



Evaluation of the Flying Doctor Telehealth Specialist Service Final Report



Evaluation of the Flying Doctor Telehealth Specialist Service **Final Report** **June 2021**

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Contact details

Professor Irene Blackberry

Chair and Director, John Richards
Centre for Rural Ageing Research
La Trobe Rural Health School
La Trobe University
PO Box 821 Wodonga
Victoria 3689 Australia
T: 02 6024 9613
F: 02 6024 9737
latrobe.edu.au/jrc

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Project Team

La Trobe University

Dr Tshepo Rasekaba
Dr Rebecca McKechnie
Professor Irene Blackberry

Royal Flying Doctor Service Victoria

Ms Jocelyn Syme
Ms Cassie Moore
Dr Melanie Trivett

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Executive Summary

Medical specialist services availability in rural areas is limited and patients often have to travel long distances to metropolitan or major regional towns. A consortium of ten Victorian small rural health services (Small Rural and Regional Health Service Research Team) in partnership with the Royal Flying Doctor Service (RFDS) Victoria, secured a 12-month project funding to establish the Flying Doctor Telehealth (FDT) specialist service to improve access to specialists care in rural Victoria. The service under the partnership commenced in November 2016 with RFDS Victoria continuing an endocrinology service that had been in existence since 2013. In 2017, RFDS Victoria expanded the FDT specialist service adding respiratory, cardiology and psychiatry specialities and reached into more rural communities.

The John Richards Centre for Rural Ageing Research at La Trobe University conducted a mixed-method evaluation of the FDT specialist service activity data for a service uptake patient cohort from 1st March 2018 to 31st March 2019 and their linkage datasets including Medicare,

Victorian emergency presentations, hospital admissions and patient transport assistance data. Data linkage covered the period “Pre,” “During” and “Post” FDT specialist service. Four specialists who provided care via the FDT specialist service, and 11 remote access site facilitator nurses were interviewed.

This report contains FDT specialist service evaluation which aimed to i) investigate the impact of FDT specialist service on increasing access for patients in rural Victoria, ii) examine adoption of FDT specialist service by rural partner sites and iii) evaluate whether the collaborative telehealth approach provides professional support and education opportunities for rurally isolated health professionals. Additionally, analyses of health care utilisation and an economic evaluation were undertaken.

Key findings:

- The FDT specialist service increased access to specialists for patients in rural communities as evidenced by service expansion from the initial 10 rural sites by October 2017 to 56 by March 2019 across Victorian rural communities and adjacent Victoria-NSW border towns.
- Service uptake was significantly associated with increased usage and costs of primary care services while hospitalisation and associated costs decreased; suggesting better engagement with out of hospital health care services. Usage of the patient transport subsidy scheme, predominantly for specialists not offered under FDT increased. Overall health care utilisation costs were significantly high among women.
- Facilitators at remote health service sites overwhelmingly corroborated evidence from the quantitative analysis that the FDT specialist service increased access and continuity of care to patients in rural areas. Some of the interviews coincided with the COVID-19 pandemic, further supporting the view that the FDT specialist service was instrumental in facilitating continuity of care during the pandemic related-restrictions and disruptions.
- The FDT specialist service clinical consultations facilitated knowledge exchange between the rural site facilitators and the specialist; an important proxy opportunity for professional development for the healthcare work staff at rural health services.
- Barriers to implementing the FDT specialist service included increased administrative tasks, resulting in inefficient and disrupted workflows, limited scheduling capabilities, lack of policies to guide telehealth at rural partner service organisations, high staff turnover, and fewer general practitioners referring patients or championing the FDT specialist service.
- Increased options for bulk-billing of telehealth consultations such as have been possible for the FDT specialist service during COVID-19, combined with mandated social isolation, saw unprecedented rise in the use of telehealth and the service.

Uptake of the FDT specialist service was associated with a number of benefits:

56

FDT rural access sites following an initial 10 pilot sites.



1,280km



Less distance travelled per patient per year to see specialists >100km away.

However, patients still have to travel to see other specialists not available under the FDT specialist service.



Engagement with and care in the community increased as acute healthcare utilisation decreased.

\$67

The average per patient per month saving as a result of fewer hospitalisations.



Key recommendations

1. The expansion of the FDT specialist service model into a virtual multidisciplinary telehealth service model to facilitate better linkages to primary care, allied health, other specialist services and home telehealth option for follow up appointments.
2. A longer-term study, including linkage to health service utilisation and patient outcomes data, to reveal whether the benefits and impact of FDT specialist service are sustained in the long term.
3. Development of online training resources to streamline and standardise processes, to mitigate staff turnover and facilitate sustainability of FDT specialist service continuity.
4. Understanding the journey and lived experiences of patients who access the FDT specialist service, will shed light into the drivers of higher health care utilisation among women.

In conclusion the FDT specialist service has been successful in its expansion to reach and increase access to specialists for rural communities. The endocrinology service was in particular the most used service whereas cardiology and respiratory had the lowest usage numbers, providing an opportunity for efforts aimed at increasing uptake, hence contribute to service sustainability. The FDT specialist service coincided with an increase in some health care utilisation but a decrease in others

with associated cost savings and decreased travel distance. Patients were more than twice as likely to access the transport subsidy scheme and record more travel to see other specialists they could not access under FDT service. At the time of this report, the FDT specialist service had been running for few years, demonstrating evidence on the success and sustainability of the FDT specialist service model in rural health sites.

Healthcare access, outcomes and the tyranny of distance for rural Australia

An introduction



Background

Healthcare access and health outcomes in rural Australia

Rural communities experience significant challenges accessing healthcare services due to healthcare workforce shortages, geographic isolation and socioeconomic disadvantage [1]. In particular, access to specialist services is a salient and complex issue faced by rural Victorians [2]. Often, smaller rural areas do not have the numbers to maintain traditional models of health care delivery locally, thus residents from such areas are required to travel extensively to seek health care from larger urban hubs [1, 2]. This has significant impacts on individuals and communities, emanating from factors such as travel expenses and inconvenience, time off work and social dislocation [2].

A combination of lifestyle characteristics and the social isolation that accompanies rural living limits timely access to health services, as well as continuity of care and monitoring of intervention effectiveness. In turn, this affects an individual's health outcomes and management of chronic disease, resulting in poorer quality of life and increasing dependence on the health care system in the long-term [1, 3]. This is evidenced through inequalities in health outcomes between urban and rural residents, with notably poorer health outcomes experienced by rural Australians. Compared to those residing in urban locations, rural dwelling people experience a two-fold increase in the risk of mortality, four years shorter life expectancy and forty percent increase in the burden of disease compared to their urban counterparts [4].

Geography of Australia

Australia exhibits one of the most urbanised populations in the world, with a large proportion of the Australian population clustered in cities and towns within 50 kilometres of the coast. The land spanning the middle of the country is vastly unpopulated (Figure 1). Nearly one third (29%) of the current 23 million Australian population live in rural or remote areas across the country.

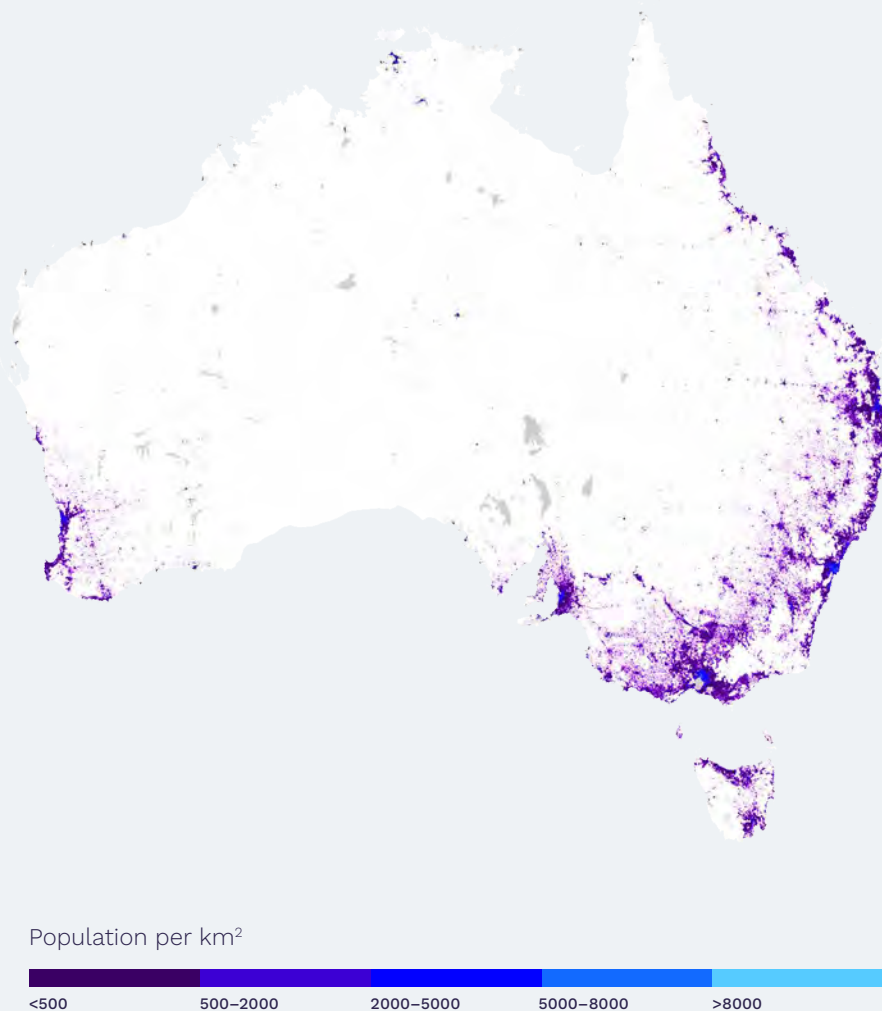


Figure 1: Australian population density

Telehealth to address inequities in healthcare access

Telehealth is defined as;

‘the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities’ [5].

Multiple forms of telehealth exist, including teleconferencing/real time telehealth, store and forward and remote monitoring.

Telehealth initiatives provide a potential option to mitigate some of the aforementioned issues faced by rural communities by improving access to and the diversity of services available [1, 6]. The resultant benefits extend beyond the individual patient to include health professionals, health service organisations, and society as a whole. For patients, the amelioration of extensive travel to access services reduces the associated burden, cost and inconvenience compared to traditional appointments, and enhances the continuity of care. This improved access to health services results in timely specialist intervention and treatment, leading to improved health outcomes, fewer hospital admissions and shorter admission durations [2, 7–9]. For health professionals, improved access to specialist through telehealth initiatives has resulted in informal interprofessional knowledge sharing and skills, and professional development, facilitating a better educated and trained rural workforce [2, 9]. Additionally, these opportunities serve to provide opportunities for networking and collaboration, further enhancing skills and knowledge whilst addressing issues of social isolation, which in turn may promote retention of rural health workers [9]. Ultimately, the flow on effect of these benefits to society may be seen in increased productivity, and the financial benefits of patients remaining within their rural communities [2]. These substantial benefits warrant the continued use of telehealth and bring rise to questions about how organisations can adopt and sustain telehealth practices.

A telehealth service is considered sustainable when it is embedded within routine practice rather than being considered a special case or complementary service. Normalisation of telehealth into routine practice requires diffusion and integration at health service system level and amongst healthcare service provider staff [10]. Despite the notable benefits of telehealth, uptake has been slow and fragmented and its use continues to be viewed as complementary [11]. Barriers to implementation have previously been identified to include funding, unreliable internet connectivity, staff readiness and ability, and preferences for traditional face-to-face approaches to care [3], whilst barriers to embedding telehealth within mainstream practice may include a lack of staff to ‘champion’ telehealth efforts, a lack of perceived cost benefits, poor responsiveness to stakeholder requirements, and the usability of technology, service adaptability and process inefficiency, amongst others [7, 12, 13].

Purpose built RFDS telehealth platform

In 2016, ten small rural Victorian health services formalised a partnership to develop the Small Rural and Regional Health Service Research Team (SMARt) (Figure 2) to approach healthcare provision issues with a collective impact. SMARt partnered with the Royal Flying Doctor Service Victoria (RFDS Victoria) to develop a telehealth strategy to improve access to specialist services through the Flying Doctor Telehealth (FDT) specialist service.

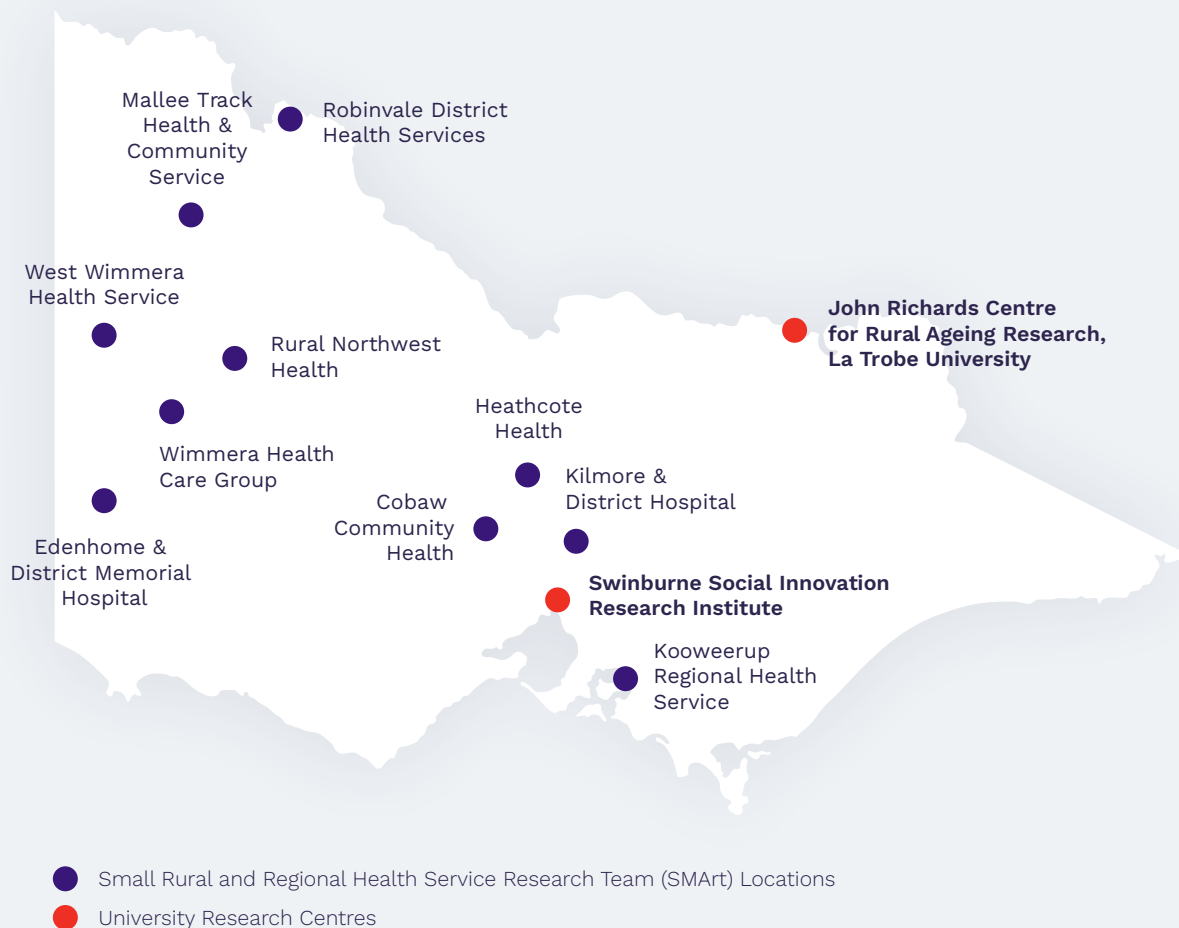


Figure 2: Schematic map of Victoria showing location of the Small Rural and Regional Health Service Research Team (SMARt) (Source <https://smartruralhealth.wordpress.com/>)

The partnership was successful in securing a 12-month (November 2016 to October 2017) project grant from the Victorian Department of Health and Human Services under the Victorian Telehealth Specialist Clinic Funding 2016 initiative. Service in this project commenced with specialist endocrinology for SMART health services. The RFDS Victoria had been running an endocrinology telehealth service since 2013. By mid-2017, RFDS Victoria had embarked on a service expansion program to add other specialist services and new telehealth sites, focussing largely on Victoria and later expanding inter-state. Following the completion of this initial 12 months project, RFDS Victoria embedded the specialty expanded FDT specialist service in its core primary care service and commissioned a purpose-built telehealth platform. Specialist respiratory, psychiatry and cardiology services were added and there was a further increase in the number of remote telehealth sites.

In consideration of the documented barriers to the uptake of telehealth, the RFDS telehealth platform aimed to address these through the development of an easy-to-use interface coupled with provision of comprehensive training to staff and clinicians to use the telehealth platform. Furthermore the service is offered free-of-charge to patients and the rural partner health services, and includes a concierge support service [9]. All consultations under the FDT specialist services are conducted via video conference. The specialists in the FDT service have access to service fee payments via the Medicare Benefit Schedule (MBS).

In early 2018, RFDS Victoria partnered with the John Richards Centre (JRC) for Rural Ageing Research, La Trobe University, for the JRC to undertake evaluation of the FDT specialist service with respect to its mandate of increasing specialist access for rural patients in Victoria. Furthermore, the evaluation sought to appraise FDT specialist service on effectiveness to overcome the aforementioned barriers to telehealth adoption and bridging geographic and demographic related inequities in healthcare access for patients and professional development. This evaluation offers an opportunity to demonstrate the benefits of a telehealth service in increasing access to specialist services [3] in rural Australia. The findings will inform and aid the expansion and/or scale up of the telehealth service to additional rural communities in rural Victoria and beyond.



Evaluation key aims

With a scope centred on endocrinology, respiratory, cardiology, and psychiatry specialist services, the aims of this evaluation and research project were to:

1. Investigate whether the FDT specialist service increased access to specialist services for patients in small rural Victorian communities and the short term impact of this service.
2. Evaluate how the FDT specialist service is embedded into practice within the participating rural health services and capacity of health services to adopt telehealth, underpinned by the Normalisation Process Theory [14].
3. Determine if the collaborative approach to accessing specialist services via telehealth provides professional support and education opportunities for rurally isolated health professionals at participating health services.
4. Undertake an economic evaluation of the FDT specialist service with respect to health services utilisation.

