Video-based telehealth in Australian primary health care: Current use and future potential

Abstract.

Many Australians have limited access to health-care services due to a range of barriers, including geographic distance and restricted mobility, which telehealth can potentially address. This paper reviews the current and potential use of video consultation in primary health care in Australia, drawing on international literature. There is substantial evidence of high patient satisfaction, but many studies have methodological limitations. Overall, evidence of effectiveness and cost-effectiveness is weak. There is reasonable evidence for diagnosis, home care and specialist consultations by GPs with patients present. Two telehealth initiatives using video consultation are briefly presented. Both provide evidence that video consultation has a valuable role to play, but does not obviate the need for face-to-face consultations. Video consultation challenges traditional professional roles, particularly those of nurses, and can improve health workers' skills and job satisfaction. More fundamentally, telehealth challenges the traditional distinction between primary and secondary care. This can be a source of resistance but may ultimately be one of its strengths. Appropriately targeted video consultation has much potential to improve the delivery of primary health care in Australia, particularly in rural and remote regions.

What is known about the topic?
- Telehealth is increasingly used in health care and has the potential to increase patient access to services. However, there is little good-quality published research about video-based telehealth in primary health care.

- Overall evidence is weak, but demonstrates that video consultation has the potential to provide significant benefits to primary health-care patients, staff, and services, particularly in rural and remote regions.

Introduction

Many Australians have limited access to health-care services due to a range of barriers, including geographic distance and restricted mobility. Telehealth is increasingly advocated as an important approach to reducing inequalities in accessing these services.

Video-based telehealth (videoconferencing or video consultation) is a useful technology, well-suited to the Australian geography and health-care system. This paper reviews its current and potential use in primary health care (PHC). It draws on Australian and international literature, including grey literature, because much of the peer-reviewed literature focuses on hospitals rather than PHC settings.

Telehealth

Telehealth is a strong trend in health-care systems internationally. A useful broad definition, from the Canadian Society of Telehealth, is:

> the use of information and communications technologies (ICTs), to deliver health services and transmit health information over both long and short distances. It is about transmitting voice, data, images, and information rather than moving patients or health practitioners and educators. (Deshpande et al. 2008, p. 1)

Technically, telehealth includes the use of telephones and email, which have been routinely used in health care for decades. However, the term is primarily used to encompass videoconferencing, remote monitoring of clinical signs (e.g. blood pressure), and 'store-and-forward' applications that capture clinical data (e.g. radiological images) and transmit them to specialists for later analysis (Cochrane Library 2010). In addition to direct clinical applications and research and health education, videoconferencing is also widely used for formal supervision, continuing health professional education, and administrative activities.

Clinical telehealth encounters involve a patient (and/or a carer) and at least one health-care provider, or two or more providers. Of particular relevance to PHC are video consultations involving a patient and a GP or other PHC worker, with or without a specialist.

Since 2011, the Australian Government Department of Health and Ageing (DoHA) has provided Medicare rebates for specialist video consultations in remote, regional, and (until 2013) outer metropolitan areas, and in residential aged-care facilities and Aboriginal health services. Eligible patient-end providers include GPs and other doctors, nurse practitioners, midwives, and practice nurses and Aboriginal health workers providing services on behalf of medical practitioners (MBS Online 2012).

Clinical applications

Telehealth is used across the continuum of health care, including diagnosis, acute and chronic care, rehabilitation, and palliative care.

Video consultation has been used for diagnostic purposes in diverse clinical arenas, including dermatology, psychiatry, neurology, orthopaedics and paediatrics. Overall, the evidence indicates reasonably good diagnostic agreement between video consultations and face-to-face (FTF) consultations. Two systematic reviews have indicated that video consultation is useful and accurate for diagnosis in psychiatry and neurology (Norman 2006; Deshpande et al. 2008).

