros Care believes that further development of the MHCAH – Health Portal will create a stand-alone telehealth suite that:

- Enables a broad range of existing and emerging peripherals to link to the Health Portal.
- Links with the PCEHR and key primary health secure messaging software.
- Creates a user friendly and interactive portal for both clients and health professionals.
- Improves interoperability for video-conferencing regardless of platforms used.

This will reduce reliance on third party vendors and will improve efficiency and cost of the telehealth service considerably. The goal is to provide a full service for less than \$70 a week.

5.6.5 EFFICIENCY OF SERVICE DELIVERY

Telehealth Nursing: Remote vital signs monitoring service can facilitate monitoring, coaching and early intervention services for people with chronic disease, regardless of distance and remoteness, provided the home has internet connectivity. A registered nurse can effectively triage and support a client virtually, in any location.

Several efficiencies are possible due to client self-monitoring of their vital signs, the wellness interviews, the secure triage website and the ability to undertake virtual consultations. At the time of writing this report, the THRN's were spending an average of 1.65 minutes

per client, per day on triage and follow-up (Figure 16 and Table 38). This means that one THRN can effectively monitor 255 clients per day. As the figures below illustrate, optimal efficiency was achieved when service capacity reached approximately 100 clients (Figure 17). After this point, while the number of new clients increased, the telehealth triage capacity remained approximately stable at around 1.65 minutes per client. In contrast, a single home visit by a registered nurse, assuming an efficient roster and no further than 5km of travel per client would require at least a 30 minute visit per client including travel (Table 37).

Table 37: Telehealth nurse clinical triage capacity

Average minutes per clients from Oct (when service capacity reached 100 clients) to May 2014	165
Nurse minutes in a day (7 hours)	420
Capacity Clients	255

Figure 16: Change in clinical triage capacity over time

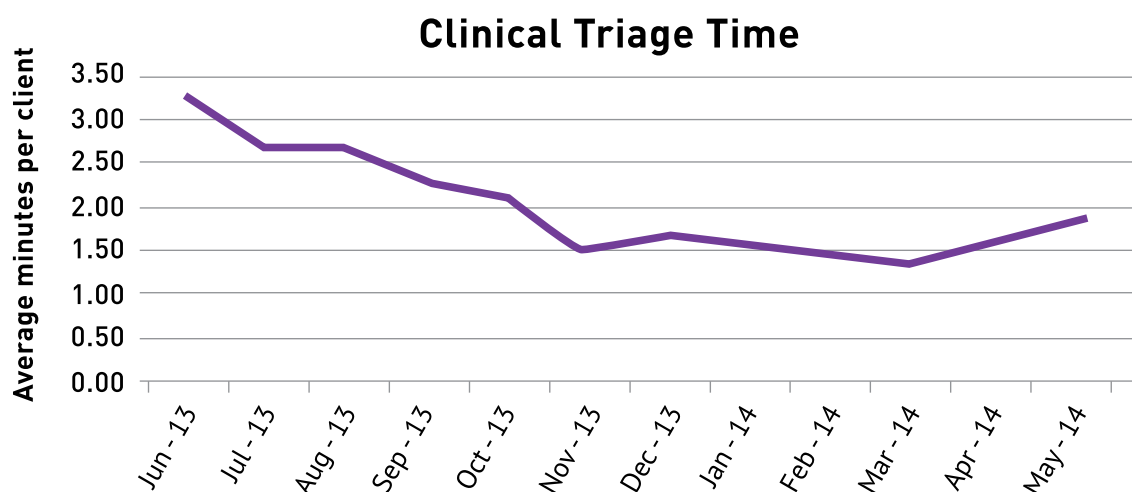
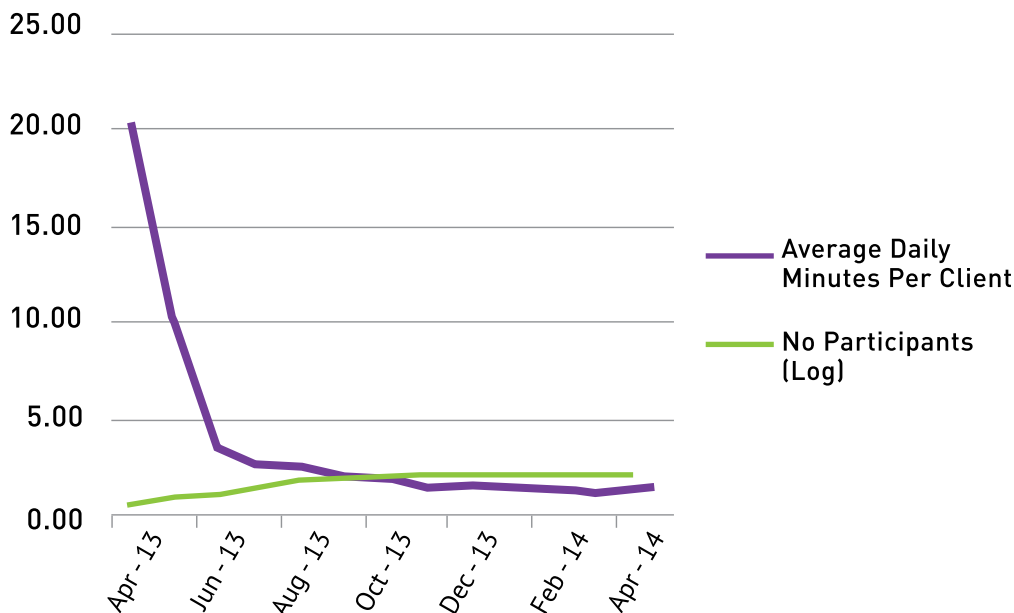


Figure 17: Average daily minutes required per client over total client recruitment (log)



Virtual Case Management Tool: The MHCAH pilot uncovered significant potential to use telehealth to reduce travel time for community-based case managers and consequently increase capacity to manage more clients. At Feros Care, community case managers drive an average of 158 km per day and spend approximately 138 minutes driving to undertake home visits and assessments. The average length of each client contact is 53 minutes. This allows the nurse to undertake four client visits daily. While not completely comparable, if 50 per cent of client visits could be delivered online, the number of clients managed by a Care Manager could increase by up to 40 per cent.

5.6.6 SERVICE INTEGRATION

Feros Care has commenced integration of the MHCAH telehealth service as follows:

- 20 clients from the pilot will continue to use the MHCAH for telehealth monitoring via the Home & Community Care program under nursing care.
- Five clients from the pilot have been referred to the Aged Care Assessment team for a Home Care Package Assessment, with the intention of including the MHCAH telehealth monitoring under their consumer directed care package.

Beyond the pilot, the LHD Chronic Care team will continue to undertake virtual consultations with this client group however, the GP will not as there is no ongoing funding available for video-conferencing.

In addition to the above, Feros Care has:

- Commenced the trial and evaluation of the MHCAH tablet as standard issue to Home Care Package clients as a Case Management Tool, in Tasmania (July 2014). The goal is to evaluate the efficiency and effectiveness of the MHCAH to support efficient case management, improved social connectedness and health literacy education.
- Commenced a new MHCAH service in Southern Sydney with 200 seniors with chronic disease under the Home and Community Care Nursing Services program.
- Commenced a Better Health Care Connections Pilot focussing on multi-disciplinary care models in residential care utilising Telehealth services with the goal of engaging in virtual consultations by GPs, specialist, hospital discharge and A&E Departments.

- Been approached by the Centre of Health Innovation, Gold Coast Hospital and the Medicare Local to potentially partner in a project to provide Telehealth solutions to approximately 1500 patients.

The current pricing of the MHCAH service is a barrier for broader deployment to the community care and private market with the true cost of delivery currently at \$111.76 per week or \$15.97 per day including overheads (\$87 or \$12 per day excluding overheads). However, this cost may be justifiable for early discharge or hospital avoidance programs for patients at high

risk of hospitalisation. The weekly cost of providing video-conferencing services only is \$54.41 including overheads (\$41.85 excluding overheads).

5.6.7 COMPARISON OF BROADBAND OPTIONS FOR THE TELEHEALTH PILOT

Table 38 illustrates the comparative costs and costing components of different types of broadband connection which need to be considered in comparing pricing for the needs of the pilot. Overall, NBN has the lowest setup costs and ADSL2 the highest costs; however different packages are available with varying components.



Table 38: Comparative costs of different broadband options

SUPPLIER	ACCOUNT SIZE	TYPE	CONNECTION COST	INSTALLATION	MONTHLY COST	ROUTER	CANCELLATION FEE	TOTAL	ADDITIONAL COST	COMMENT	DETAILS
Iprimus	20GB	NBN	\$	\$	\$59.00	\$120.00		\$179.00			
Iprimus	20GB	ADSL2	\$299.00		\$39.95	\$189.00	\$100.00	\$627.95	\$448.95	Cancel fee if cancel within 6 months	New line for PABX unit blocks
Iprimus (existing)	20GB	ADSL2		\$69.00	\$39.95	\$189.00	\$100.00	\$397.95	\$218.95	Cancel fee if cancel within 6 months	Installed over client existing phone line.
Telstra	4GB	4G			\$50.00	\$216.00		\$266.00	\$87.00		
Telstra Air Card + Hub	8GB	4G			\$70.00	\$340.00		\$410.00	\$231.00		
Telstra	10GB	ADSL2	\$299.00	\$59.00	\$59.49	\$144.00	?	\$561.49	\$382.49	2 year contract with cancellation fee	New line for PABX unit blocks
Telstra (existing)	10GB	ADSL2		\$59.00	\$60.00	\$144.00	?	\$263.00	\$84.00	2 year contract with cancellation fee	Installed over client existing phone line.
		Clients own Account				\$120.00		\$120.00	\$59.00	Client using their own ADSL	Depends on clients account type

5.6.8 EVIDENCE OF GOVERNANCE ARRANGEMENTS

Feros Care's telehealth services post pilot is under the ongoing management of the organisation's Lifelink Telehealth care service. Lifelink services fall within Feros Care's operational and corporate governance structures that include; Care and Clinical Governance, Senior Management Team, Audit Risk and Compliance committees. Feros Care's telehealth services and systems has ISO9001:2008 Quality Management certification that is externally verified annually. Any new telehealth service rollouts are managed and governed by Feros Care's project management framework.

5.6.9 EVIDENCE OF ONGOING SUPPORT

Feros Care has been awarded funding under the Home and Community Care program to operate a telehealth service under the "nursing service" type, in the Southern Sydney planning region for up to 200 clients a year. Depending on the final outcome of the new Home and Community Care Nursing Services program, there may be an opportunity to see this service grow in future funding rounds.

There is evidence that private health insurers are investing in telehealth remote vital signs monitoring services such as HCF's My Health Guardian Program, however, there is little evidence of mainstream telehealth services in the public health system.