Ethical approval for the study was obtained from La Trobe University Human Ethics Committee (HEC Number HEC17-051).

The background of the slide features a blurred image of a young child with light-colored hair, wearing a white shirt with dark horizontal stripes. A semi-transparent purple rectangular area is positioned over the child's face and upper body. Overlaid on the entire image is a white network diagram consisting of several circular nodes connected by thin white lines, creating a web-like structure. The text is located in the lower-left portion of the slide, within the purple area.

Methodology

How was the
evaluation
conducted?



Evaluation framework

The evaluation was guided by the framework for evaluating telehealth services, developed by the University of Melbourne's Institute for a Broadband Enabled Society[15], and underpinned by the Normalisation Process Theory (NPT) [16]. The evaluation framework focuses on four key components that have links to the Australian Institute of Health and Welfare (AIHW) framework for health performance indicators (AIHW 2009) and the Australian College of Remote and Rural Medicine (ACRRM) framework (ACRRM 2012). The components and links to the respective AIHW and ACRRM frameworks are summarised in Appendix 1.

Normalisation Process Theory (NPT) focuses on the work-related tasks that are undertaken in implementing and subsequently embedding processes within practice, to the point that the intervention itself becomes common practice and is said to be 'normalised'. The four main components of NPT are coherence (distinction, purpose and benefits of the intervention), engagement (perceptions of target users and willingness to engage), collective action (effect of the intervention on existing tasks, workflows and organisational goals and activity) and reflexive monitoring (likely perceptions post-implementation and opportunities for reflexive evaluation); these exist in a dynamic relationship with each other (rather than as a series of stages in a linear relationship) [16].

Evaluation design

This evaluation adopted a pre-post design utilising a mixed-method approach, including quantitative FDT specialist service activity data, healthcare administrative data linkage, econometrics and semi-structured interviews with FDT specialist service specialists and staff who facilitated service appointments at remote telehealth locations where patients accessed the FDT specialist service.

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Participants and setting

All Victorian patients, facilitators (nurses) and specialists accessing the FDT specialist service for endocrinology, respiratory, cardiology or psychiatry services during the period from 1 March 2018 to 31 March 2019 were eligible for participation. While the primary focus was on Victorian patients, it was noted that some of the remote telehealth sites were located along the Victorian border with New South Wales (Balranald, Dareton, Barham, Moulamein, Koraleigh, Buronga), thus creating opportunity for cross boarder service catchment. In such instances, patients and facilitators with NSW listed postcodes were included.



Recruitment and enrolment

Coordinators of the FDT specialist service at RFDS Victoria, assisted by a volunteer, posted recruitment information packs to patients described above. Staff attempted at least one phone follow-up when signed consents were not returned. The recruitment packs primarily focussed on gaining patients' consent for use of their FDTSS collected service administrative and key clinical data for the purpose of the evaluation, as well as administrative health data held by the Victorian Department of Human and Health Services. A separate consent document was also included, specifically for linkage with the Commonwealth Department of Human Services held Medicare data.

RFDS Victoria staff also posted recruitment packs to all remote telehealth site facilitators (n=58) and the specialists (n=11) who were integral to the FDT specialist service model were engaged with the service between 1 March 2018 and 31 March 2019. The packs contained a letter of invitation, participant information, consent form and reply-paid envelope. Specialists and facilitators who were willing to be contacted for a telephone interview returned signed consent forms to the RFDS Victoria staff, who in turn provided contact details to the evaluation and research team. A member of the research team contacted all facilitators and specialists who had provided informed consent, to schedule an appropriate time for a phone interview.

Five of the eleven specialists and eleven of the fifty-eight facilitators consented to be contacted for an interview, with four and eight of these respectively available to be interviewed. Nonetheless data saturation was reached after eleven interviews, thereby eliminating the need to persist with follow up of the remaining facilitators and specialists. Due to challenges contacting the facilitators and specialists to arrange a suitable time, the interviews were conducted over the period from May 2019 to May 2020, thus allowing a brief period that incidentally coincided with the COVID-19.

Data collection and data sources

Quantitative data

Following the necessary consent, administrative FDT specialist service patient (index) cohort data including limited clinical outcomes were obtained from RFDS Victoria. Other data spanning June 2016 – June 2019 were obtained by applying to each respective data custodian as outlined below.

- 1. Commonwealth Department of Human Services** – request for Medicare Benefit Schedule (Medicare/MBS) claims data linkage covering use of out of hospital specialist services and primary care services
- 2. Centre for Victorian Data Linkage, Department of Health Human Service Victoria** – request for hospital emergency department (ED) presentations data [Victorian Emergency Minimum Dataset (VEMD)], hospital admissions data [Victorian Admitted Episode Dataset (VAED)], and patient transport and accommodation subsidy data [Victorian Patient Transport Assistant Scheme (VPTAS)]. This is a subsidised transport scheme for Victorians who have to travel more than 100 km to see a specialist.

The above data were used to generate the following variables for subsequent statistical analysis.

Participant sociodemographic and geographic characteristics

Participant gender was recorded, and date of birth was used to calculate age. Postcode was used to identify relative area level disadvantage and rurality. Disadvantage was classified by identifying the associated Socioeconomic Indexes for Areas (SEIFA) code, specifically using the Index for Relative Socioeconomic Advantage and Disadvantage (IRSAD). Indexes reflect the collective socioeconomic characteristics of people living in a geographically defined area, based on census data including education, employment, and household incomes. The IRSAD ranks areas on a continuum from most disadvantaged to most advantage, with higher scores indicating high incidence of advantage (i.e. low rates of disadvantage) [18]. Rurality was ascertained by identifying the ASGC (Australian Standard Geographical Classification)

Remoteness Areas classification that corresponded with participant postcode. The ASGC Remoteness was developed by the ABS, based on an enhanced version of the ARIA (Accessibility/Remoteness Index of Australia), ARIA+. ASGC Remoteness categorises areas as 'major cities', 'inner regional', 'outer regional', 'remote' and 'very remote' [19].

Health service utilisation

Medicare, VEMD, VAED and VPTAS datasets were spliced into three phases relative to the FDT specialist service access stage:

1. 'Pre' from 1st July 2016 to 28 February 2018 (20 months) – assumed that FDT specialist service services were not available to the participants
2. 'During' from 1st March 2018 to 31 March 2019 (13 months) – participants accessed the FDT specialist service with more expanded specialities following the initial pilot project phase
3. 'Post' from 1st April 2019 to 30th June 2019 (3 month) – a follow up period following the first 12 months of the FDT specialist service.

Primary care service and out of hospital specialist utilisation for each participant was identified by Medicare (MBS) item claim numbers. International Classification of Disease (ICD-10) codes were used in determining ED presentation and hospital discharge diagnoses for all cause presentation or discharge diagnoses and diagnoses attributable to the index condition that instigated referral and access to the FDT specialist service, i.e. diabetes (Endocrinology), heart disease (Cardiology), psychiatric condition (Psychiatry) and respiratory disease (Respiratory). Data were summed to create count variables reflecting the use of any/all cause ICD-10 codes, as well as a set of codes related to any of the conditions of referral to the FDT specialist service. Further information about the variables created is provided in Appendix 2.

Qualitative data – semi-structured interviews

Specialists and facilitators who provided consent were contacted via phone by a member of the evaluation team for an over the phone interview. The interviews comprised of semi-structured questions which were underpinned by the previously described evaluation framework and theory. Questions were framed to capture information on resources, infrastructure, readiness for technology, and clinician perceptions of workflow and patient acceptance, to gain an understanding of the challenges, barriers and enablers to adoption and embedding of telehealth, and the FDT specialist service platform specifically. The interviews were recorded and then transcribed verbatim by a professional transcription agency.



Data analysis and synthesis

Quantitative data

Data were analysed in IBM SPSS statistics version 25. Descriptive statistics were summarised as means and standard deviations, medians and interquartile ranges, and/or frequencies and percentages. Data were analysed using Negative Binomial regression (General Estimating Equation for repeated measures), to accommodate for identified overdispersion of health utilisation variables.

Qualitative interviews

Transcripts were uploaded into NVivo 12 for electronic coding and thematic analysis. Transcripts were broken down into the smallest meaningful segments of text and descriptive codes that aligned with the evaluation framework were attached. Segments within each code were compared and categories continuously refined through an iterative process. Rigour of the findings was supported by independent analysis by two different researchers, followed by comparison and discussion of the respective findings.

Economic evaluation

The data analysis was divided into the three phases relative to the FDT specialist service access stage (Pre, During and Post as previously described).

A 'participant record' was created for each participant, to include age (where available, at beginning of period), sex, address, and postcode. For each participant, a timetable of health-related activities for the 'Pre' period was also created, to include all relevant information available from Medicare, VPTAS, VAED and VEMD data. The costs of these activities were estimated, using methods as described overpage.

The health-related activities in the ‘Pre’ period were then used to predict health-related activities in the ‘During’ and ‘Post’ periods. The data were segmented by age range and gender of participant, and the predictions assumed cost-inflation for each group, based on the average Melbourne Consumer Price Index (CPI); Pre 110.825. During 114.08 and Post 115 [20]. Each participant was then tracked through time, with age in each new period increased, so that activities, costs, etc. matched that of the relevant age and gender group in the ‘pre’ period. The predicted values for the costs of Medicare, VPTAS, VAED and VEMD activities, as well as travel distances and accommodation from VPTAS, were then compared with actual values for the ‘during’ and ‘post’ periods.

Emergency department presentation costs for each visit have been estimated with reference to the various issues of the National Hospital Cost Data Collection Report (NHCDC) [21], as follows:

NHCDC Round		Admitted (\$)	Non-admitted (\$)
Round 21	2016/7	908	432
Round 22	2017/8	965	472
Round 23	2018/9	1002	495

In instances where the participant presented to ED but ‘did not wait’ it was assumed some triage and other costs were incurred. In that case an allowance was made of 50% of the non-admitted cost. Where participants were transferred to another facility, the admitted rate was used.

The VAED linkage dataset recorded hospital stays and specialist consultations, with associated costs. Each of the 7,721 events in the dataset was costed, using WIES averages (Table 3) taken from DHHS policy and funding guidelines [22]. Costs were attributed to the location of the facility where the hospital stay, consultation or treatment took place.

Table 3: WIES unit costs for attribution of hospitalisation costs

Payment	Metropolitan and regional (\$)	Subregional and local (\$)	Small rural (\$)
2019–2020 (Appendix 1, Table 1.1)			
Public WIES26	5,029	5,295	4,950
Private WIES26	3,650	3,839	–
2018–2019 (Chapter 3, Table 3.1)			
Public WIES25	4,833	5,083	4,877
Private WIES25	3,560	3,741	–
2017–2018 (Chapter 3, Table 3.1)			
Public WIES24	4,732	4,978	4,795
Private WIES24	3,544	3,726	–
2016–2017 (Chapter 3, Table 3.1)			
Public WIES24	4,640	4,857	4,734
Private WIES24	3,527	3,690	3,590

Summary descriptive statistics of costs were used in the analysis and presentation of observations and findings by linkage dataset type (VEMD, VAED, VPTAS and MBS) and gender subgroups with segmentation by age groups.

Furthermore, econometric analysis was performed using ‘Pooled Cross Section and Time Series Regression with Fixed Effects’ to explore correlations and changes between periods.

For the purposes of this evaluation, the analytical interest was in the impact of the introduction of the FDT specialist service, proxied by the dummy variable for the ‘During’ period. Significance in this variable could lead to inference of at least a correlation, after adjusting for other factors and differences in participant characteristics, between the introduction of FDT specialist service and changes in healthcare access. The coefficient on this variable provides both an indication of the direction of change (positive means greater access) and of its magnitude.

In the absence of information on the wider characteristics of the participants, for example, household type, socioeconomic indicators etc. at the individual level would have been helpful), proxies were created using participant postcodes of residence. This allowed creation of proxies for remoteness, and to relate the data to other databases such as Socioeconomic Indexes for Areas (SEIFA) [20], Socioeconomic Advantage and Disadvantage (IRSD and IRSAD), Economic Resources (IER), Education and Occupation (IEO), and the ASGC (Australian Standard Geographical Classification) Remoteness Areas classification[21].





What were
the findings?

Quantitative analysis

Service capacity and demand

During March 2018 – March 2019 there were 779 appointments booked, the majority of which were for Endocrinology services. Cardiology and respiratory showed very low levels of service activity at the time based on booked patient consultations (3 and 13 consultations respectively) (Figure 3).

Appointment by FDT specialist service

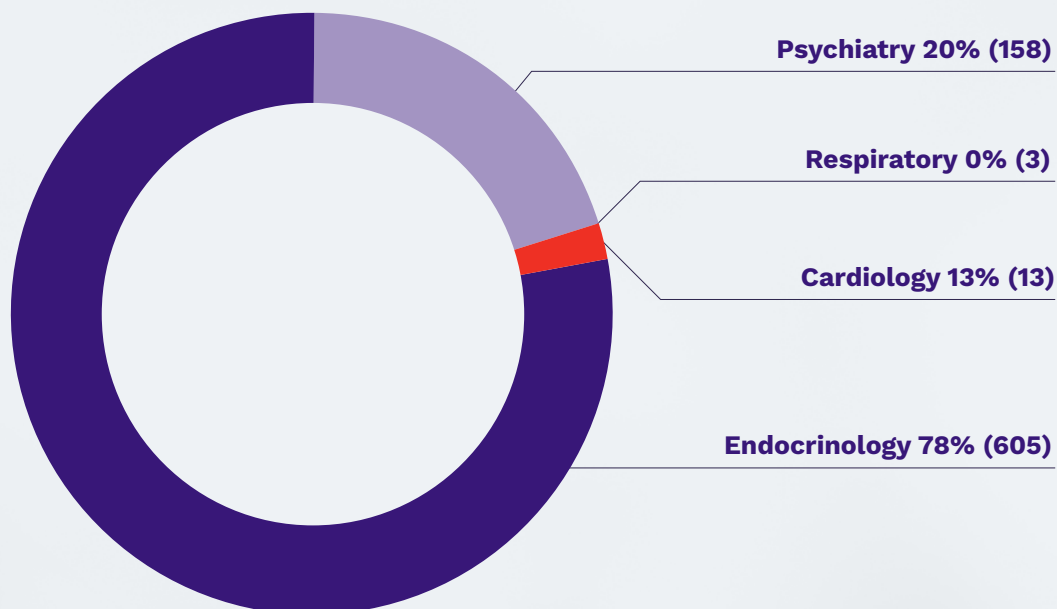


Figure 3: Appointments by service typed booked through FDT specialist service

Appointment attendance was high, with two thirds of patients (67%) attending. A small proportion of clients (5.5%) did not attend scheduled appointments, and an additional 12% cancelled appointments. No reasons were provided to further explain patient non-attendance. There was a small number of appointments (11%) which were unplanned, and service processes captured these as 'overutilisation' (the descriptor applied for unscheduled appointments) (Figure 4).

Appointment status

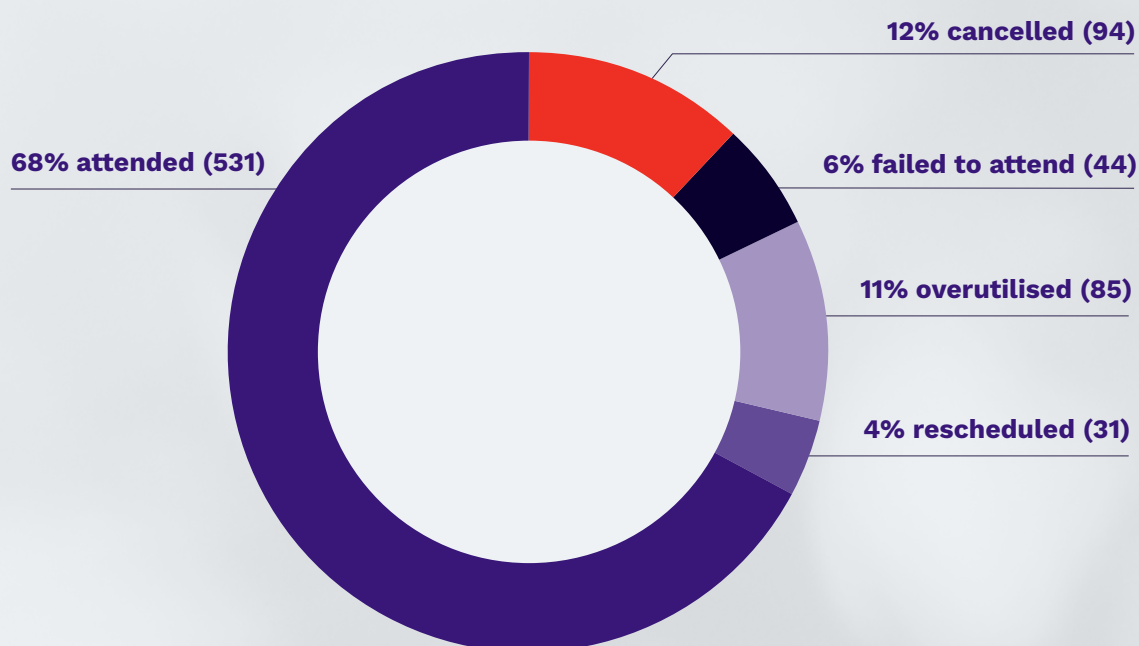


Figure 4: Status of 779 FDT specialist service appointments (March 2018 – March 2019)

Service locations

A total of 56 unique FDT specialist service sites spanning 38 postcodes were set up in Victoria at the time of this report (Figure 5). Because induction and on-boarding of new sites was ongoing, the reported number of sites was current at the time of for the evaluation period (1 March 2018 – 31 March 2019); hence by the time of producing this report there were in excess of 90 sites.



Figure 5: FDT specialist service Victorian site locations

Classification of rurality of the telehealth site postcodes based on ARIA are summarised in Figure 6. Most sites were classed as outer regional, meaning these sites are located in areas of “significantly restricted accessibility of goods, services and opportunities for social interaction” [22].

