Workforce Innovation Grants Program 2013-14

Final report: Telehealth in Advanced Musculoskeletal Physiotherapy Post Arthroplasty Review Clinic (AMP PAR)

St Vincent's Hospital Melbourne

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Contents

1. Executive summary

- The overarching aims of this project were to scope the potential use of a Telehealth service within the existing Advanced Musculoskeletal Physiotherapy (AMP) post arthroplasty review (PAR) clinic at St Vincent's Hospital Melbourne (SVHM) and to establish a framework in which similar models of care could be deployed across the healthcare network.
- This process was informed by existing frameworks in other craft groups such as the Australian college of rural and remote medicine, nursing organisations and other health organisations in Victoria and internationally.
- The Telehealth project was established within the PAR clinic at SVHM in order to improve patient access to care, address workforce capacity, enhance patient satisfaction and to reduce the high costs to SVHM associated with providing patient transport.
- The model used in this project was remote patient review (RPR). This is a direct consultation with the AMP at SVHM to the patient in their own home. No additional clinician involvement was required at the patient end for this cohort.
- The initial scoping phase included a survey of 100 patients attending the Elective Surgery Access Service (ESAS) for review to ascertain interest in future utilisation of Telehealth and potential barriers.
- The framework underpinning the evaluation of the Telehealth service is the Victorian Innovation and Reform Impact Assessment Framework (VIRIAF). The key areas evaluated under the VIRIAF are: efficiency (inputs and outputs), effectiveness (outcomes), sustainability and feasibility. A mixed methods design of qualitative and quantitative data collection was used to inform the evaluation.
- The implementation of Telehealth has resulted in:
  - 50 occasions of service (OOS)
  - Reduction in proportion of DNAs from 30% to 14% for AMP PAR service
  - $4,870 saved in patient associated transport costs to ESAS
  - 6,298 total km's saved in patient travel
  - An average of $84 saved per patient (travel, petrol, time off work)
  - An average of 5 hours in time saved per patient
  - Improved clinic efficiency by six minutes compared to AMP PAR service
  - Reduced cost per OOS by $0.15
  - 100% Patient satisfaction
  - Online access to radiology for nine external providers
  - Development of operational guidelines for AMP clinicians using Telehealth
- The Telehealth project has been successful in improving clinic efficiency, increasing patient access to care and reducing costs to SVHM associated with patient transport.

Future directions

- Continued work with ICT to establish an SVHM wide WebRTC platform. CISCO WebEx is a suitable platform that SVHM will be making available to clinicians from June/July 2016.
- Expand Telehealth service to include ESAS pre-admission clinic.
- Continue to utilise Telehealth as an option for review appointments in the ESAS clinic as per established process.
- Target patients requiring transport assistance to utilise Telehealth in order to further reduce ESAS clinic costs and the burden on the patient to travel for a brief review appointment.
- Establish capacity to link with interpreter services in order to provide Telehealth to non-English speaking patients.

– Advocate for a Telehealth co-ordinator to be established at SVHM to drive the development and uptake of Telehealth across SVHM.

Key recommendations

– SVHM performs over 6,500 elective surgeries annually and there are more than 127,000 non-admitted clinic attendances. Over half of all SVHM patients live outside of the metropolitan catchment area, with 11 percent coming from rural and regional Victoria. This presents an opportunity to re-design services to provide person-centred care that considers the patient experience from start to finish.

– Top down support from an executive level is required to further scale Telehealth in a systematic way across SVHM. This involves adequate funding, directive for the provision of user-friendly technology and supporting a change management process.

– The DHHS develop partnerships to enable access to a uniform webRTC platform such as Health Direct Video Call for all public healthcare networks to utilise.

– Explore ways to incentivise the use of Telehealth for the monitoring and management of chronic health conditions in order to reduce the impact of multiple review visits on tertiary hospitals.

2. Background

Osteoarthritis (OA) is the leading cause of pain and disability among the elderly (Brooks, 2002). Total Joint replacement (TJR) is considered the most effective form of management for end stage OA. The demand for TJR is rising rapidly due to the aging population and this growth has impacted on the ability of the health system to consult patients in a timely manner. In response to this increasing demand the focus of planning has been to improve efficiency across the entire care spectrum, including exploring models for improving workforce capability and capacity.

This difficulty of Victorian health care services in meeting these increased demands has been highlighted in the recent reports, "The Travis Review" and "Health 2040". These reports provide recommendations on how to increase the capacity of Victorian hospitals and deliver the best value for patients. Key recommendations made by Health 2040 (DHHS 2015) include:

- Health systems that deliver the best value for patients
- Take advantage of major advances in science and technology
- Person-centred health care
- Enables choice, personalisation, positive experience, active individual participation.
- Opportunities to be supported by technology – Telehealth could be more actively pursued.

Key recommendations made by The Travis Review (Travis, 2015) include:

- Focus on patient outcomes, patient experience, access to care
- Care outside the walls of the hospital
- Adequate provision of funds to enable innovation e.g. seed money to cover the start-up costs required for change.

Advanced Musculoskeletal Physiotherapy (AMP) clinics utilise experienced physiotherapists to manage musculoskeletal conditions traditionally seen by medical staff. St Vincent's Hospital, Melbourne (SVHM) has had an AMP led post arthroplasty review clinic since 2008 which has shown benefits in terms of efficiency and effectiveness of patient flow, coupled with the financial advantages. AMP roles have shown to be a safe, cost effective model of care for TJR reviews (Large et al. 2014); and have been widely accepted in Australia and internationally as a standard model of care in many healthcare networks.

St Vincent's Hospital, Melbourne is responsible for approximately 700 joint replacements a year. This is largely due to ESAS which offers surgery to patients from any public healthcare network who have endured long wait times. This leads to approximately 2,000 routine post arthroplasty reviews required annually at SVHM as per the Australian Orthopaedic Association (AOA) guidelines. This burden impacts on timely appointments and access for new patients. Many patients travel long distances to attend these recommended reviews over a ten year period. This can result in significant costs to patients and carers, increased did not attend rates (DNA) and time away from paid employment. There are high costs to SVHM associated with patient transport for the elderly, rural or disabled population to attend post arthroplasty review appointments. SVHM must continue to search for innovative approaches to conduct post-operative reviews whilst maintaining the highest quality of care and patient satisfaction.

Telehealth, the provision of healthcare and education over a distance using technologies such as telephone or videoconferencing, is one such area that could be further explored. Telehealth services can improve health outcomes by improving access to care, particularly for patients in rural communities where health services are limited. Research in the area of Telehealth following TJR surgery is limited, however there is some emerging evidence to suggest it may be well accepted by patients and staff

(Tousignant et al, 2011) demonstrate similar outcomes to face to face consultations (Russell et al, 2011) (Piqueras et al, 2013), be time efficient and provide cost benefits to the healthcare network and the broader community (Marsh et al, 2014). Telehealth is available for specialist clinic use at the Royal Children's Hospital and Monash Children's Hospital in Melbourne and has been widely utilised in other states with good success.

In 2014, the Victorian DHHS funded the "Telehealth Initiative: an expansion of the AMP PAR clinic" at SVHM. This commenced as a scoping project and progressed to the development and implementation of a Telehealth model of care within the existing AMP PAR clinic. As part of the establishment phase, the key learning's have been used to support Telehealth uptake in Victoria through a webinar presented to Victorian physiotherapists and the development of a Telehealth guidebook.

This report would like to acknowledge the following stakeholders and partners for their support through this project:

– The Department of Health & Human Services
– Ms Carolyn Page (Musculoskeletal Team Leader, SVHM)
– Ms Belinda Cary (Manager of Physiotherapy, SVHM)
– Professor Peter Choong (Director of Orthopaedics, SVHM)
– Mr Francis Ma (Orthopaedic surgeon, SVHM)
– Dr Michelle Dowsey (Coordinator Orthopaedic Research, SVHM)
– Ms Fiona McKinnon (Director of Allied Health, SVHM))
– Ms Nicole Bates (Telehealth coordinator, Monash Hospital)
– Ms Susan Jury (Telehealth coordinator, Royal Children's Hospital)
– Mr Dilesh Patel (Blue Jeans Network)
– Mr Craig Spiers (ESAS manager)
– Ms Diane Dalton and Ms Sunny Zhao (ESAS waiting list officers)
– Ms Miriam Gilles (Telehealth Coordinator, Correctional Health, SVHM)
– Ms Robyn Blackmore (SVHM Consumer Representative)
– Mr Andrew Dalla Rosa and Mr Stanley Harlen (ICT, SVHM)
– Ms Catherine Senserrick (Senior AMP PAR clinic, SVHM)
– Mr Colin Laurie (AMP PAR clinic, SVHM)
– Ms Sallie Cowan (Physiotherapy Research, SVHM)

3. Project methodology

- Summary of previous phases of project development

Phase 1 (scoping)Telehealth project (July-March 2015)	This aim of this first phase was to scope the potential use of a telehealth service within the existing AMP PAR clinic at St Vincent's Hospital and to establish a framework that would provide the basis for wider application. This involved the development of operational guidelines including patient selection, consent and information, telehealth consultation and evaluation.
Initial Phase 2 (establishment)Telehealth Project (April 2015-Dec 2015)	The second phase of this project focused on implementing and embedding telehealth as an alternate method of consultation alongside the existing AMP Post Arthroplasty Review (PAR) clinic at SVHM. The aim of the project was to assess the feasibility, cost efficiency and effectiveness of a telehealth service within a large tertiary hospital.