5.7 LEARNING: WHAT WAS DONE WELL, WHAT COULD BE IMPROVED?

Learning about the processes of implementation was captured from the perspectives of the end-users and the service providers. This section of the report summarises the feedback from users on their views of what was done well and what could be improved from survey and interviews. In addition, Feros Care have systematically reflected on all of the processes of implementation and provided a detailed analysis of the key learning from each aspect.

5.7.1 CLIENT PERSPECTIVE: WHAT WAS DONE WELL?

Open ended responses from 82 clients suggested that the things that were done well with MHCAH were “everything”; nurse availability for monitoring, vital signs monitoring, and technical service support. Clients most valued being monitored, having regular access to support, reducing social isolation and advocacy, avoiding unnecessary GP visits, improving their understanding of self-monitoring and behaviour change, early detection of problems, and the availability of and access to information.

Everything (n = 24)

Please do not stop or take this away; without it I would be dead.

I think the program is great for the elderly with health problems and your interaction with patients is great. Anyone with health problems of any age should be able to have this service in their home.

Thank you for allowing me to experience part of modern technology

I think they did a fine job

It is all good for people who really need it

All people representing Feros Care have been very helpful

I really enjoyed the video conferencing but I would have liked more

All aspects were well done

Nurse availability and monitoring (n= 11)

Can call on a nurse anytime as needed.

The nurse's quick response to point out the change in vital signs.

If I was sick in bed and didn't do it for several days the sister always rang to see how I was.

Vital sign monitoring (n=5)

All of it as it and the hard working people behind the screen miss nothing.

Service support (technical) (n= 12)

The gentleman who installed and explained the system was very good. His help appreciated.
Supply of information via technicians when needed.
Breakdown and service.

WHAT WERE THE MOST VALUABLE ASPECTS OF THE TRIAL?

Being monitored (n=21)

A great system for monitoring BP etc. with the knowledge that someone is monitoring your results.
Personal contact and re-assurance that someone else is daily reading your results.
Able to know when vitals up or down. A call when something different occurs. Nice to know someone is always there.
The pilot programme helped my carer monitor vital signs and report to a doctor.
Having blood pressure readings sent to your doctor.

Access to regular support (n=6)

The equipment and nurses who call if they see a problem with your data.
You have instant help from health professionals.
Knowing there is someone there if needed.

Reducing social isolation and advocacy (n= 8)

Mixing with other people.
Older people having a feeling of being connected to society.
It has shown me that when I didn't have a voice they have spoken for me.
Contact with the outside for me. Two enquires by phone to check issues with my health.
If I were on my own knowing someone was there to help if readings were a worry.
Great idea for people who live out of town and not close to doctors.

Helps avoid unnecessary GP visits (n=4)

Saves sitting in the Doctors surgery for a while if you're really sick. You have access to a nurse to find out information about what you should do.
Not to go to the doctor just for check-up is great.
Not attending Doctors as much.

Understanding self-monitoring and changing behaviour (n=8)

For the first time I have been given a good feel for what the readings actually mean.
I was able to keep an eye on my BP & weight.
Maintaining my blood pressure.
Taking sugar [readings], reducing portions, reducing food.

Early detection (n=2)

I really would like to keep it, I feel better having it there to check my vitals as I would know if I needed to go to the Doctor. Of course the nurse is there if I need any question answered.
Finding serious changes early.
Being able to witness first-hand the various results and take immediate action if required.

Confidence building (n=3)

Continued monitoring builds confidence.
Feel safe about illness.
Peace of mind!

Availability and access to information (n=5)

More Information available.
Regular check-ups documentation, which can be accessed by health professionals, contact with caring nursing staff.

5.7.2 CLIENT PERSPECTIVE: WHAT COULD BE IMPROVED?

Clients were asked “What could we do to improve your experience of MHCAH?” Written responses were received from 70 clients. Respondents made some suggestions for ongoing improvement of MHCAH including: the provision of trend reports to clients (not just service providers), overcoming technical problems and having more contact with the THRN.

Nothing needs to change (n=34)

How can one improve on perfection?
No need to improve anything.
It was ok but I was relieved when it finished.

More information and feedback from the program (n=4)

Would also like a copy of the vital signs e-mailed to me when the Dr receives them.
Feedback - a quarterly graph of results so that we can track our progress.

Improve equipment (n=3)

Ensure equipment working before holding conferences.
To make equipment more reliable.

Improve internet connection (n=3)

Because of the access to Internet problems a lot of time the scheme could not function and caused problems for staff and participants. If the Wi-Fi is not working during an emergency it could have bad consequences.

The potential to provide better support to clients (n=10)

You could add another question. "Have you taken your medication today?"
More contact later in the trial.
Specialised Blood Tests.
Visit from nurse to actually take my husband through the process very carefully.
Allow time for vision impaired but I cope very slowly.
Talk to the nurse more.
Maybe link up with doctors who would talk on different health topics.
Arrange a "one on one" video conference with the nurse practitioner once a month to discuss any questions/problems that aren't necessarily "life threatening".
Video Doctor conference.

Make it cost effective for ongoing use (n=5)

Several clients were concerned about the ongoing cost of using MHCAH and their inability to pay for it if they were required to.

Government should pay for it.
Keep it going do not put a price on people's health.
Do I need to pay if I was connected to NBN broadband internet provider? If so, I'll think about the service payment.
I couldn't afford it if I had to pay for it.

Low willingness to pay was reflected in clients' preferences for ongoing use of telehealth (See Section 5.5.1).

5.7.3 FEROS CARE PERSPECTIVE: WHAT WORKED WELL AND WHAT COULD BE IMPROVED?

The following tables outline the learning from each of the phases of MHCAH as captured from the perspective of Feros Care.

Table 39: Internet and Routers

	PERFORMANCE/ NOTES	SUGGESTED IMPROVEMENTS
NBN Internet Connectivity	No issues to report. No failed video conferences due to connectivity. Signal was consistent, reliable, quality connection. Two area wide incidents occurred during the 18 months which were rectified quickly.	-
NBN Coverage/ accessibility	Rollout was slow, especially for multi dwelling and complex dwellings. Once NBN was available in the area, installation was achieved easily.	-
NBN Speed	Typical average download speed was 20 to 25 Mbps, typical average upload 4 to 6 Mbps. (as per testing performed using speedtest.net)	-
4G Internet Connectivity	Not as reliable as the NBN connections, both signal strength and speed was inconsistent. We encountered unexplainable dropouts during video calls although reconnection was possible. We noted speeds dropped at certain times of the day in some areas.	4G cradles have an internal antenna which improves signal (external antenna also available)
4G Coverage/ accessibility	Available throughout the project area including the northern beaches. Encountered occasional issues in several areas of Sawtell, however overall coverage was very good.	4G cradles have an internal antenna which improves signal (an external antenna is also available)
4G Speed	Speed testing showed a greater range depending on the area. Typical download speed ranged between 2 to 19 Mbps, upload speeds 1 to 4 Mbps (as per testing made using speedtest.net)	4G cradles have an internal antenna which improves signal (an external antenna is also available)
ADSL	(ADSL2) connections had additional connection and installation costs and projected a wait time of up to six weeks for installation. Service providers required a minimum connection period for ADSL2 connections which made this option prohibitive.	Source month to month plans.

	PERFORMANCE/ NOTES	SUGGESTED IMPROVEMENTS
Equipment: NBN/ ADSL Router: Cisco Linksys EA2700	No problems	-
Equipment: 4G Router: Telstra WI-FI Netgear 4G Advanced	If 4G devices if not in cradle and left on 24/7 they would intermittently lose contact with the internet. Home visit was required in some instances if client unable to reset the router.	4G cradles connected through an Ethernet cable for all 4G routers to eliminate “battery full” issue and WiFi disconnections .

Table 40: Planning

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Tracking project tasks, goals and responsibilities	Creation of a Project Management Schedule to identify tasks, goals and responsible team members. These tasks were broken down into a weekly milestone chart which captured the project team meeting minutes.	-
NBN rollout zones activated at differing times	Spreadsheet was created of all streets in pilot area and organised by zone to enable client's address to be quickly identified and NBN activation date established.	-
Risk Management	Risk table created and risk management plan used to address risks.	-



Table 41: Set up and testing

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Source NBN retail service provider (RSP) and establish an agreement	<p>Approached RSP's Iprimus and SkyMesh, Iprimus offered itemised monthly accounts and direct access to business sales specialist.</p> <p>It was critical to find a direct line of communication to arrange installation dates and times, this was invaluable. We were happy to pay more for a two day install instead of a two week turn around.</p>	-
Setting up of client interviews were cumbersome and time consuming	Created standard interview templates for main disease types and combinations.	In Mark II we would develop an easier MHCAH menu – with tick box functionality to customise client interviews.
Sourcing disease- related wellness questions for monitoring symptoms	Sourced chronic disease interviews from Kiama Telehealth Pilot and previous Feros Care trials.	Review and investigate best practice interviews for monitoring of disease symptoms and early detection of illness and exacerbations.
Testing required on all equipment and software before rollout	<p>Created test plan and two stage field testing:</p> <ol style="list-style-type: none"> 1. Set up test systems for team to trial and report back with errors. 2. Small field tests on local client group, with feedback on equipment and software and results actioned before going live. 	Ideally a longer test period and larger test sample (of users in the target demographic). Ensuring a good mix of IT capability amongst users.
Deployment of telehealth kits	Established courier TNT for overnight delivery to Coffs Harbour. Technician able to pick up kits at 7:30 AM the next day from TNT dispatch.	-
Problems with utilising 2 telehealth tablets/ kits in the one home – due to Bluetooth interference.	<p>Rollout of multi-user MHCAH tablet to accommodate couples or multiple users of the one system. ID barcode cards were used to access their individual interview.</p> <p>A Honeywell 1250G-2USB-1 Bar code scanner was plugged into the device through a USB connection.</p>	Multi-user arrangements have infection control issues. The MHCAH Mark II development will need to allow for individual peripherals.
Help button for remote assistance	A help button was added to the front screen of the MHCAH to allow users to access VC support.	Include help button in client orientation and training.