Rurality of FDT specialist service sites

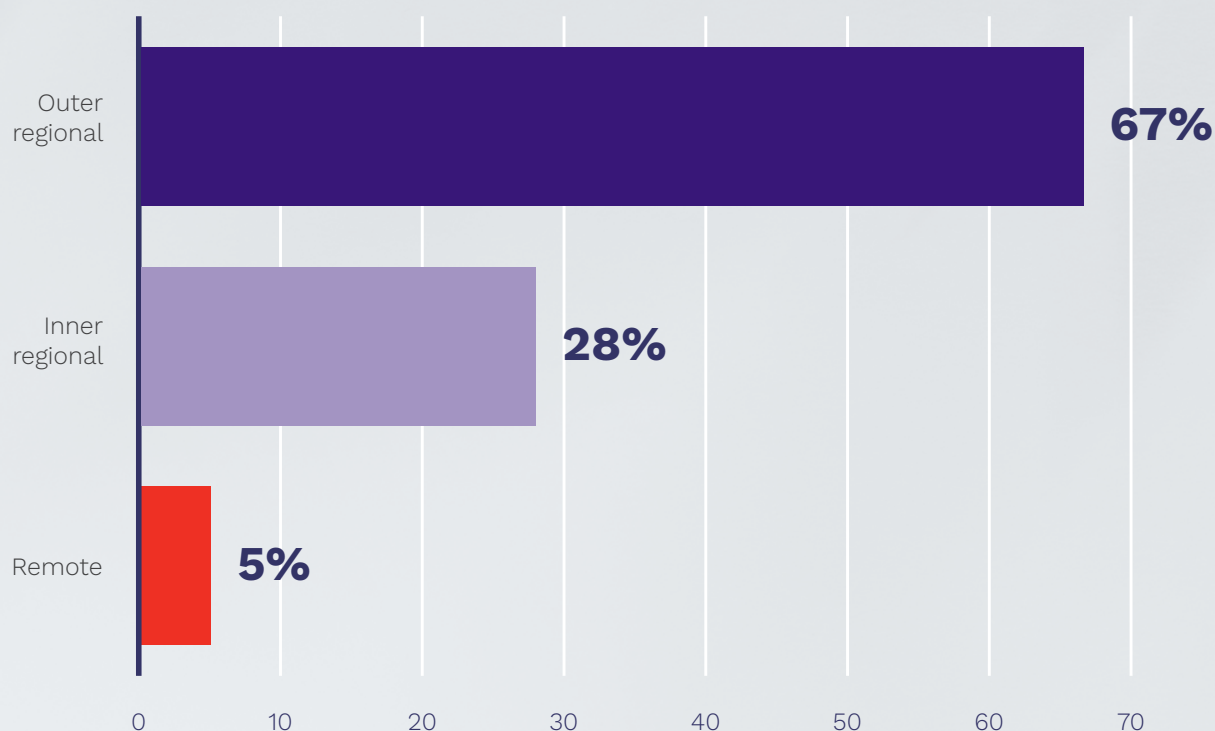


Figure 6: Classification of rurality of 56 FDT specialist service sites

Patient clinical outcomes: Diabetes (endocrinology) sub-cohort

A dataset with 881 records from the cohort subsample of 375 individual patients with diabetes was available for a snapshot of clinical outcomes. The patient average age was 54 (range 15–93) years of age and most (66%) had type 2 diabetes (Figure 7). The “Other diabetes” included types such as gestational diabetes, Latent Autoimmune Diabetes of Adult (LADA), Maturity Onset Diabetes of the Young (MODY) or the type of diabetes was not specified. In addition, there was a small number of patients that were recorded as having GDM and type 2 diabetes, potentially an error, because it is unfeasible for the two to co-exist. Hence, for the purpose of this analysis the implicated cases were assigned to the “Other diabetes” group.

Types of diabetes

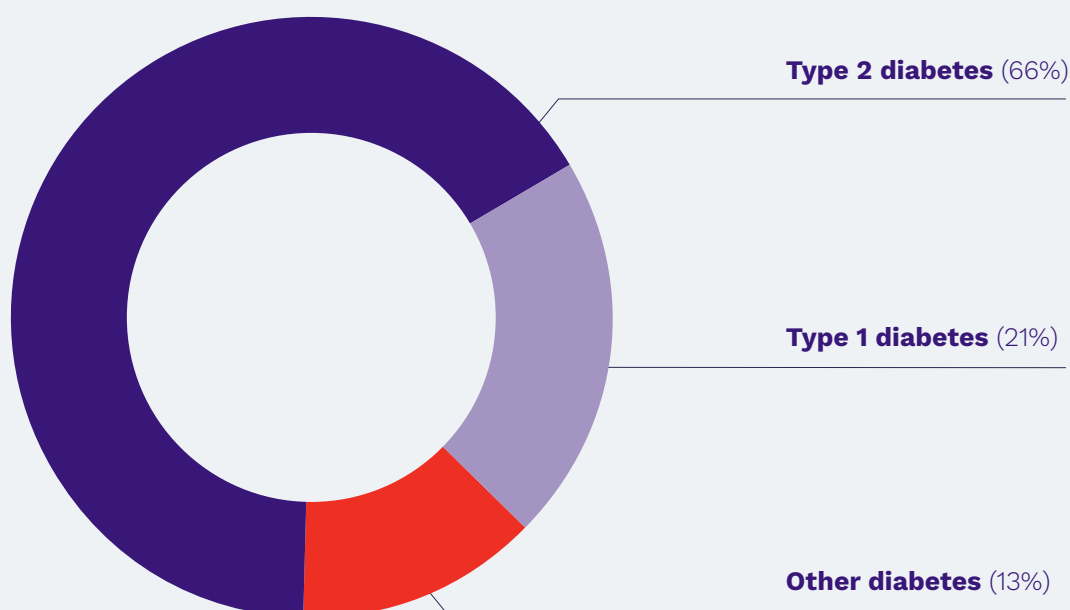


Figure 7: Distribution of the types of diabetes for the patients with clinical outcomes data (n = 375)

Of the 375 patients in the diabetes sub-cohort, n=340 had HbA1c recorded with a total of 779 HbA1c data points. However, the most recent HbA1c results all predated the start of the "During" stage of FDT specialist service, with the most recent 6 months data available of only 21 patients; mean HbA1c(SD)=65.7(15.2) mmol/mol rendering the data unusable for any analysis of association with the "During" stage of the FDT specialist service. Because of a change in priorities in the business operations of FDT specialist service clinical data for the diabetes sub-cohort, let alone other FDT specialist service specialist areas became a low priority and no further clinical data were collected as part of minimum FDT specialist service dataset for RFDS Victoria.

Health service utilisations

Health service utilisation was assessed via a subset of 410 FDT specialist service clients. Sociodemographic and geographic characteristics are summarised in Table 4. These have been stratified to reflect the characteristics of all participants for whom data were available compared to just those who participated in a FDT specialist service video consultation. The total sample exhibited a mean age of 58 years, with slightly more women (53%) compared to men. Approximately 70% of the sample resided in the lowest three SEIFA tertiles, and/or in outer regional areas. With regard to the latter, this indicated that patients who accessed the FDT specialist service resided in areas of “significantly restricted accessibility of goods, services and opportunities for social interaction” [22], therefore were considered socioeconomically disadvantaged.

The highest proportion of participants accessed the Endocrinology service, followed by psychiatry. Very few participants accessed the respiratory or cardiology services at the time of the evaluation. The sociodemographic and geographic characteristics of participants who had participated in one or more telehealth consultations were comparable to those of the entire sample for which data had been obtained, thus statistical investigation of changes in health care access before and after the commencement of the evaluation period focus on those who received one or more telehealth consultations.

Table 4: Sociodemographic and geographic characteristics of the FDT specialist service patient cohort

	Total sample		1 or more video consultations	
	N	%	N	%
Age (mean, SD)	58 years	17.72	59 years	17.25
Sex				
Male	191	46.6	113	49.3
Female	218	53.2	116	50.7
SEIFA				
Lowest (Deciles 1 – 3)	285	69.5	161	70.3
Middle (Deciles 4 – 6)	112	27.3	61	26.6
Highest (Deciles 7 – 9)	12	2.9	7	3.1
ARIA				
Inner regional	96	23.4	44	19.2
Outer regional	291	71.0	169	73.8
Remote	22	5.4	16	7.0
Number of FDT specialist video consultations				
0	181	44.1	NA	NA
1	160	39.0	160	69.9
2	50	12.2	50	21.8
3+	19	4.6	19	8.3
Flying Doctor Specialist Service Utilised				
Endocrinology	186	45.4	169	73.8
Cardiology	7	1.7	5	2.2
Psychiatry	57	13.9	52	22.7
Respiratory	3	0.7	3	1.3
Unknown	157	38.3	NA	NA

There appeared to be a higher number of total Medicare claims and claims for services related to any of the FDT specialist service (endocrinology, cardiology, respiratory and psychiatry) after March 2018 (commencement of the evaluation period) compared to the period prior (November 2016 – February 2018) Figure 8 – Figure 10. During the same period, there was a higher number of VPTAS claims (Figure 13). As expected there was a noticeable increase in telehealth related medical claims during the implementation of the FDT specialist service (March 2018 – March 2019) compared to the period before (November 2016 – February 2018). Hospitalisations or emergency department presentations before or after the commencement of the evaluation period are shown in Figure 11 and Figure 12, which when considered with econometric data, indicated reduced acute health care utilisation during FDT specialist service uptake.

Total Medicare claims per month among FDT specialist service clients

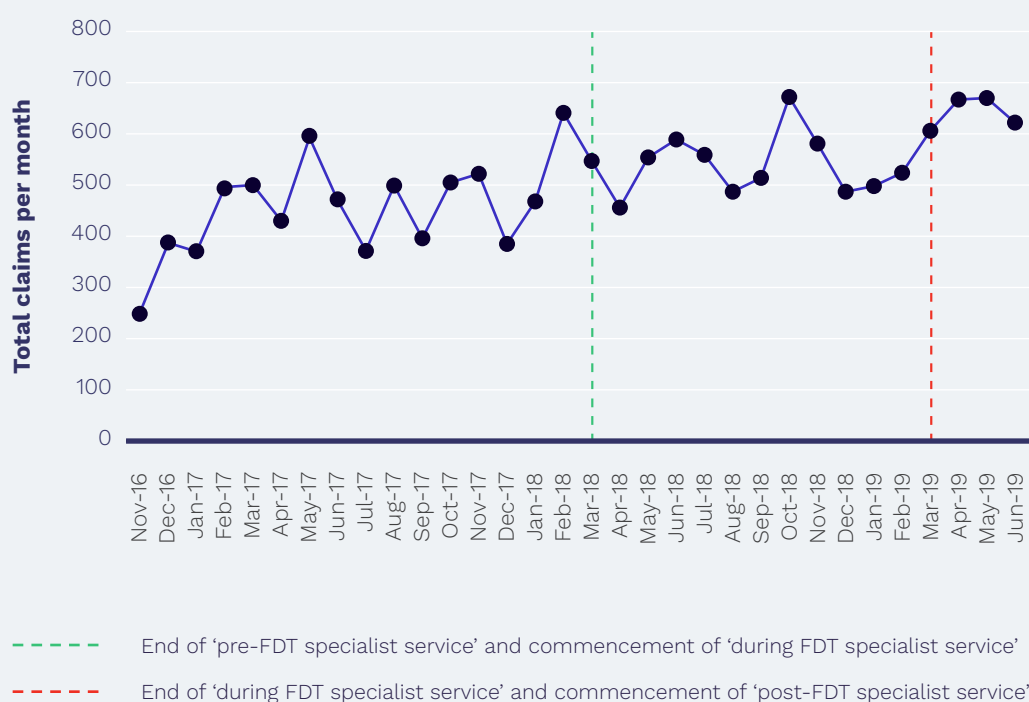


Figure 8: Total Medicare claims among FDT specialist service evaluation participants for each month (n = 115)

Total Medicare claims relevant to any FDTSS service per month among FDT specialist service clients

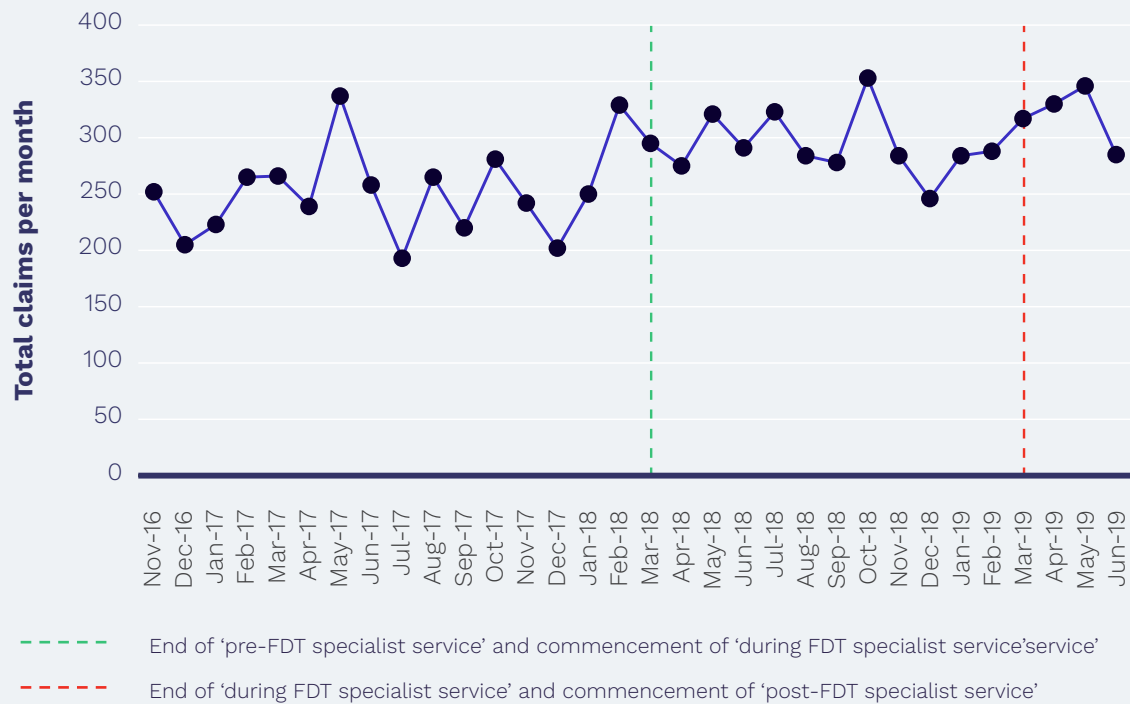


Figure 9: Total Medicare claims relevant to any FDT specialist service service (n = 115)

Total Medicare claims relevant to any FDTSS service per month among FDT specialist service clients

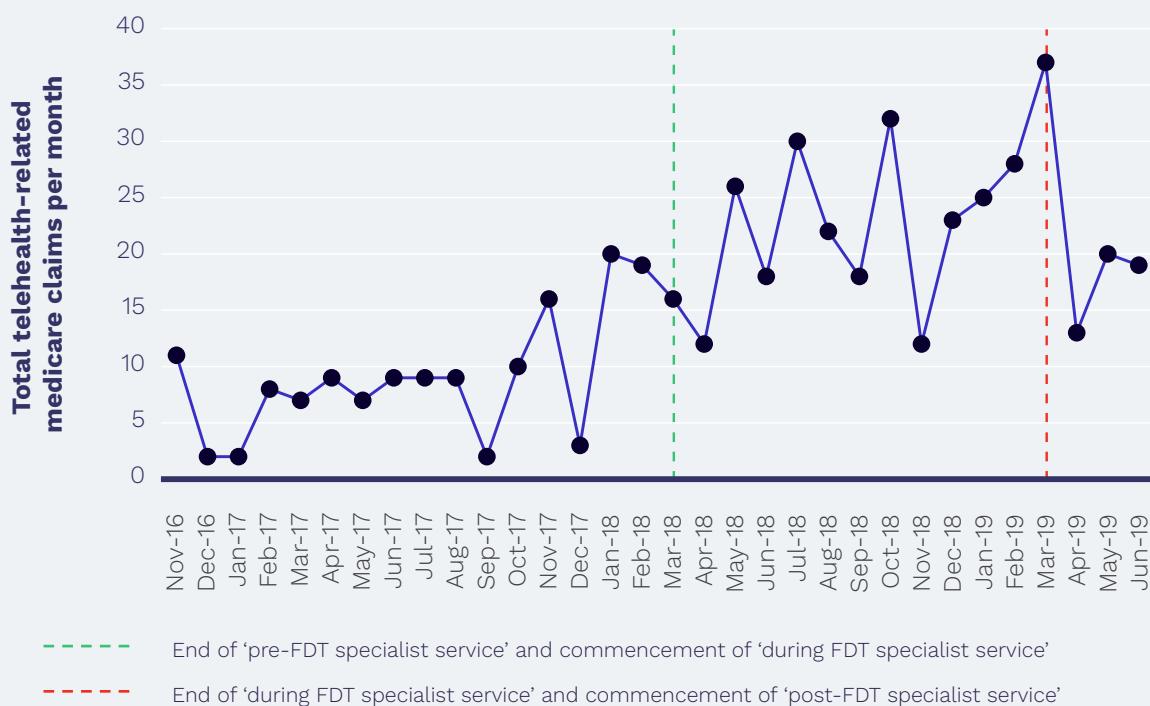


Figure 10: Total telehealth Medicare claims per month among FDT specialist service participants (n = 115)