- This project targeted patients who would be attending SVHM for a post-operative review appointment within the AMP PAR service.
- Based upon the literature review and initial stakeholder engagement, it was decided to offer Telehealth to patients attending for review greater than one year after surgery in order to minimise potential risk.
- Upon completion of the phase 2 in December 2015, the results from the Telehealth project were presented at an Orthopaedic surgeon business meeting. Support was gained from the orthopaedic surgeons to extend the eligibility criteria to include patients from the six month review point provided they were not experiencing any issues that would require detailed assessment.   This was identified as a way to increase patient choice and improve patient flow through the service.
- Sharing of knowledge gained through the Telehealth project was essential to raise awareness within SVHM and across the Victorian health care system. Communication has been an important part of the process to develop interest, demonstrate the benefits of Telehealth and generate the engagement required to further embed Telehealth as part of usual care. The following are examples of how the Telehealth project has been promoted within SVHM and externally.
  – ePoster at the Australian Physiotherapy Association (APA) conference October 2015
  – Research Week 2015 (SVHM) – Winner of Senior Medical Staff Association Best Modified Poster presentation
  – ePoster at the 11th National Allied Health Conference (NAHC) November 2015
  – Presentation of project to Orthopaedic Surgeon group December 2015
    - Nine orthopaedic surgeons present at meeting
    - Telehealth was well received with no objections to the service raised
    - Recognition of expense associated with orthopaedic surgeon reviews
    - Acknowledgement of the cost efficiency of AMP reviews
    - Good discussion on clinical governance and the expansion of eligibility criteria
    - Interest in utilising technology infrastructure once developed
  – Case study article on Telehealth published in "The Font", the SVHM newsletter
  – Article published in the Australian Hospital & Healthcare Bulletin
  – Article published in the APA magazine *"InMotion"*

- Application submitted in the SVHA Innovation & Excellence Awards 2016
- Telehealth Webinar for Physiotherapists: representatives from nine health care services across Victoria attended

Stakeholder engagement:

SVHM

- SVHM Executive Committee
- ESAS management and administration
- Orthopaedic department
- Information, Communication and Technology (ICT)
- Correctional Health Telehealth Coordinator

Consumers

- Consumer representative
- Patient surveys

External

- Radiology providers
- Cisco and Architech
- Monash Children's Hospital Telehealth coordinator
- Royal Children's Hospital Telehealth coordinator
- DHHS – Telehealth Unit

Scoping and development

- As part of the development phase, a literature review was conducted on the use of Telehealth in physiotherapy, orthopaedics and general medical. The main findings included:
  - Using Telehealth for reviews following intra articular injections showed improvements in patient flow and access to outpatient specialist appointments with a reduction in the waiting list (McGinley & Lucas, 2006).
  - A large pool of research in Telehealth in areas of chronic disease management such as diabetes and pulmonary disease showed a high level of patient satisfaction (Eng et al, 2014)(Tousignant et al, 2011) but identified potential barriers such as language, age and technology (Sharareh & Schwarzkopf, 2014)(Wood et al, 2011).
  - The use of standard commercial videoconferencing equipment is an effective form of communication with clear imaging and sound (Smith et al, 2004).
  - Skype has been successfully used as a method of providing telemedicine follow up due to its simplicity and lack of cost (Sharareh & Schwarzkopf, 2014).
  - A web-based system for routine arthroplasty follow up provides greater flexibility to compete the assessment at a time and location both convenient for the patient and the surgeon as well as requiring minimal additional equipment or training (Marsh et al, 2014)
  - Outpatient appointments via videoconferencing for regional paediatric patients in Queensland led to reduced costs to the patient and their families and contributed to reduced travel time and less time spent away from work, school, friends and family (Smith et al, 2003).
  - Benefits of Telehealth to the health service have been shown in reduced societal and health-care payer costs (Marsh et al, 2014), reduced physician time compared to face-to-face contact (Sharareh & Schwarzkopf, 2014), and financial savings due to the cost of patient transport (Smith et al, 2007).

- A bench-marking process was undertaken to ascertain the current use of Telehealth across Victoria. The Royal Children's Hospital (RCH) and Monash Children's Hospital were consulted for guidance in developing and implementing a Telehealth service as they both have established the use of Telehealth within their specialist clinics. Knowledge gained:
  – Technology used: benefits and issues. RCH had been using a cloud based program "GoToMeeting" but found this not to be ideal in regards to connectivity, cost and a staff member being required to assist patients with a test call. They have since developed a collaboration with Health Direct Australia in order to use Health Direct Video Call, which is a free web-based videoconference platform. Monash Hospital has been using a cloud based program "Blue Jeans" and found this to be a suitable platform with the organization investing in a significant number of user licenses for the outpatient clinics.
  – Challenges to scaling up project: IT support, funding, creating awareness, implementing Telehealth as part of usual care, "business as usual".
  – Both sites reported that they required a significant period of time to build interest in Telehealth and to start generating referrals (12 – 18 months). RCH were starting to see approximately 10% of regional outpatients via Telehealth.
- A patient survey was conducted to gauge interest in Telehealth. One hundred patients attending for AMP review were asked if they would utilise Telehealth for future reviews with 74% indicating that they would. The main reasons for declining Telehealth were due to language barriers and technology.

- The implementation process has required communication and collaboration with the ESAS administration staff in order to identify patients and promote the service. The feedback from the waiting list officer has been positive and supportive for the utilisation of Telehealth. A number of Telehealth referrals have been received from the waiting list officer due to patients stating their inability to attend a face-to-face appointment.
- The Telehealth clinic has been accepted as part of ESAS with the allocation of a consult room and the support from administration staff in collecting patient medical history's and recording patient review times on the database as occurs for the PAR clinic. There has currently been engagement from the orthopaedic surgeons in regards to scoping of the service, developing the framework and setting the patient inclusion criteria.
- Consultations with SVHM ICT department and an external tech company (Architech) have occurred throughout the establishment phase with the aim to leverage the existing Cisco infrastructure (WebEx) for conducting the Telehealth service. It is envisioned that this platform will contain educational material, provide an interactive interface for the patient and allow patients to register their details for Telehealth appointments.

Establishment

- The model was established within the existing SVHM AMP guidelines that currently exist for physiotherapists within the PAR clinic. The Telehealth AMP works within the same scope of practice, clinical governance and use the same operational framework as the PAR clinician but establish specific operational guidelines for Telehealth reviews.

  The project timeline is represented in a Gantt chart as Appendix 1.

4. Evaluation

Ethics

- The SVHM Research Governance unit approved the quality assurance application for the Telehealth project with the focus on embedding Telehealth within the existing PAR clinic at SVHM and a trial of up to 50 patients with this model of care.

Evaluation framework

- The framework underpinning the evaluation of the AMP program is the VIRIAF – a framework that is closely aligned to the Impact Assessment Framework developed by Health Workforce Australia to support the evaluation of workforce innovation projects and that is tailored specifically to the Victorian context. The VIRIAF promotes standardised evaluation of workforce projects and is designed to support economic evaluation to inform possible roll out further programs (Appendix 2).
- Two key questions underscore the VIRIAF:
  - Is the program appropriate, considering the efficiency, the effectiveness and the sustainability of the program?
  - Is the program feasible, considering whether it can be replicated on a larger scale and whether identified risks are able to be mitigated?

Data Collection

- The evaluation data was collected from the Telehealth patient database, PAR clinic snapshot, estimation of clinic administration time, the existing AMP database and surveys sent to patients seen via Telehealth.
  - Patients were asked to complete an online survey via Survey Monkey after their Telehealth review (Appendix 3). Those attending their review via telephone were asked for their feedback utilising the same questions.
  - Data was collected from the ESAS clinic waiting list officer in the form of estimated time used when making appointments, rescheduling appointments and following up DNAs.
  - Data was provided from the ESAS Manager on the reduction in transport costs since the implementation of Telehealth.
  - Clinic snapshots were taken during October 2015, December 2015 and March 2016 to compare patient time through an OOS Telehealth and usual AMP PAR pathway.
  - The type of appointments available for each orthopaedic surgeon (review or new) were compared before and after the implementation of Telehealth utilising the Patient Administration System (PAS).
  - Change to the number of DNAs occurring in the AMP PAR clinic was evaluated by comparing the clinics before and after the implementations of Telehealth utilising PAS.

Efficiency

- Data to inform the assessment of the cost efficiency of the Telehealth service was collected from an Excel Database created for this project. Key data inputs towards the calculations associated to cost efficiency were:
  - Average wage rates for all staff involved in the PAR pathway and Telehealth pathway
  - Total occasions of services and DNAs

- Average cost of an OOS through the PAR pathway and Telehealth pathway.
- Transport costs occurred by ESAS

- Costs/Inputs

Assumption	Cost
ESAS administration hourly wage rate	$24.00 (based on weekly salary for clerical worker WC9)
Grade 3 AMP hourly wage rate	$44.00 (based on weekly salary for Grade 3, year 3)
AHA/Administration hourly wage rate	$25.50 (based on weekly salary for AHA Gr 2)
Orthopaedic surgeon hourly wage rate	$120.61 (assuming annual salary $220,000)
Value of patient waiting time per hour	$29.71 (assuming average weekly earnings of $1,129) ABS, November 2014

*Based upon PwC evaluation of the AMP programs (2015)

Effectiveness

- The objectives for the Telehealth project according to VIRIAF included improving access to care, workforce capacity and client satisfaction. Data to inform the effectiveness of the Telehealth service was collected from clinic snapshots, baseline measurements utilising PAS, patient survey's and staff feedback. Key data inputs towards the measurement of effectiveness were:
  - DNA rates
  - Change to orthopaedic workload (number of new and review appointments)
  - Patient surveys measuring satisfaction, utility and cost savings
  - Patient demographic data

Sustainability

- Key data inputs towards the calculations associated with sustainability were:
  - Future capacity of the service
  - Stakeholder engagement
  - Infrastructure development and cost
  - Funding

5. Service model

Patient Selection

- Patients that were due for their 3, 5 or 10 year post surgical review from August to December 2015 were identified from the database spreadsheet provided by the ESAS clinic. Patient eligibility was determined according to the criteria used in Phase 1 as outlined in Table 1. Each patient was sent an information letter inviting them to use Telehealth for their next review. The letter contained information about the purpose, process and structure of the Telehealth review as well as the required technology. Patients were provided with an email address and phone number to contact in order to find out more about the service and to either accept or decline a Telehealth review.

- Upon consultation with the orthopaedic surgeon group at the completion of Phase 2 in December 2015, support was gained to revise the eligibility criteria to include patients that were 6 months or greater post surgery. This change reflected the guidelines of the existing AMP service and was expected to increase the number of eligible patients that could be offered Telehealth.
- Patients attending their face-to-face review were asked if they were interested in Telehealth for their next review. If so, this was recorded on the database and their email address recorded on the Patient Administration System (PAS) to allow for an electronic appointment to be sent. The ESAS administration now routinely refer patients to be triaged for Telehealth if they identify that they would require transport, live a distance from SVHM or had previously DNA an appointment due to difficulty attending.