Table 42: Project team resourcing

ISSUE/ REQUIREMENT	POSITION	WHAT WE WOULD DO NEXT TIME
Client assessment, case management & contact for local referral relationships.	Part time local Case Manager	Ongoing plan to engage referrers and stakeholders throughout the life of the project, not just the initial stages.
Community awareness and engagement, including coordination of displays, information booths and presenting at clubs, groups etc.	Part time Partnerships Manager	-
Installation, training and decommissioning, day-to-day support and troubleshooting	Full time Local Telehealth Technical Officer	Essential for employee in this position to have good balance of tech and customer service skills.
Daily technical and clinical triage of vitals and wellbeing remotely. VC clinical inquiries	Two part time THRN This provided continuity of service delivery.	Resource as per number of active clients – plan for higher resources required for clients in service less than 12 weeks.
Intake, dispatch, inventory management, documentation and backup technical triage.	Full time Telehealth Support Officer	Essential for employee in this position to have good balance of technological and customer service skills.
Quality data collection, government reporting and support.	Part time Quality Officer	-
Project management, stakeholder relationship management.	Project Manager	-
Co-ordination of marketing collateral, engagement of consultative committee, photo shoots, mails outs and social chat club.	Part time Marketing Manager	-
Project sponsor, engaging with stakeholders, organisational commitment and provision of high level plans to government departments.	Chief Executive Officer	-

Table 43: Stakeholders

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Stakeholders act as champions for the MHCAH pilot.	A request was sent to Medicare Local, LHD, local government, university and care providers to nominate representatives for a consultative committee. Memorandum of understandings established.	To engage the consultative committee and champions more frequently. E.g. every two months virtually.
Low referral rates from GPs and health professionals. No MBS items for GP consultations and short length of pilot was a significant deterrent.	GP/referrer workshops held to promote the pilot. Referrals from GPs accounted for 7% of overall referrals Undertook significant community engagement strategy which provided the referrals needed for the pilot.	More realistic in our targets for GP engagement based on the fact that they are time poor and have a low tolerance to pilots with short timeframes. One opportunity could have been to “buy” a range of appointment times each week to improve their participation.
No ability to forward trend reports via a secure means (e.g. no interface between telehealth website and GP’s messaging platforms)	Reports were faxed and mailed. Team worked towards delivering a secure message service to GP practices using Argus to provide a direct message to GP Practices using the software for patient management.	In the MHCAH Mark II development, build an interface with key GP secure messaging (ARGUS, Medical Objects) and lobby to have the ability to upload trend reports on the PCEHR.
GP suggestions that data should be provided in ‘real time’ electronically	Worked with GPs to identify preferred formats for trend reporting. Needed to address interoperability issues with existing GP practice software.	Incorporate trend reports into existing GP practice software.
GP suggestion that clients are referred only on the basis of GP referral or other appropriate provider.	-	-

Table 44: Marketing and referrals

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Low referrals from health professionals	<p>Extensive marketing campaign consisting of weekly demonstration and displays stands to promote program and receive referrals. Project team focussed on ex-services clubs, shopping centres and specialised interest groups and clubs.</p> <p>70% of the overall referrals came from family/self-referral as a result of this marketing campaign.</p> <p>Local Care Manager established relationships with health professionals and service provider in the local area. Development of a referral/ assessment tool.</p>	A formalised engagement plan for the Local Care Manager throughout the pilot. Formalise referral pathways and create MOU's with stakeholders.
Branding design on the MHCAH device, external publications and marketing material	Engaged marketing and design consultancy to draft the MHCAH front screen, logos, brochures and marketing material.	-
Communication with clients/ waiting list	<p>Simple newsletter created and sent out to keep active clients and clients waiting for connection up-to-date with the project.</p> <p>Other communication included surveys, Christmas cards, phone calls, photo frames if they were involved in photo shoots/ case studied, showcased in Feros Care magazine and small thank you basket.</p>	MHCAH Mark II to have a sticky note type display on tablet to post individual and group messages. E.g. Advertise health literacy sessions.

Table 45: Devices

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
<p>Significant time in asset tracking and security.</p>	<p>Tablets and devices are managed in “kits”.</p> <p>All equipment labelled with a unique asset number using waterproof stickers. Assets were controlled using IT database SYS Aid to keep track of individual assets which were grouped into kits and then assigned to clients or marked “spare” with current location. Asset movement recorded using a checklist on arrival location for installation then checked off during discharge and storage.</p>	<p>Feros Care is moving to a more specialised asset management/ tracking system.</p>
<p>Battery management can be resource intensive if client in unable to change batteries. The pulse oximeter is particularly complex.</p>	<p>Created a client battery change guide for scales, oximeter, BP and glucometer. Set up a preventative maintenance schedule for Tech home visits to change batteries every three months with clients needing assistance.</p>	<p>Leave a stock of batteries for clients who have the ability to change the batteries to reduce visits.</p> <p>Through admission process, identify family /carer who can support.</p> <p>In the MHCAH Mark II development, source alternative peripheral options.</p>
<p>No peripheral alternatives were provided by vendor.</p>	<p>On the ground support for problem peripherals (particularly oximeter).</p>	<p>In the MHCAH Mark II development, build the flexibility for a broader range of low cost and more user friendly peripherals.</p>
<p>Nonin Onyx 11 pulse oximeter unable to gain readings from clients with “cold fingers”.</p>	<p>Client made more aware of warming their hands before conducting daily client interview.</p>	<p>Add “Tips” to user guide</p>
<p>Omron 708-BT blood pressure monitor cuffs struggled with hard cuffs and sizing.</p>	<p>Installer was given 2 different types of cuffs. Clients were assessed into one of the following categories:</p> <ol style="list-style-type: none"> 1. Thin arms and no risk of skin tear – these clients could slide a hard cuff on and off 2. Short upper arms or overly large arms, clients at risk of easy skin tear or with limited mobility – these clients were usually better suited to a soft cuff. 	<p>In the MHCAH Mark II development, source alternative peripheral options.</p>

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Omron 708-BT blood pressure monitor: clients forgot to press the upload button.	<p>Outlined in the user manual.</p> <p>Reiterated this step for clients during the installation process.</p>	Review client Vital Sign Monitoring Guide.
Myglucohealth MGH-BT1 glucometer: upload process difficult as icons on the LCD screen small and hard to see.	<p>Outlined in the manual.</p> <p>Reiterated this step for clients during the installation process.</p>	<p>Make process easier to follow by ignoring the screen display and just asking clients to press button twice.</p> <p>Clearer simpler "how to guide" in Vital Sign Monitoring Guide.</p>
MyGlucohealth MGH-BT1 glucometer: readings differed from clients own glucometers.	<p>Team members carried out testing of multiple devices and results indicated that all devices measure slightly differently.</p> <p>Advised by vendor: The MyGlucoHealth Meter is plasma calibrated, which is more accurate than whole blood calibration. If a test is taken on a plasma calibrated meter and then compared to a meter that is whole blood calibrated, the readings will be approximately 12% lower on the whole blood calibrated meter.</p> <p>Clients were given the option of continuing to use their own device and to manually enter readings.</p>	Raise issue with new clients and give them the option of continuing with their current glucometer. Ensure they only use the one device consistently.
AND UC-321PBT Weight Scales: readings taking a long time to send through to tablet.	Ask clients to activate scales again and complete a second reading to "force" the first one through.	Improve instructions in Vital Sign Monitoring Guide.
Taidoc TD-1261 Thermometer: in ear technique resulted in wax build up on the device and failed readings.	Advised clients to hold thermometer to temple.	Improve instructions in Vital Sign Monitoring Guide.

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
<p>Samsung Slate XE700T1A-A03AU</p> <p>Tablet: screen automatically resizing when touched in two places.</p>	<p>Updated master image to disable screen resize.</p>	<p>Lock down tablet even further.</p>
<p>Samsung Slate XE700T1A-A03AU</p> <p>Tablet: touch Screen hard to manage for some clients with shaky or weak hands.</p>	<p>Stylus added to telehealth kit to allow clients much greater accuracy and control when using the touch screen.</p>	<p>Lock down tablet even further to provide an “unbreakable” environment.</p>
<p>Samsung Slate XE700T1A-A03AU</p> <p>Tablet: icons too small for visually impaired clients.</p>	<p>Provided a Dell Touch Screen all-in-one computer to accommodate for clients with low vision. Screen size considerably larger and base is much more stable.</p>	<p>-</p>



Table 46: Software

SOFTWARE TYPE AND USE	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
<p>SysAid Technologies</p> <p>Logging support jobs/ request. Help Desk response.</p>	<p>This was used as helpdesk software to track assets, assign owners and track location of assets.</p> <p>SysAid also used to create, modify, track, assign responsibility, track workflow and service requests.</p>	<p>Feros Care is moving to a specialised asset management/ tracking system.</p>
<p>ICP Triage Manager</p> <p>Triage database and telehealth user maintenance.</p>	<p>This was used to collect all vital sign readings, create and print trend reports and track client contact/ wellbeing.</p>	<p>-</p>
<p>Team Viewer</p> <p>Remote assistance and off site access to systems.</p>	<p>Used to access client tablets remotely and allow for updates or remote assistance.</p> <p>Created the Help Desk Icon on the tablet for the client to use which would establish a video connection with technical support.</p>	<p>-</p>
<p>Lifestyle UVC ClearSea</p> <p>Video Conferencing Platform – Health Professionals.</p>	<p>This was used to establish instant secure video conferencing experience between clients, project staff and health professionals. Also used to enable multi chat sessions (up to 16 clients) for hosted health literacy, chat club and other education and social video conferences.</p> <p>This was found to give an overall better video experience than Skype.</p>	<p>Alert health professionals that firewalls or local access levels may require administration support to use this software.</p>
<p>SKYPE</p> <p>Video-conference Platform for Family and Friends.</p>	<p>To allow clients to contact family and friends outside the secure environment. This was installed and clients were able to press buttons to call family and friends. This was found to be a lower quality experience than ClearSea.</p>	<p>Formalise the process of connecting family and friends and have a guide that can be sent out to clients and family.</p>
<p>The Care Manager (TCM)</p> <p>Client data management.</p>	<p>Used to capture all client information, interactions, incidents, interventions and records but not their vitals.</p>	<p>-</p>

Table 47: Client install and training

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Multi dwelling units (MDUs) NBN connections delayed past roll out dates.	MDUs were categorised and put on a waiting list. Retail Service Provider (RSP) was contacted at intervals to check availability for NBN at MDU addresses. Clients were advised of the delay and when available given the option to connect using 4G technology.	Multiple connection options at beginning of pilot (e.g. NBN, ADSL and 4G)
Difficulty organising installs, NBN crews getting delayed and incorrect job information due to length of process from RSP to contractor.	Made contact with local contractor to allow a better flow of information in cases where installation details were delayed or confusing. This also allowed technician to be on site for all installations. Critical to build relationship with contractors installing the NBN service.	-
Client confusion or anxiety leading into NBN installation.	Local Feros Care telehealth technician on site for all installations to prevent clients from getting confused or worried. This required close communication with contractors installing NBN services to coordinate the timing of installation.	-
Post installation support - clients forgot how to run the interview after the tech left the house.	Technician slowed down the training process and used the vital signs monitoring guide as a reference during training. An initial step was added to the process to familiarise the client with a touch screen (e.g. pressure to use). A three step process was adapted to first run through the interview once as demo. The second time the client went through the interview on their own and assistance was provided (as required). The client ran through the interview a third time on their own. If they required further assistance the technician would run a fourth interview	Training video or visual step by step help displayed on the screen.
Privacy for clients.	Release forms used, clients rights explained clearly and no issues were reported during the pilot.	Headphones to be used during any video conversation discussing client's personal information or situation. Screens to be used behind the THRN during video consultation.