Total hospitalisations per month among FDT specialist service clients

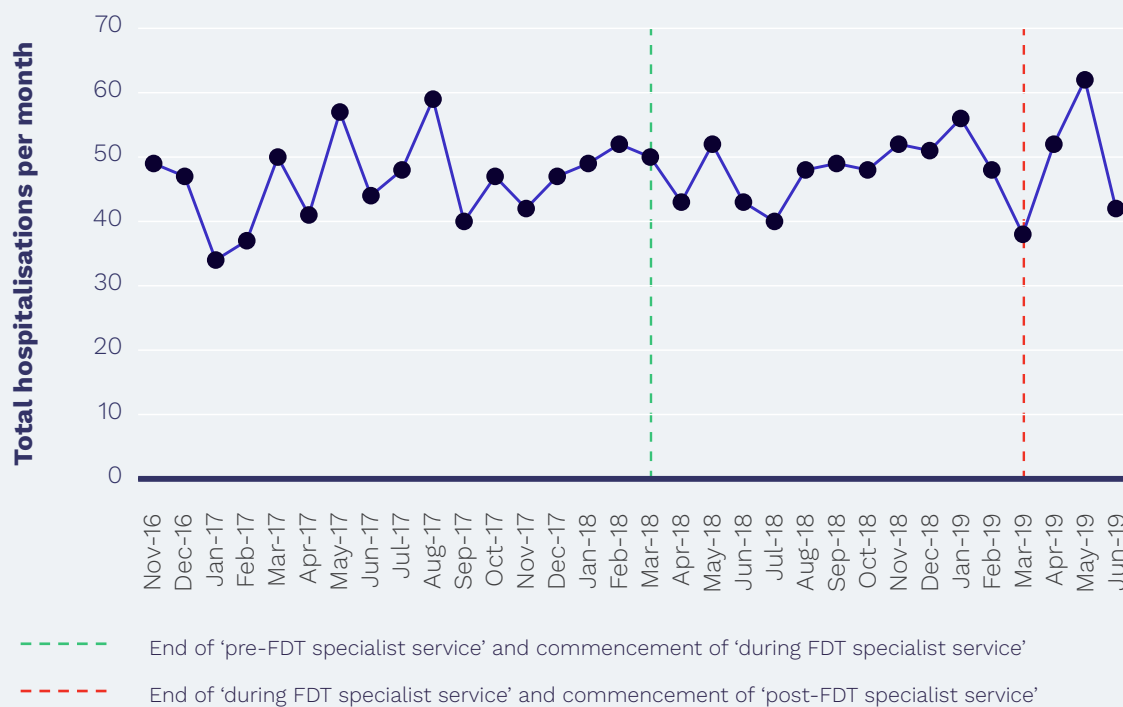


Figure 11: Total hospitalisations per month among FDT specialist service evaluation participants (n = 306)

Total emergency department presentations per month among FDT specialist service clients

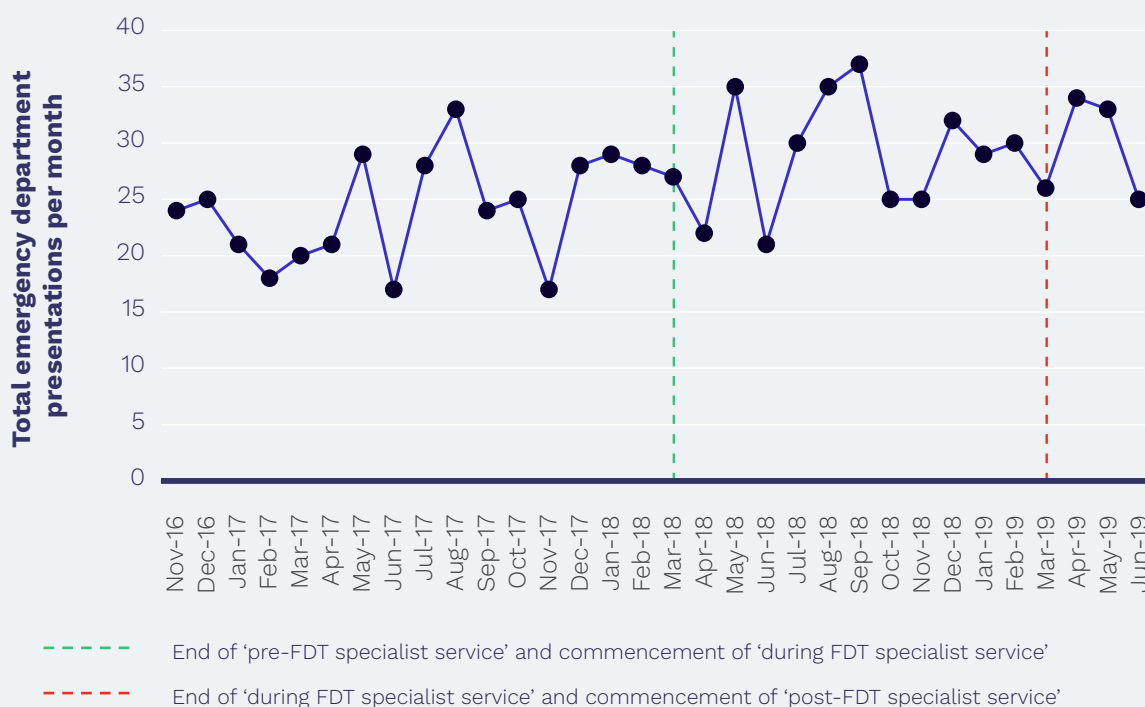


Figure 12: Total emergency department presentation among FDT specialist service evaluation participants (n = 261)

Total hospitalisations per month among FDT specialist service clients

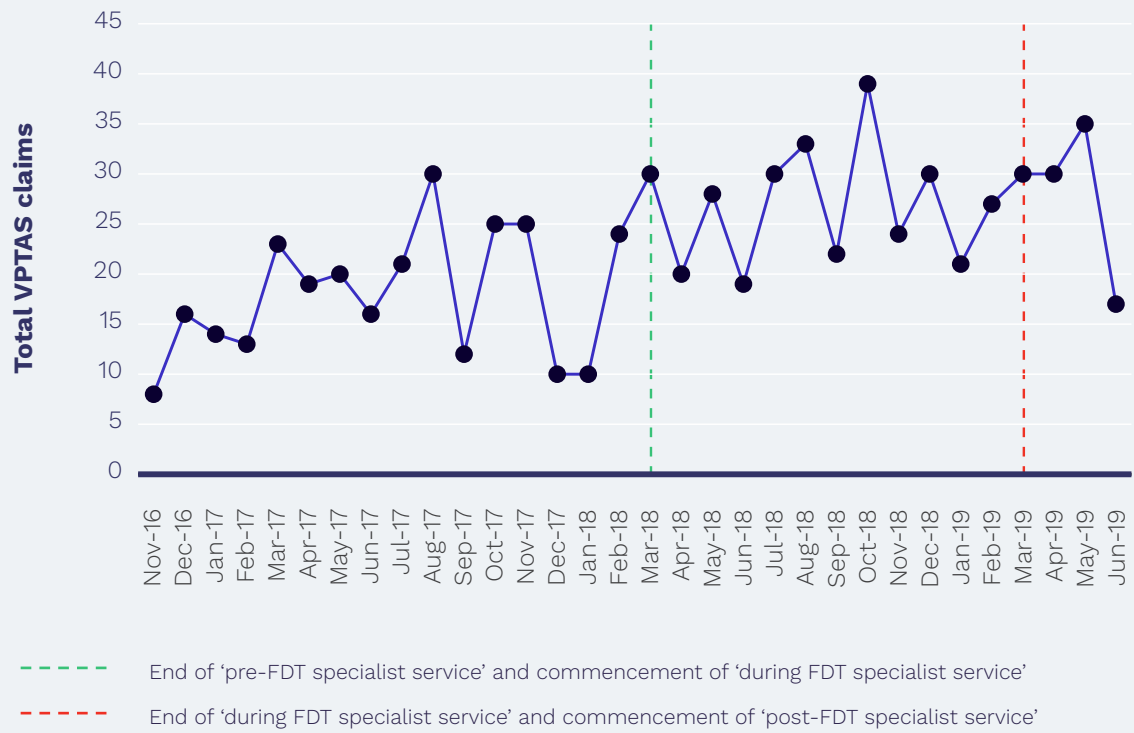


Figure 13: Total VPTAS claims per month among FDT specialist service evaluation participants (n = 115)

To investigate these trends at the individual level, regression analysis was applied to pre and post evaluation period data to ascertain association with uptake of the FDT specialist service. Findings are summarised in Table 5. These findings support the figures opposite, highlighting greater FDT specialist service uptake and engagement with out-of-hospital care service including travel to see other specialists, indicating:

- Increased incidence of any Medicare claims from an average of 59 to 80 claims per person (1.38 times the incidence of Medicare claims in the period prior to March 2018)
- Increased incidence of Medicare items relevant to any of the FDT specialist services, from an average of 32 claims to 42 claims per person (1.35 times the incidence of relevant claims compared to pre-March 2018)
- Increased incidence of Medicare items relevant to the specific FDT specialist services accessed by the individual, from an average of 3.1 to 4.7 claims per person (1.52 times the incidence compared to pre-March 2018).
- Increased incidence of telehealth specific Medicare claims 3.7 times higher compared to the period before implementation.
- Increased incidence of VPTAS access for any reason after implementation of the FDT specialist service compared to the period prior to its adoption in March 2018 (2.33 and 1.90 times the incidence respectively).

Data on travel subsidy showed a significant decrease in the distance travelled over the 12 months of FDT specialist service uptake. In the 12 months prior, patients travelled an average of 2,576km vs. 1,279 during FDT service uptake. Most of the remaining travel was predominantly to attend appointments with specialists who were not available under the FDT specialist service. This, coupled with increased engagement with primary care services as well as feedback from facilitators, highlights the opportunity for a multidisciplinary virtual clinic model.

Table 5: Healthcare utilisation before and during FDT specialist service evaluation period

	Mean (SD)	Mean (SD)	aOR	95% CI
Any Medicare claims	58.8 (34.4)	80.1 (73.1)	1.38	1.15–1.65 ^a
Medicare items relevant to any FDT specialist services	31.6 (16.4)	42.1 (27.4)	1.35	1.17–1.54 ^a
Medicare items relevant to FDT specialist service accessed	3.1 (2.5)	4.7 (4.2)	1.52	1.23–1.87 ^a
Medicare telehealth claims	0.95 (1.5)	3.3 (2.2)	3.71	2.62–5.25 ^a
Hospital admissions (any reason)	2.9 (15.5)	3.3 (15.7)	1.16	0.98–1.38
Hospital admission for primary diagnosis relevant to any FDT specialist service	0.6 (1.0)	0.5 (1.2)	0.97	0.67–1.41
Hospital admission for any diagnosis relevant to any FDT specialist service	1.3 (2.0)	1.5 (2.3)	1.17	0.92–1.49
Hospital admission for primary diagnosis relevant to FDT specialist service accessed	0.1 (0.5)	0.2 (0.5)	1.12	0.54–2.31
Hospital admission for any diagnosis relevant to FDT specialist service accessed	1.2 (1.9)	1.3 (2.3)	1.15	0.89–1.50
Emergency department presentation for any reason	1.8 (2.2)	2.0 (3.0)	1.07	0.85–1.36
Emergency department presentation for reason relating to any FDT specialist service	0.4 (0.8)	0.5 (1.0)	1.42	0.92–2.19
Emergency department presentation for reason relating to FDT specialist service accessed	0 (0)	0 (0)	–	–
Frequency VPTAS scheme accessed for any reason	2.3 (2.6)	5.3, 5.4	2.33	1.67–3.24 ^a
Frequency VPTAS scheme accessed for reasons relevant to any FDT specialist service	0.5 (1.2)	1.1 (2.0)	1.90	1.18–3.04 ^b
Frequency VPTAS scheme accessed for reasons relevant to FDT specialist service accessed	0.1 (0.4)	0.1 (0.5)	1.22	0.33–4.49

^aP < 0.001^bP < 0.01^cP < 0.05

Specialists and nurses perspectives of FDT specialist service

Interview participants included 10 nurses and a dietitian in the facilitator group. There were five specialists representing endocrinology, respiratory and psychiatry.

Client control

Responsiveness: *Healthcare service is client oriented. The client is treated with dignity, confidentiality and encouraged to participate in choices related to their care.*

A prominent theme emerging from many interviews with facilitators was that of perception of patient autonomy. The FDT specialist service model fostered opportunities for patients to have a familiar clinician (the facilitator) or family members in attendance in a familiar environment assisted with patients feeling comfortable and confident to participate actively during consultations with the specialist. As a consequence, facilitators believed that patients felt, a sense of shared ownership over the consultation and subsequent decisions and management.

“

“I’m able to bring the district nurse into the appointment as well. I’m able to bring some of the nursing staff from the aged care facility in as well and it’s more of a shared ownership of the appointment and the care that was to follow on.”
...F3.

Having a facilitator present assisted in bridging gaps in communication or understanding between the patient and the specialist. Also, facilitators assisted patients, including those with hearing and vision impairment, with interpreting medical jargon. One participant believed this role contributed towards the high attendance at FDT video consultations at their local site. The involvement of multiple parties provided a consistent, quasi-multidisciplinary care, albeit involving the specialist and predominantly the nurse as a facilitator. Participants believed this process streamlined care for better continuity of care and better patient outcomes. This is described further on under 'continuity of care' domain.

Participants did not voice any privacy or confidentiality issues related to the use of the FDT specialist service platform. However, privacy was a concern regarding the use of other platforms, which had increased in use during the COVID-19 crisis (which emerged during the period participants were being interviewed). One facilitator did note a lack of privacy due to a poorly soundproofed room; the clinic circumvented this by attempting to book FDT specialist consultations for less busy times of the day. However, this was not always convenient for the facilitators or the patients, or sometimes did not align with the specialist's availability. This reinforces the importance of sufficient infrastructure to ensure privacy and confidentiality during telehealth.

Accessibility: *People can obtain healthcare at the right place, at the right time irrespective of income, physical location, or cultural background.*

Participants identified increased access to specialists services, as the defining benefit of the FDT specialist service. The FDT specialist service provided clients with opportunities to access quality specialist doctors, regardless of geographic location and financial constraints. FDT specialist service especially enabled disadvantaged members of the community access to care, particularly those who had difficulties with extended travel times or on low income or Indigenous populations who could not afford the time and financial costs associated with a face-to-face consultation with a specialist.

“

“The most important for us is the convenience for our clients, for less travel and things like that... getting access to some services that they think that they wouldn't [have]... Because we're an ageing population and so they're finding it more difficult to travel and... and as you get older you get more health problems. Yeah, so better access to those specialist services.”...F1.

Video conferencing provided free (bulk-billed) access to a required specialist who would have otherwise been inaccessible due to high costs associated with the consultation and travel. Reportedly, without the FDT specialist service, patients would be faced with travelling upwards of seven hours to attend specialist appointments face-to-face. These travel times would require many to take time away from work, and in some cases to stay overnight in the specialist's location, constituting a significant financial burden for the patient. In one case, a facilitator referenced telehealth as the only feasible way for patients to access a specialist and the FDT specialist service was seen as a providing that solution and choice for rural dwelling patients. Additionally, the time requirements if specialists were to travel to communities was also acknowledged, with telehealth options alleviating the time and costs associated with travel.

“

“We wouldn't have any access if it wasn't for telehealth... there's absolutely no doubt in my mind we would not have any access at all if it wasn't on for telehealth.”...F6.

Further increasing the accessibility of specialist services, telehealth ameliorates the longer waiting time associated with seeing a specialist face-to-face. Whilst certain wait times were still associated with accessing specialists via telehealth, these were reported to be substantially less compared to those for traditional consultations.

These findings highlight the importance of FDT specialist service as a telehealth model for facilitating timely and convenient access to specialist services to meet the treatment needs of patients, increase attendance at appointments, and potentially improve health outcomes.

Continuity of care: *Ability to receive uninterrupted coordinated care or service across programs, practitioners, organisations, and levels over time.*

Continuity of care was another dominant theme that arose from the interviews. Participants (facilitators and specialists) held mutual recognition of each other's role under the FDT specialist service for a shared goal of ongoing care for patients. Additionally, they identified general practitioners, patients' family members, and other health care professionals as key players who on occasion are engaged through the FDT specialist service consultations. This facilitates a multidisciplinary decision-making process and aligns management across the healthcare team to ensure a coordinated approach to patient care.



“He likes it with the support of his GP there because everyone has a bit of input. That’s probably the most important thing, that is we’re all on the same page and we’re all there together... it makes life simpler and much easier for our clients and for us, and for the doctors to keep in the loop.”...F4.

From one specialist's perspective, the FDT service provided the convenience of flexibility around consultation times and follow-ups, allowing for sessions tailored around the unique needs of the patient and a greater role of the GP in assisting with care-related decisions.

As a result of more effective and accurate communication between the healthcare team, and subsequently consistent and reinforced health advice, the health outcomes for the patient, and the facilitator-patient dynamic may ultimately be improved.



“I know some of my clients quite well and so I can put things across, and they can be discussed, like I did yesterday... As a result of that the outcome is going to be better for the client, so I use it as a communication tool for me as well, with the endocrinologist, not just the client, so there is that collaborative approach.”... F2.

Whilst most participants discussed this in a positive light, one participant perceived the requirement to assist in healthcare consultations to be improper of use time. Potentially this reflected the difference in health care settings (tertiary hospital environment, as opposed to primary care) where the FDT specialist service model was implemented. Staff (facilitators) found themselves having to balance sitting through the FDT specialist service consultation against attending to their own competing clinical care demands, given their role in the FDT specialist consultations was facilitatory as opposed to clinical.



Acceptability of telehealth

An additional theme relevant to patient control, was that of acceptability of telehealth services. Most participants reported that patients were readily accepting and embracing of the notion of telehealth, particularly those for whom access to a specialist may be impeded by financial and travel constraints. Further driving this acceptance was the ubiquity and use of online modalities for many other errands and tasks associated with daily living, such as banking and social video calls. While such technology used is the non-health context, such use may be a critical driver of general digital literacy, resulting in familiarity with technology and internet services believed to contribute to acceptance of the FDT specialist service model.

In spite of the above, several participants mentioned the potential for initial hesitancy to use telehealth among older adults, particularly those who were unfamiliar with, or did not widely use technology or online platforms. However, respondents mentioned that the concerns of patients who were initially hesitant were often alleviated after experiencing the first FDT specialist service consultation.

In summary, findings relating to the patient control domain of the evaluation framework highlighted the responsiveness of telehealth in encouraging an autonomous patient approach. This significantly improved access to specialist services for people residing in rural areas, and potentially improved continuity of care above those experienced during traditional consultations. As technology and its use in activities of daily living continue to grow, so too does the acceptance of telehealth as a feasible option for receiving healthcare services. This is a critical element towards ensuring that the FDT specialist service expansion has the patronage to match and assure sustainability.

