

# Barriers to Telehealth Uptake in Rural, Regional, Remote Australia: What Can Be Done to Expand Telehealth Access in Remote Areas?

Miss Marianne ST CLAIR<sup>a</sup>, Mr David MURTAGH<sup>a</sup>,  
*Simbani Research, Darwin, Northern Territory, Australia*

**Abstract.** Telehealth using high quality satellite internet has been shown to improve health service delivery in three very remote Aboriginal communities, however, further expansion of telehealth in this and other areas of the Northern Territory (NT) is limited by the lack of adequate internet. Despite the growing evidence of the benefits of telehealth there remains limited uptake in the NT in the primary health care sector.

A national survey through Broadband for the Bush Alliance (B4BA) and its member organisations into consumers' experiences of telecommunications and telehealth services was done. The survey was supported by detailed case studies based on semi-structured interviews. It was found there were a number of barriers to telehealth uptake at the national level: Lack of adequate internet; consumers not being aware of, or knowing how, to access telehealth; lack of access to clinicians providing telehealth services; lack of Medicare item numbers for telehealth and the lack of resourcing at the patient end. The research indicated there needs to be investment into telecommunications infrastructure, public education about telehealth, an increase in Medicare telehealth item numbers and resourcing for primary health care services to support telehealth expansion particularly in rural, regional and remote areas.

**Keywords.** Telehealth, Remote Primary Health, Telemedicine, Remote telecommunications, Internet connectivity

## Introduction

Internet connectivity is a critical part of health service delivery in the Northern Territory (NT). Over the past twelve years shared health records have been embraced by the community controlled and public health sectors. However, uptake of telehealth has been limited in the NT and use of digital technologies for telehealth is restricted by inadequate internet services (1, 2; 3).

Implementation of telehealth in three very remote clinics in East Arnhem Land has been successful using a collaborative and cross-culturally sensitive approach (4; 5). Telehealth using dedicated, high quality satellite technology has been demonstrated to be a new and innovative strategy to improve remote Aboriginal health (6).

Telehealth is providing opportunities for:

- Family, patient and clinician meetings to facilitate joint and more informed decision making (5), resulting in a more positive patient outcome and crucial

clinical procedures being done more expediently therefore improving the probability of survival (6). Patients are able to see familiar faces – even if it is via a video-conference.

- More accurate assessments for evacuations and acute care retrievals, providing staff training and support, providing the ability to access a wider range of services, facilitating more culturally sensitive induction of new staff and patient safety (6).
- Higher quality training and direct observation of trainee GPs.
- Showing patients and families pictures and videos from the internet, the supervising GP can demonstrate clearly what the problem is, the treatment required and opportunistically provide education for both patient and remote end clinicians (5).
- Generating savings in patient travel.

Telehealth has changed the way services are delivered in the Laynhapuy Homelands for the benefit of Aboriginal people (6). Telehealth has been shown to save approximately \$1.2 million with just over 1,000 consults in the NT (7). The same report suggested 75,000 potential telehealth consults could have been done in the 2014/15 financial year.

## **1. Significance**

In an era of increased access to internet-based resources and services and, given over 40,000 Aboriginal people live in very remote NT and 17,000 in remote NT (8) there is an expectation that service delivery to remote areas should improve. Despite the evidence indicating the benefits of telehealth implementation in remote areas, there is still limited uptake in the NT. Anecdotal evidence indicates telecommunications services in regional and remote areas are poorer and more expensive than in urban (Better Internet for Rural, Regional and Remote Australia, Regional, Rural and Remote Communications Coalition). Many investigations are based in urban areas and there is a distinct lack of peer reviewed investigations into telecommunications services in rural, regional and remote areas. This project aimed to provide base-line data and analysis covering a range of telecommunications issues, report on consumers' experiences of internet and telecommunication services (including telehealth) and evaluate the results with respect to impacts on telehealth implementation.

## **2. Methods**

The research comprised of a national survey distributed through the B4BA Network and a series of in-depth case studies using semi-structured interviews. Details of survey and case study questions/responses are available at [www.simbani.com.au](http://www.simbani.com.au). Ethics approval was obtained through Charles Darwin University for the survey (H16028) and case studies (18022).

The survey was designed to evaluate a range of issues anonymously. Survey respondents were asked to self-identify their locality in various ways to avoid the use of physical residential addresses and postcodes. Some of the remote Australian postcodes cover areas larger than some countries and therefore do not give a clear sense of

remoteness and can cross over between multiple remoteness categories (9). Urban/capital city and Capital city fringe were pooled and categorised as Urban. The categories of rural, regional and remote were pooled and classified as RRR. The survey included a section where respondents could self-identify as a volunteer for case studies.