Table 1: Eligibility Criteria

INCLUSION CRITERIA	EXCLUSION CRITERIA
>12 months post arthroplasty (Phase 1 and initial phase 2) **6 months+ post arthroplasty (extended Phase 2)**	Non-routine surgical procedure
Initial Diagnosis: osteoarthritis	Perioperative fracture; post operative infection
Limited comorbidities	Significant comorbidities complicating review
Uncomplicated surgical history and past reviews	Inflammatory disease (Rheumatoid Arthritis, psoriasis); Neurological condition e.g. Polio
Has access to a compatible electronic platform and familiarity with use	Non-English speaking

- 136 patients were identified as being appropriate for Telehealth from the database. Fifty-four patients have completed their Telehealth review. There have been 58 patients decline the service due to poor access to appropriate technology (48%), prefer a face-to-face appointment (26%), issues that required consultation (9%), no reason was given (7%) or they preferred to delay their appointment (10%). The remaining 24 patients have been lost to follow up as they did not respond to letters, emails or phone calls. As a result these patients have been discharged from the hospital. Table 2 outlines the demographics of the 54 patients that have completed Telehealth reviews.

Table 2: Patient Demographics (completed Telehealth)

Demographic	Average
Age	64 years old (43 – 83 years)
Gender	Male = 16; Female = 34
Total Knee Arthroplasty	23
Total Hip Arthroplasty	27
Distance living from SVHM (Appendix 4)	120km (13km – 745km)

Clinic Establishment

- The Telehealth clinic was co-located alongside the existing AMP PAR clinic to ensure support from the senior physiotherapist and orthopaedic surgeons. An appropriate private clinic room with adequate lighting and noise reduction was identified to be used for the Telehealth reviews.
- A laptop was used to run the videoconference platform, Blue Jeans, as the SVHM desktop computers do not currently allow for the use of web camera or videoconferencing due to the "quick connect" function where programs or plug in devices cannot be installed.
- Google Chrome was downloaded to the laptop by IT as the selected videoconference platforms do not run with Internet Explorer.
- A Telehealth information sign for patients was displayed in the waiting room encouraging patients to ask about Telehealth for their next appointment. This has been developed into a Telehealth Fact Sheet for patients and is currently being reviewed by SVHM communications so that it can be used as an official handout for patients attending ESAS (Appendix 5).

Technology

The selection of the network platform suitable for Telehealth within this project was important. The factors that required consideration included security, cost, operability for patients and clinicians and reliability.

- Skype
  - Phase 1 of this project utilized Skype. This is a medium that has been endorsed in the rural GP network and is frequently used in many health services. Patients are familiar with its use and infrastructure. Despite the benefits it is not considered a long term option due to reduced security and reliability of connection. However, it does present as a viable option in the absence of affordable and usable alternatives.

- Blue Jeans
  - This was identified as being a more secure and reliable option for undertaking Telehealth reviews compared to Skype. Telehealth is currently being used widely at Monash Health, particularly in pediatric services, with Blue Jeans being the chosen platform for delivering the service. Blue Jeans is a cloud based video-collaboration service that does not require any additional hardware or software. A one year free trial of a Blue Jeans license was established for the implementation and establishment phase. This allowed a meeting invitation to be sent to a patients email with a link to open the scheduled video-conference. Blue Jeans is a versatile system that can be used with a web browser, room systems, mobiles and other software-based video clients. Based upon feedback from patients in the initial use of Blue Jeans, a set-up instruction guide was developed and is sent to patients to assist with the usability of this program. The reliability and connectivity of Blue Jeans has been to a good standard, allowing adequate visual assessment of the patient. There were no "drop outs" and technical difficulties were experienced on two occasions where the patient either could not be seen or not heard. This may have been due to issues with set up at the patient end.
  - Whilst Blue Jeans has been a reliable and user friendly platform for the Telehealth project, its high cost ($150 month, excluding GST, for one user license) does not make it a viable option for a public healthcare service.

- CISCO
  - SVHM has Cisco Jabber installed, software that is used for telecommunication internally and for site to site Telehealth use for correctional health (SVHM to Prison). In its current form it is not able to be used to communicate with an external user such as a patient in their own home. The SVHM

ICT department is in the process of extending its contract with CISCO to include WebEx. This is a webRTC program that would enable Telehealth reviews to be conducted into the patient's home.

- Health Direct Video Call
  – This is a web-based videoconference platform, which is jointly funded by the Commonwealth and the states and territories. It is free to use for the states which fund it. As Victoria does not currently provide funding, Health Direct Video Call is not accessible to Victorian Hospitals, with the exception of those undertaking a targeted project such as RCH.

Radiology

- The reliability and quality of x-rays at review appointments is critical for effective consultation. Creating an alternate pathway for imaging into this project, for patients using Telehealth, was important. In Phase 1, online access to radiology was established with further external radiology providers identified during the second phase. Online accounts have been created for SVHM access. This has enabled improved accessibility and choice for patients when undertaking the required follow up x-rays.
- List of providers:
  – MIA; I-MED; Bendigo Radiology; Goulburn Valley Imaging (Private); Goulburn Valley Health PACS (Public); Healthcare Imaging Services; Capital Radiology; Marina Radiology; Lake Imaging
- The patients are able to attend any local radiology centre, taking the referral slip sent to them in the information pack. This is signed by an orthopaedic surgeon at SVHM with bulk billing indicated.

  Patients are informed of the closest provider that allows online viewing of images.

  Patients are instructed to contact the project officer at SVHM via email once x-rays have been taken.

  The x-rays are viewed directly on the computer network at SVHM.

  If unable to locate a suitable, local radiology service for a patient that would allow imaging to be viewed online, a disc with images would be requested and forwarded to SVHM.

Clinic Process

Prior to review	During review	After review
-Patient to complete WOMAC and have imaging performed **-X-rays reviewed** **-Create appointment on Blue Jeans (automatic email sent with link to access meeting)** **-Send email to patient including information on Blue Jeans application and Telehealth instructions** **- The Telehealth review was conducted on the laptop. X-rays could be shown and explained to the patient using the share screen function.**	- Patient to attend the appointment by logging on through Blue Jeans. -Patient using iPad or laptop to allow for greater maneuverability of device to display full body reviews for objective examination -Standard subjective assessment completed as per face-to-face appointment -Functional assessment: gait, squat, single leg stance, range of movement -Each session timed from start to finish and recorded on Telehealth database	- A survey monkey online evaluation link is sent to patients requesting feedback -Notes recorded on electronic medical records using the template as per the AMP review clinic.

Barriers and Enablers

Technology

- Barrier
  - Technology presented as a significant barrier on two fronts, at the patient end and at an organisational level. The main reason for patients declining Telehealth was not having access to the necessary technology such as an internet connection and computer. This is not likely to be a long-term problem, as with time, technology will become more widely utilised and accessible. As an alternative, patients could also be assisted by their GP clinic or local health care centre to undertake their Telehealth review.
  - Wade & Hamlyn (2013) describe the relationship between the clinical and technical aspects of Telehealth as problematic and often fail to achieve sustainability. This has presented as a challenge throughout the project with the clinical requirements not being met by the available technology. A major barrier to the utilisation of Telehealth and further embedding it within the service has been the inability to use the existing SVHM videoconference technology. The current program CISCO Jabber is only able to be used within SVHM and correctional health and is not licenced to be used externally. Discussions with ICT have occurred to explain the clinical need and model of care for the Telehealth project in order to find a simple and effective solution. CISCO WebEx, a cloud based real-time web communication program presents as a likely solution and SVHM ICT are in the process of making this available. However, in order to install and run this program, a secondary computer screen will need to be installed to circumvent the inability to download a program onto the SVHM computers as due to the "quick connect, single log in" function, each computer runs off one main server. A number of clinics across SVHM are set up with dual screens and would be well placed to commence use of CISCO WebEx. For other clinics, a second screen would need to be purchased from IT (~$200) or a laptop be used.
  - There are a number of other suitable and cost effective videoconference platforms available, however, they require Google Chrome to function and currently SVHM has Internet Explorer as the preferred web browser due to higher levels of security.

- Enabler
  - Technology is a key factor in the successful utilisation and sustainability of a Telehealth service. Obtaining the use of Blue Jeans on a free trial for the course of the project was a significant enabler of the service. It was easy to use for both clinicians and the patient and it provided a reliable connection of good quality in order to conduct a suitable consultation. To ensure uptake of Telehealth, the technology should be simple and easy to use.

Staff

- Barrier
  - In order to integrate Telehealth within the ESAS clinic and increase clinician uptake, it needs to be part of usual care. The technological aspects need to be at a point where it can be incorporated as part of normal work flow and doesn't add to a clinician's workload. Once a suitable system becomes accessible, training can be provided to more clinicians to further increase awareness and uptake. The presence of a Telehealth champion is important to facilitate this change management process in order to drive understanding and awareness amongst staff so that Telehealth becomes accepted as a part of usual care.
- Enabler
  - Conversations with ESAS staff including administration, nursing and executive staff have been positive in regards to establishing a Telehealth service within the PAR clinic. They recognise a strong need for this to be an alternative to traditional care to improve outcomes and efficiencies in the system. It will be important to increase the awareness and usability of Telehealth amongst the wider staff group such as orthopaedic registrars, orthopaedic nurses and pre-admission clinic.

Funding

- Barrier
  - Many pilot projects fail to continue or to be embedded as part of usual care without funding from the organisation. The benefits of Telehealth to the patient and organisation are evident but with any commitment to change, funding is required to adequately develop, promote, embed and sustain a service. Establishing a sustainable source of funding to continue to develop Telehealth at SVHM has been a challenge. A matter for decision is currently being finalised for SVHM Executive requesting ongoing funding of this clinic model.
- Enabler
  - The funding of this project by the DHHS has allowed the capability to assess the feasibility of a Telehealth service within the AMP PAR clinic at SVHM and develop a model of care.

Patient

- Barrier
  - Telehealth is quite a new concept to patients and may seem to be difficult or too hard, particularly to those not confident with technology. It is important to continue to raise awareness and present Telehealth as a viable option so that it becomes part of usual care.
- Enabler
  - From the literature review, patient survey and Telehealth trial, there is clear evidence that patients see a benefit in this service. Each patient from the phase one pilot and phase two implementation stated that they were happy with the service and would opt to use Telehealth again.
  - The development of information handouts and Telehealth tips for patients (Appendix 6) enabled patients to be more confident with undertaking a Telehealth review and increased the efficiency of the service.