Findings have generally been mildly positive for patients treated with the assistance of video consultations for a range of conditions, in a variety of specialties. One review of telehealth-assisted chronic disease management (Wootton 2012) identified three diabetes trials in which patients whose management included videoconferencing had significantly better blood glucose levels. The results for heart failure were less conclusive; several studies found fewer hospitalisations and higher quality of life, but the differences were not always significant. Wootton (2012) concluded that 'the evidence base for telemedicine in managing chronic diseases is on the whole weak and contradictory'. Overall, the available evidence indicates that outcomes of video consultations are not significantly different from outcomes of FTF consultations for most conditions and specialties.

Evidence of cost-effectiveness is limited, and the quality of studies is poor-to-average. Some of the best evidence is from a systematic review by Wade et al. (2010), which found that video consultation was cost-effective for home care and for specialist consultations by GPs with patients present.

Overall, patients have reported significantly higher levels of satisfaction with video consultation compared with FTF consultation (Ellis 2008). Reported benefits include reduced waiting times, less need for travel and time off work, and greater overall convenience. However, the methodology of many patient satisfaction studies has been weak (Williams et al. 2001), in keeping with patient satisfaction research more generally (Sitzia 1999).

Telehealth initiatives

Two initiatives, one from Australia and one from Britain, are presented here as case studies to illustrate some of the issues in video consultation in PHC. The former is significant in the development of telehealth in Australia, and has been evaluated; the latter has been more rigorously evaluated than most telehealth initiatives.

Rural and Remote Mental Health Service (South Australia)

The Rural and Remote Mental Health Service (RRMHS) was established in South Australia in 1996, and soon extended into the Northern Territory (Buist 2003). It uses videoconferencing as part of a consultation-liaison approach to primary mental health care, providing consultative support services to locally based health-care providers in a large, sparsely distributed population (422 000 people in 2005) (Fielke 2005). Preceded by the establishment of an innovative telepsychiatry service in South Australia in the early 1990s, it was one of the first Australian services to use video consultation as an integral component of service delivery (Fielke et al. 2009). Videoconferencing has been extensively used in the RRMHS for a wide range of clinical purposes, particularly consultations about new patients, reviews, and inpatient assessment (Fielke 2005).

An evaluation by Kalucy et al. (2000) found a high level of video consultation use. GP satisfaction with telepsychiatry compared with the FTF visits to the psychiatric service was somewhat lower (66% v. 72%), but community health workers (90% of whom used it) had much higher satisfaction with telepsychiatry (82% v. 34%).

Diagnosis was found to be as reliable via video consultation as FTF consultation (Baigent et al. 1997). However, there was less agreement in some areas, including mental-state findings regarding some types of observed behaviours, and affective quality (blunting of emotions), and psychiatrist concern about patients. Patient acceptance was comparatively high (71% reported finding video consultation more enjoyable than FTF interviews; 54% reported being happy to have video consultation or even preferring it).

The RRMHS was developed to validate the professional roles of GPs and community workers in the provision of mental health services, rather than merely providing specialist clinical services (Fielke 2005). One of its major objectives is to 'enhance general practitioners and other primary care workers' skills in the detection and management of mental illness' (p. 2). However, this does not seem to have been formally evaluated.

An Aboriginal Mental Health Team is embedded within the RRMHS (Fielke et al. 2009). It includes virtual outreach via videoconferencing. However, in 2009, efforts to increase video consultation to remote communities (where many Aboriginal people live) were still hampered by some technical challenges, including picture quality, which is crucial for cross-cultural assessment.

Virtual Outreach Project (UK)

A large UK randomised controlled trial, the Virtual Outreach Project, investigated the impact of video consultations ('virtual outreach') between patients and GPs in general practices and specialists in hospital outpatient departments (Wallace et al. 2004). In this more rigorous study, 2094 patients were randomly assigned to virtual outreach (1051) or standard FTF outpatient appointments (1043) with a broad range of specialists, who generally provided consultation appointments at the beginning or end of routine outpatient clinics. The project team recruited and trained 134 GPs from 29 practices in London and Shrewsbury.