Clinician quality of care

Effectiveness: *Care/intervention/action provided is relevant to the client's needs and based on established standards. Care, intervention, or action achieves desired outcome.*

Participants strongly felt that telehealth provided care that was relevant to a client's specific needs. As mentioned earlier, telehealth provided access to

specialist services to meet treatment needs, and provided opportunities for patient advocacy, and potential multidisciplinary and collaborative approaches to condition management by allowing other healthcare professionals to participate in the consultation. Using telehealth for access to specialist services also facilitated more timely and appropriate management that aligned with best practice for clients who may have particularly complex conditions and/or multiple comorbidities. This is complemented by a perceived air of legitimacy associated with being instructed by a specialist doctor and assists in achieving improved outcomes at a faster rate.

Most commonly, facilitators described the effectiveness of telehealth consultations as being evidenced through improved clinical outcomes including blood glucose levels, HbA1c, blood pressure, relevant pathology etc. Behavioural changes by patients and attitudes towards the consultations as well as high attendance at consultation were also suggested as usual means for assessing the effectiveness of telehealth.

Safety: *The avoidance or reduction to acceptable limits of actual or potential harm from healthcare management or the environment in which healthcare is delivered.*

Whilst the concept of safety was not explicitly described during interviews, potential benefits that aligned with this component of the evaluation framework were implicit throughout. A reduction in acceptable limits of potential harm may be facilitated through opportunities to access specialist services in a timely manner (when one may not have been accessed otherwise), which in turn allowed for more appropriate management, hence effective health outcomes. Several participants highlighted that existing management of a patient's condition may have plateaued and was no longer sufficiently effective and had reached the point where the local healthcare team (typically the GP and a diabetes educator) had no further recommendations. The ability to seek specialist services via telehealth provided opportunities to reduce the potential harm associated with continuing the current ineffective health management strategies.

Finally, the increasing severity of the COVID-19 situation in Australia during the progression of these interviews saw a risk to safety associated with traditional face-to-face consultations. Experience from FDT specialist service was

leveraged to increase the use of telehealth beyond the intended purpose to facilitate specialist access to those living in isolated areas. It meant patients could have access to health professionals where feasibly possible, regardless of geographic location while observing social distancing rules brought about by the COVID-19 pandemic. This is further explored in the section 'COVID-19 as an enabler of telehealth'.

Bridging the gaps: opportunities a multidisciplinary model and interprofessional learning

An additional theme relating to clinician quality of care which emerged during the interviews was that of 'bridging the gaps.' The benefits of improved access to specialists extended beyond the patient, to include other health professionals in rural areas. Participants mentioned the importance of telehealth in bridging gaps in speciality knowledge by providing opportunity for timely and convenient contact when advice for the management of a particular health condition was urgently required.

The opportunity to participate in telehealth consultations constituted a unique learning experience for facilitators, who gained additional knowledge and skills as they worked directly in collaboration with the specialist doctors. Participants highlighted the potential for telehealth to be used for professional development and as a peer support mechanism.



“It’s been a wonderful learning opportunity from the point of view that you’re actually having direct contact with endocrinologists.”... F3.

Through the above experience emanating from FDT specialist service, telehealth may serve as an opportunity to overcome the geographic barriers to professional development for rural health care staff. As well, it may act to limit professional isolation, which is a significant contributing factor to difficulties in retaining a rural health care workforce.

Organisational sustainability

Efficiency and sustainability: *Achieving desired results with most cost-effective use of resources. Capacity of system to sustain workforce and infrastructure, to innovate and respond to emerging needs.*

Support from management has been identified as an important enabler in order to sustain telehealth [23], thus it stands that to gain this support services must be aligned with the overarching objectives of health service management. Most participants reported organisational goals that related to the provision of accessible healthcare to the community, and/or aligned with best practice health management guidelines for specific conditions which recommend increased access to specialist services for patients. As evidenced in previous sections, accessibility was a predominant theme that emerged through these interviews, and participants firmly believed that telehealth aligned with the goals of the health service management.

Likely to also aid in meeting the goals of organisational management is the potential cost-effectiveness attributed to telehealth through the reduction of patient travel and transport, or through a reduction in overhead costs such as rent. It should be noted however that the additional administrative associated tasks associated with the organisation and management of a telehealth consultation may limit these potential savings, which is discussed in relation to workflow further below.

Participants were also explicitly asked about the sustainability of telehealth, with the majority of participants believing that telehealth is a sustainable service due to the simplicity of getting established, particularly with the initial setup assistance offered by the FDT specialist service. There was also little required in terms of capital and operating costs, and therefore minimal financial input from required organisations.

However, funding was commonly reported barrier to the sustainability of telehealth, with no certainty or permanency of ongoing finances to support staff positions and/or clinics; instead, clinics received confirmation of any successful funding on an annual basis.



“It all comes down to a funding thing as well to be able to support and coordinate these appointments.”... F3.

This may have follow-on effect for sustainability by potentially exacerbating already high staff turnover rates in rural areas [24]. High staff turnover was identified by several participants as being a major organisational change that had occurred in the preceding six months.



“Staff come and go like you wouldn’t believe.”... F2.

High rates of staff turnover were identified by one participant as directly affecting the sustainability of the use of the FDT specialist service platform; after a high rate of staff turnover, familiarity with the platform and knowledge the accompanying passwords and procedures required for its use had been lost, resulting in the service now utilising a different service provider.

The loss in knowledge and experience associated with high staff turnover is a risk for the sustainability of telehealth initiatives. Several participants highlighted the potential usefulness of their organisations adopting specific telehealth processes and policies or ‘universal’ login information being made available to all staff at a service. Additionally, ongoing communication with a designated contact at the FDT specialist service (not just during the initial set-up stage) may assist in ensuring staff remain familiar with the platform, despite high turnover rates.

The potential to streamline the processes required to implement telehealth would improve efficiency, and has been reported as an enabler to the uptake and sustainability of telehealth services [23]. Efficiency and the potential for telehealth to be embedded within existing practice was investigated by asking participants about potential disruptions to workflow that may arise

from organising and managing telehealth consultations, with additional administration identified as the most common disruptor to normal workflows. Additional administration was required in the booking of consultations, which involved identifying an available time (from the specialist's schedule) that also suited the patient, the facilitator and often the GP as well, scanning referrals, organisation of clinical measurements and follow-up and scanning of pathology results prior to the appointment date. On completion of appointments, follow-up letters and relevant scripts and pathology requests were often required to be followed up for patients and GPs.



“If the process is to run or the success that we’ve had it can take quite a bit of your work time in administration, like the coordination and, for instance, the following up of the referral, the requesting of the referral, the getting the referral back, the processing and the coordination of the consumer to make sure that that day and time suits them.”... F3.

In particular the lack of online or electronic access to pathology seemed to constitute a significant burden in terms of additional administration. Difficulties in searching the names of available specialists through the FDT specialist service site was also identified by one very experienced facilitator. Increased administration may result in increased costs, and subsequently decreased cost-effectiveness, associated with a telehealth consultation, which may pose a threat to its sustainability.

The perceived burden of the additional administration seemed to differ between those who had the opportunity to manage their own time allocations compared to those in which management dictated consultation times. Two

facilitators mentioned ensuring that sufficient time was scheduled to allow for measurements, confirm referral, and one had their own systematic process of working through the telehealth consult and signing of Medicare forms to ensure an efficient and streamlined approach to telehealth consults.

In contrast, other facilities had consultation times developed around traditional face-to-face consultations, which may result in higher perceived burden of the administrative work undertaken and/or facilitators working beyond paid hours in order to complete administrative tasks required to finalise the consultation.

These findings reinforce the importance of organisations developing policies and procedures that pertain specifically to telehealth, based on due consideration given to the tasks required, who will be responsible for completion of these, and the true time requirements associated with both contact and non-contact patient encounters and the balance in negotiating a time allocation that meets the needs of the facilitator and patient whilst also maximising cost-effectiveness.

The development of policies and systematic processes, as well as a 'universal' telehealth e-mail account shared by all facilitators at a service could also prevent issues that may arise if a facilitator is sick or unavailable on the day of a consultation. Currently confirmation and appointment details are e-mailed to the individual facilitator, presenting a risk should the facilitator be unable to attend the designated appointment time.

Disruptions to streamlined workflow may also occur through the way in which telehealth consultations are booked, with appointments being booked at ‘ad hoc’ times based on whatever times remain free to select from, rather than being able to book blocks of time. This was particularly problematic for one participant in a tertiary care setting, as this required significant movement from one part of the hospital to the other. Another participant mentioned scheduling other work requirements around the ‘randomly’ dispersed telehealth consultation in the week.

Despite the potential disruptions and additions to normal workflow, participants generally believed that the benefits of telehealth outweighed this. In the face of continued difficulties attracting specialist physicians to rural areas, the convenient and equitable access to specialist services that telehealth facilitates combined leaves no choice but for organisations to ensure telehealth is a sustainable option.



“It’s sustainable for us for sure because they find it very difficult to attract medical consultants to small rural communities. They just don’t want to come. So, I think for us it’s hugely important.”... F6.



The role of the GP

A new theme, 'the role of the GP', emerged as being important in consideration of the sustainability and effectiveness of FDT specialist service. A GP referral is a requirement for the initiation of an FDT specialist service consultation, highlighting the importance that GP support may play in the uptake and sustainability of the FDT specialist service model. Some participants reported support from GPs who embraced the notion of telehealth, in some cases championing the service and being responsible for most referrals for FDT specialist service through local clinics.

However other GPs remain resistant to the use of telehealth, despite the notable benefits it may provide to patients. Long term failure for patients to be referred on to required specialist services was a concern for several participants, as the situation was manifesting in increasingly poorer control and complex conditions, as evidenced by clinical indicators. These situations may occur as a result of 'going under the radar' for too long; initially it may have been thought that traditional approaches such as lifestyle changes would suffice, however over a prolonged period of time this has not been the case.



“Their complex complications were starting to kick in. They were starting to have microvascular eye problems. They were having macrovascular cardiac problems. They were early 70s, just starting to enjoy their retirement and having heart attacks. I said, when was the last time you saw an endocrinologist? Oh, never seen one. I’ve only ever been managed by the GP.”... F8.

Hesitancy to refer patients to the telehealth service may be due to a multitude of reasons, including not being aware that the service exists, a lack of trust, lack of understanding or experience with the technology used, a lack of knowledge regarding the extent of the benefits to clients, or self-perceived confidence in the ability to manage the patient’s conditions themselves. Further highlighted was the nature of well-intentioned practice approaches adopted rural GPs to take on an all-encompassing role in managing a multitude of conditions across the life course of their patients was noted. Often these GPs act as the primary health care providers to patients for many years and may be hesitant to handing over care to another practitioner. Another cited reason for less than expected GP referrals is the limited access to MBS claim items for GPs for telehealth care. However temporary MBS items specifically established due to COVID-19 improved this.

Technology capability/capacity

Technical aspects: *Adequate performance: equipment works reliably and well over available network and bandwidth. Equipment is compatible with equipment used at other sites. Standards relevant to security of storage and transmission are met. Peripheral devices are fit-for purpose.*

All participants felt they had the basic infrastructure required for successful telehealth consultations, these being internet connections, access to laptop/desktop computers, and a physical space in which consultations could be hosted. However, as has been found in previous studies, internet connection was unreliable in some areas, proving to be a barrier to effective telehealth. Whilst this is not an aspect of direct control for the FDT specialist service, it highlights an area in which continued advocacy should be directed.

Overwhelmingly the FDT specialist service platform was a popular choice as reported by participants. Several participants reported a preference for this platform as this was the first service to contact them, access to the system was established and training provided by the service provider themselves, and the platform was secure, simple and intuitive to use. Furthermore, administration and technical staff from the FDT specialist service were reported to be extremely helpful and quick to address any issues that arose.



“You plug in a camera, you get on the website, you sign in, the list comes up automatically with who you’ve got booked in, in the future, you click on them and that’s it... you’re probably clicking about four boxes to get the whole thing going in the end. I find it very user friendly, it’s good. They’ve got great technology service. I mean, all you need is the internet.”... F5.

As discussed previously in 'organisation sustainability', a commonly occurring theme was that of increased workflow resulting from additional follow up of referrals, letters, pathologies, and prescriptions. Some further limitations of the platform which contributed to increased workflow were identified to be a lack of opportunity to undertake practice-related tasks within the platform, such as billing or accessing patient notes (if using the telehealth platform from the workplace laptop or computer).



We've got a webcam on the computer and speakers and we can do a telehealth appointment. The problem is that we have to exit our file, our computer system, so if the doctor wants to know anything else, we can't access while we're doing telehealth through our desk computer."...F2.

As the use of telehealth progressively increases, in part due to the effects of the recent COVID-19 crisis, platforms that include the ability to undertake relevant practice-related tasks will undoubtedly be sought after. The use of Skype and Zoom for teleconferencing was reported to have increased among doctors, however these do not offer opportunities to upload or share documents. Alternative platforms that are currently being used and are comparable to the FDT specialist service included HealthDirect (which one specialist had integrated with another program, 'Coviu'), and 'Halaxy'. The defining characteristics of these is the incorporation of tasks relevant to practice. Halaxy includes an in-built system for clinical notes, and the opportunity to share patient files between health practitioners through third party integration with Referralnet and Argus. It also allows for billing and invoice management, and links directly to popular bookkeeping programs. Coviu now offers an opportunity for electronic prescriptions through integration with an app 'Rosemary Health Prescriptions'.

The ability to integrate these within a telehealth platform would undoubtedly assist in alleviating some of the disrupted workflow created by the additional administration associated with organising and finalising telehealth consultations. Additionally, the opportunity to use electronic patient notes whilst simultaneously accessing the FDT specialist service platform would provide a more streamlined consultation process.

Commissioning of equipment: *Equipment installed according to producer's guidelines. Equipment and connectivity are tested with other participating healthcare organisations.*

Commissioning of and training with the FDT specialist service is undertaken by the service provider themselves, and this was identified as being very helpful and a significant enabler to the use of the platform. As discussed under sustainability, a lack of ongoing contact after initial commissioning saw one service begin to utilise a different platform for telehealth services, after significant staff change over resulting in knowledge, familiarity and login details for the FDT specialist service platform fail to change hands to new staff members. Staff turnover in rural health care facilities is known to be high, posing a significant threat to the sustainability of the use of the platform if organisations do not adopt specific telehealth policies, or if ongoing contact is not maintained.

Risk management: *Risk analysis is performed. Procedures for detecting, diagnosing, and fixing equipment are in place. Technical support services are available. Backup plan to cope with equipment or connectivity failure.*

The main issue identified regarding the FDT specialist service platform was potential difficulty connecting, however this was reported to be addressed and resolved rapidly by FDT specialist service support staff.



“

“If we have [had difficulties connecting], it’s been quickly resolved. We just phone the provider and – or the other party, like the Flying Doctor Service, and we’ve been able to sort it out pretty quickly.”... F7.

Some organisations had dedicated IT teams, although these were not necessarily immediately considered as ‘telehealth infrastructure’. Smaller clinics/facilities tended to not have IT teams.

Additional themes

There are several additional themes, pertaining to the 'referral process' and 'COVID-19 as an enabler for increased telehealth usage', which warrant consideration and/or may indicate points for improvement for the telehealth platform.

The referral processes

Whilst all telehealth consultations required an initial referral from a GP, there were differences in the undertaking of the referral process. Referrals may be sent to a central location for all clinic bookings, to an individual facilitator, or directly to the specialist who in turn would forward it on to the FDT specialist service. For referral processes that did not directly involve the facilitator, breakdowns in communication may present a risk to effective organisation and facilitation of a telehealth consultation.

The differences in referral processes across specialists, facilitators and clinics highlights the importance of organisational policy and procedures in establishing consistent processes, and the role the FDT specialist service may play in assisting to establish these.

Prior to COVID-19, referrals were typically provided for people living in rural locations who would have had to travel extensively to access specialist services. These clients typically presented as more complex cases with multiple comorbidities, requiring attention sooner than what may have been available if a traditional face-to-face consult were sought. In some cases, the client's preference for teleconferencing was also taken into consideration.

Scheduling a consultation time required the identification of a time that suited the specialist, facilitator, and patient, which at times may be difficult due to how appointments are made available. Facilitators can choose from a list of any available appointment days and times with the specialist of their choice. However, depending on how soon the appointment was required, this approach often meant selecting from whatever was left or available, resulting in telehealth consultations booked sporadically within the working week of the facilitator.

This may be particularly prevalent for facilitators working with specific population subgroups, such as gestational diabetes in which the time between diagnosis and request for a consultation is extremely brief. This accounted for significant disruptions to and inefficient workflow. Several participants identified a preference for the potential to book blocks of appointments to allow telehealth to essentially be run as a dedicated clinic from their end.



“Often what we find is that appointments, that appointments that are left are just scattered throughout the week and we have to try and find something that’s suitable... When you book an appointment on the telehealth platform it might be at 1:00 pm or 4:00 pm or something. So, I have to stop whatever it is I’m doing elsewhere in the hospital and go and do that specific appointment. I’d like to see a block where you could have a block of your clients so you’re not toing and froing all the time.”... F6.

Current strategies to partially address urgent patients or referrals is the reservation of appointments specifically for such cases, however these are not shown in the FDT-SS platform, instead requiring facilitators to ring the FDT-SS directly to enquire as to the availability of these hidden appointment times.

Finally, the issue regarding the communication of appointment time and processes to the individual facilitator, and the difficulties that may be associated should the facilitator not be available at the scheduled consultation time, have been discussed under ‘sustainability.



COVID-19 as an enabler of telehealth

Whilst interviews were being conducted, the COVID-19 pandemic began to emerge and rapidly escalated. Correspondingly, the use of telehealth rapidly increased as well. While this had implication for FDT-SS, the response related to adoption telehealth in general with hints that services that had familiarity emanating from engaging with FDT-SS would be better placed to make the transition.



“An enabler is definitely the COVID-19. People that never would have used it are now using it out of necessity, because they’re not allowed to leave town. It’s definitely a major part of what we do. Now that we’ve got the coronavirus, the GPs are Skyping nearly everybody”... CP.

The isolation restrictions mandated nationally resulted in the approval for bulk billing of telehealth consultations against a Medicare provider number and applied to the use of telehealth by all health professionals for all patients, regardless of geographic location. Previously such an arrangement was reserved for specialist consultations. As a result, the majority of health-related consultations with GPs, specialists and health professionals shifted to incorporate teleconferencing or phone-based consultations.