Radiology

- The identification of additional external radiology providers who will allow online access to imaging has been essential in developing the Telehealth service. Access to further services can be arranged as need arises. A map of radiology services (Appendix 7) and a clinician resource has been developed. This has been disseminated amongst the musculoskeletal physiotherapy team and orthopaedic surgeons.

6. Workforce model

- The funding from DHHS allowed for a Telehealth project lead within the PAR clinic at SVHM, two days per week. This role was required to undertake stakeholder engagement, develop the processes for Telehealth, undertake patient selection and recruitment, deliver training to staff, complete Telehealth reviews, evaluate the project and raise awareness of the service. The Telehealth Coordinator was required to work with the existing AMP clinicians and ESAS administration in order to promote and embed Telehealth as an option for patients.
- Processes have been developed to enable earlier identification of patients appropriate for Telehealth. The patient review appointment slips which are filled out by the clinician (AMP or orthopaedic surgeon) were updated to include a check box for patient suitability for Telehealth. This was recorded on the database to increase the efficiency of the triage and booking process.
- The Telehealth model (Appendix 8) was established within the existing SVHM AMP guidelines for the PAR clinic. The Telehealth AMP will work within the same scope of practice, clinical governance and use the same operational framework as the PAR clinician but establish specific operational guidelines for Telehealth reviews (Appendix 9). Telehealth was designed to provide the same service as would be received from a face-to-face review with only the mode of delivery being different. Therefore, the existing AMP competency framework can be used with the addition of Telehealth as a mode for service delivery.

Training

- The therapists involved in Telehealth undertake the same training as per the AMP PAR clinic learning and assessment framework. The therapists will adhere to the same scope of practice as described in the AMP PAR clinic operational guidelines.
- Specific guidelines pertaining to the practical use of the Telehealth infrastructure has been added to this existing framework.
- During the implementation phase, two clinicians were trained to co-ordinate and conduct a Telehealth review. This has been important for succession planning and leave cover.
- A webinar was conducted on the use of Telehealth in AMP clinics with physiotherapists across the Victorian health care network attending.
- A Telehealth Guidebook (to be submitted as a separate document) has been developed as a resource for other AMP clinics, particularly PAR, to assist with the implementing Telehealth as part of their service.

Risk

- All AMP services have a risk assessment completed in conjunction with the St Vincent's Hospital Melbourne Quality and Risk Unit and meet the Clinical Risk Management St Vincent's standards

- No adverse outcomes were recorded throughout this project.
- Specific risks to this project identified in table below

Risk No:	Description	Likelihood	Consequence	Risk Rating	Strategies for Mitigating Risk	Updated Risk Rating following mitigation
1.	Limited executive commitment to project goals	Unlikely	Low	Low	Executive support has already been established	Low
2.	Organisational structure results in unclear governance	Unlikely	Low	Low	Project within established AMP clinic	Low
3.	Difficulty engaging internal stakeholders	Unlikely	Low	Low	Broad consultation has already taken place and stakeholders are already engaged	Low
4.	Project team lacks authority to complete work (eg: changes to processes)	Unlikely	Low	Low	Stakeholder group (including Executive) already established and have indicated support for this project	Low
5.	Stakeholder resistance	Unlikely	Low	Low	Stakeholders, including medical, nursing and exscutive staff are already consulted and engaged	Low
6.	Failure to meet DHHS reporting requirements (eg progress and acquittal reports)	Unlikely	Low	Low	Appointed Project officer will have experience with implementation of advanced practice role and managing other DHHS projects Progress reports will be provided as required	Low
7.	Errors in project planning (eg timeframes, costings)	Possible	Moderate	Medium	Clear project timelines developed with comprehensive proposed budget	Low
8.	Inability to access relevant data	Unlikely	Low	Low	Established Database for PAR and telehealth exists	Low
9.	Unable to sustain role at completion of project	Possible	Low	Medium	Project addresses key priority areas for organisation Robust data will be collected and business case submitted in timely manner	Low

Learning's

– A reliable and user-friendly videoconferencing platform is essential to ensure successful uptake of Telehealth by clinicians and patients
– A local Telehealth Coordinator is important for promoting the service and driving uptake.

– A bottom up process is important for understanding how Telehealth can be used to address clinical needs.

7. Results and findings

Efficiency

Patient Pathway

- The patient journey through Telehealth is directly compared to the AMP PAR clinic. This incorporates the average direct consultation time and direct administrative time for a single patient OOS. This data was taken from snapshots of the AMP PAR clinic in September 2015, December 2015 and May 2016. The time for a Telehealth occasion of service was calculated as an average of all patients seen from August 2015 – June 2016. The administration time includes direct time spent with patient on arriving and leaving the clinic.

- Table 3 below shows that the average cost per OOS through the Telehealth clinic was $18.25 less expensive than the PAR clinic.

Table 3: Valuing the change to the patient pathway

	Average patient wait time through an OOS (value)	Average admin staff time through an OOS (value)	Average AMP time to see patient	Total value of time through an OOS
PAR clinic pathway	26 minutes $12.85	2 minutes $1	15 minutes $11	43 minutes $24.85
Telehealth pathway	0 minutes	0 minutes	9 minutes $6.60	9 minutes $6.60
Change				-$18.25

- There was no patient waiting time for the Telehealth service as every appointment commenced as scheduled and patients were joining from their own home or workplace. When attending face-to-face appointments, patients may allow more time for traffic, parking and other variables, therefore, arriving early and increasing the time waiting to be seen.

Administration time

- Table 4a below compares the average administration time spent on triage, patient bookings, phone calls and rescheduling appointments per patient for the PAR and Telehealth clinics. It shows that the administration process for Telehealth was $5.25 more expensive than the established PAR clinic. The PAR clinic administration time was calculated based on an estimation provided by the waiting list officer performing these duties. The administration time for Telehealth was based upon patient mapping data collected on the Telehealth patient database. This increase in expense is due to the administrative processes for Telehealth being conducted by the AMP. This will likely decrease as efficiency improves with patient identification and the incorporation of Telehealth administration processes with the existing ESAS administration duties.

Table 4a: Valuing the change to the administrative pathway (managing patient bookings)

	Average time for triage and booking patients (value)	Average time to reschedule patients (value)	Total value of administration time
PAR clinic pathway (tasks performed by admin)	10 minutes $4	6 minutes $2.4	16 minutes $6.40
Telehealth pathway	9 minutes (AMP) $6.60 5 minutes (Admin) $2.10 Total $8.70	4 minutes $2.95	18 minutes $11.65
Change			+$5.25

- Table 4b below shows the average administration time spent per patient on managing DNAs and rescheduling surgeon review lists for leave was $5.50 less expensive through the Telehealth pathway. There was only one DNA during the Telehealth project period and no need to reschedule Telehealth review lists, this presents as a substantial savings offset to the administration costs for patient triage and bookings.

Table 4b: Valuing the change to the administrative pathway (managing DNAs and rescheduling lists)

	Average time to send DNA letters (value)	Average time to reschedule DNAs (value)	Average time to reschedule a surgeon review list (value)	Total value of administration time
PAR Clinic pathway	5 minutes $2	10 minutes $4	6 minutes $2.40	21 minutes $8.40
Telehealth pathway	2 minutes $1.45	2 minutes $1.45	0 minutes	4 minutes $2.90
Change				-$5.50

DNA cost

When a DNA occurs, the cost can be counted in administration time and clinician time (either AMP or orthopaedic surgeon). Table 5 below shows the cost of a DNA in regards to administration time, AMP time and orthopaedic surgeon time. The administration time is calculated from Table 4b, combining the time taken to send DNA letters and reschedule the patient. The AMP and orthopaedic specialist time is calculated based on the length of the allocated review slot, being 10 and 5 minutes respectively. This shows that a DNA for an orthopaedic surgeon review costs $16 per patient and a DNA for an AMP

review costs $13.35 per patient. This does not take into account the flow on effect that DNAs have on the waiting list.

Table 5: The cost of a DNA

Clinic	Average time and cost per DNA
Orthopaedic surgeon time (value)	5 minutes $10
Administration time (value)	15 minutes $6
Combined orthopaedic and administration time (value)	**20 minutes** **$16**
AMP time (value)	10 minutes $7.35
Administration time (value)	15 minutes $6
Combined AMP and administration time (value)	**25 minutes** **$13.35**

Recurrent costs

As part of the implementation phase, the time spent on planning, developing resources, stakeholder engagement, promoting the service and presentations has been significant. The planning and research hours have reduced since commencement of Phase 2 and with the establishment of the service will be overcome.

The time associated with triage, patient bookings and carrying out appointments that is estimated to be consistently recurrent for Telehealth is 27 minutes per OOS at a cost of $18.25. Therefore, the increased administrative costs for Telehealth are offset by the reduced consultations costs meaning that Telehealth is as efficient as traditional AMP PAR service (Table 6). With the AMP PAR clinic already shown to be an efficient and effective model of care (PwC 2015), the addition of Telehealth will complement these savings.

As Telehealth becomes further embedded within the ESAS clinic, less time will be required to be spent on patient recruitment and some of the administrative costs can be incorporated into the existing structure, therefore, reducing the overall costs associated with Telehealth.

Table 6: Comparison of recurring costs

	Patient pathway per OOS	Administration (value)	Total value for OOS
PAR clinic pathway	15 minutes (AMP time) $11 2 minutes (admin time) $1	16 minutes $6.40	33 minutes $18.40
Telehealth pathway	9 minutes (AMP time) $6.60	18 minutes $11.65	27 minutes $18.25
Change			-$0.15

Radiology costs

The shifting of radiology to external providers with Telehealth presents as another potential saving to the hospital. It is difficult to assess the impact with a small cohort, however, it would be expected that with more patients having their x-rays taken at local providers, the time and cost saved to the medical imaging department due to not undertaking x-rays or scanning external images onto the viewing system would be beneficial. As part of the PAR clinic snapshot, it was observed that it took 43 minutes for a patient having their x-ray taken at SVHM on the same day as their face-to-face appointment. It may also be more convenient for the patient to have their radiology at a local provider where they could go outside of work hours and require less travel. However, it is recognised that this is a cost shift to the wider system.

Patient transport

The ESAS administration assists in organising transport services (SVHM volunteer driver or Red Cross) for eligible patients required to attend a review appointment. This takes considerable administration time and comes at a cost to the clinic. The ESAS manager reported the transport costs to be $4,840 under budget the commencement of Telehealth, where usually the clinic is over budget.