Video consultation led to substantial reductions in numbers of tests and investigations, particularly for gastroenterology patients. However, it generated more outpatient visits, particularly for orthopaedic patients. During a 6-month follow up, there were no significant differences overall in the number of GP, outpatient, or accident and emergency contacts, or in day surgeries, inpatient stays or procedures, or prescriptions.

Video consultation resulted in significantly higher patient satisfaction. In a purposive sample of 28 recipients, semi-structured interviews revealed that overall, video consultations were highly acceptable to patients, particularly in relation to convenience and punctuality (Harrison et al. 2006). Wallace et al. (2004) speculated that additional benefits might become apparent with longer follow up, and that video consultation might be more effective if it was used predominantly for follow-up appointments rather than for unselected first-time referrals.

The findings and interpretation of this study are more objective than those of Kalucy et al. (2000) and Fielke (2005) regarding the RRMHS. However, the RRMHS is very relevant to rural Australia, where there is substantial unmet health-care need.

Significance of telehealth to primary health care

Together with the brief review of evidence from systematic reviews, the two case studies shed light on the value of video consultation in PHC settings in Australia and elsewhere. The findings and interpretation of the Virtual Outreach Project (Wallace et al. 2004) are more objective than those of Kalucy et al. (2000) and Fielke (2005) regarding the RRMHS, but the fact that the study was conducted in the UK limits its generalisability to Australia somewhat. In both cases, there is evidence that video consultation has a valuable role to play, but does not obviate the need for FTF consultations.

The potential of video consultation to address inequities in access to health care is most obvious in relation to rural and remote areas, where PHC workers are often the only health-care providers and may struggle to deal with the substantial burden of ill-health. According to a recent review:

> *increased use of telehealth for clinical services and professional development may be a single strategy that can have a positive impact on two significant ongoing issues for rural Australia: the poorer health status of rural Australians and the crisis in the rural health workforce.*
> (Moffatt and Eley 2010, p. 280)

The RRMHS findings support ongoing DoHA funding of Medicare rebates for specialist psychiatric video consultations by GPs in rural and remote areas.

However, video consultation is also useful in urban areas, as demonstrated by the Virtual Outreach Project (Wallace et al. 2004), the findings of which support its use across a broader range of specialties, but suggest that some targeting may be appropriate. Video consultation may be particularly useful for frail elderly people who experience poor mobility. Aged care was identified as one of the 'main clinical telehealth success areas in WA since 2001' (Dillon and Loermans 2003, p. S2:16).

Telehealth is particularly relevant to Aboriginal and Torres Strait Islanders because of the remoteness of many communities and the poor standard of health experienced by many Indigenous Australians, including a high burden of chronic disease such as diabetes and renal disease (Australian Institute of

Health and Welfare 2011). The RRMHS illustrates that it is feasible to use video consultation with Indigenous people (Fielke et al. 2009). Other evidence for telehealth services specifically for Indigenous Australians is limited, but evidence from remote areas is relevant.

As mentioned earlier, video consultations involving a patient, a GP or other PHC worker, and a specialist are one category of particular relevance to PHC. Generally, the patient and the PHC worker are together at one location, while the specialist is at a remote site. Such three-way encounters can have a valuable educational role for the professionals involved, helping PHC workers increase their clinical skills and understanding of speciality areas (Wallace et al. 2004) – particularly rural/regional workers (Kerr and Day 2010; Moffatt and Eley 2010) who have limited access to continuing medical education – and helping specialists develop a better understanding of front-line PHC practice.

The authors of another UK RCT, which examined the GP learning and skills uptake that resulted from participating in teledermatology video consultation, estimated that equivalent training would cost £6123.60 per GP (Wootton et al. 2000). Furthermore, it was noted that the benefits of upskilling extended to all patients: 'The increased educational benefits and experience apply to all patients presenting to primary care with dermatological conditions ... and not only those requiring referral' (Loane et al. 2001, p. 117).