Table 48: Triage

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
<p>Triage times were escalating due to wording of wellness questions.</p>	<p>The THRN reviewed the wellness questions and the initial prioritisation of actioning client's answers.</p> <p>As a result of this review some questions were given a lower response priority to allow for quicker response for clients at higher risk.</p> <p>THRN prioritised high needs vs low needs on a case-by-case basis.</p>	<p>Clinical pathways to be developed and reviewed by Feros Care's Care Governance Committee.</p> <p>Pathway to be used to establish a first level response to escalate high priority to RN.</p>
<p>Trend reports are very time consuming and the current automated batch report not suitable.</p>	<p>The process of automating these reports has been initiated. A template has been created to give a brief summary of the client's results for the review period for GPs who do not require the larger report.</p>	<p>Full automation of the trend reports process to minimise the time taken for THRN when creating and sending reports to participants GPs.</p>
<p>Decommission strategy required to assist client to transition out of telehealth / monitoring program.</p>	<p>Clients with stable readings were provided final reports and discharged from the program.</p> <p>Clients identified as having ongoing needs or requiring additional support were referred to appropriate service providers at the time of discharge.</p>	<p>Formalise a "clients at risk" process to flag clients who require ACAT assessment with initial admission/ during monitoring.</p>
<p>Triage times began to escalate due to unrealistic vital signs ranges, e.g. too narrow</p>	<p>The THRN established a dialogue with the client's GP or relevant health professional, to establish acceptable vital sign ranges.</p> <p>If no response was received from the client's GP, more appropriate vital sign ranges were used and a letter of advice was posted to the GP.</p>	<p>Secure messaging options to improve GP response.</p> <p>Systematic review of vital sign ranges after the initial 4 week period in consultation with client's GP.</p>

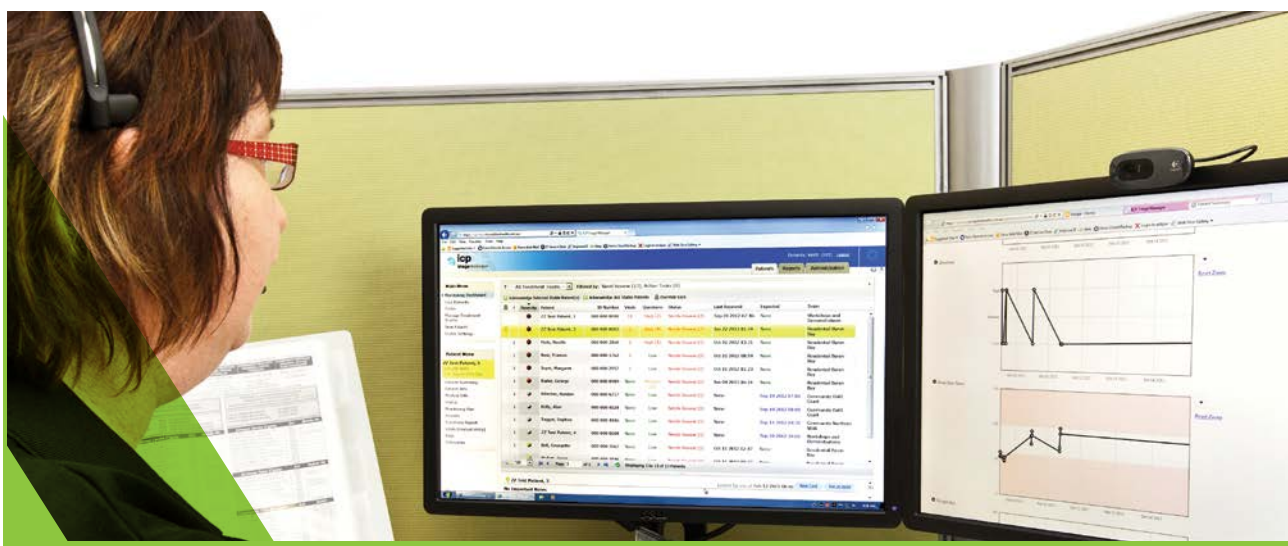
Table 49: Video conferencing

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Bad lighting in clients homes making video calls difficult.	<p>Sourced lamps, looked at USB lights powered by tablet.</p> <p>Most clients preferred to source their own light or image became more clear once asked to turn the light on.</p>	<p>Installer has lamps available in cases where client's home has insufficient lighting to see peripherals/ video-conference.</p>
Clients had issue receiving video calls, due to dexterity.	<p>Activated auto answer on tablet for clients who were having issues.</p> <p>The project team implemented a procedure for a mandatory phone call to check client is ready before video conferencing to ensure privacy.</p>	-
Clients had issue hanging up on video calls due to poor dexterity.	<p>Nurse, doctor or support staff to end all calls, clients trained in closing video call window once call completed.</p>	<p>Clearer, simpler "how to" guide in Vital Sign Monitoring Guide.</p>
Group sessions/ multi chat.	<p>Clients were given the opportunity to participate in multi chat groups. To allow for improved delivery and use of time, a group session etiquette was created including:</p> <ul style="list-style-type: none"> • One speaker at a time • Raise your hand and wait for the Moderator to call your name to speak • No mobile phones/ pets <p>Project technical support established a "virtual meeting room" on the video-conferencing bridge and manually dialled clients into the bridge.</p>	<p>Consider utilisation of a booking system which automatically calls clients at the time of group session.</p>
Sound issues during video calls particularly when more than two callers.	<p>Headphones used in all group sessions to isolate sound, give clients more privacy and eliminate echoes from other speakers.</p>	<p>Clients to be fully trained during the installation and training in use of headphones for all video conferences. Use of headphones including volume control to be included in Vital Signs Monitoring Guide.</p>
High definition video consultation results in high data usage.	<p>Data usage was considered initially before data packs were established. This was closely monitored for each account and limits were increased as required.</p>	-

Table 50: Reporting and data collection

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Client demographics	A client management system, The Care Manager (TCM) was adapted to allow for the storage of the MHCAH Assessment Pathway as a data form which allowed for easy reporting and export of client base data.	-
Registering clients for the PCEHR	<p>Clients were registered for ehealth records as part of the initial assessment pathway.</p> <p>This was completed over the phone by the Case Manager or THRN conducting the assessment and took approximately 10 minutes.</p> <p>An identifier was recorded in the client management database to track clients who were registered.</p>	An assisted registration form is now available to reduce the time taken over the phone. Clients' registration information can be acquired from ehealth.
Metrics required to be collected as part of DoHA funding agreement	<p>A workshop was held to go through each metric and map it to a data capture source. Reporting mechanisms were also established.</p> <p>Metrics spreadsheet created to allow easy monthly reporting to Department.</p>	-
NBN rollout zones activated at differing times	Spreadsheet created of all streets in pilot area and organised by zone to enable client's address to be quickly identified and NBN activation date established.	Ideally multiple connection options would be available to reduce any waiting period (e.g. NBN,ADLS and 4G).
Baseline surveys and data collection	Manually completed for each client and uploaded into clients file in TCM. Surveys collaborated onto Metrics Spreadsheet.	Surveys/ feedback to be captured using telehealth technology as a touch screen survey or a recorded response via video-conferencing.
Discharge surveys and data collection	Manually completed for each client and uploaded into clients file in TCM. Surveys collaborated onto Metrics Spreadsheet.	Follow up survey would be better planned for 12-15 weeks into monitoring to better capture changes that the client is noticing as a result of using the equipment. After a long period of use the client may be less able to distinguish the changes that monitoring has made to their lives.

ISSUE/ REQUIREMENT	WHAT WE DID	WHAT WE WOULD DO NEXT TIME
Capture changes in social isolation as a result of participation in pilot	A sociogram tool was created to capture client relationships and current satisfaction levels. This was used as baseline data and subsequently recaptured after discharge.	<p>As above, it is recommended that the best practice would be to capture this information earlier. This would ensure that the client is still in the process of making changes to their behaviour, environment and lifestyle as a result of participation.</p> <p>It is difficult to track these changes retrospectively once the changes have become the norm.</p>
Client Experience Surveys and data collection	Surveys were manually completed by each client and posted back to Feros Care. Survey results were collaborated using online survey tool (Survey Monkey) and then put into a spreadsheet for analysis.	Surveys/ feedback to be captured using telehealth technology as a touch screen survey or a recorded response via video-conferencing.
Monthly case studies	A client was selected each month to demonstrate the effectiveness of the project. The THRN selected a client who had shown improvement or had a significant intervention event during the reporting period.	-
Secure message development direct trend reports to GP practices	Team working towards delivering a secure message service to GP practices using Argus. This will provide a direct message to GP practices using the software for patient management.	Link to PCEHR and TCM.



6. DISCUSSION

6.1 PROPOSITION 1: TELEHEALTH INCREASES ACCESS TO HEALTH CARE STAFF FOR SENIORS BY PROVIDING A HOME BASED COMMUNICATION PORTAL LINKED DIRECTLY TO A PRE-DETERMINED RANGE OF HEALTH PROFESSIONS.

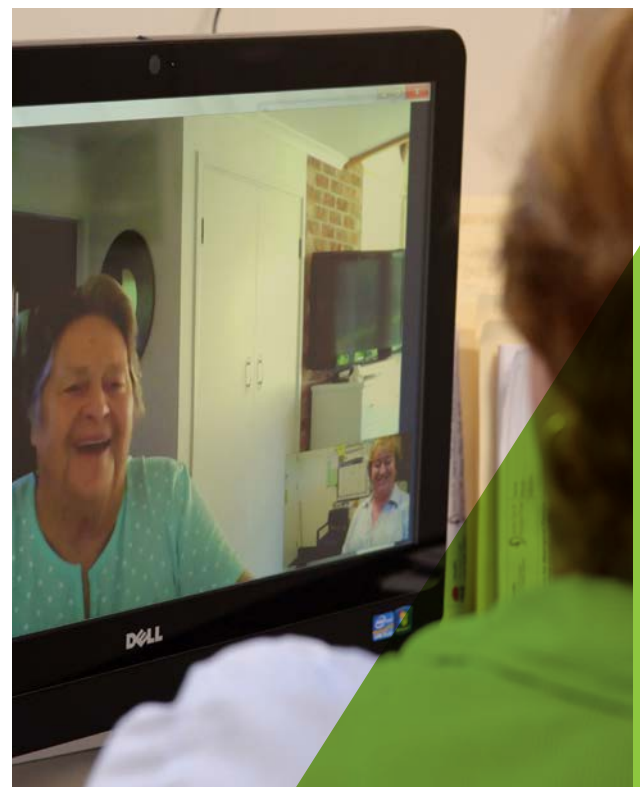
The MHCAH trial provided all participants with direct access to a THRN to whom they would not otherwise have had access. Consequently, direct access to health care staff increased. Half of all clients participating in the trial (51%) did so because they wanted to know that someone was keeping an eye on them. During the trial, participants completed 2,767 video-conferencing calls with the THRN.