The benefits of continuing this arrangement for telehealth post-COVID-19 to minimise unnecessary inconvenience and assure continuity of care for all patients, regardless of geographic location were highlighted, these included limiting unnecessary appointments for simple requirements such as reissuing scripts for ongoing medication requirements, and ameliorating the costs and inconvenience associated with attending specialist appointments in busy tertiary locations.

To accommodate social distancing and isolation requirements, telehealth was extended beyond the clinic environment to take place in people's homes. This provided some benefits in terms of internet connectivity issues previously experienced at some remote FDT-SS sites. However, the approach precluded conducting objective clinical, which if FDT-SS expanded to the home, would need to be considered.

The continuation of teleconferencing from within the patient's home may be a preferred option for people, however it will be dependent on the continuation of bulk billing opportunities through Medicare. To better facilitate the telehealth process within the home, participants had several suggestions, including loan devices for clinics to provide to patients with limited access to technology, and opportunities to directly upload objective clinical measurements to a telehealth platform.



“If the government just says, they're not giving the Medicare rebate, then I think it'll just die out, and it'll go back to the way it was. But I don't know whether they will pay the attention to the patients... I don't know whether the ongoing provision of telehealth will be dependent on the patient wishes.”... S4.

Economic evaluation

Data overview

The available data relate to treatment, consultation, admission, emergency, and travel arrangements for 734 participants, mostly from Victoria a small number from towns in New South Wales bordering Victoria, because of cross boarder services access. The main data comprised:

- 18,305 chargeable items, with Medicare (MBS) item numbers, dates, provider charges, whether bulk billed, and participant out of pocket payments. These were available for 115 participants who had granted consent for access to these data). The maximum number of Medicare charges per participant was 364, the minimum was 1.
- 1,245 travel and accommodation subsidies (VPTAS), with dates, and distance travelled. The method of transport (usually car, but sometimes taxi or plane) and type of accommodation was available for 124 participants. The maximum number of subsidy events per participant was 75, the minimum was 1.
- Gender and address, Victorian-only, 661 participants recorded, with a further 73 for whom address was not recorded.
- 56 sites with addresses, which provided FDT specialist service telehealth services.
- 1,662 lines of VAED hospital admission and specialist consultation events, with age of participant and date/time. In total, the linkage dataset contained 7,721 events, which involved consultations, including surgical and other procedures.
- 942 VEMD emergency events with date/time, age group, sex, and other indicators.

Focus on the 'Pre' period

In the 20 months from 1st July 2016 to 28th February 2018 the group of participants for whom Medicare records were available incurred \$404,808 of Medicare costs, translating to an average of \$259.80 per month for the 860 participant months in the data. Segmenting this group by age of 72 individuals for whom age data was available resulted in a pattern of costs as depicted in Figure 14 below. Females had a peak in Medicare costs in the 31–35 years of age group, and again from 46–50 and 86–90 years of age. Costs for males increased gradually, with a peak in the 71–75 age range.

Monthly costs per patient: Pre



Figure 14: Per patient Medicare incurred costs in the “pre” FDT specialist service access stage

Travel patterns, and subsidies for accommodation, for participants in the 'Pre' period were recorded in the VPTAS linkage dataset. Figure 15 below provides an age-related pattern of kilometres travelled for health-related purposes.

Monthly km per patient: Pre

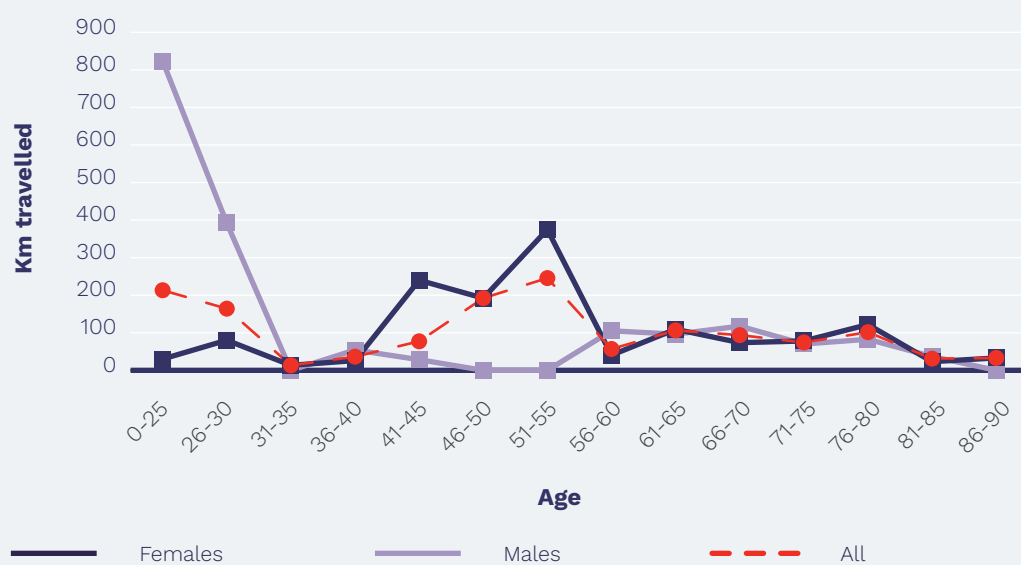


Figure 15: Age-related VTPAS funded distance travelled for health reasons

The data contained a particularly complex outlier case of an individual who travelled 10,433 km during the 'Pre' period by a mixture of plane and taxi, for a total of 10 trips. Otherwise, there was a peak in travel for females in the 51–55 age group. Apart from the outlier case, travel and accommodation subsidies in the 'Pre' period were relatively modest, averaging around \$34 per participant-month, as shown below (Figure 16).

Monthly travel and accomodation subsidy per participant: Pre

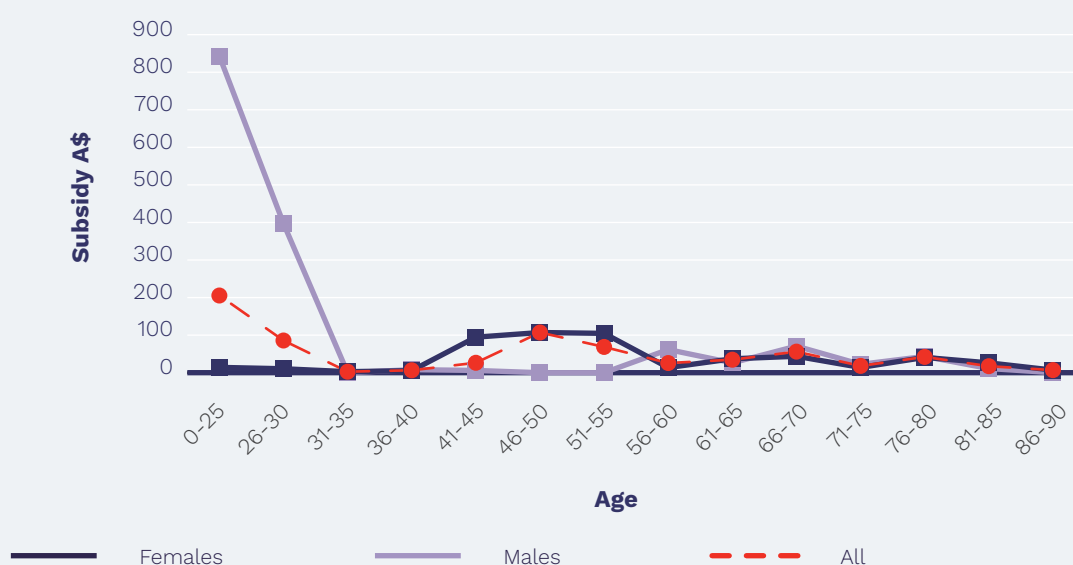


Figure 16: Monthly travel and accommodation costs under the VPTAS Pre-FDT specialist service access stage

Overall, there were 6,280 participant-months in the VAED dataset for the 'Pre' period, with a total estimated cost of A\$3,686,954. On average, participants cost \$587.10 per participant month. There were peaks in costs for males in the 31–35, 41–45, 51–55 and 71–85 age ranges, and for females in the 46–50, 76–80 and 86–90 age ranges (Figure 17).

Monthly costs per patient: Pre

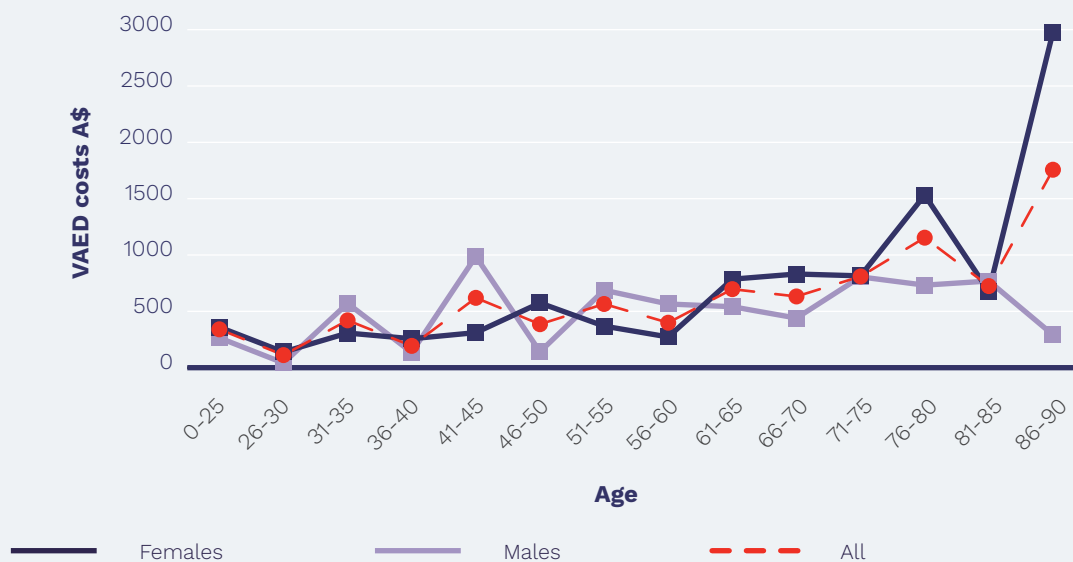


Figure 17: Estimated hospital admission costs by age range during the Pre-FDT specialist service stage

The VEMD database records use of ED facilities, and whether participants were then admitted to hospital or transferred to another health facility. In total, participants spent 121,535 minutes (2,026 Hours) in the ED during the 'Pre' period, an average of just over 4 hours per visit, which is consistent with expected ED benchmarks. The data revealed that some participants in the study used the ED frequently, with a few presenting two or three times in a single month.

The figure below shows the average monthly ED costs per participant (including those who "did not wait"). Costs for females peaked in the 41–45 age range, and for males (excluding the outlier case mentioned earlier) in the 56–65 age range.

Monthly ED costs per participant-month: Pre

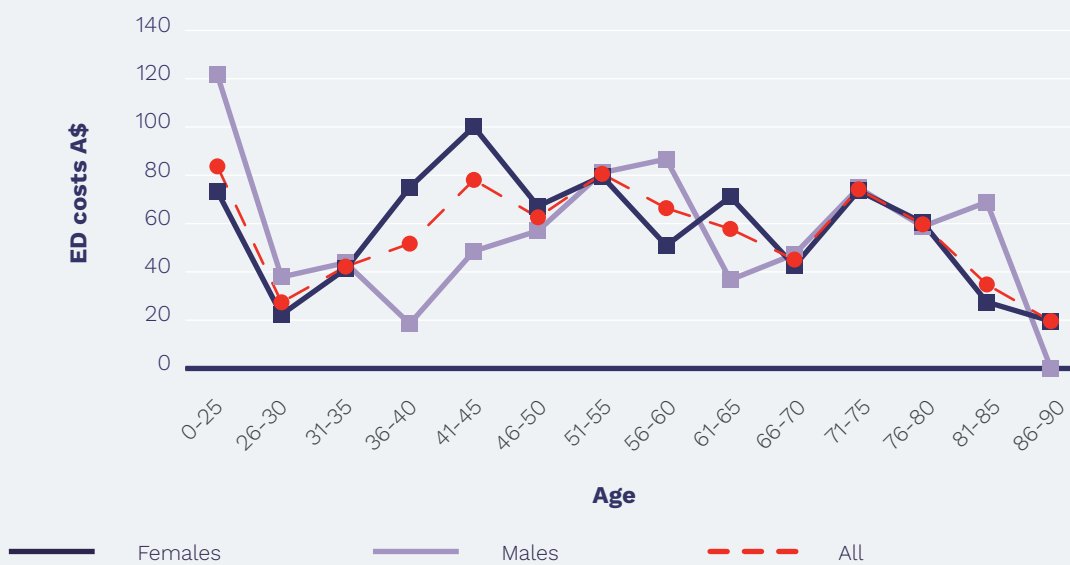


Figure 18: Monthly ED costs by age during the Pre stage

Comparison of predicted costs with actuals in the 'During' period

Health-related activities and associated costs in the 'During' period have been predicted on the basis that participants, in the absence of FDT specialist service, would have had the same, inflation-adjusted, access and cost as those in the relevant age range for the 'Pre' period.¹ The table below (Table 6) compares average monthly cost on this basis with actual cost as recorded in the relevant dataset.

¹ Because of data size limitations, especially for the Medicare data, we have used five-year age ranges.

Table 6: A comparison of actual vs. predicted costs “During” FDT specialist service access

Pre	Actual During	Predicted During	Difference (effect of Telehealth?)	Number of patient-months DURING	Total difference DURING \$
Medicare Costs (for a subset of participants)					
249.56	346.09	259.17	86.92	1,495	125,519
Transport and Accommodation VPTAS					
34.28	48.79	32.98	15.81	1,339	21,131
Hospitalisation VAED					
587.09	573.54	640.95	(67.41)	4,082	(261,092)
Emergency Department VEMD					
56.33	72.44	57.46	14.98	3,393	53,065
Distance travelled (km) VPTAS					Total km
82.29	118.49	78.3	40.19	1,326	51,314

Medicare costs, for participants for whom records were available, rose relative to prediction, by an average of \$87 per participant-month (pm). Transport and accommodation subsidies also rose, by around \$15.80 per pm, as did emergency department use. Participants travelled for more kilometres, on average, than they did in the ‘Pre’ period. All of these are consistent with FDT specialist service potentially creating additional access to healthcare, and thus that additional treatment and other health inputs were provided. In contrast, there is some evidence that hospitalisations declined in the same period.

Comparison with the 'Post' period

The table below (Table 7) makes a comparison between predicted and actual costs for the three months of the 'Post' period. The same pattern emerges as in the 'During' period. Access to Medicare, transport and accommodation subsidies, and ED is increased relative to predictions based on the 'Pre' period, and use of hospital and specialist care is reduced, albeit marginally. Total kilometres travelled rose relative to the 'Pre' period. There was a moderate decrease in cost for hospitalisation.

Table 7: A comparison of actual vs. predicted costs in the "Post" stage

Pre	Actual Post	Predicted Post	Difference	Number of patient-months POST	Total difference POST \$
Medicare Costs (for a subset of participants)					
249.56	455.56	254.76	200.79	345	69274.29
Transport and Accomodation VPTAS					
34.28	44.30	32.50	11.79	300	3850.40
Hospitalisation VAED					
587.09	631.98	649.97	-17.99	942	-16947.18
Emergency Department VEMD					
56.33	79.24	58.08	21.16	783	16567.73
Distance travelled (km) VPTAS					Total km
82.29	98.73	78.17	20.56	297	6126.22

Changes analysed by age range

Focusing on the change in Medicare costs, there is evidence that in some age groups access to healthcare rose considerably between the 'Pre' and the 'During' periods. Figure 19 shows average monthly costs in the 'Pre' (blue), 'During' (red) and 'Post' periods by age groups for both females and males. The purple line is the predicted level (after allowing for inflation and changes in age group as the cohort ages) based on the pattern observed in the 'Pre' period. The introduction of FDT specialist service seems to have coincided with a steep rise in primary care access costs for females in the younger age group (45–50), and in the oldest age group (86–90) for which data were available. However there seems to have been lesser effect on primary care costs in the intermediate age groups, although costs were still marginally greater than the Pre stage.

In some age groups there was a rise observed between the predicted level and the 'Post' period, which may reflect a 'hangover' of greater access from the 'During' period into the relatively short 'Post' period. This provides the impetus for a more longitudinal data linkage study for further elucidation.

Medicare: Monthly average cost per patient – Females



Figure 19: Average monthly Medicare costs for females analysed age group

Among males (Figure 20), the age pattern is rather different, with the most pronounced increase in the 'During' period coming in the middle (61–70) age ranges, and among the 81–85 group. However, sample sizes are rather too small for robust conclusions to be drawn, especially about the steep rise in the 'Post' period for 81–85 year olds.