Upon triaging the patients that utilised transport services between Jan 2016 and June 2016, thirteen patients were identified as being appropriate for Telehealth. This would have saved an additional 718km in patient travel, freed up valuable resources and further reduced ESAS transport costs.

Effectiveness

Access to care

Figure 1 below shows a reduction in DNAs from 30% to 14% in the AMP PAR clinics since the commencement of Telehealth. The baseline data was collected from the proportion of DNAs that occurred in the AMP PAR clinics from February – April 2015 (prior to Telehealth) and compared to the proportion of DNAs in the AMP PAR clinics from February – April 2016 (after implementation of Telehealth).

The reduction in DNAs is unlikely to be solely attributable to Telehealth due to the small cohort; however, Telehealth is likely to have a positive long term impact on this outcome. Patients that were seen via Telehealth may have been more likely to DNA a face-to-face review if they are working, live far away or feel they are managing well. The convenience of Telehealth and the patient engagement in the booking process may reduce the overall number of DNAs, which will improve the effectiveness of the clinics as well as patient access to care.

Figure 1: Proportion of DNAs in AMP clinics before and after implementation of Telehealth
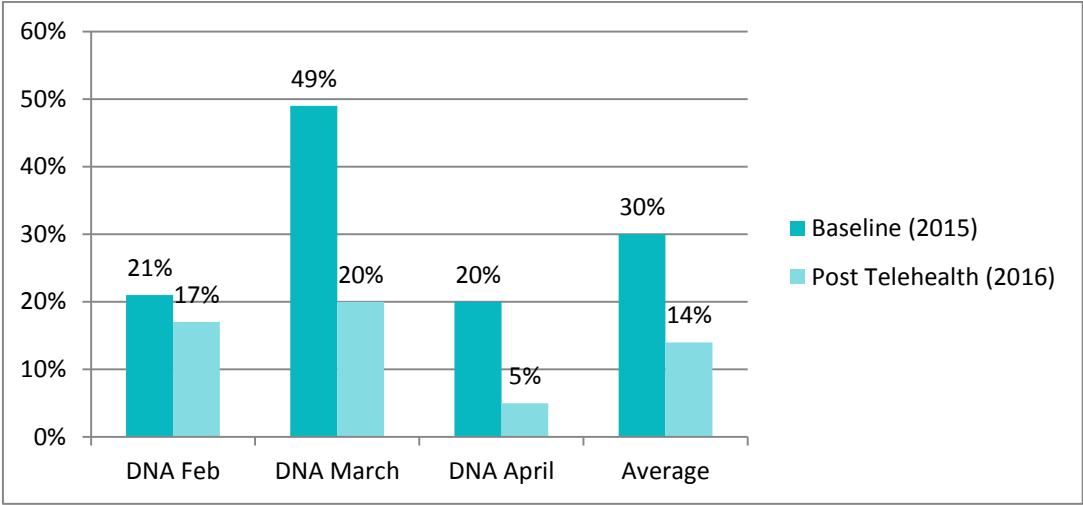
Mode of Telehealth

For the fifty patients seen via Telehealth, six utilised Skype, thirty-three were seen via Blue Jeans and eleven were reviewed by telephone. Whilst videoconference was the preferred method of Telehealth, it was important to offer a telephone review to patients that did not have access to the necessary technology, were doing well and did not want to or were unable to travel to SVHM. In this case, patients were still required to have an x-ray and these were viewed online prior to the consultation. Patients were asked questions about their pain and mobility. The option of a telephone review will improve access to care for patients that may have difficulty attending SVHM and do not have technology to enable a videoconference review.

Figure 2: Mode of Telehealth Delivery
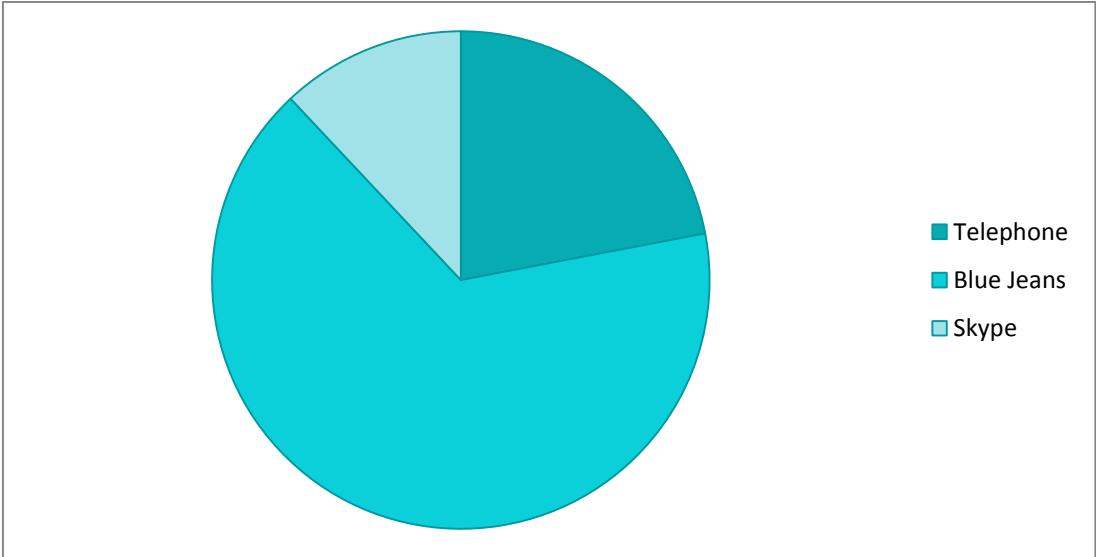
Safety and quality of care

There were no adverse outcomes to patients seen by Telehealth for this project. This is largely due to the selection criteria being designed to identify low-risk patients and the review following the same clinical guidelines as the face-to-face review. Of the fifty patients seen via Telehealth, only one patient was required to attend a face-to-face AMP review in order to perform a comprehensive musculoskeletal

assessment to assist with diagnosing cause of knee pain. This review led to the patient being referred to a local physiotherapist to address musculoskeletal issues contributing to knee pain. The patient reported being satisfied with this outcome.

Of the thirty-nine patients seen via videoconference thirty-four (87%) were completed without any technological issues and five (13%) experienced technical difficulties. One review via Skype dropped out on two occasions which was likely due to quality of internet connection (unknown if issue at SVHM or patient end); one patient was unable to connect to Blue Jeans at all due to poor internet signal strength in a rural location; two patients had issues with audio (likely operational error at patient end); and one patient had difficulty with receiving video (unknown if issue at SVHM or patient end). For each of these instances, the review was able to go ahead via telephone and achieve a satisfactory outcome for all parties.

Workforce capacity

Figure 3 demonstrates the change in the number of new and review patients seen by the orthopaedic specialists. This data compared the month of March 2015, prior to inception of Telehealth as the baseline and the month of March 2016, post the commencement of Telehealth as the comparison. This shows that the orthopaedic surgeons had more capacity to see new patients and saw less reviews. This could be due to the Telehealth service seeing standard review patients that would have otherwise been seen by the orthopaedic surgeon, therefore, allowing creating orthopaedic surgeon availability to see new patients.

Figure 3: Change in orthopaedic surgeon capacity
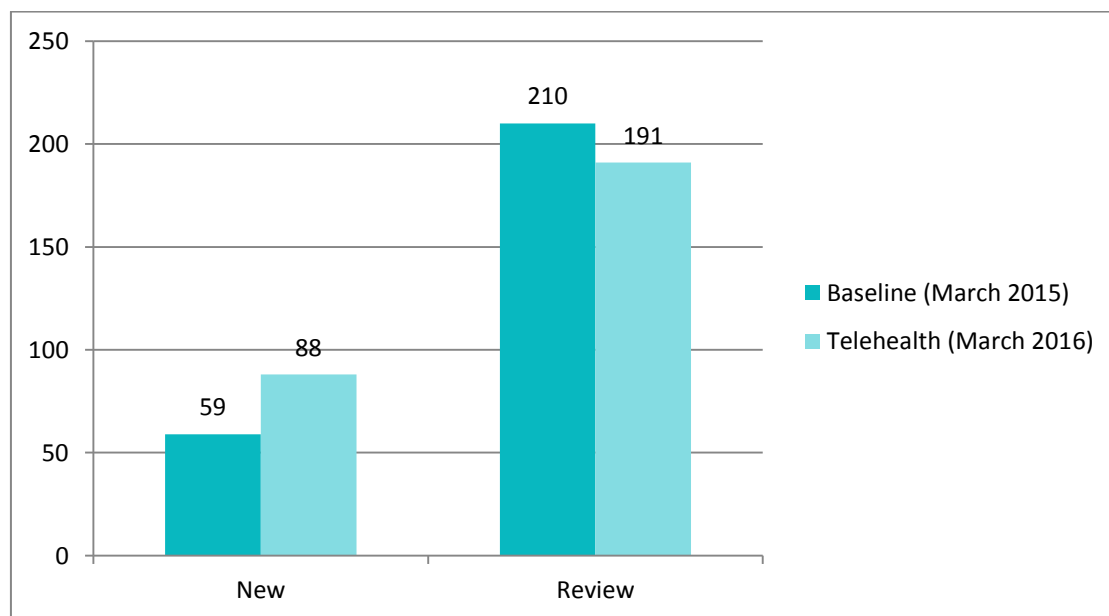
- The results cannot be directly attributed to Telehealth alone due to the small number of patients seen, a concurrent PAR project to increase capacity of the physio led clinic and the impact of surgeon leave. However, with the Telehealth service reviewing 50 patients that would have otherwise been seen by the orthopaedic specialist, it can be assumed that orthopaedic surgeon capacity for new and complex review patients would have increased.

Patient satisfaction

- The patient experience with telehealth was evaluated using a questionnaire sent via Survey Monkey (Appendix 3). The results showed that:
  - 100% of patients found telehealth to be covenient

- 100% felt well prepared for the review
- 94% found the telehealth process easy to follow
- 100% would use telehealth again for future appointments

- Patient feedback – comments made on survey:
  - "Thank you for caring, it was much appreciated"
  - "Review was done very professionally. I am very happy with it"
  - "Keep up the good work St Vincent's"
  - "It's a really great idea for follow up appointments"
  - "I think it is an excellent service and time saver. Well done St Vincent's"
  - "I really appreciated not having to go into the hospital and wait as you usually do"
  - "Many thanks to St Vincent's for introducing this service which is a great advancement in technology and of untold assistance to outpatients especially in rural locations"
  - "Great idea for people who live in regional areas"
  - "It was convenient and easier than I thought. I would have no hesitation in using this system again"

- Savings to the patient

The average savings to each patient in regards to time (travel, time off work) and money (transport, parking, loss of work) was calculated from the completed questionnaires sent via Survey Monkey (Appendix 3). If the patient had undertaken a telephone review then they were asked the questions at the end of the call. This data includes that one patient would have required a full day off work for themselves and a relative, whilst another patient would have taken a day of unpaid leave in order to attend a face-to-face appointment.