It was more difficult for the trial to influence access to other types of services because of the model of recruitment. Only 19 of the clients recruited through Coffs Harbour (n=176) were existing Feros Care clients, and the majority self-referred to the trial. In addition, there was a lack of engagement of local health service providers and GPs. However, several clients expressed a willingness to explore other opportunities to use the telehealth to engage with service providers, particularly their GP (52%), specialists (37%) and pharmacists (37%).

With the exception of access to the THRN, there was no evidence of an increase in health service use by the clients. Indeed there was some evidence that involvement in the trial actually reduced some health service use. This evidence was based on patient self-report; and 24 per cent of clients reported that their participation in the trial reduced their need to go to the GP. This was supported by the client-reported health service use data reported at baseline and follow-up compared with their recollection of their health service use over the previous 12 months. These results suggested a decline in GP visits ($p = 0.000$), emergency department admissions ($p = 0.021$) and admissions to non-local hospitals ($p = 0.000$). The use of other health practitioners showed some decline, although this was not statistically significant, with the exception of physiotherapy ($p=0.0472$).

There was evidence from the trial and the supporting literature that use of telehealth can reduce the need for health service providers to travel to see clients. While this was not fully realised within the trial, due to the lack of service provider engagement, North Coast Community Options reported that telehealth reduced their need for travel to see clients, while providing a more 'realistic' interface with clients at home.

Client access to other types of services increased. The use of video-conferencing provided access to the health education, health literacy and self-management group sessions, social chat clubs and bingo (230 video conferences episodes recorded).



6.2 PROPOSITION 2: SENIORS WILL BE ABLE TO USE THE TELEHEALTH TECHNOLOGY, ON A DAILY BASIS, TO MONITOR THEIR VITAL SIGNS WITH THE SUPPORT OF A TELEHEALTH NURSE.

The study presented strong evidence in support of this proposition, as evidenced by the following data;

- Over the 12 month duration of the project, 181 clients performed 32,540 vital sign readings.
- As a result of their participation in MHCAH, clients received a total of 3,873 interventions, including client support phone calls (n=2331), referral follow-up calls (n=407), medication changes (n=53) and hospital admission prevention (n=19).
- Clients were involved in 2,767 video conference calls with their THRN.
- On average, monitoring and reporting of vital signs took 6.17 minutes per client. Qualitative feedback from clients indicated that the monitoring was easily incorporated into their daily routines.
- Based on client survey data, the majority of clients (68%) participated in the trial because they were interested in monitoring their own health and client survey data suggested that the trial was successful at enabling clients to manage (58%) and monitor (65%) their own health.
- A total of 1,040 incidents were recorded, the majority of which were missed interviews due to an equipment fault (not uploading vital signs) (n=449). Missed interviews due to client error accounted for 17 per cent of all incidents, and client lack of availability accounted for 15 per cent of all incidents.
- The numbers of errors due to broadband connections were small: 75 (8%) of all incidents were due to an NBN installation fault; 15 (2%) the fault of the Registered Service Provider; and 17 (2%) due to 4G fault.
- Clients reported some challenges using the equipment used to capture their vital signs, with the blood pressure cuff being the most problematic (27% of all clients surveyed). Other equipment problems occurred with the tablet (24%), the pulse oximeter (19%) and the broadband connection (17%).
- Participants demonstrated high rates of adherence to their daily telehealth readings, however nearly half of all clients (48%) did not feel that ongoing monitoring was necessary following the completion of the trial.



6.3 PROPOSITION 3: ACCESS TO TELEHEALTH IN THE HOME PROVIDES THE POTENTIAL FOR CONTINUOUS AND REGULAR DATA ARISING FROM THE MONITORING OF VITAL SIGNS WHICH CAN BE USED TO IMPROVE MEDICAL DECISION MAKING.

Support for this proposition was equivocal:

- From the client perspective, one of the most successful components of the MHCAH interventions was the effect it had on improving their ability to understand and interpret their vital signs monitoring and reflect on how this related to their chronic disease symptoms. This led to subsequent changes in health behaviours and health literacy, and the way that they interacted with their health practitioners. In particular, clients reported that as a result of participating in the trial they went out more (15%); changed their medication (17%); improved their diet (28%); drank more water (39%); better understood the relationship between their diet and their health (34%); did more physical activity (33%) and had a better understanding of their vital signs (47%). Approximately one quarter of clients also reported that they went to the doctor less frequently (24%), and perceived that participating in the trial helped them identify a major health problem before it became serious (23%).
- Interviews with the health service providers also indicated that vital signs monitoring provided an objective indicator to map against the client experience, which could better guide and inform decisions about diagnosis and treatment.
- Real-time monitoring of clients led to the timely identification of client needs and risks, and subsequent referrals to appropriate services. In particular, there was anecdotal evidence of timely referrals to the emergency department, GP, and changes in medication as a result of daily monitoring.
- The ability to see clients using video-conferencing was also considered a valuable aid to triage. The THRN and care managers reported that they used visual cues to make clinical decisions about their clients that would not have been available using telephone contact. These included making visual assessments of the client's health, as well as environmental and social assessments.
- However, GPs were equivocal regarding the value of trend reports arising from the vital signs monitoring. Trend reports were sent to 51 GPs. Of the 21 GPs who responded to the survey about the use of vital signs monitoring, 10 were positive about the value of trend reports in the development of their patients' treatment plans, and nine GPs reported receiving useful information that they would not normally receive. Eleven were neutral or positive about the value of daily home monitoring to facilitate timely interventions; early detection (9); reduce hospitalisation (8); or reducing visits to accident and emergency (8).
- Trend reports need to be disseminated and formatted in a way that makes them accessible to the GP. Feros Care are in the process of addressing this, however large variations in the levels of technical literacy and access to technology of the GP practices will present a challenge.
- Qualitative data and survey evidence suggested that patients were more empowered to talk to their doctor about their health as a result of participating in MHCAH, with 25 per cent of participants reporting that they were more confident discussing their health with their doctor.

6.4 PROPOSITION 4: HAVING ACCESS TO REGULAR, ONGOING DATA FROM VITAL SIGNS MONITORING PROVIDES A TRIGGER FOR EARLY INTERVENTION WHICH CAN REDUCE THE LIKELIHOOD OF EMERGENCY SEQUELAE.

This proposition was difficult to test empirically and the data relied on self-report and staff perspectives. Evidence directly supporting this proposition was limited, but included the following;

- The detailed intervention data collated by the THRN and qualitative data illustrated the extent of the nursing involvement in patient care. In many cases, these interventions triggered a change in the client circumstance or behaviour (such as a referral to the doctor or change in medication). It is impossible to state empirically that these interventions were causally related to prevention of hospital admission. However, daily monitoring of the client suggested that many of these issues were identified quickly, and responses made early.
- There are several anecdotal sources of evidence that regular daily monitoring from the THRN resulted in an alternative or earlier intervention that may not have occurred without THRN involvement. These included prompting visits to the GP, several of which resulted in medication changes.

- Evidence collected by the THRN suggested that early intervention and / or referrals triggered by the THRN as a result of vital signs monitoring and direct interactions with the client resulted in avoidance of 19 hospital admissions.
- Of the clients who responded to the Client Experience Survey, 24 per cent perceived that their involvement in MHCAH reduced their use of the GP.
- Based on the comparison of client-reported health service use at the start and end of the project, there was evidence of a reduction in emergency department admissions ($p=0.021$) and GP use ($p=0.000$), although these differences cannot be verified through health service statistics.
- The focus group feedback involving the GP suggested that MHCAH provided clients with increased health care options, more timely interventions and more appropriate interventions due to their ability to map objective vital signs data onto client-reported symptoms.
- The THRN reported that the ability to see the client using video-conferencing in the context of their vital sign readings gave them the ability to perform more accurate triage and flag appropriate referrals to services.



6.5 PROPOSITION 5: SENIORS TRAINED TO USE VIDEO-CONFERENCING TECHNOLOGY WILL USE THE TECHNOLOGY TO BUILD OR REINFORCE SOCIAL NETWORKS.

The MHCAH intervention provided a range of video-conferencing opportunities for clients with health professionals and friends and family.

- In total, 4,888 episodes of video-conferencing were used by clients. The majority were with the telehealth nurse and friends and family.
- Prior to their involvement in MHCAH, 70 per cent of clients had never used video-conferencing. However, 23 per cent of survey respondents reported that they became more confident using video-conferencing as a result of participating in MHCAH, although 13 per cent said that they do not like using video-conferencing.
- More than half of the respondents (52%) said that they would consider video-conferencing with their GP. Respondents, albeit smaller numbers (fewer than 40%) also said that they would consider video-conferencing their specialist, pharmacist, physiotherapist and / or occupational therapist.
- Some respondents said they would consider the use of video-conferencing to receive health talks (35%), virtual museum tours (12%), bingo (12%), yoga (13%), and chair tai chi (17%).
- Qualitative feedback from clients, friends and family provided a picture of people connecting with each other in new ways and a reduction in social isolation so that “I am a person and not just a prisoner”. In addition, there was evidence from the social network analysis of increased frequency of communication between clients and their family using Skype, and significant improvements in client satisfaction with their communication with others.
- Qualitative feedback from service providers, suggested that staff were able to gain a clearer assessment of the client in their home context through the use of video-conferencing, compared with telephone assessments. There was also a suggestion that the interaction may be more ‘real’ than a home visit because clients behave more naturally and the clinician is able to observe the physical and social environment. However, new considerations arose around client confidentiality in relation to installing video-conferencing into a client’s home.
- The facilitated video-conferencing sessions, while not used by all clients, were rated very favourably by participants. Clients liked being able to engage with each other and the health practitioners.
- On average, all clients reported a significant improvement in their levels of satisfaction with their social support over the duration of the project, although there was no difference in levels of improvement between clients who used video-conferencing compared with other forms of communication to develop social networks.



6.6 PROPOSITION 6: ACCESS TO TELEHEALTH IMPROVES HEALTH OUTCOMES BY: INCREASING OVERALL WELLBEING BY REDUCING SOCIAL ISOLATION; INCREASING ACCESSIBILITY TO HEALTH SERVICES; EMPOWERING PEOPLE TO TAKE CONTROL OF THEIR DISEASE / CONDITION.