Medicare: Monthly average cost per patient – Males

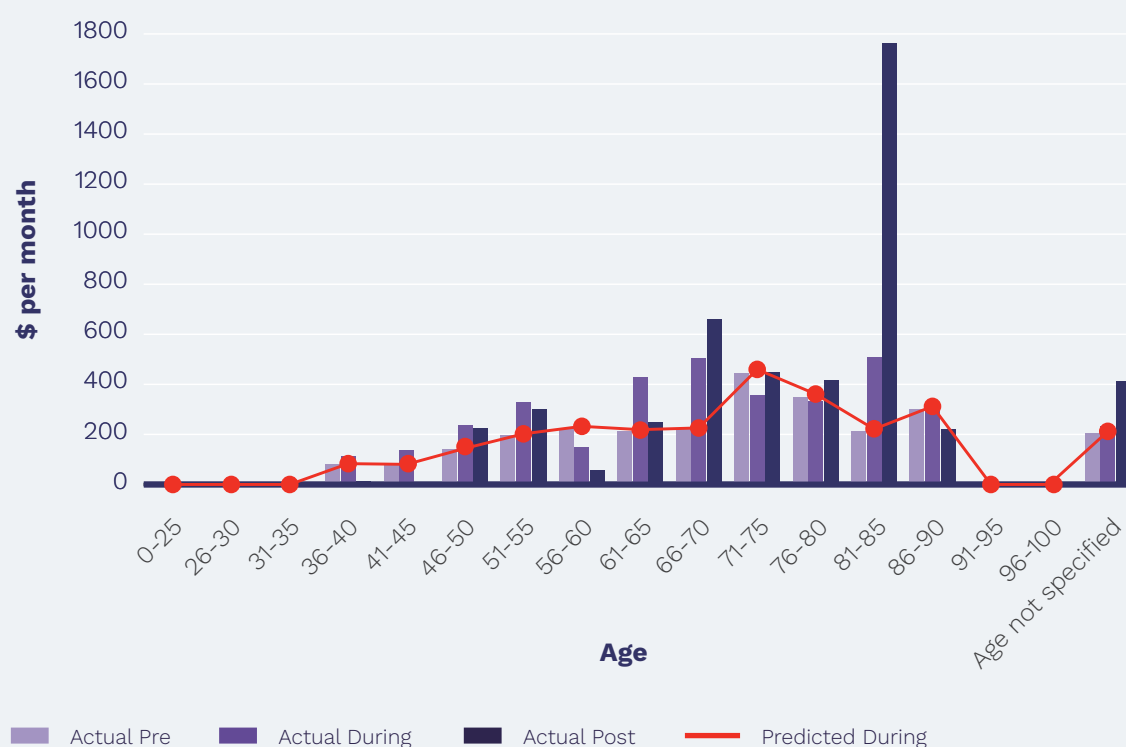


Figure 20: Average monthly Medicare costs for females analysed age group

Turning to hospitalisation costs (Figure 21), where there was a larger sample size and better recording of age data, there is a less pronounced pattern in the younger age groups, albeit with falls in hospital usage in some age ranges in the ‘During’ period. The largest increase in hospital usage relative to prediction occurs in the 86–90 age group. This would be consistent with increased health care needs of this age group, whether associated with FDT specialist service pre-empted care needs or other morbidity.

VAED: Monthly average cost per patient – M & F

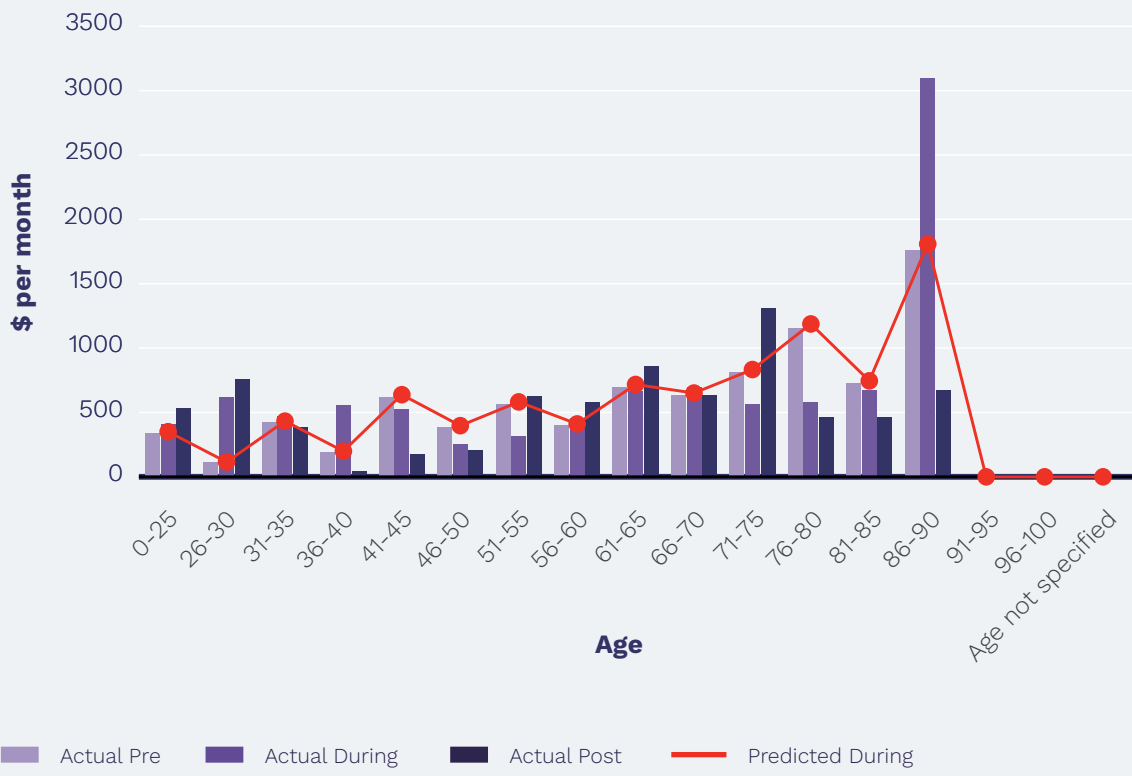


Figure 21: Average monthly hospitalisation costs for males and females analysed age group

The use of emergency department (Figure 22) again shows higher than predicted usage in the 'During' period in the lower age groups, and in the 66–70 and 86–90 age ranges. The 'Post' period coincided with particularly high usage in the 75–85 age range, but again the sample size is too small for robust conclusions to be drawn.

VAMD: Monthly average cost per patient – M & F

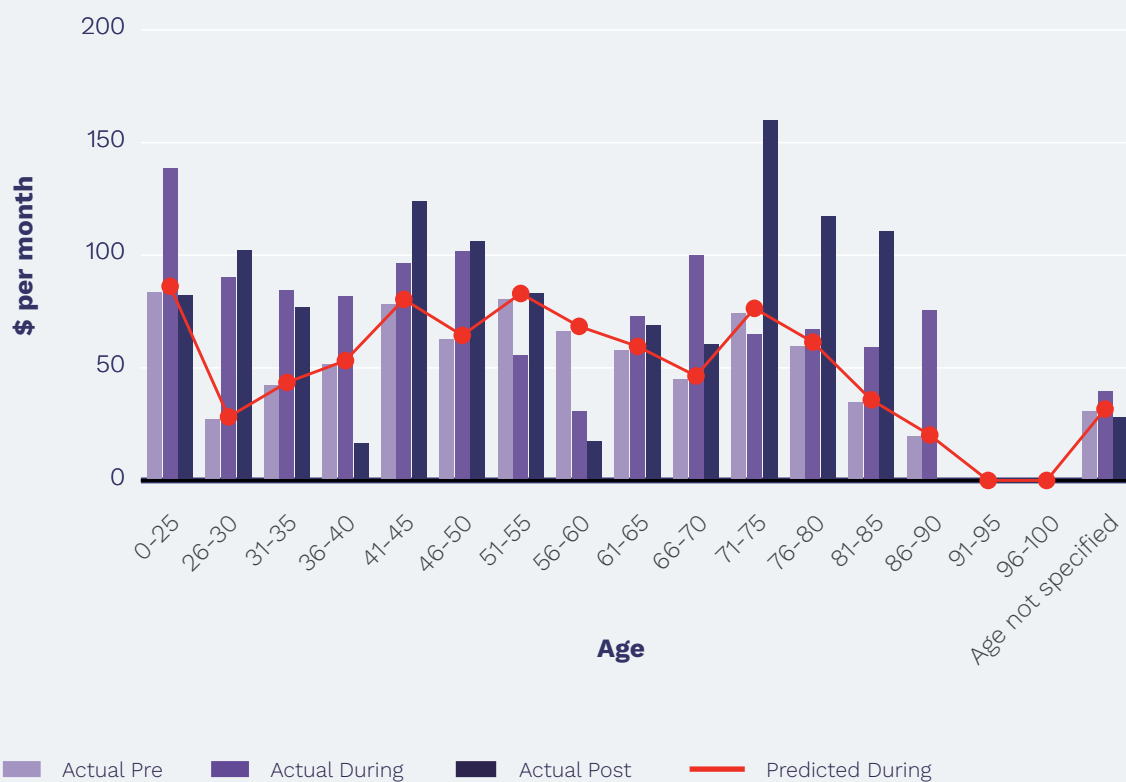


Figure 22: Average monthly ED costs for males and females analysed age group

Econometric analysis

Because only a subset of participants granted access to their Medicare data, complete data were available for 115 people, over the total period of 36 months with a total of 4,140 observations. The econometric analysis, in broad terms, confirmed what has been summarised in tabular and graphical form above. The 'During' period coincided with a rise in the use of out of hospital primary care and specialist services (Medicare), of transport and accommodation subsidies, and of emergency departments. However, it also coincided with a fall in the use of acute hospital services, as reflected in the VAED dataset. Both of these trends are consistent with FDT specialist service being associated with increasing access to health services for the remote and regional group of participants in the study, while perhaps reducing the need for expensive acute intervention.

However, it is important to note that this does not necessarily prove that FDT specialist service **caused** the observed changes. Other factors, independent of FDT specialist service, may also have played a role. To prove causation, it would be necessary to control for these other factors, for example, provision of additional clinics, extra medical and nursing staff, education programmes, community action and support. This work is beyond the scope of the present evaluation and research but may be a consideration for future work.

Controlling for the other variables (i.e. socioeconomic advantage and disadvantage, education and occupation, and remoteness), the gender dummy for females variable, was significant and positively correlated with health care utilisation. This was consistent with the data presented above. Population density was not significant and had a negative coefficient (indicating that Medicare-funded services may be more available in areas with higher population density). Participants who travelled more for healthcare reasons also incurred more Medicare costs. The socioeconomic deprivation variable, IRSD, was highly significant with a negative coefficient, indicating lower base expenditure on the more disadvantaged. Overall, the implication is FDT specialist service introduction and scale up into more socioeconomically deprived communities potentially provides a lifeline for people who previously were not accessing health services as reflected by the relatively low base cost of healthcare utilisation.

Exploring the impact on more remote communities of the 'During' period where FDT specialist service was available, the 'During', IRSD and population density explanatory factors were replaced by a proxy for remoteness in the 'During' period. The result was a significant, positive coefficient for the remoteness dummy, indicating that FDT specialist service had a moderate positive impact on health access in the more remote areas.

With regard to travel and accommodation subsidies, the 'During' variable was significant and had a positive coefficient, showing positive effects of FDT specialist service. Socioeconomic disadvantage was only marginally significant, and negative, indicating higher costs for those in the more disadvantaged areas. Gender was not significant, but had a positive coefficient, again indicating trend towards greater access to specialists for females. Taken together with healthcare cost associated with females as described earlier, potentially, FDT specialist service is filling a gap in specialist access for rural women who would otherwise be faced with health care access inequity, reinforcing how invaluable FDT specialist service is to rural and remote communities.

Consistent with the graphical and tabular analysis above, hospital usage declined in the 'During' period, as indicated by a negative coefficient in the econometric regression modelling, albeit at a low level of significance. The observation suggests FDT specialist service was associated with lower hospitalisation for rural and rural communities; a saving of approximately \$260,000 for this study sample which on service scale up could increase the magnitude of cost savings to healthcare expenditure.

In summary, the econometric results reinforce the summary descriptive statics findings outlined in the graphical and tabular analysis. Both sets of results provide evidence that there was an increase, relative to what might have happened otherwise, in primary care services gleaned from Medicare, travel and accommodation subsidies for specialist access other than endocrinology, psychiatry, cardiology and respiratory, and emergency department use in the 12 months of FDT specialist service expansion and scale up across rural Victoria. Thus, demonstrating an association between FDT specialist service introduction and scale up with access improved access to primary care services. The evidence also pointed to a decline in usage of hospitals over the same period highlighting potential cost savings, although whether the savings was offset by costs of an increase primary care service usage remains a question which could not be answered within the scope of the current study.





Discussion and recommendations

Discussion and recommendations

This evaluation and researched aimed to primarily investigate whether the FDT specialist service improved, access to endocrinology, cardiology, psychiatry and respiratory specialists for patients in rural Victoria. On a secondary level the investigation looked into clinical outcomes limited to patients in the endocrinology service, utilisation of health services across primary care (Medicare data), emergency department presentations (VEMD), acute hospitalisation (VAED), and patient transport (and accommodation) assistance (VPTAS). It also sought to evaluate the capacity of health services to adopt telehealth, how the FDT specialist service telehealth is embedded into practice, and whether the collaborative approach to accessing specialist services via telehealth provides professional support and education opportunities for rurally isolated health professionals at participating health services. Additionally, health utilisation costs were evaluated with a focus on whether the implementation and expansion of FDT specialist service was associated with cost benefits. The evaluation process was guided by the Framework for Evaluating telehealth services and underpinned by NPT to identify the factors required to 'normalise' telehealth. The results of are discussed within the domains of the evaluation framework.

The service most utilised was endocrinology, followed by psychiatry. Very few participants accessed FDT specialist service cardiology or respiratory services. However, to put service usage into some context endocrinology was serviced by five specialists, psychiatry by two specialists and one for each of cardiology and respiratory. It would be worthwhile exploring further to elucidate whether low service activity was due to a lack of capacity in relation to the available specialists (cardiology and respiratory physicians) or there was lack of demand for these services in the areas that FDT specialist service operated in or whether demand might have existed but patients were unsuitable for a telehealth-based service.

Quantitative evaluation: Patient clinical outcomes and utilisation of health services

The findings of the evaluation demonstrate that FDT specialist service is well targeted with regard to the location of FDT specialist service sites and patients. Service implementation and expansion are meeting the express aim of using telehealth to increase specialist health care service access for people in rural Victoria. The majority of FDT specialist service remote telehealth service sites and the postcode of residence for the majority of patients fell within outer regional and remote locations, which are recognised and so classified as areas of significant disadvantage and need [22]. In addition, there was a significant increase in telehealth-related MBS item claims after commencement of the FDT specialist service, highlighting the increased service utilisation and potential for improved specialist access the target patient populations. During the timeframe covered by the evaluation MBS (Medicare) items were largely restricted to specialist consultations. Therefore, it can be inferred that such MBS claims were reflective of access to the speciality areas under FDT specialist service. This is supported by significant increases in claims for any MBS item numbers, as well as item numbers specifically relevant to all four of the FDT specialist service speciality areas (endocrinology, cardiology, psychiatry and respiratory). Interestingly, and again congruent economic evaluation findings, an increase in frequency of VPTAS access was also seen during FDT specialist service. It could be inferred that the improved access to specialist doctors facilitated additional care and referrals in other aspects of patient care, resulting in increased requirement to travel.

In relation to patient clinical outcomes, no significant changes were identified in population level HbA1c as the only available, albeit limited, clinical outcome data. This may be due to the relatively short time over data were available. Ultimately, access needs to have demonstrable effects and impact on patient clinical (and psychosocial) outcomes. FDT specialist service has clearly been implemented successfully in relation to the objective of reach. However, this reach needs to translate into demonstrable impact on patient clinical and other outcomes in order to move close the evidence loop for service sustainability. Hence, it would be worthwhile to consider a study on the longer-term clinical benefits and impacts of FDT specialist service.

Recommendations – patient control

1. Evaluation/investigation of reasons for low service utilisation for cardiology and respiratory specialties.
2. Collection and analysis of individual level data pertaining to clinical outcomes with respect to each the FDT-SS specialties.



Qualitative evaluation: FDT specialist service implementation

Patient control

Overwhelmingly, facilitators and specialists utilising the FDT specialist service indicated that telehealth offered significantly improved access to specialist services for people residing in rural and/or for those who may experience physical or financial constraints to extended periods of travel. As a convenient and free-service, telehealth improves access regardless of geographic location or financial situation for an equitable approach to healthcare access [10, 25]. Furthermore, telehealth ameliorated the long waiting times associated with traditional face-to-face consultations, constituting a significant benefit for complex patients who may require urgent attention.

The shared consultation arrangements between specialist, patient, and facilitator creates a collaborative, multidisciplinary approach to health management leading to improved continuation of care, patient advocacy and health outcomes. Additionally, the patient-facilitator dynamic may encourage patients' active participation in the decision-making process to enhance patient autonomy. Social support creates a sense of normality through familiarity, helping patients to feel more connected to the consultation process [11]; these findings highlight the 'patient-centric' care model of telehealth, through which participants feel more empowered to actively participate in their own health care [26]. This may be enhanced through the formalised links the FDT specialist service creates between rural facilitators and urban specialists, which has previously been identified as superior to informal networks of contact, due to professional relationships between practitioners built over periods of time [27].

As the use of technology in tasks of daily living (such as banking, shopping, communication etc) becomes more ubiquitous, and heightened by the COVID-19 crisis, patients continue to become more accepting of telehealth services which is the foundational element of the FDT specialist service model. Increased acceptability of FDT specialist service, combined with the significant output benefits of increased access to specialist health care, potential for collaborative care and improved patient outcomes, all highlight the importance of encouraging the use of telehealth, for those in rural and remote areas, as well as considering its potential application in urban settings as well. Expansion into urban setting is an opportunity worth exploring for rapid deployment during times of need such as during the COVID-19 pandemic when services were thrust into telehealth because of requirements to observe social distancing rules [28–30].

Recommendations – patient control

1. Supplementary evaluation of clinical effectiveness of the service using clinical outcomes to augment improved specialist service access.
2. Evaluation of objective measures with regards to specialist access and clinical and psychometric outcomes for FDT specialist service patients.



Clinician quality of care

Telehealth provided quick and equitable access to a specialist, which facilitators believed necessitated appropriate and timely management of health conditions, particularly for patients with more complex conditions and/or with multiple comorbidities. In doing so telehealth not only met the unique needs of the patient, but the requirements of ‘best practice guidelines’ for a number of health-related conditions, the main one in the current sample being diabetes. The opportunity for other healthcare professionals to participate in the consultation also enhanced patient advocacy and a collaborative approach to condition management for better health outcomes. Furthermore, the current role of the predominantly nursing cadre in FDT specialist service could extend beyond telehealth appointment facilitator and coordinator to a clinical nurse specialist and integration of allied health services for a multidiscipline telehealth model.

Importantly, telehealth was identified as a means of bridging knowledge and skills gaps in rural areas and offering opportunities for professional development and peer support. Currently, through the FDT specialist service, this occurs through the facilitator’s active participation during specialist consultations, however opportunity also exists for formal professional development opportunities. Telehealth therefore has potential to bridge the geographic inequalities in professional development, isolation, and peer-support which may assist in retention of rural health workforces [25, 27].