Volunteers for the case study component of the research were obtained through the survey and other B4BA activities. Semi-structured interviews (10; 11) were done face-to-face or by phone. Notes were taken during the interview and returned to the interviewee/s for approval. Once approved, the interviews were formatted into a structured form with comments from the interviewer highlighted. Twelve interviews were done with individuals or couples – eleven were RRR. Participants also came from a number of different states and remote classifications including some from very remote areas. A summary of each case study was then produced with key points and quotations presented in a one-page format. The project team used an additional data analysis tool: Microsoft Power BI. All questions were optional and there were a number of blank responses to questions. This may be due to the question not being relevant or possibly “survey fatigue” (12). The survey was designed to build on multiple question analysis and presentation. A total of 283 surveys were completed. Data were cleaned (eg minor spelling errors corrected) and imported into Microsoft Power BI for analysis.

### **3. Results**

#### *3.1. Demography of Respondents*

The survey was designed to measure all areas of Australia without preferencing RRR. Survey respondents were distributed across Australia in a similar distribution as the ABS reports (8) except there were more responses from the NT. This may be due to a number of factors including B4BA evolving in the NT and their 2018 conference being held in Darwin. The majority of survey and case study participants were RRR. For the survey 83% were RRR and less than 17% Urban. Of the respondents that identified themselves as Urban, 10 were from the NT and would be classified as Outer Regional by the ABS so the RRR is an underestimate. One case study participant was Urban and the remainder RRR. It is concluded that the distribution between RRR and Urban for both the survey and case studies were similar.

#### *3.2. Funding Telehealth*

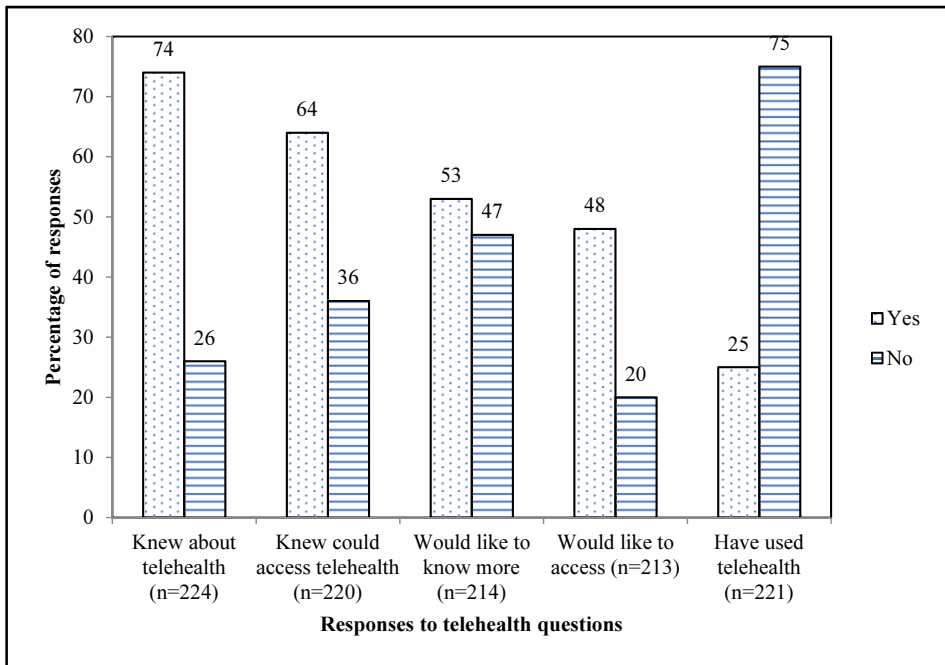
It was suggested by a number of case study participants that telehealth should be publicly funded and most (98%) survey respondents indicated that telehealth should be Medicare billable.

#### *3.3. Knowledge and Use of Telehealth*

The majority (74%) of survey respondents knew about telehealth but only 64% knew they could access telehealth. Case studies indicated similar awareness of telehealth with a number of participants not being aware of telehealth until this project. Approximately 25% of survey and case study participants reported using telehealth. Half of the case

study participants and approximately half of survey respondents reported they would like to access telehealth. The responses to telehealth survey questions are summarised in Figure 1.