  - There was a total of 6,298 km's saved in patient travel
  - An average of $84 saved per patient (travel, petrol, time off work)
  - An average of 5 hours time saved per patient (travel, time off work, waiting)

Workforce satisfaction

The physiotherapists involved in the PAR clinic have found the Telehealth process easy to follow and would be willing to utilise Telehealth for reviews where indicated. The option to undertake reviews via Telehealth can add a different dimension to the AMP role in the PAR clinic, thereby increasing professional satisfaction.

Sustainability

Capacity

Of the twenty patients requiring transport assistance (SVHM volunteer driver or Red Cross) to attend their review appointment between Jan 2016 and Jun 2016, thirteen could have been reviewed via Telehealth. This would have saved an additional 718km in patient travel, freed up valuable resources to be utilised elsewhere and further reduced ESAS transport costs.

With identifying patients interested in Telehealth at their AMP PAR review, 133 patients have been recorded on the database as future Telehealth candidates. This provides support to the continuation of Telehealth based upon patient interest. It is expected that this will grow as awareness increases, simple infrastructure becomes available and Telehealth becomes part of usual care.

Currently the AMP PAR clinic has capacity to see 494 patients per year. It is expected that 15% of these patients could be seen via Telehealth. With the aim of expanding the AMP PAR clinic to see just over 1,000 reviews annually, this would equate to approximately 150 Telehealth reviews.

As part of the clinic expansion and development, it is envisioned that Telehealth will become the standard option for uncomplicated reviews.

Stakeholder engagement

The implementation process has required communication and collaboration with the ESAS administration staff in order to identify patients and promote the service. The feedback from the waiting list officer has been positive and supportive for the utilisation of Telehealth. A number of Telehealth referrals have been received from the waiting list officer due to patients stating their inability to attend a face-to-face appointment.

The Telehealth clinic has been accepted as part of ESAS with the allocation of a consult room and the support from administration staff in collecting the patient medical history and recording patient review times on the database as occurs for the PAR clinic. There has currently been engagement from the orthopaedic surgeons in regards to scoping of the service, developing the framework and setting the patient inclusion criteria.

Funding

A "Matter for Decision" has been submitted to the SVHM executive to approve the funding for 16 hours per week for a grade 3 AMP in the ESAS PAR service to deliver additional AMP clinics, including Telehealth.

8.   Discussion

The Telehealth project in the AMP PAR clinic has shown to be a safe, effective and efficient model of care. The addition of Telehealth has led to a reduction in costs and improved patient flow through ESAS. It empowers the patient to have greater choice in their care and the benefits of this are reflected in the results. Clinic efficiency was improved with administrative staff not required to check in a patient and the time taken for a patient to get from the waiting room to the clinic room eliminated. Shifting radiology to local providers decreases the impact upon the SVHM medical imaging department to respond to a high volume of imaging required for post-operative reviews.

The reduction in DNA rates improve clinic efficiency and flow, enabling improved access to care. With the Telehealth service targeting uncomplicated reviews, this allows orthopaedic surgeons to see more new patients or review complex cases.

Often a patients struggle to attend a review appointment goes unnoticed. Patients are relieved when they learn they are able to be connected with specialist services at SVHM without the burden of travel. Feedback strongly supports the continued use and development of Telehealth as a patient driven change to service delivery. There is the technological capacity to enable patients to receive high standard care without the need to endure crowded waiting rooms or bear the cost of travel and time away from work and family. The quality of assessment that can be achieved via videoconference has been excellent and efficient. Patient access to technology presents a barrier to Telehealth but this is not a fixed issue as use of mobile technology becomes more commonplace in society and internet connectivity in rural areas improves.

With clinician acceptance a key factor in driving sustainability, the Telehealth model will continue as part of the AMP PAR service with the physiotherapists and ESAS administration committed to providing this

option. Whilst the technological aspects are not yet consolidated, alternative arrangements such as Skype and Blue Jeans can be used.

Based upon this project and other bodies of work across Australia, there is great potential for Telehealth to be replicated in other services and organisations. The process to utilise Telehealth as way of providing pre-admission education in ESAS for total joint replacements is underway. The specialist outpatient clinics are well set up to provide Telehealth as an option to patients for their review appointments. Telehealth could also be used in the community setting where chronic disease management can be remotely monitored, reducing time wasted on clinician travel. The same could apply to rehabilitation in the home, where exercises can be reviewed and health coaching provided via Telehealth, thereby increasing clinic output due to reduced clinician travel.

In order for Telehealth to be scaled up successfully within an organisation and across others, it is essential that the ICT infrastructure enables the use of the required technology. A bottom-up process is quite successful in determining the clinical needs of a service and identifying how Telehealth can be used to address these in order for it to be feasible and utilised by the health professionals. However, it is essential that there is top-down support from an executive level to provide funding and assist with the change management process.

Expanding the use of Telehealth will improve the ability of SVHM to streamline service delivery through running "smarter" clinics and moving healthcare outside the walls of a metropolitan hospital that has access issues for the elderly and disabled.

Case Studies

Case 1:

Mrs B is a 69 year old female who lives 213km from St Vincent's. She was due to have her 5 year review post right total hip replacement. Mrs B was identified as appropriate for Telehealth according to the selection criteria; therefore, she was contacted and given this option to which she agreed.

Mrs B was able to have her x-rays taken at a local radiology service and these were available to be accessed by SVHM online. Her x-rays were reviewed by the orthopaedic surgeon and no issues with the right hip prosthesis were identified.

The Telehealth review was conducted using Skype. Mrs B reported being in good health, with no pain in her right hip and had returned to playing 18 holes of golf 2-3 times a week. The video consultation set up allowed for Mrs B to be observed mobilising, performing functional tasks and view hip range of movement without any issue. Mrs B was asked to provide feedback on her experience of using Telehealth. She reported being extremely happy with the Telehealth service and would use it again in the future.

The Telehealth appointment took 13 minutes in total, whereas, it would have taken her a whole day to come to St Vincent's with 3 hours of travel to and from Melbourne. This was a significantly positive outcome for Mrs B.

Case 2:

Mr M is 77 year old from regional Victoria, 3 hours from Melbourne. He underwent a total hip replacement and was due for a 6 month review. He had previously missed the 3 month review due to limited access to transport and reduced mobility. Mr M had been admitted to respite care at the time of review. The HARP team, involved in his care, were happy to facilitate a Telehealth review for Mr M to save him the discomfort and effort of a long trip to Melbourne to receive standard post-operative care. Mr M was transported from respite to the local community health centre where the technology was set up for a Telehealth review. The link to the appointment had been sent to Mr M's care co-ordinator with HARP.

As part of the review it was possible to discuss Mr M's progress and view his mobility via videoconference. The review lasted 10 minutes and enabled Mr M to receive recommended follow up without the burden of significant travel and the cost to SVHM in providing transport. Mr M reported being very grateful for the opportunity to utilise the Telehealth service and would like to attend his next review via Telehealth.

Utilising local health care providers to assist rural patients with Telehealth reviews could improve access to care for patients that do not have the necessary technology and would be adversely affected by lengthy travel to Melbourne.

9. Conclusion

- Telehealth has shown to be an efficient and effective model of care for post arthroplasty review patients. This model could easily be applied to similar outpatient clinics to achieve even greater benefits for SVHM and its patients.
- Further work is required to scope the feasibility of implementing Telehealth in other areas such as community health, aged care facilities, chronic disease monitoring, emergency care and supporting rural centres.
- Telehealth should be available for all non-complicated reviews for patients that fit the eligibility criteria, thereby, reducing costs associated with radiology, ESAS administration and consultation time, as well as creating availability for the orthopaedic surgeons to see more complex reviews and new patients.
- Telehealth will continue to be promoted as a comparable service to traditional face-to-face clinics for undertaking post-operative reviews in order to increase awareness and acceptability of this service to patients and staff.
- Incorporate Telehealth as part of business as usual within ESAS. This will require further collaboration with ICT and ESAS administration in order to consolidate the long term administrative processes around Telehealth clinic bookings and patient selection.
- Attention must be given to change management in order to create a sustainable model. This includes organisational acceptance of changes to work processes and traditional roles. There needs to be a concerted effort across the organisation to normalise Telehealth to encourage widespread uptake by clinicians and patients. This requires management and political support.
- It is highly recommended that an organisation aiming to embed a sustainable Telehealth model invest in a Telehealth Coordinator to be the local champion to drive change management and work with individual clinics to develop a style of Telehealth that will address their clinical needs.