Participation in specialist consultations can improve PHC workers' job satisfaction. The opportunity for GPs and nurses and other PHC workers to participate in, and learn from, specialist consultations was explicitly welcomed by some participants in New Zealand's Buller Health Telehealth Pilot, for example:

> *The GP and oncology nurse both felt that the convenience of telehealth gave them an opportunity to participate more fully as members of their patient's care team because they could attend the specialist appointment with the patient.* (Day and Kerr 2011, p. 5)

A key finding of an evaluation of that pilot (Kerr and Day 2010) was that roles need to be reconsidered and reconfigured to some extent. In particular, nurses were central to the provision of outpatient telehealth; they organised and participated in videoconferences, including taking clinical measurements as required.

More fundamentally, telehealth challenges not only traditional professional roles, but also the traditional distinction between primary and secondary care. The Manager of Buller Health commented:

> *It's very exciting the way GPs are working alongside staff from the health board in teams...*
>
> *We don't talk about primary health and secondary health on the Coast – we just talk about health.* (Ministry of Health 2011, p. 11)

Such attitudes are congruent with the call by Sir Muir Gray, Chief Knowledge Officer of the UK National Health Service, to 'Ban the use of terms like 'primary' and 'secondary', 'acute' and 'community', which are 20th century terms and introduce the new language of 'system, network, pathway' (Gray et al. 2011). The fact that telehealth blurs primary and secondary care can be a source of resistance but may ultimately be one of its strengths.

Conclusion

Video consultations are generally well accepted by patients but there is a need for patient satisfaction to be investigated more rigorously, along with other dimensions of patient experience. Evidence of effectiveness and cost-effectiveness is not strong, but generally suggests that outcomes of video consultations are not significantly different from outcomes of FTF consultations for most conditions and specialties. International research such as the UK Virtual Outreach Project should be cautiously generalised, because local contexts affect performance of services, and there is a need for further and more rigorous research in Australia. However, video consultations are not intended to totally replace standard consultations, but rather provide timely access in circumstances where FTF consultations are not available, so implementation needs to be guided by pragmatism as well as evidence. This includes impact on patient satisfaction, PHC worker skills and roles, and organisational dynamics. Current Medicare rebates and other funding mechanisms are also important.

Video consultation has the potential to provide significant benefits to PHC in Australia, particularly in rural and remote regions, provided it is implemented appropriately. As well as increasing access to health care and helping to address the substantial burden of ill-health, it can improve PHC workers' skills and job satisfaction.

References

Australian Institute of Health and Welfare (2011) 'The health and welfare of Australia's Aboriginal and Torres Strait Islander people: an overview.' (Australian Institute of Health and Welfare: Canberra)

Baigent MF, Lloyd CJ, Kavanagh SJ, Ben-Tovim DI, Yellowlees PM, Kalucy RS, Bond MJ (1997) Telepsychiatry: 'tele' yes, but what about the 'psychiatry'? Journal of Telemedicine and Telecare 3, 3–5.

Buist A (2003) Telepsychiatry in Australia. In 'Telepsychiatry and e-mental health'. (Eds R. Wootton, P. Yellowlees, P. McLaren). pp. 113–123. (Royal Society of Medicine Press: London)

Cochrane Library (2010) Telemedicine. Available at http://www.thecochranelibrary.com/details/collection/806797/Telemedicine.html [Verified 24 July 2012]

Day K, Kerr P (2011) Telemedicine: rethinking healthcare roles for smarter care. HINZ Conference and Exhibition, 23–25 November 2011, Aotea Centre, Auckland. Available at http://www.hinz.org.nz/uploads/file/2011conference/P11_Day.pdf [Verified 24 September 2013]

Deshpande A, Khoja S, McKibbon A, Jadad AR (2008) 'Real-time (synchronous) telehealth in primary care: systematic review of systematic reviews.' (Canadian Agency for Drugs and Technologies in Health (CADTH): Ottawa).