There was strong evidence from the MHCAH trial to suggest that telehealth reduced social isolation and empowered participants to take control of their health:

- One of the main drivers for clients' participation in MHCAH was self-monitoring their health (68% of clients). Nearly half of all clients reported that as a result of their involvement in MHCAH, they could better manage their own health (48%) and access better information about their health (48%).
- Clients reported that being involved in MHCAH had given them a better understanding of their vital signs monitoring (48%), and several had made positive changes to their lifestyle (going out more [15%], eating more fruit and vegetables [28%], increased physical activity [33%]) in response. Sixteen percent of clients reported changing their medication as a result of their involvement in the trial. Clients reported being able to better manage their blood pressure and diabetes, and were more conscious of the effect of their lifestyle on their health.
- Overall, client health, as measured by the Single General Self-Rated Health Question, improved slightly, but significantly ($p = 0.000$), over the duration of the trial. Given the age and chronic conditions of the clients, their health could have been expected to remain stable or deteriorate. However, while this was an important finding, the lack of a control group made it impossible to attribute the change to the intervention. At the end of the trial more participants reported having excellent or very good health and there was an overall improvement in the client-self management of chronic disease (as measured by the Stanford "Self-efficacy for management of chronic disease").
- As reported in Proposition 1, access to the THRN was the major reported area of increased access to health services; otherwise, there was evidence of a decrease in health service use.



6.7 PROPOSITION 7: ACCESS TO TELEHEALTH REDUCES HEALTH SYSTEM COSTS BY REDUCING UNEXPECTED OR UNANTICIPATED HOSPITAL ADMISSIONS THROUGH EARLY IDENTIFICATION OF RISKS; AND REDUCES TRANSPORT COSTS DUE TO THE ABILITY TO RECEIVE HEALTH CARE AT HOME.

We were not able to access hospital data, and because this was a longitudinal study without a control group, there were difficulties attributing outcomes, such as reduced hospitalisation, to the intervention. However, there were several valuable anecdotal examples of the way the clients perceived that the MHCAH reduced their potential use of health services.

- The details of the THRN intervention logs suggested that clients were receiving timely and effective care which resulted in changes to their treatment, referrals and behaviour. The downstream effect of these interventions were difficult to directly capture and quantify, however the findings suggested that there was a reduction in visits to the emergency department, to non-local hospitals and to the GP.
- We propose that two mechanisms for the success of MHCAH were (a) client self-monitoring through vital signs recordings; and (b) client knowledge that the THRN was monitoring the client (the surveillance effect). The former resulted in a clearer understanding of the relationship between health behaviours and outcomes (as measured by vital signs). Consequently, clients modified their behaviour, resulting in the improvements outlined in 6.6. The second resulted in increased adherence to vital signs readings, reduced social isolation (real and perceived) and early intervention when a problem was detected. This, in turn, has the potential to reduce health care costs by reducing the acuity of the condition when the client presents at a health service. Additionally, improved health status is likely to reduce ongoing health service use and medication, resulting in a reduced burden on health services (and consequently health care costs).
- Feros Care undertook modelling based on the activity of their existing Community Case Managers (see Section 5.5, Scaling and Sustainability). The modelling showed that if half of the current Community Case Manager visits were provided using telehealth, they could increase their service delivery capacity by 40 per cent.



6.8 THE OVERALL EFFECTIVENESS OF THE TELEHEALTH SERVICES PROVIDED IN THE PROJECT.

Evidence of the effectiveness of telehealth services was indicated by the following;

- High rates of uptake and sustainability of the technology with clients
- Very low rates of incidents (fewer than 3% of all interventions)
- High levels of client satisfaction
- High levels of client engagement
- Changes in client health related behaviour
- Changes in client access to health services
- An overall improvement in client health status over the duration of the project

Factors that limited the effectiveness of the telehealth services were indicated by the following:

- Poor levels of health service provider engagement
- Formats of and access to trend reports by GPs
- The NBN was not available to all clients, and the 4G internet platform was not as reliable as the NBN for video-conferencing

6.9 PROPOSITION 9: ACCESS TO HIGH SPEED BROADBAND INCREASES THE OPPORTUNITIES FOR ACCESS TO TECHNOLOGY THAT WOULD NOT OTHERWISE BE AVAILABLE.

High speed broadband provided a stable platform for sharing and uploading vital signs, and importantly, allowed video-conferencing. Only the NBN platform was stable enough to provide consistent, uninterrupted video-conferencing. While 4G was cost-effective, it

was not consistent enough to provide stable video-conferencing with clients. The contractual requirements around ADSL2 meant that it could not be considered for the pilot.



6.10 ANY BARRIERS, REAL OR PERCEIVED, TO THE UPTAKE OF THE SERVICE, INCLUDING WAYS IN WHICH THESE WERE OVERCOME OR COULD BE OVERCOME.

Several of these issues are addressed in detail in section 5.6 Results. Specific barriers to client uptake of the services are summarised below:

- Barriers to uptake of the service by clients came from reluctance from GPs to participate in the trial. The majority of clients (64%) self-referred into the trial; the remainder of the referrals came from Feros (12%), GPs (8%), family (5%), community health services (5%) and other non-government community services (5%).
- In the client interviews, one client reported that her social circle was highly sceptical of the trial, which diminished her likelihood of participating in the trial (although she did).
- Despite stereotypes that older people have difficulties engaging with technology, this was not supported by the study. Indeed, it appeared that the “community” had less difficulty adapting to the use of technology than the health service providers. This observation was supported by the health service providers.
- Another perceived concern was one of patient privacy. This issue was not raised by clients at all.
- Some GPs perceived that clients became more anxious as a result of self-monitoring. This was not supported by any of the other data.
- For health service providers to adapt to the changing telehealth environment, substantial changes are required. These will involve strong leadership and change management practices to implement change in existing workplaces and new ways of training health service providers.
- Participants were voluntary and were not Feros Care clients, therefore it was more difficult for Feros to case manage these clients.
- There was some confusion about the installation of the NBN due to the multiple tiers of service providers. Feros Care had little control over the rates of NBN installation, and the community received some misinformation from the array and tiers of providers.

6.11. ANY OTHER LESSONS LEARNT OR RECOMMENDATIONS FOR FUTURE IMPLEMENTATION.

Several of the practical lessons for future implementation are captured in Section 5.6 Learning: What was done well, what could be improved? However one of the unintended findings of this study was the high level of client self-referral and their subsequent engagement in the trial. It appears that the “normal” model of telehealth interventions and subsequent client engagement are driven by health service providers. In contrast, in this trial, the majority of clients took the initiative to use the technology which empowered a number of them to become more

active in the self-management of their health. Client willingness to engage with health services using telehealth technology exceeded the opportunities available for them to do so. The combination of video-conferencing and client self-management through interventions such as vital signs monitoring may provide a powerful opportunity for patient centred/patient controlled models of health service delivery. However these opportunities will only be realised if sufficient numbers of providers create appropriate opportunities for patient engagement.

6.12. ANY OTHER SIGNIFICANT FINDINGS OF THE PROJECT.

The NBN enabled Telehealth Pilot provided the opportunity to conduct and evaluate a range of multi-party video calls for up to 16 participants in one call. These sessions included health literacy sessions, health talks, social chat and virtual games (bingo). Both the health related and social sessions were received positively by participants and presented opportunities for a new virtual social support service models.

Feros Care has used the results of the Pilot to further develop a concept called their “Virtual Senior Centre” that will provide a calendar of interactive virtual activities that could be accessed by any senior in Australia (regardless of where they live, i.e. home, retirement village, residential aged care facility) who has access to high speed broadband.

6.13 STUDY LIMITATIONS

This was a highly ambitious trial, involving the rapid recruitment and rollout of telehealth technology to 200 home dwelling clients, the majority of whom were from a region that was not previously served by Feros Care. The short timeframe for the trial meant that the evaluation was unable to capture longer term follow-up; there was only limited time to embed changes in practice; and clinicians were unwilling to engage because of the short-term nature of the intervention.

The pilot was effective, but there was the potential to provide far greater levels of intervention and client interaction using telehealth technology, without incurring extra costs. This potential was restricted by the limitations outlined in detail below. This, in turn reduced the ability of the pilot to demonstrate the full potential of the intervention.

The majority of clients recruited were not Feros Care clients because of the need to roll out MHCAH in an NBN pilot site. This meant that the clients were not case managed by Feros Care, limiting the ability of Feros Care to engage with wider community services to deliver appropriate telehealth interventions in the allocated timeframe. A longer time period may have facilitated this change.

The NBN rollout was slower than promised, resulting in substantial delays in recruitment for many participants and preventing recruitment for many others. The NBN rollout was also disproportionately targeted towards single dwellings, rather than multiple-occupancy dwellings, where a number of older people reside.

This also substantially reduced the ratio of potential connections to referrals. However, the pilot was rolled out largely on-time and on budget. Only one client recruitment milestone was missed.

One third of clients recruited to this study were, by self-report, experienced computer users. Therefore, there was a likely degree of self-selection bias amongst participants, who were conceivably more technically literate and engaged than the wider population. Therefore it is possible that these participants may have had a more positive experience of engagement with the technology than the ‘typical’ community member.

Due to the tight recruitment timeframes for pilot participants set by the DoH and the limited geographic coverage of the NBN, Feros Care needed to seek self-referrals from the Coffs Harbour senior community rather than traditional referral sources (hospital, health professionals, GPs). This resulted in the majority of referrals for the pilot coming from self-referrals. It also resulted in a population of participants who were not in the ideal target group for the pilot (i.e. lower risk of hospitalisation due to their chronic condition).

7. CONCLUSIONS

This trial of MHCAH has provided a great deal of insight about the possibilities for the use of the NBN and telehealth with home dwelling older people with chronic conditions.

Principally, despite common misconceptions and stereotypes, this trial has demonstrated that technology is not a barrier to the use of telehealth for older people when it has a user friendly interface and appropriate support. The majority of participants were comfortable using the technology. All of the participants used video-conferencing at least once, and several participants used video-conferencing to increase their contact with friends and family.

The major benefits of MHCAH to clients were:

- Increased confidence in managing their own health
- A greater understanding of the relationship between their health behaviour and their vital signs readings
- Changes in health behaviour resulting from better health monitoring and understanding
- Reduced social isolation
- The sense of security of knowing that someone was monitoring their health
- Regular and easy access to a THRN
- Improved confidence, willingness and experience in the use of technology to interact with health service providers and manage their health
- Fewer (self-reported) visits to the GP, emergency department, and non-local hospitals.

While the majority of survey participants indicated that they would like to continue to have access to MHCAH, there was a low willingness or ability to pay for ongoing services. This study was not able to determine the cost-effectiveness of the use of MHCAH, and until the technology is more fully utilised, this would not be a fair analysis.