From the case studies, only 3 participants had accessed telehealth (all RRR) and all had good experiences. Two of these participants had accessed specialist services in major cities. One participant approached two specialists interstate to access telehealth, but both refused. One case study was a couple running a medical practice in a regional town that serviced remote areas and telehealth was a day-to-day model of service delivery for that practice.



**Figure 1.** Summary of responses to Telehealth Survey Questions.

Some case study participants provided insightful examples how telehealth could improve health service delivery, patient safety and reduce travel:

- “Son had a knee reconstruction – I had to take a week off – drive 9 hours to town and back. So 3 days round trip each time we had to go into town for a follow up appointment with doctor or with allied health.”
- “We could use telehealth to save travelling to GPs and specialists. For me to go to the city...have to drive, then fly, stay overnight. ...I lose a week. Have up to 10 staff – they often need scripts. That means I have someone go all the way into town for a 5 minute appointment!”

The statement below captures some of the sentiment expressed by the cohort of case study participants that did not know about telehealth.

- “No, not before I read the information sheet about this research from you. Then I Googled it and America uses a lot of telehealth. I feel that we should be able to access our own doctors using telehealth. It would save going to town (very significant drive especially if you are unwell). When you feel sick – you need to get yourself up and drive into town. I also see specialists in town. It’s a safety

*issue driving when you are not well. We're still in drought and didn't know that we might be able to see a GP by telehealth and have it billed to Medicare. I posted the information about the web-based fee for service GP on our community Facebook page and people were thrilled to know that this option existed. More needs to be done about telehealth."*

### 3.4. Benefits of Telehealth

A number of benefits were reported by survey and case study participants: Telehealth can generate savings from reducing travel, reducing time away from home/work as well as other associated expenses. In some cases, although savings were made in terms of travel and time, the cost of the consult was not billable to Medicare and therefore was an additional expense. Telehealth may also improve diagnostic capabilities.

### 3.5. Barriers to Accessing Telehealth

Many of the survey and case study participants were unaware they could access telehealth services. There were also a number of barriers identified: Inadequate internet service and data allowances, consultations not being billable to Medicare, some clinicians (including specialists) not providing services via telehealth, regulatory requirements (with respect to training requirements to deliver telehealth) and the lack of funding for patient-end support. The most frequently mentioned barrier was the lack of adequate internet. Medical practitioners reported a number of failed telehealth sessions due to inadequate and unreliable internet. A lack of Medicare item numbers for telehealth (including GP) consultations is a major barrier to telehealth.

### 3.6. Quality of Telecommunications Services

In RRR areas there was a tendency for respondents to consider services to be unreliable and poorer with respect to speed. Long latency intervals also impeded video conferencing abilities. Case studies indicated services varied with a number of participants reporting mobile, ADSL and satellite services being variable. Some case study participants reported SkyMuster was reliable and others did not. All case study participants reported issues with reliability of services such as poor coverage, drop outs, slow download and upload speeds, contention, poor reception and seasonal contention due to large influxes of population into the area in holiday periods. Case study participants clearly indicated radio (13) phones were unreliable and often of poor quality (ie unclear). It was essential to have two different telecommunications technologies available. If one technology failed, there was an alternative for general communications, reporting the fault and for emergencies: *"Having internet as back-up is good."* There are concerns raised if participants lost the second technology *"If we moved to satellite phone – have some concerns. Now we have 2 different technologies, so that's good"*.

With the concern expressed regarding possible negative health impacts of mobile phone services, it was suggested that resources should be invested into developing more efficient, effective and newer technologies (eg light technologies) to continue to improve internet and telecommunications services for all areas, particularly RRR. Reliability, speed and bandwidth (including upload ability) are key factors in improving telecommunications. Governance/management and affordability are also areas that need to be improved to ensure better telecommunications services.

### 3.7. The Need for Patient-end Support to Be Resourced

A couple that ran a medical practice in a small regional town reported that they delivered telehealth services successfully including to very remote areas. The need for patient-end support was critical for the delivery of telehealth services: *“Telehealth is disruptive to the clinic. More funding for local services for support staffing is needed - this is really important. It’s the difference between failing and successful telehealth. If you want it to work it has to be coordinated. Hospitals have a huge mandate to provide telehealth, but doesn’t matter how well resourced the hospital end is, for it to work you need to resource the patient-end. A lot of places haven’t understood that resourcing need.”*

## 4. Suggestions from Case Study Participants

There were a number of suggestions from case study participants for additional uses of telehealth.