Recommendations – clinician quality of care

1. Promote best practice guidelines and engagement with rural based providers, including GPs to reinforce access to FDT specialist service for more timely intensification or stepping up treatment of patient medical conditions.
2. Investigate opportunities to extend the FDT specialist service model to offer professional development opportunities, and/or in the development of peer-support groups.

Sustainability and costs

The patient-centric care model and improved patient outcomes highlight opportunities for the benefits of telehealth not just in rural areas, but for urban patients as well. In consideration of this, a notable enabler to the adoption of telehealth was the alignment of its benefits with the overarching objectives of the health organisations implementing it. These were broadly based around community assistance and access to healthcare, improvements in health outcomes, or adherence to best practice guidelines. The costs saved in patient transport as well as overhead costs and on-site administration staff may also align with the goals of management. This however may be negated by costs associated with the increased administrative activities required for the organisation and implementation of a telehealth consultation, which did not incur financial compensation and contributed to disrupted and workflow, constituting a significant barrier to embedding telehealth within existing practice.

Additional administration was reportedly required in booking consultations (organisation and follow-up of referrals, physically scanning referrals in to the FDT specialist service platform, identification of a consultation time that suited all parties, organisation and follow-up of pathology and results) and finalisation of the appointments (follow-up of letters, additional pathology and prescriptions). In part the additional work and disruptions to existing workflow was attributed to a lack of opportunity to integrate traditional practice-related tasks within telehealth platforms and in some clinics, a lack of time afforded for such tasks to be undertaken. Also contributing to the disrupted workflow was the way in which consultation times were structured and booked. Appointments were selected 'ad hoc' from a list of any available time slots, resulting in facilitators having to organise their work days around sporadically scheduled consultations. Heavy workloads and scheduling have previously been identified as barriers to telehealth, and innovations that are anticipated to increase workloads or disrupt workflow may be less likely to be adopted or embedded within practice [27, 31]. The establishment of policy and procedures pertaining to telehealth may assist in reducing some of the disruption to workflow currently experienced by telehealth facilitators. In addition, software improvements, or integrations with other applications, that allow practice-related tasks to be incorporated within telehealth platforms, as

well as schedule flexibility through specialised arrangements for bulk bookings (i.e. blocks of time allowing telehealth to be run as a clinic in its own right) could streamline the processes required in implementing telehealth and enhance collective action to embed it within daily practice [23]. In relation to the referral and appointment booking processes, inconsistencies across organisations (including who receives the referral and how the referral is processed, and consultation arranged) may lead to communication issues and comprise the successful completion of a consultation. This reinforces the importance of developing both general and organisation specific policies and procedures pertaining to telehealth.

The adoption of the FDT specialist service telehealth platform was perceived as straightforward, due to its simplicity and low start-up costs. Additionally, the access it provided to physicians who would be otherwise completely inaccessible saw many facilitators believing that there was no choice but to make telehealth sustainable. However, short-term funding models associated with clinics and staff positions as well as high rates of staff turnover were identified as potential barriers to the normalisation of telehealth, or of the FDT specialist service platform specifically. Funding is commonly identified as a barrier to effective telehealth [1, 32–34]. Ideally reliable longer-term funding models would be sought to ensure the longevity of clinics supporting the health of rural communities (and indirectly their use of telehealth), coupled with the development of site specific policies and procedures pertaining to telehealth and ongoing contact with the FDT specialist service, to streamline and maintain processes across clinic staff. Additionally, the development of organisational policies and procedures pertaining specifically to telehealth would assist in seamless transmission of knowledge and skills to new staff members.

Another aspect for consideration in the sustainability of telehealth is the important role of the GP, who are required to provide a referral for a patient to receive telehealth; thus the GP plays the role of the ‘gatekeeper’ to telehealth implementation. There seemed to be mixed acceptance of telehealth. Reasons for this may include poor understanding or lack of familiarity of the technology or process, lack of understanding of the benefits or its alignment with best practice guidelines, a lack of financial incentive, or perceived ability to manage the condition by oneself. The notion of a ‘champion’ is not foreign

within health, and has been shown to be a key organisational enabler to the adoption of new technologies [31], however traditionally the champion is someone within the organisation. In the case of rural GPs, different mentalities regarding responsibility for patient care may need to be addressed, as well as ensuring sufficient professional development opportunities regarding changes and updates to best practice for condition management. The development of strategies that address these to improve incentive for and willingness of GPs to recommend telehealth is warranted and, ironically, telehealth could serve as a means of offering such professional development opportunities, whilst improving understanding of the process itself. among GPs, with some encouraging and championing the service, whilst others are resistant to its use.

The implementation of FDT specialist service was associated with a pronounced rise in primary care costs for females in the younger age group, the oldest age group and males in the intermediate age group during FDT specialist service. Whereas, although still marginally higher than the pre-FDT specialist service stage costs, FDT specialist service seemed to have had less effect, nonetheless greater than the Pre stage, on primary care costs in the intermediate female age groups. It is possible that this may indirectly reflect a greater ability to engage with technology-facilitated specialist service access among younger participants, and the older age group given the concierge nature of FDT specialist service and men in the 61–70 age group which may be key to FDT specialist service sustainability. Data limitations did not make it possible to directly link primary care service patterns with FDT specialist service specialists, let alone patients GPs for referral to primary allied health services. Nonetheless it is possible patterns of use and costs may reflect greater FDT specialist service-mediated engagement with primary care, potentially with consequently fewer ED presentations and hospitalisations and costs.

Recommendations – organisation sustainability

1. Development of training resources and/or development of a FDT specialist service implementation toolkit, to streamline and standardise processes, including pre-recorded webinars to mitigate staff turnover and facilitate on-boarding of new staff to ensure sustainability of knowledge of the process and telehealth platform.
2. Ongoing contact between FDT specialist service and clinics to ensure continuity of the above despite staff turnover.
3. Embedding clinical outcomes/investigation/pathology results sharing capability in the telehealth platform, and pending its ongoing development, potential for integration of electronic medical records or leverage My Health Record.
4. Integration with or embedding of electronic prescription process with telehealth platform (similar to that provided through Rosemary Health app).
5. Collaborative funding for telehealth nurse coordinator roles at rural telehealth sites. Given some clinicians performed a dual role of clinician and (an unfunded) telehealth coordinator, it would be worthwhile allocating funded time specifically for the coordinator role, either within the current dual roles or separate role).
6. Embedded appointment list within the platform, site rather than individual facilitator log-in to facilitate role sharing/fill-in within remote telehealth host organisation.
7. Advocacy for continued bulk billing of telehealth consultations for GPs, to provide financial incentive to use of telehealth and participation/ collaboration in consultations with specialist.
8. Investigate a strategy of engaging and informing GPs about benefits of telehealth and alignment with best practice guidelines for relevant health conditions.
9. Further studies, including longitudinal data linkage to:
 - Build definitive evidence of causality between reduced acute health service utilisation and costs and FDT specialist service and decreased.
 - Establish whether or not the apparent costs savings due to decreased acute care utilisation are offset by an increase in primary care usage associated with FDT specialist service.
 - Map the long term impact of FDT specialist service on clinical outcomes, and cost benefits

Technology capability/capacity

In general, participants believed they had the basic infrastructure requirements to undertake telehealth consultations, those being laptops/computers with camera access and an internet connection. As identified previously, unreliable internet connections remain a notable barrier to telehealth, particularly in rural areas [35]. Universal access to telecommunication infrastructure is required to support the adoption of telehealth, to empower patients and provide equitable distribution in healthcare architecture [26], and advocacy efforts should focus on achieving broadscale equity in telecommunication service distribution.

The FDT technology specialist service platform rated highly amongst participants, due to the comprehensive concierge service supported by RFDS Victoria staff offering establishment, training and ongoing technical support, which specifically addresses several acknowledged key barriers to telehealth, those being a lack of technical support and vulnerability to technical failures [31, 36]. Additionally, the platform is identified as being user friendly and straightforward to use. However, the aforementioned limitations in terms of integrating practice-related tasks may pose a barrier to its continued use, particularly as more telehealth providers enter the market with platforms that do offer such inclusions. Undoubtedly integration with medical software is difficult due to the many different record systems, however innovation has been identified as one of the key trends to influence the growth of telehealth [37] and new providers are capitalising on this. HealthDirect integrated with Halaxy, or Coviu integrated with the Rosemary Health prescriptions app were two examples provided of teleconferencing software that also integrated other practice-related tasks such as sharing of patient notes, billing and invoicing, and/or electronic prescriptions. Pathology requests and follow-up were identified to be one of the most time intensive administrative tasks associated with organising a telehealth consultation, thus a platform that identified opportunities to integrate these would likely be highly valued by practitioners.

Recommendations – technology capability

1. Inclusion of software/apps/technology to allow practice-related tasks to be incorporated within the telehealth platform (as per recommendations in organisation sustainability).
2. Advocacy for continual improvement of internet services to rural areas.

The future of telehealth

During the interview process, the COVID-19 situation rapidly increased in magnitude and severity resulting in the widespread adoption of telehealth. This was facilitated by new temporary MBS items which increased options for claimable telehealth consultations, including general practice. Until then, this had been reserved for specialists providing services to rural clients via telehealth. A small amount of investigation regarding this phenomenon revealed benefits in the potential to continue such an arrangement. One benefit was more effective use of limited appointment times towards those who required physical observation by a doctor as well as alleviation of the inconvenience and financial costs associated with specialist visits in tertiary care environments (for example, time off work due to travel, waiting times and consultation time, as well as costs associated with parking, for people who resided even in urban locations) was another identified benefit. The COVID-19 situation also saw telehealth extend beyond the clinic to be incorporated within the home, to which potential benefits included better internet connections and less clinic-environment related anxiety.

The extension telehealth to include eligibility for a broader variety of health care professionals, including GPs, and to be undertaken in the patient's home, represents an opportunity for better direction of resources and funding, and a potential means of addressing the issue of low numbers of GPs in rural areas. By limiting patient contact to those who require physical observation a practitioner, or those who have limited access to or ability to navigate technology, issues with limited appointment availabilities and long waiting

lists may subsequently be ameliorated. Follow-ups and repeated medication scripts could be efficiently undertaken in a timely manner, minimising inconveniences for all parties involved. The inconvenience of taking time away from work and family, travelling, finding, and paying for parking, and extended waiting room times, could also be decreased for those accessing specialist services, regardless of their residential location (urban or rural). Finally, smaller numbers of patients waiting in overcrowded waiting rooms could assist in retarding the transmission of communicable diseases, of particular importance during the current climate and the annual flu season. These findings highlight the multitude of benefits offered by telehealth and provide a strong case for its increased and ongoing use within the population as a whole, as well as a move to include home-based telehealth consultations.

Recommendations – other

1. Advocacy for continued bulk billing of telehealth services, to incentivise its use among a broader variety of health care professionals.
2. Continued diversification of telehealth to include in-home telehealth, particularly for some follow up appointments, where appropriate.

Strengths and limitations

This evaluation and research draws on a robust methodology of a mixed methods, including data linkage, other quantitative data, qualitative interviews and economic analysis. The results is stronger, complementary findings from the different methodological components and data sources. This more than compensates for the limitations described below, for increased confidence in the findings.

For limitations, only 16% (n=115) of the FDT specialist service cohort provided consent for access to their Medicare data. Nevertheless, the number was adequate for strong health service utilisation and economic analysis. Also, availability of clinical outcomes was limited and only available in one FDT

specialist service specialty area, hampering, for example, analysis of the clinical benefits of FDT specialist service. Patient characteristics data were limited leading to reliance on proxies derived from other sources in lieu of direct patient data. In particular, the FDT specialist service study also recorded health-related activities for participants in the relatively short period of three months after the 'During' period. It was challenging to determine how much weight to put on what happened then, especially considering the relatively small sample size for the post period. It is possible, for example, that the increase in health access that occurred in the 'During' period had knock-on effects which also increased health care utilisation costs the "post" period.



Conclusions

The FDT specialist service was set up to improve access to specialist health care for patients in rural communities. The evaluation of the service demonstrates that FDT specialist service achieved this objective, with the majority of patients who accessed the service residing in regions of significant disadvantage. The FDT specialist service was associated with reduction of acute healthcare utilisation, which, with ongoing service development may translate into substantial cost savings to the healthcare system. Accordingly, utilisation and costs of primary care services increased, indicating that patients were managed in the community by their primary care providers. We observed a significant proportion of associated healthcare utilisation costs were attributable to women. The need for subsidised travel to see endocrinology, cardiology, respiratory or psychiatry specialists, which were offered under FDT, decreased significantly during FDT service access. In contrast, there was an increase in costs and distance travelled to see any specialist, predominantly relating to specialists that were unavailable under FDT. This underscores the benefit of FDT to reduce travel among patients in rural communities and the need to expand the specialist offerings of FDT. Overall, the findings suggest that FDT specialist services promotes better engagement with primary care services and triggers multidisciplinary patient care referrals.

At the time of the evaluation, FDT specialist service existed as an exclusively medical specialist telehealth model. Feedback from interviews with health care providers identified an opportunity for the model to extend to primary care practitioners. While such model may mitigate rural workforce shortages, funding for ongoing telehealth MBS items for GPs, nursing and allied health practitioner services is still undetermined. There is an additional benefit of participation in telehealth consultations including opportunities for professional development and peer-support for telehealth facilitators, which may address issues of isolation and geographic inequalities in professional development opportunities, to assist in the retention of rural healthcare workforces.

Whilst initial implementation of the FDT specialist service was relatively seamless, notable barriers existed in relation to embedding use of the FDT access technology platform within practice. Key barriers to embedding the platform into practice were identified to be increased administrative requirements (resulting in inefficient and disrupted workflows), limited scheduling capabilities/availabilities, lack of remote FDT specialist service host site organisational policies or set processes for telehealth, high staff turnover, and engagement of only a small number of GPs to champion and encourage telehealth services. The creation of online training resources and ongoing contact with clinic

representatives, the integration of apps or software that will allow for the inclusion of relevant practice specific tasks within the telehealth platform, and targeted strategies to engage GPs more, are potential strategies identified to overcome these barriers.

The evaluation findings highlighted opportunities for examining clinical outcomes and quality of life of patients possible longer term. The lived experiences of patients, in particular to understand higher health care utilisation by women

would be critical. The endocrinology service preceded the FDT specialist service and it was the longest running service component since 2013. It takes a considerable amount of time to build engagement with rural health services and users before success and accelerated uptake are realised.

Other potential factors influencing service uptake include service maturity and overall availability of specialists. Monitoring population profile and needs overtime is important to the sustainability of the FDT specialist service.



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Appendices

Appendix 1: Components and links to AIHW (2009) and ACRRM (2012) frameworks for evaluation framework for telehealth services

Dimension/ component	Link to AIHW framework (2009) or ACRRM framework (2012)	Description
Patient control	Responsiveness	Healthcare service is patient oriented. The client is treated with dignity, confidentiality and encouraged to participate in choices related to their care.
	Accessibility	People can obtain healthcare at the right place, at the right time irrespective of incomes, physical location and cultural backgrounds.
	Continuity of care	Ability to receive uninterrupted coordinated care or service across programs, practitioners, organisations and levels over time.
Clinician quality of care	Effectiveness	Care/intervention/action provided is relevant to the client's needs and based on established standards. Care, intervention or action achieves desired outcome.
	Safety	The avoidance or reduction to acceptable limits of actual or potential harm from healthcare management or the environment in which healthcare is delivered.

Dimension/ component	Link to AIHW framework (2009) or ACRRM framework (2012)	Description
Organisation sustainability	Efficiency & sustainability	Achieving desired results with most cost-effective use of resources. Capacity of system to sustains workforce and infrastructure, to innovate and respond to emerging needs.
Technology capability/ capacity	Technical aspects	Adequate performance: equipment works reliably and well over available network and bandwidth. Equipment is compatible with equipment used at other sites. Standards relevant to security of storage and transmission are met. Peripheral devices are fit for purpose.
	Commissioning of equipment	Equipment installed according to producer's guidelines. Equipment and connectivity are tested with other participating healthcare organisations.
	Risk management	Risk analysis is performed. Procedures for detecting, diagnosing and fixing equipment are in place. Technical support services are available. Backup plan to cope with equipment or connectivity failure.

Adapted from 'A Unified Approach for the Evaluation of Telehealth Implementations in Australia: A White Paper' [17].

Appendix 2: Linkage datasets variables for healthcare utilisation mapping

Variable	Description
Any Medicare items claimed.	Count of any Medicare item numbers claimed.
Relevant Medicare items claimed.	Count of Medicare item numbers relevant to any of the four FDT-SS services (endocrinology, cardiology, psychiatry, respiratory) utilised (regardless of which service the participant was accessing).
Medicare items claimed relevant to FDT-SS service accessed (endocrinology, cardiology, psychiatry, respiratory).	Count of Medicare item numbers relevant to the specific FDT-SS cohort the participant accessed.
Any Medicare telehealth items claimed.	Count of telehealth Medicare items claimed.
Hospital admissions for any reason.	Count of hospital admissions for any reason.
Hospital admissions based on relevant primary diagnosis.	Count of hospital admission for which primary diagnosis is relevant to any of the four FDT-SS cohorts.
Hospital admission for any relevant primary or subsequent diagnosis.	Count of hospital admissions where any diagnosis (primary or subsequent) is relevant to any of the four FDT-SS cohorts.
Hospital admissions based on primary diagnosis relevant to FDT-SS service accessed.	Count of hospital admission for which primary diagnosis is relevant to the FDT-SS service the participant is accessing.
Hospital admissions based on primary or subsequent diagnosis directly relevant to FDT-SS service accessed.	Count of hospital admission where any diagnosis (primary or subsequent) is relevant to the FDT-SS the person is accessing.
Emergency department presentations for any reason.	Count of any emergency department presentation for any reason.

Variable	Description
Emergency department presentations relevant to any FDT-SS service.	Count of emergency department presentation for reason relevant to any FDT-SS service.
Emergency department presentations relevant to FDT-SS accessed.	Count of emergency department for reason relevant to the FDT-SS cohort accessed.
VPTAS claimed for any reason.	Frequency of any VPTAS claims for any reason.
VPTAS claimed for reasons relevant to any FDT-SS service.	Frequency of VPTAS claims specific to any FDT-SS service.
VPTAS claimed for reason relevant to FDT-SS service accessed.	Frequency of VPTAS accessed specific to the FDT-SS service accessed.