This pilot was relatively unusual in that the majority of participants self-referred into the trial, rather than being recruited through a health service or case manager.

Consequently the study has provided 200 community dwelling older people with the ability to use a computer as a portal to monitor their health and directly access health services and service providers. Through this, the service users have accessed and identified several potential opportunities for the use of telehealth. Ironically, it is the lack of engagement of service providers that has limited the true potential of telehealth and technology use for older people. This is an important component of the change management necessary to optimise the use of telehealth in the community.

The telehealth trial was established as part of a pilot to explore the possibilities of the NBN. The study has shown that to optimise the use of telehealth access to community dwelling people, (particularly the use of video-conferencing) a stable technology base is necessary.

There are several barriers to health service provider engagement in telehealth. Funding mechanisms for GPs discourage them from taking time out of clinical practice to learn new skills. Additionally, the integration of telehealth into routine practice requires changes to the daily clinical routine of health care providers. However, the service providers consulted in the trial acknowledged the advantages of being able to review participants remotely, although they did not see this as a substitute for hands-on diagnosis and treatment.

There are underutilised potential opportunities for video conference meetings and specifically targeted programs, such as physiotherapy, using the telehealth system.



Feros Care NBN Telehealth Pilot Team

8. RECOMMENDATIONS

RECOMMENDATION 1:

That telehealth services become embedded as a mainstream component of service delivery to community dwelling older people. This would involve changes to current Health Care and Aged Care funding models, guidelines and service models to ensure telehealth and emerging technologies are considered a standard service option available to clients and patients in all community care programs (e.g. for all Home Support, Care Packages, Hospital in the Home, Chronic Disease Management, Early Discharge, Palliative Care, Transitional Care and ComPacks programs). This would enable telehealth to be more widely available to many senior Australians and those requiring care and support, and to reorientate service providers to ensure that technology is seen as an approved intervention and a fundamental approach to care delivery, not an “add on”.

RECOMMENDATION 2:

That the NBN “fibre to the door” is made widely available to the home. This study demonstrated that for telehealth to be effective, it needs to be delivered using a stable, high-speed internet platform to the home. With almost 5000 video calls delivered during the pilot, the NBN was the only uniformly reliable platform for the delivery of telehealth across this pilot. New innovations and the constantly increasing demand on capacity are likely to put further pressure on the ways that people connect to the internet. Fibre to the door will “future proof” the ability to provide high speed broadband that can keep up with the advancement in technology.

RECOMMENDATION 3:

The introduction of new Medicare Benefit Schedule (MBS) items for secure video-conferencing for client-to-GP, and client-to-allied health to facilitate integrated telehealth service models. This will enable service providers to deliver responsive and timely health care “virtual” consultations to clients in their own home. It will also provide access to GPs and allied health support for housebound and palliating clients in the

community. A sustainable funding model will be the key driver for GP’s to seriously consider the adoption of Telehealth.

RECOMMENDATION 4:

The provision of funding support for clients to access telehealth services. This, and other studies, indicate that telehealth has the potential to reduce GP and hospital use. However, there are ongoing costs associated with delivering and supporting telehealth, and clients have demonstrated a low willingness or ability to pay for the services. The potential cost savings for health services mean that it is likely to be cost effective to subsidise telehealth services for the client, however further research will be required to establish this.

RECOMMENDATION 5:

Widespread change management strategies be developed to support the uptake of telehealth by GPs and other service providers. This is likely to include changes to professional training and organisational support to implement the culture change required to introduce telehealth services to service providers. The clients demonstrated high willingness and adaptability to the NBN enabled technologies, suggesting that uptake of telehealth interventions will not be limited by service user capability.

RECOMMENDATION 6:

The introduction of a national policy agenda to drive a more co-ordinated and strategic approach to the research, funding and deployment of telehealth and emerging smart and digital technologies in health and aged care delivery. In particular, these should support new service delivery models; using technologies in the areas of security and safety (telecare smart homes, communication, social support); diagnosis and treatment (telehealth, nanomedicine) and assistive technologies (mobility systems, biorobotics etc). This includes key policy statements on enabling technologies in National Reform agendas.



RECOMMENDATION 7:

The establishment of “Demonstrator Services/Sites” which are funded to build awareness and capability of the use of telehealth and emerging technologies in health and aged care delivery models. These service demonstrators would build the knowledge, awareness, capacity and capability of aged care and health providers on the application and benefits of telehealth, smart and digital technologies.

RECOMMENDATION 8:

Research into the cost-benefit of telehealth provision for different stakeholders. Service users, providers and health care funders all stand to benefit from the introduction of telehealth. However, under existing funding models, the costs of telehealth are likely to be borne largely by the service user. A greater understanding of the cost-benefit of different models of telehealth to different stakeholders will support the more equitable allocation of resources to support the implementation of telehealth for those most likely to benefit from its introduction.



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■ LIST OF APPENDICES

APPENDIX A: NBN CLIENT SURVEY

APPENDIX B: NBN PHYSICIAN / GP SURVEY

APPENDIX C: NBN CLIENT EXPERIENCE QUESTIONNAIRE

APPENDIX D: FAMILY AND FRIENDS SURVEY

APPENDIX E: FINANCIAL REPORT

APPENDIX F: SOCIOGRAM



NBN (Filmed) Client Survey

Client Name: _____ Interview Date: _____ Interviewed By: _____

Section 1 – Self Efficacy for Management of Chronic Disease

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number that corresponds to your confidence that you can do the tasks regularly at the present time.

On a scale of 1 (not at all confident) to 10 (totally confident) please mark what is closest to how you feel about the following statements.
(N/A = not applicable)

Office Use	N/A	Not at all confident	1	2	3	4	5	6	7	8	9	10	Totally confident	Office Use	Please Elaborate
A1														A2	
A3														A4	
A5														A6	
A7														A8	
A9														A10	
A11														A12	



Client Name: _____ Interview Date: _____ Interviewed By: _____

Section 2 – Use of Health Care Services

In this Section we are interested in how often you saw a doctor or other health professional, or received other health services, in the last year. Don't worry if you cannot remember exactly, just give the best estimate that you can. Feel free to ask a family member or friend to assist you if you think it would be helpful.

Q7. IN THE LAST YEAR, how often, on average, did you visit your GP (or have the GP come to visit you)? (Note: Although you may have visited your GP more often just before you went into hospital this last time, or had a few visits close together if you had the flu or another problem, we really want to know what you **usually** do). **(Please circle one number only):**

- a. More than once a week 1
- b. Once a week 2
- c. Once a fortnight 3
- d. Once a month 4
- e. Less often than once a month 5

Q8. IN THE LAST YEAR, how often did you visit the Emergency Department at your local hospital? **(Please circle one number only):**

- a. Once a week 1
- b. Twice a week 2
- c. Once a fortnight 3
- d. Once a month 4
- e. Less often 5
- f. Not at all 6



Client Name: _____ Interview Date: _____ Interviewed By: _____

**Q12. IN THE LAST YEAR, how often were you admitted to your local hospital?
(Please circle one number only):**

- a. Once 1
- b. Twice 2
- c. 3-5 times 3
- d. 6-10 times 4
- e. More often 5
- f. Not at all 6

**Q13. IN THE LAST YEAR, how often were you admitted to any other hospital?
(Please circle one number only):**

- a. Once 1
- b. Twice 2
- c. 3-5 times 3
- d. 6-10 times 4
- e. More often 5
- f. Not at all 6



Client Name: _____ Interview Date: _____ Interviewed By: _____

**Q14 IN THE LAST YEAR, did you receive any services from the health care providers listed below?
Please tick the Yes box for any that you received services from and in the next box, circle how often you received those services**

TYPE OF SERVICE		HOW OFTEN?				
	Tick if Yes	Every Day	2-4 times a Week	Once a week	Once a Fortnight	Less often
Community Nurse		1	2	3	4	5
Physiotherapist		1	2	3	4	5
Occupational therapist		1	2	3	4	5
Podiatrist		1	2	3	4	5
Naturopath		1	2	3	4	5
Massage therapist		1	2	3	4	5
Dentist		1	2	3	4	5
Other (please specify)		1	2	3	4	5



Client Name: _____ Interview Date: _____ Interviewed By: _____

Section 3 – Self Related Health Questions

In general, would you say your health is....(circle one number)

- | | |
|-----------|---|
| Excellent | 1 |
| Very good | 2 |
| Good | 3 |
| Fair | 4 |
| Poor | 5 |



NBN Physician/GP Survey



Client Name: _____ Interview Date: _____ Interviewed By: _____

Your feedback is vital in helping us to achieve our goal of continuously improving the services we provide. Thank you for taking the time to complete this survey and for participating with us in our telehealthcare technology trial.

On a scale of 1 (strongly disagree) to 10 (strongly agree) please mark what is closest to how you feel about the following statements. (N/A = not applicable)

Office Use	N/A	Strongly disagree	1	2	3	4	5	6	7	8	9	10	Strongly agree	Office Use	Please Elaborate
E1														E2	
E3														E4	
E5														E6	
E7														E8	
E9														E10	
E11														E12	
E13														E14	
E15														E16	
E17														E18	

Client Name: _____ Interview Date: _____ Interviewed By: _____

Office Use	Please Elaborate	0	1	2	3	4	5	6	7	8	9	10	Strongly agree	Office Use	Please Elaborate
E19	Video conferencing provides an adequate environment to undertake meaningful patient consultation													E20	
E21	I would recommend the use of daily monitoring to other physicians													E22	
E23	I would recommend video conference based consultations to other physicians													E24	
E25	Daily home monitoring of patients has increased my workload													E26	
E27	The technical difficulties outweigh the benefits of videoconferencing with my patients.													E28	
E29	Monetary compensation for video consultations during the pilot was at an appropriate level													E30	
E31	I would like this service to continue													E32	
Please Tell us what impressed you about the home monitoring service?															
How could we improve this service?															

My Health Clinic At Home Pilot Client Experience Questionnaire

We need your help!

It is an important time for Feros Care and we would like to hear about your experience during the **My Health Clinic At Home** pilot. Your feedback will assist us in developing future telehealth services for people in your region and all over Australia. Would you please spend 20 minutes completing the survey questions and return your completed survey in the enclosed Reply Paid envelope by **Friday, 11th April 2014**?

If you have any questions or would like assistance please contact our Telehealth team by pressing the **HELP** button on your device or ring **1300 851 771**.

Section A

Tick ALL relevant answers

- 1** Why did you decide to participate in the *My Health Clinic At Home* pilot (select all that apply)?
- I was interested in monitoring own health
 - I wanted support with my health care
 - I was interested in getting the NBN Broadband Internet connected
 - I wanted to support the evaluation (ie for the greater good)
 - I was curious about the project / NBN
 - My friends / family wanted me to
 - My GP or another health professional suggested it
 - Other (please specify).....
.....