10. Glossary

AMP – Advanced musculoskeletal physiotherapist

DHHS – Department of Health and Human Services

DNA – Did not attend

ESAS – Elective surgery access service

ICT – Information and communication technology

OA – Osteoarthritis

OOS – Occasion of service

PAR – Post arthroplasty review

RCH – Royal Children's Hospital

RPR – Remote patient review

SVHM – St Vincent's Hospital Melbourne

THJR – Total hip joint replacement

TJR – Total joint replacement

TKJR – Total knee joint replacement

VIRIAF – Victorian Innovation and Reform Impact Assessment Framework

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12. Appendices

Appendix 1: Time frame for project (Gantt chart)

Appendix 2: Victorian Innovation and Reform Impact Assessment Framework (VIRIAF)

Appendix 3: Patient questionnaire – post Telehealth consultation

Appendix 4: Patient demographic map – location of patients seen via Telehealth

Appendix 5: Telehealth Fact Sheet

Appendix 6: Telehealth tips for patients

Appendix 7: Radiology services with online access in Victoria

Appendix 8: Telehealth Model of Care

Appendix 9: Telehealth operational process for clinicians

Appendix 10: AMP PAR clinical reasoning flow chart

Appendix 1: Time frame for project (Gantt chart)

Phase	Task	2014			2015												2016					
		O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Scoping	Literature review Benchmarking ESAS patient survey Stakeholder engagement Quality assurance/ethics	▓	▓	▓	▓	▓																
Pilot	Clinic process development and refinement Investigation of technology Radiology access Patient triage and recruitment Trial completed Refinement of processes based on feedback						░	░	░	░	░	░										
Establishment	Integrated alongside existing AMP PAR clinic – weekly clinics Patient triage and recruitment Data collection Training – AMP in PAR Article written for Australian Physiotherapy Association magazine; ePoster presented at APA conference; Webinar on Telehealth in PAR clinic delivered to physiotherapists from 9 Victorian health care services Development of Telehealth guidebook Attendance at Australian Telehealth Conference										▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓

Appendix 2: Victorian Innovation and Reform Impact Assessment Framework (VIRIAF)

Efficiency

Inputs
- Salaries (including on-costs)
- Training costs
- Capital costs
- Supervision costs
- In Kind costs (e.g. volunteer resources)
- Administration costs
- Service provision

Outputs
- Change in workforce numbers
- Other workforce costs (e.g. change to overtime, casual and agency costs)
- Work Structure
- Indirect impacts to other parties

Data Collection

Effectiveness

Safety and quality of care

Access to care

Client satisfaction

Objectives

Workforce capacity

Workforce satisfaction

Integrated workforce

Clinician competencies and optimal use of skills

Sustainability

Enablers
- Engagement of stakeholders
- Clear and open communication
- Alignment with national and Victorian health reform initiatives
- Ongoing supervision requirements
- Incorporating the workforce project into standard practise
- Increase levels of awareness from key stakeholders

Barriers
- Workforce recruitment and retention
- Workforce mix
- Funding requirements

Data Collection

Assess Appropriateness (on a case by case basis)

- Analyse indicators to determine relative gains and significant elements in efficiency, effectiveness and sustainability
- This may involve balancing big improvements in one dimension against small or no change in others
- Positive consideration should be given to cases where initial implementation costs can be overcome quickly, where there is strong patient and staff
  feedback and where sustainability is high
- Determine level of appropriateness

Assess Feasibility (on a case by case basis)

Replicability	Scalability	Risk
The impacts if the project is replicated somewhere else	The impacts if the project is implemented many times	The extent of known risks and how these are managed

- Analyse enablers and barriers to determine the feasibility of running the project in other settings and on a larger scale
- Analyse the level of risk associated with wider implementation of the project
- Consider if challenges highlighted under 'appropriateness' can be overcome if the pilot was extended
- Determine level and bounds of feasibility

Appendix 3: Patient questionnaire – post Telehealth consultation

- I received the same standard of care from my video consultation as I would have from a face-to-face consultation.

  – Strongly Agree
  – Agree
  – Unsure
  – Disagree
  – Strongly disagree

- The video consultation was convenient for me (eg. saved me travel costs, saved me taking a day off work, was easier to manage because I have limited mobility).

  – Strongly Agree
  – Agree
  – Unsure
  – Disagree
  – Strongly disagree

- I felt well prepared for the video consultation.

  – Strongly Agree
  – Agree
  – Unsure
  – Disagree
  – Strongly disagree

- I found the process easy to follow.

  – Strongly Agree
  – Agree
  – Unsure
  – Disagree
  – Strongly disagree

- Was using telehealth quicker for you than attending a face to face review at St Vincent's Hospital Melbourne? If so, how much time do you think you saved?

  Comments:

- Was it cheaper for you to use telehealth than attending a face to face review? Consider usual costs associated with attending review at St Vincent's Hospital such as, parking, transport, petrol, food, time off work. If so, approximately how much money do you think you saved?

Comments:

- Would you be likely to have a telehealth review again?

  – Strongly Agree
  – Agree
  – Unsure
  – Disagree
  – Strongly disagree

- Any other comments?

Comments:

Appendix 4: Patient demographic map – location of patients seen via Telehealth
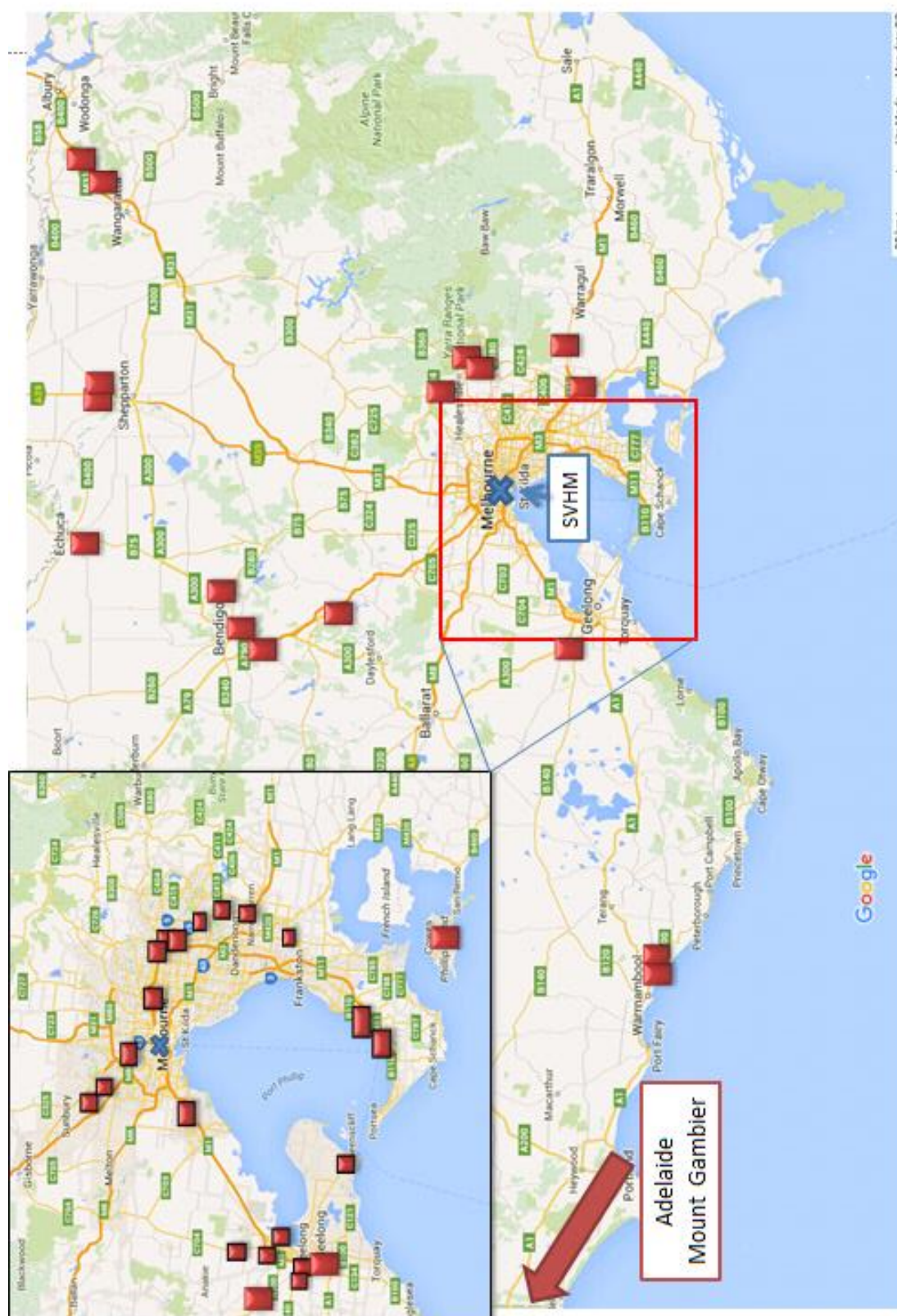
Appendix 5: Telehealth Fact Sheet

Ask about Telehealth!

- **Do you have difficulty attending appointments in person?**
- **Do you live in regional or rural Victoria?**
- **Are you working?**

YOU MAY PREFER TO HAVE YOUR NEXT REVIEW VIA A VIDEO CONSULTATION.

St Vincent's Hospital Melbourne (SVHM) is offering a telehealth service that allows you to undertake your review after total joint replacement surgery via a video link.

The consultation is conducted with you at home, or at your local GP clinic and with the specially trained physiotherapist in the joint review clinic at SVHM.

What equipment is needed?

Either you or your GP will need:

- A computer with a web camera (built in or plug in)
- A microphone (built in or plug in)
- A reliable internet connection
- An email address
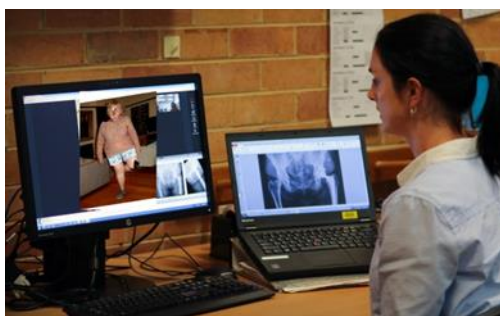
How?

- You will be provided with instructions on how to join the appointment. Using a computer, laptop or tablet, click on the link in the email sent to you to connect online to the SVHM physiotherapist for your appointment. You will be able to see and hear each other through a live video link.

- The video consultation will allow for your mobility and movement to be assessed just as it would if you came in to St Vincent's for your appointment.

- Your x-rays can be arranged through a local provider.

Advantages of Telehealth:

- Reduced travel time and cost (transport and parking)
- Less time off work (for you or your carer)
- No more waiting rooms
- Less disruptive to your life

Disadvantages of Telehealth:

- The clinician can not physically examine you
- The video may fail but this is rare. The consultation can usually be completed by phone if this occurs.

What if I prefer face-to-face consultation?

You can always choose to have a face-to-face consultation at St Vincent's Hospital Melbourne if you prefer. Telehealth is an option you may use on some occasions and you may still come to St Vincent's when needed.

Is there a cost?

- There is no cost from SVHM to you.

What now?

- If you are interested in Telehealth video consultation, let the surgeon or physiotherapist know or you can contact the clinic.
- If it is appropriate we will book your next appointment with Telehealth.
- We will need your email address to send the appointment link and simple set-up instructions.
- Complete a test run before your appointment.
- You're ready to have your Telehealth review

Find out more

Talk to your SVHM doctor, physiotherapist or the ESAS clinic administration

CONTACT:

Elective Surgery Access Service (ESAS)
Ph: (03) 9288 2905

Appendix 6: Telehealth tips for patients

Tips for setting up for Telehealth appointment:
- Please wear shorts for the appointment so that your leg can be viewed more easily.