### 4.1. Emergency 000 Calls – Improving Triage and Reducing Ambulance Call Outs

*“Being on a video conference rather than phone - 000 would be much better – the person could see what was going on using Telehealth! ...If we used telehealth there would be a lot less waste of ambulance services. Services talking to each other would be good! Would be a lot less Ambulance calls out as the videoconferencing would provide better information.”*

### 4.2. Telehealth App on Phone for Homeless People with Medical Conditions

One rural regional participant suggested that there should be mobile phone applications to support homeless people with their medical conditions and linking to a video conferencing support facility: *“What about people that live on the street? – all they’ve got is their phone...if they had a medical condition there should be an app on their phone to videoconference to whomever they need to.”*

### 4.3. Priority Access to Telecommunications Services and Increased Data Allowances for Consumers

*“We have an autistic grandchild in the family and he is brilliant in IT/communications. Being on-line is his life! If he can’t use the tools available to him on-line he is cut off from the world. He can’t do the things he needs to do to develop. He can’t cope with classroom situations but does very, very well on-line.”*

The lack of adequate and reliable internet connectivity is a major barrier to the expansion of telehealth. Case study participants provided a number of suggestions for improving access to telehealth:

- *“Telling people about it would be useful!”*
- *“Having a pool of specialists/GPs, hearing, eyesight, early childhood specialists. Getting on email/website and organise a video conference would be very useful. That would be incredible for remote cattle stations or any remote people.”*

- *“Would be good but I don’t know about it. I’m under a specialist as well as GP. The specialist is wonderful. Will ask them about the option to do consult via internet (would save a trip to town).”*
- *“Telehealth should be free for communities and rural people.”*
- *“Access to telehealth could be improved by having willing, distant doctors who are motivated to form relationships with communities and be available.”*
- *“Support for the patient-end, coordination, facilitation and a clinician at the patient-end...Its important that there is support for communities to take up telehealth at the patient-end.”*

Detailed results of the survey and case study portfolios are available (2; 3).

## 5. Discussion and Conclusions

With the publicity surrounding the implementation of My Health Record it is not surprising the public are becoming more aware of electronic health systems. However, many members of the public have limited understanding of telehealth access. It would be useful to gain an understanding of the public’s knowledge of telehealth and their ability to access it, especially in RRR areas.

The current funding model does not provide patient-end support. This lack of patient-end support may be one of the major reasons for telehealth not being used by community clinics. Resourcing patient-end support in remote clinics could increase equity of access to services and telehealth.

A number of additional uses for telehealth have been identified:

- Video-conferencing by Emergency Services to improve triage and management.
- Telehealth phone applications for homeless people for management of their health issues with unmetered access to a relevant video conferencing support system.
- Priority and unmetered access to telecommunications services for consumers with special needs and accessing health services.

Increasing access to telehealth services can be assisted by:

- Improved internet connectivity to meet the requirements of video conferencing.
- Educate the public about availability.
- Increase data allowances and not metering telehealth services.
- Increase availability of telehealth services.
- Assist clinicians to deliver telehealth without onerous training or regulatory requirements.
- Increase Medicare item numbers.
- Resource patient-end support.

Telehealth has successfully been implemented in very remote homeland communities in East Arnhem Land (4, 5, 6) using high quality (but very expensive) satellite. SkyMuster services vary in their quality and telecommunications services in RRR areas are often not adequate for telehealth. Future work with NBN Co to develop more affordable and reliable connectivity is a high priority.

Of the 95,222 Aboriginal people living in very remote Australia 40,149 live in the NT (8). Many remote Aboriginal people only have pre-paid mobiles and can spend a significant amount of their limited income on data (14). When their credit runs out they are not able to access essential services such as health or emergency services. In Central

Australia Indigenous households are 76% less likely to have access to internet than non-Indigenous metropolitan households and, although this market might be relatively small, it is important in terms of provision of basic services (15). Access to basic and affordable internet is urgently needed for RRR Australians. Having access to two telecommunications technologies is of critical importance: *“We have nothing to the outside world if both go down together. Sometimes both go down.”* Case study participant referring to radio phone and SkyMuster). Improved internet services are urgently required to improve access to telehealth for RRR people.