Dillon E, Loermans J (2003) Telehealth in Western Australia: the challenge of evaluation. Journal of Telemedicine and Telecare 9, 15–19.

Ellis I (2008) General practitioner, veteran, defence force personnel and consumer acceptance of e-Health. Centre for Veterans and Military Health, Darwin.

Fielke K (2005) Mental health services in rural and remote South Australia: from 'awful neglect' to gaining respect. 8th National Rural Health Conference, 10–13 March 2005, Alice Springs. Available at http://nrha.org.au/8thNRHC/Papers/fielke,%20ken.pdf [Verified 24 September 2013]

Fielke K, Cord-Udy N, Buckskin J, Lattanzio A (2009) The development of an 'Indigenous team' in a mainstream mental health service in South Australia. Australasian Psychiatry 17, S75–S78.

Gray L, Smith AC, Armfield NR, Travers C, Croll P, Caffrey LJ (2011) Telehealth assessment final report. Uniquest, Centre for Online Health, University of Queensland, St Lucia.

Harrison R, Macfarlane A, Murray E, Wallace P (2006) Patients' perceptions of joint teleconsultations: a qualitative evaluation. Health Expectations 9, 81–90.

Kalucy R, Hawker F, Delin J, Muenstermann I (2000) 'Evaluation of specialist psychiatric services in rural and remote South Australia.' (Flinders University: Adelaide)

Kerr P, Day K (2010) 'Buller Health Telehealth Pilot: evaluating an opportunity whose time has come.' (West Coast District Health Board: Greymouth)

Loane MA, Bloomer SE, Corbett R, Eedy DJ, Evans C, Hicks N, Jacklin P, Lotery HE, Mathews C, Paisley J, Reid P, Steele K, Wootton R (2001) A randomized controlled trial assessing the health economics of real-time teledermatology compared with conventional care: an urban versus rural perspective. Journal of Telemedicine and Telecare 7, 108–118.

MBS Online (2012) Specialist video consultations under Medicare. Available at http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/mbsonline-telehealth-landing.htm [Verified 14 August 2012]

Ministry of Health (2011) Better, sooner, more convenient health care in the community. New Zealand Ministry of Health, Wellington.

Moffatt JJ, Eley DS (2010) The reported benefits of telehealth for rural Australians. Australian Health Review 34, 276–281.

Norman S (2006) The use of telemedicine in psychiatry. Journal of Psychiatric and Mental Health Nursing 13, 771–777.

Sitzia J (1999) How valid and reliable are patient satisfaction data? An analysis of 195 studies. International Journal for Quality in Health Care 11, 319–328.

Wade VA, Karnon J, Elshaug AG, Hiller JE (2010) A systematic review of economic analyses of telehealth services using real time video communication. BMC Health Services Research 10, 233

Wallace P, Barber J, Clayton W, Currell R, Fleming K, Garner P, Haines A, Harrison R, Jacklin P, Jarrett C, Jayasuriya R, Lewis L, Parker S, Roberts J, Thompson S, Wainwright P (2004) Virtual outreach: a randomised controlled trial and economic evaluation of joint teleconferenced medical consultations. Health Technology Assessment 8,

Williams TL, May CR, Esmail A (2001) Limitations of patient satisfaction studies in telehealthcare: a systematic review of the literature. Telemedicine Journal and e-Health 7, 293–316.

Wootton R (2012) Twenty years of telemedicine in chronic disease management - an evidence synthesis. Journal of Telemedicine and Telecare 18, 211–220.

Wootton R, Bloomer SE, Corbett R, Eedy DJ, Hicks N, Lotery HE, Mathews C, Pailey J, Steele K (2000) Multicentre randomised control trial comparing real time teledermatology with conventional outpatient dermatological care: societal cost-benefit analysis. British Medical Journal 320, 1252–1256.