- Please sit back far enough from your computer/laptop so that your full body length can be viewed on screen
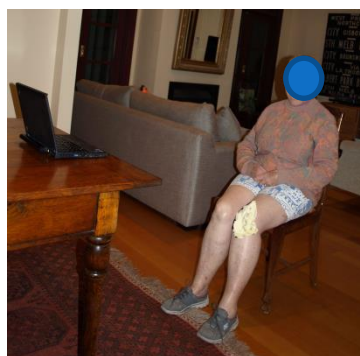
Activities to be performed during telehealth appointment:
You will be asked to complete the following movements during the appointment in order to adequately assess how well you are functioning.

Sit to stand

Squat

Single leg balance

Walking

Heel raise

Hip bending (in standing)

Leg sideways (in standing)

Leg backwards (in standing)

Appendix 8: Telehealth Model of Care

EARLY IDENTIFICATION:
Pre-admission/Inpatient
Details recorded
Provided with brochure, link to website

6 week review
Completed by orthopaedic surgeon
-decision made for timing of next review. Record
on database if for AMP PAR or Telehealth

Ortho Surgeon
-complex patients,
requiring assessment for
further intervention

AMP PAR clinic
-complex patients with
musculoskeletal
deficiencies requiring
assessment
≥3 month reviews

Telehealth (video link)
-uncomplicated, doing well
-have access to technology
Telehealth (telephone)
-uncomplicated, doing well
-no access to technology
-≥6 month reviews

Imaging reviewed by orthopaedic
surgeon

Under current model:

Patient attends SVHM on
approximately **seven** occasions

Under Telehealth model:

Patient may only need to attend
SVHM on **two** occasions

Potential to greatly reduce the need
for patients to attend SVHM by up to
five visits

Appendix 9: Telehealth operational process for clinicians

Telehealth PAR clinic processes

REFERRALS:

- Telehealth referrals may come from ESAS administration or Orthopaedic surgeons (via email to AMP PAR clinician) if they have identified someone that may have difficulty attending a face-to-face review or if it has been recorded on the database that the patient is interested in Telehealth.
- Each referral needs to be triaged to ensure appropriate for Telehealth.

TRIAGE:

Eligibility
- Previously uncomplicated reviews; English speaking; ≤6 months post op; not requiring musculoskeletal assessment; access to necessary technology
- Can be evaluated case by case; telephone may be used in absence of video where appopriate

Contact patient
- Call patient to discuss Telehealth and gain consent - obtain patient's email
- Discuss technology requirements. If patient to use GP for telehealth technology liaise with GP clinic for appointment time and send link to GP clinic email.

Notify ESAS
- Notify ESAS adminstration if patient accepted for Telehealth - to be recorded on ESAS database.
- If not for Telehealth, ESAS administration to book usual appointment

BOOKING PROCESS:

Link to meeting
- *Dependent upon platform used*
- Skype: ensure patient has skype account - add as user
- Blue Jeans: create appointment in application, add patient email and link will be sent

Patient information
- Email Telehealth information to patient (specific to THA or TKA)
  Patient Letters\TH patient tips THA.pdf
  Patient Letters\TH patient tips TKA.pdf

X-ray referral and WOMAC
- Fill out bulk bill radiology request (pads can be found in ESAS) - complete with Prof Choong provider number #033265HX & Ortho reg to sign (designate closest provider to patinet with known online access)
- Send WOMAC with return envelope (note different WOMAC for surgery pre-2012 and post-2012; returned WOMAC sent to Ruth Guy - Orthopaedic Research)
- Patient to notify once x-ray taken (via email or phone call)

APPOINTMENT PROCESS:

Join meeting
- Log into meeting at desginated time (as per instructions)
- Ensure video and microphone working (use test function)

Conduct review
- Complete review as per usual process
- View patient mobility, range of movement and function
- Show x-ray images to patient via screen share function

After appointment
- Complete follow up review slip for ESAS administration
- Complete notes on MRO and stats as per usual process
- Add images to PAR X-ray meeting presentation
- Email patient link to Survey Monkey

Appendix 10: AMP PAR clinical reasoning flow chart

Pt symptomatic?
- NO
- YES

XR satisfactory?
- YES
- NO

Urgent XR changes?

YES (XR satisfactory):
- X-ray on powerpoint for senior orthopedic consultant (bottom half)
- Schedule regular review on green slip for reception ie 3,6,12 month,3,5,10 years
- Offer Telehealth as option for next appointment: get email at time of consultation. Flag this on green slip.

NO (Urgent XR changes)
(i.e. new radiolucent lines<2mm; stable radiolucent lines/areas; new radiolucent areas around acetabular component without change in prosthesis position; heterotopic ossification)
- Xray on powerpoint for senior orthopedic consultant (top half)
- Initially schedule regular reviews. Depending on risk factors for patient (obesity, diabetes, alignment issues, history of joint/wound infection) may consider earlier review point.
- Offer telehealth asoption for next appointment

YES (Urgent XR changes)
(i.e. concerning xray changes- radiolucent lines >2mm especially if progressing; progressive radiolucent area around acetabular component; change in position or alignment; liner wear)
- Schedule next review in 12 months
- Xray on powerpoint for senior orthopedic consultant (top half)

ESCALATION ADVICE
- Email surgeon pictures if surgeon still works at hospital (as a courtesy. Explain management plan)
- Letter to GP after review with senior orthopedic consultant / management plan approved (as a courtesy and in case becomes symptomatic can refer back sooner)
- Consider ordering long leg views for next appointment if TKR
- If less than 12 months post op should order blood test (FBE/ESR/CRP) via GP to rule out infection. Not necessary if >12 months postop unless surgeon requests

Hot, swollen knee with decreased ROM, difficulty weightbearing OR Painful hip, limp/difficulty weightbearing, irritable on IR/ER
- YES
- NO

ESCALATION ADVICE
Send to ED with history/details/imaging

- Note any hyperalgesia, skin and temperature changes etc
- Scar massage if confined to scar
- Laterality resources
- Document pain (VAS), analgesic requirements, current management plan
- Letter to GP re findings asking for management
- Ax for catastrophising- Pain catastrophising scale. Score >30 consider referral for counselling/psychology/pain management clinic depending on severity and coping strategies
- Chronic pain clinic referral internal or via GP
- Usually routine reviews scheduled unless specific reason you are following up. Try to transfer management of pain etc to GP
- Xray on powerpoint lower half- make senior orthopedic consultant aware of case and plan

- Can increase wear and tear on liner, alter alignment, increased risk infection apart from other health issues
- Document weight from PRO/MRO
- Discuss current activity levels/advise on safe exercise and recommended daily levels of activity (30mins moderate intensity ex 5 days/week)
- Dietician referral internal or external via GP/EPC
- EP or PT referral for exercise prescription

Xray changes?
- MINOR
- MAJOR

MINOR — ESCALATION ADVICE
- Email surgeon and ask if they would like to review the patient or are they happy for r/v in PAR clinic in 12 months
- Email WLO to schedule r/v once agreed plan
- Organise blood test via GP (FBE/ESR & CRP) to rule out low grade infection
- Xray on powerpoint for senior orthopedic consultant (at top)
- Letter to GP with management plan
- All correspondence documented in MRO
- Document pain levels (VAS), analgesia types & dosages
- Gait aid prescription as appropriate

MAJOR — ESCALATION ADVICE
- Do consult form and ask receptionist to book next available appt with surgeon (depending on urgency/symptoms/# risk). If surgeon no longer works at St Vs, senior orthopedic consultant will triage requests to someone else.
- Xray on powerpoint for senior orthopedic consultant (at top – explaining that pt has been referred back to surgeon)
- Document pain levels (VAS), analgesia types & dosages
- Gait aid prescription as appropriate

Painful GT / Trendelenberg Limp / Gluteal tendinopathy
- YES
- NO

Loss of knee ROM, non-significant pain
- YES
- NO

PFJ signs & symptoms
- YES
- NO

Ankle/foot alignment issues or pain
- YES
- NO

Obesity
- YES
- NO

Chronic pain / CRPS
- YES
- NO

Back pain referring to buttock/hip/knee etc
- NO
- YES

- Assess and carefully document any salient findings including pain levels/analgesia as above
- Refer to physiotherapy as above
- Letter to GP
- Routine review except where unclear whether joint vs lumbar spine causing pain and want trial physio to determine and change
- Xray on powerpoint lower half

EXAMPLES OF ASSESSMENT
- Check leg length and alignment both clinically and on xray
- Palpate GT and get NRS for pain/10
- Record current analgesic requirements
- Refer to physio for targeted management (internal or external via EPC)
- Consider taping/offloading prinicpals (eg posture/pelvic tilt alignment/even weightbearing both LLs, avoid crossing legs/ gait aids prescription as appropriate)
- Consider NSAIDS and simple analgesia
- If conservative management fails order ultrasound/CSI via GP (in consultation with senior orthopedic consultant and considering risk factors for infection)
- Management plan and imaging to be emailed to surgeon and also discussed with senior orthopedic consultant . Letter to GP
- Check op notes re surgical approach (common in lateral/Hardidge approach)and integrity of abductors if mentioned
- Document all in MRO
- Schedule review in 6-12 months depending on severity

ESCALATION ADVICE
- Referral to surgeon if conservative management fails especially if mal-alignment issue. Use red consult form.

- Review physiotherapy and HEP

ESCALATION ADVICE:
- Refer for consideration MUA if appropriate- organize consult on red form or email surgeon if long wait list

- Review of physio program and home ex program
- Routine knee examination including functional measures
- Consider taping/targeted ex program/physiotherapy referral
- Order long leg alignment views and review with senior orthopedic consultant (put up towards top powerpoint)
- Review 6 months/AYSF depending on severity

ESCALATION ADVICE:
- Organize consultation with surgeon if conservative management fails, particularly if tracking issues. Use red consult form

- These can cause limping, stress on knee/hip/kinetic chain, alignment issues and early imbalance/liner wear and loosening TKR in particular
- Referral to podiatry via GP/EPC program for assessment/management including appropriate orthotics/bracing
- Order long leg alignment views

ESCALATION ADVICE
- If failed conservative management can be referred to foot surgeon via red consultation form
- Gait aid prescription as appropriate

Telehealth in Advanced Musculoskeletal Physiotherapy Post Arthroplasty Review Clinic (AMP PAR)