## Acknowledgements

The authors would like to acknowledge the support of the Australian Communications Consumer Action Network for funding this research. The authors would like to thank Professor Ruth Wallace (Dean, College of Indigenous Futures, Arts and Society, Charles Darwin University (CIFAS, CDU)), Dr Payi Linda Ford (Principal Research Fellow, CIFAS, CDU), Tanya Karliychuk (Grants Officer, ACCAN), Apolline Kohen (Chair, Broadband for the Bush (B4BA)) and Dr Robert N. Starling (Deputy Chair, B4BA) for providing valuable insight, suggestions and input throughout the project. The authors would also like to acknowledge the extensive support and commitment to the research by the B4BA network members, survey and case study participants.

## References

- [1] Murtagh, D. P., St Clair, M. and Marchant, N., Expansion of Telehealth in remote Northern Australia and the potential for international collaborations, Proceedings of the 14<sup>th</sup> Rural Health Conference, 26-29 April, Cairns, 2017.
- [2] Murtagh, D.P. & St Clair, M, Analysis of B4BA Survey assessing the availability, quality, reliability and affordability of internet and telecommunications services in Australia: an evidence-based approach, Downloaded from [www.simbani.com.au](http://www.simbani.com.au) 15-03-2019, 2018.
- [3] St Clair, M. and Murtagh, D. P., Case Study Portfolio: B4BA analysis into assessing the availability, quality, reliability and affordability of internet and telecommunications services in Australia – An evidence-based approach, Downloaded from [www.simbani.com.au](http://www.simbani.com.au) 15-03-2019, 2018
- [4] St Clair, M., Murtagh, D. P., Kelly, J. Ford, P. L. and Wallace, R., Telehealth: A game changer – Closing the Gap in remote Indigenous health in three remote homeland communities in the Laynhapuy Homelands, East Arnhem, Northern Australia (NA), Conference Proceedings, Health Informatics Conference, July 29-Sydney, 2018
- [5] St Clair, M., Murtagh, D. P., Kelly, J., Cook, J., Ford, P. L., Wallace, R. & Guthadjaka, G. K, A collaborative approach in remote Aboriginal communities – why has telehealth worked in the Laynhapuy Homelands?, Proceedings of the 15<sup>th</sup> Rural Health Conference, 24-27 April, Hobart, 2019
- [6] St Clair, M., Murtagh, D. P., Kelly, J. and Cook, J. Telehealth a game changer: Closing the gap in remote Aboriginal health in the Laynhapuy Homelands, East Arnhem Land. Medical Journal of Australia – The National Digital Health Agenda – My Health Record and Beyond, 2019.
- [7] Northern Territory Government Northern Territory Government - Public Submission RTIRC 2015, <https://communications.gov.au/sites/g/files/net301/f/Northern%20Territory%20Government%20-%20Public%20Submission%20RTIRC%202015.pdf>, 2015.
- [8] ABS (Australian Bureau of Statistics) (2018). Australian Demographic Statistics, 3101.0 March, 2018, <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0>, 2018.
- [9] Jones, S., Eagleson, S., Escobar, F. and Hunter, G., Lost in the mail: The inherent errors of mapping Australia Post postcodes to ABS derived postal areas. Australian Geographical Studies Vol 41, pp 171 – 179, <http://researchbank.rmit.edu.au/view/rmit:4259>, Downloaded September, 2018, 2003.
- [10] Flyvbjerg, B, Case Study in The Sage Handbook of Qualitative Research 4<sup>th</sup> Edition. Denzin, N.K. and Lincoln, Y. S. (eds). Sage, London, pp 301-316, 2011.



- [11] Bryson, J.M., Crosby, B.C. and Stone, M.M, Designing and Implementing Cross-Sector Collaborations: Needed and Challenging. *Public Administration Review* 75(5):647-663, 2015.
- [12] Egleson, B. L., Miller, S. M., and Meropol, N. J, The impact of misclassification due to survey response fatigue on estimation and identifiability of treatment effects. *Stat Med* Vol 30: 3560-3572, doi:10.1002/sim.4377, Downloaded 17<sup>th</sup> December, 2018, 2011.
- [13] Telecom Australia (Telstra), Isolation gone forever. <https://www.youtube.com/watch?v=ygtDHu8OZbw>, Downloaded 18<sup>th</sup> December, 2018, 1985.
- [14] B4BA – Media Release, <http://broadbandforthebush.com.au/wp-content/uploads/2018/06/B4BA-Forum-2018-Media-Release-V4-Final-1.pdf>, Downloaded 18<sup>th</sup> December, 2018, 2018.
- [15] Rennie, E, Internet on the outstation, <https://insidestory.org.au/internet-on-the-outstation/>, Downloaded 18<sup>th</sup> December, 2018, 2011.