- 2** What did you hope to achieve as part of your involvement in *My Health Clinic At Home* pilot (select all that apply)?
- To identify health problems before they become serious
 - So I could better manage my own health
 - To have better information about my own health
 - To only go to my doctor when I really need to instead of having regular check-ups
 - To take the pressure off my carer/family
 - To help my doctor with the ongoing management of my health condition
 - So my carer would worry about me less
 - So I would worry less about my health
 - So I know that there is always someone keeping an eye on me
 - Other (please specify).....
.....

My Health Clinic At Home Pilot - Client Experience Questionnaire

3 How has your involvement in *My Health Clinic At Home* pilot impacted on you and your care (select all statements that apply)?

Tick ALL relevant answers

- It helped identify a major health problem before it became serious
- I can better manage my own health
- I now have access to better information about my own health
- I go to my doctor less frequently
- I go to my doctor more frequently
- My doctor has better information to help with the ongoing management of my health condition
- I am more confident discussing my health with my doctor
- My carer/family are less concerned about me
- My carer/family are more concerned about my health
- I worry less about my health
- I worry more about my health
- No change
- Other (please specify).....
.....

4 As a result of participating in *My Health Clinic At Home* pilot, have you made any changes to your daily activities?

- I go out more
- I go out less
- No change
- Other (please specify).....
.....

5 As a result of participating in *My Health Clinic At Home* pilot, have you made any changes to your medication use?

- Increased my medication
- Decreased my medication
- No change
- Other (please specify).....
.....

6 As a result of participating in *My Health Clinic At Home* pilot, have you made any changes to the way you eat? (select all statements that apply)?

- I have a better understanding of how my diet effects my health
- I eat more fruit and vegetables
- I drink more water
- No change
- Other (please specify).....
.....

My Health Clinic At Home Pilot - Client Experience Questionnaire

Tick ALL relevant answers

7 As a result of participating in *My Health Clinic At Home* pilot, have you made any changes to your physical activity?

- I do more physical activity
- I do less physical activity
- No change
- Other (please specify).....
.....

8 Has participating in *My Health Clinic At Home* pilot, changed the way you understand your vital signs (eg blood pressure, weight)?

- No change
- Yes (please specify).....
.....

9 Before your involvement in *My Health Clinic At Home* pilot, how confident were you using a computer?

- Unconfident (never used a computer before)
- Moderately confident (used a computer, but not a regular user)
- Confident (have a computer)

10 As a result of participating in *My Health Clinic At Home* pilot, has your confidence in using a computer changed? (select all statements that apply)

- I am more confident using a computer
- I am less confident using a computer
- I am more confident using video conferencing
- I do not like using video conferencing
- I have now started using a computer for other purposes (please specify).....
.....
- No change
- Any other comments
.....

11 How long does it take to you to complete your vital sign readings each day (minutes)?

minutes

12 Have you had any problems with any of the equipment associated with *My Health Clinic At Home* pilot (please tick any that you have had trouble with)?

- The NBN Broadband internet connection/4G
- The scales
- Blood pressure cuff
- Blood glucose monitor
- The thermometer
- The pulse oximeter (finger probe)
- The computer (tablet)
- Video conferencing (video calling)/skype
- Other (please specify).....
.....

My Health Clinic At Home Pilot - Client Experience Questionnaire

Tick ALL relevant answers

13 Before participating in *My Health Clinic At Home* pilot, how often had you used a video-conferencing facility (eg Skype)?

- Never used it before
- Used infrequently (5 times or fewer)
- Frequent user (more than 5 times)

14 Would you consider video conferencing with any of the following health service providers (tick all that apply)?

- Doctor
- Specialist
- Pharmacist
- Physiotherapist
- Occupational therapist
- Podiatrist
- Speech pathologist
- Other (please specify).....
-

15 Which of the following services would you use if it could be delivered with video conferencing on your computer (select all that apply)?

- Chair tai chi
- Yoga
- Bingo
- Virtual museum tour
- Health Talks
- Others (please specify).....
-

16 If you could continue using *My Health Clinic At Home* pilot, would you choose to do so?

- No – I am happy to finish when the trial finishes
 - Yes I would like to continue to use the technology indefinitely (please complete Section B)
 - Yes I would like to continue to use the technology for a short period of time (Please complete Section B)
- Comments.....
-

17 If you were to continue with *My Health Clinic At Home* pilot, how much would you be prepared to pay for the service you received (including internet costs*)?

- I would not have the service if I had to pay for it
- Less than \$10 per week
- \$11 - \$20 per week
- \$21 - \$30 per week
- \$31 - \$40 per week
- \$41 - \$50 per week
- \$51 - \$60 per week
- More than \$61 per week

**Internet costs are typically between \$30 - \$60 per month.*

My Health Clinic At Home Pilot - Client Experience Questionnaire

18 What could we do to improve your experience of *My Health Clinic At Home* pilot?
.....
.....

19 What aspects of *My Health Clinic At Home* pilot have been done well?
.....
.....

20 What are the most valuable aspects of *My Health Clinic At Home* pilot for people living at home?
.....
.....

Any other comments
.....
.....

Section B

If you would like to continue using *My Health Clinic At Home*, please give us an idea of the level of service or support you would like to receive. ✓ Tick ALL relevant answers

21 What level of clinical (Telehealth Nurse) support would you like?
 24 hour / 7 day a week access to a nurse
 Access to a nurse during business hours only
 No clinical support
 Other (please specify)
.....

22 What level of technical support would you like to receive?
 24 hour / 7 day a week technical support
 Business hours only
 No technical support
 Other (please specify)
.....

23 What level of vital signs monitoring would you like to receive?
 Daily vital signs monitoring (including doctor reports)
 Weekly vital signs monitoring or as needed (including doctor reports)
 No vital signs monitoring

My Health Clinic At Home Pilot - Client Experience Questionnaire

Tick ALL relevant answers

24

What level of support would you like with video conferencing? (select all statements that apply)?

- None thanks I can use it myself
- I do not want to use video conferencing
- I would like facilitated video conferencing
- I would like access to a range of services through video conferencing

25

Based on the preferences you have selected above, how much would you be willing to pay to receive ongoing tele-care services (including internet costs*)?

- I would not have the service if I had to pay for it
- Less than \$10 per week
- \$11 - \$20 per week
- \$21 - \$30 per week
- \$31 - \$40 per week
- \$41 - \$50 per week
- \$51 - \$60 per week
- More than \$61 per week

**Internet costs are typically between \$30 - \$60 per month.*

Section C

This section is for clients who participated in the video-conferencing sessions (Social Chat Club)

26

What were the best aspects of the social chat club (including content, technology, timing, duration of sessions, quality of video conferencing)?

.....

.....

27

What aspects of the social chat club could be improved?

.....

.....

28

What other topics would you like to see covered in the social chat club?

.....

.....

29

Overall, how would you rate the social chat club?

- Excellent
- Very good
- Good
- Reasonable
- Poor

30

Any other comments

.....

.....

Please return to Feros Care Locked Bag 1 Coolangatta, QLD 4225 in the Reply Paid envelope provided.

1. Your Name:

Your Name:

2. My Health Clinic Client's Name:

My Health Clinic Client's Name:

3. The client's chronic condition and wellbeing are better managed with Home Monitoring.

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

4. I am personally less anxious about the client's wellbeing with Home Monitoring.

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

5. The client will be able to remain living at home for longer with this technology.

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

6. Video conferencing has allowed me to be in closer contact with the client.

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

7. GP consultation using video conferencing is valuable to the client.

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

8. Video conferencing has reduced social isolation for the client.

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

9. I would recommend the use of Home Monitoring to others who have chronically ill or isolated family members.

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

10. I would like this service to continue

- 1. Strongly agree
- 2. Agree
- 3. Somewhat agree
- 4. Neither agree nor disagree
- 5. Somewhat disagree
- 6. Disagree
- 7. Strongly disagree

Any Comments?

Done

APPENDIX E: FINANCIAL REPORT

	ACTUALS FOR THE PERIOD ENDING	FORECAST TO 30 SEPTEMBER 2014	TOTAL BUDGET
INCOME			
Funding Received	\$2,273,187	\$2,461,311	\$2,461,311
TOTAL INCOME	\$2,273,187	\$2,461,311	\$2,461,311
EXPENSES			
Salaries & On-Costs	\$725,982	\$828,662	\$587,014
Administrative Costs	\$375,382	\$492,547	\$473,557
Asset Costs	\$507,919	\$528,919	\$539,349
Conferencing & Technical	\$103,999	\$122,928	\$190,806
NBN Costing	\$114,294	\$144,714	\$444,000
Other Costs	\$161,008	\$220,902	\$226,585
TOTAL EXPENSES	\$1,988,584	\$2,338,671	\$2,461,311
TOTAL SURPLUS/(DEFICIT)	\$284,603	\$122,639	\$ -



Telehealth Client Sociogram

Client: _____

Date: ___/___/___

Name _____

Relationship _____

Contact Method: Phone Email Letter Person

Distance _____ Kms

Frequency: Daily Weekly Monthly Yearly

Satisfaction 1 _ 2 _ 3 _ 4 _ 5

Contact Number _____

SKYPE AC: _____

Name _____

Relationship _____

Contact Method: Phone Email Letter Person

Distance _____ Kms

Frequency: Daily Weekly Monthly Yearly

Satisfaction 1 _ 2 _ 3 _ 4 _ 5

Contact Number _____

SKYPE AC: _____

Name _____

Relationship _____

Contact Method: Phone Email Letter Person

Distance _____ Kms

Frequency: Daily Weekly Monthly Yearly

Satisfaction 1 _ 2 _ 3 _ 4 _ 5

Contact Number _____

SKYPE AC: _____

Name _____

Relationship _____

Contact Method: Phone Email Letter Person

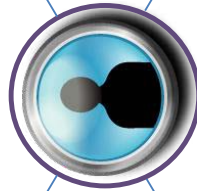
Distance _____ Kms

Frequency: Daily Weekly Monthly Yearly

Satisfaction 1 _ 2 _ 3 _ 4 _ 5

Contact Number _____

SKYPE AC: _____



Satisfaction:
How satisfied are you with the current level of social activity with this person?

- 5= Extremely Satisfied
- 4= Very Satisfied
- 3= Satisfied
- 2= Dissatisfied
- 1= Extremely Dissatisfied



FEROS CARE'S MY HEALTH CLINIC AT HOME PILOT FINAL REPORT

EVALUATION BY: **SOUTHERN CROSS UNIVERSITY**
SEPTEMBER 2014



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FEROS CARE'S
MY HEALTH CLINIC AT HOME PILOT
FINAL REPORT

EVALUATION BY: **SOUTHERN CROSS UNIVERSITY**
SEPTEMBER 2014

