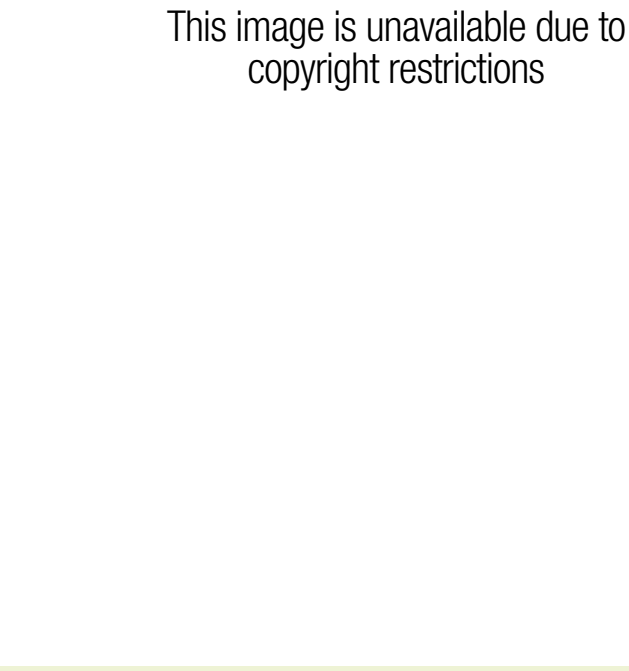
Telemedicine: prospects and realities

IAN OLVER MD, PhD, FRACP, FAChPM, MRACMA

Telemedicine, or delivering medicine at a distance, allows improved access to specialist services and education. However, several issues need to be addressed before telemedicine becomes more widely used.



The philosopher Immanuel Kant said that humans are to be treated, 'always as ends and never as means only'.[1] The opposite could be said of telemedicine where this new technology should be a means to an end and not an end in itself.

Telemedicine is defined as delivering medicine at a distance and most commonly applies to videoconferencing.[2] Telemedicine can be used to transmit x-ray images and scan images, view pathology slides from a remote site and conduct face-to-face consultations in real time. Conferences can occur between patients and doctors, as in telepsychiatry; renal specialists can monitor patients in remote dialysis centres. Conferences can also occur between doctors, for example remote doctors and multidisciplinary cancer specialists in a teleoncology meeting.

Remote practices may benefit most from enhanced patient care and educational opportunities that telemedicine allows as meetings can be held without spending time travelling between remote sites.

GPs, specialists and allied health workers will have to assess the usefulness of telemedicine in their working environment.[3] An overview of large randomised trials evaluating telemedicine against face-to-face care showed little evidence of clinical benefit.[4] For each application, therefore, the pros and cons should be identified as telemedicine is evaluated for efficacy and cost effectiveness.

Establishing a telemedicine link

Our experience in establishing a teleoncology link has underscored the recommendation that telemedicine must be identified as a means of solving a problem and enhancing practice rather than a facility created by an administrative decision and practitioners trying to find a use for it.[5] In our experience, the problem was remote clinicians needing access to multidisciplinary tertiary cancer specialists without patients travelling thousands of kilometres. The solution was regular video case conferences between the Royal Adelaide Hospital and the Royal Darwin Hospital.

Once the teleconferencing centre was available, other uses presented themselves. We have used it to support international collaborations and even to present papers at international conferences. We have interviewed far-flung job applicants and conducted information sessions for rural practitioners.

How do you get such a project started? It is very useful if a clinician 'champion' for the project can be identified at each end of a telemedicine link to plan, problem solve and involve colleagues who will potentially use the facility.

Equipment

The cost of equipment has fallen dramatically over the past decade.[6] Most commonly, ISDN (integrated systems digital network) lines are used to carry the information. There is a large range of videoconferencing units. The most complex is a purpose-built theatre with multiple cameras and monitors linked

Associate Professor Olver is Clinical Director, Royal Adelaide Hospital Cancer Centre, and Clinical Professor, Department of Medicine, University of Adelaide, SA.

to microscopes and audiovisual equipment. More widely applicable is a portable unit, which can be rolled into a suitable room to use, consisting of monitor, camera 'black box' for connecting with the ISDN line, and hand control unit. Finally, a camera linked to a personal computer puts videoconferencing into the price range of most practices. The simplest equipment involves using a PC-based camera to enable internet conferencing using conventional telephone lines.

It is important to locate portable units where they are easily accessible and not locked away, which would require set-up time before use. They should also not be located in areas used for many other activities. Even complex equipment should be set up with simple controls so that technical support is needed only for troubleshooting and not for routine use.

Changing practice?

If telemedicine is to succeed, it is important to minimise the impact of the technology on current practice.[7] For example, pathologists and radiologists don't usually give instant opinions; they take time to compare films or find particular sections of pathology slides and discuss difficult cases with colleagues. In a video case conference, even if images are transmitted digitally, it may be more appropriate to send them before the conference to allow the usual process of decision making to occur. It is self-evident that the technology must deliver images of satisfactory quality to allow confident opinions to be given.

Telemedicine must be identified as a means of solving a problem and enhancing practice.

Making time for videoconferencing can be an issue. In a remote area, enhanced access to tertiary specialists may compensate for the extra time required. In a tertiary centre, adding videoconferencing to multidisciplinary meetings that already occur can reduce the inconvenience that telemedicine may impose. We hold all our multidisciplinary case conferences in the videoconferencing facility to minimise disruption to usual practice whether or not we are linking to a remote site. The experience in Canada suggests that recognising traditional patterns of referral is also important in ensuring the success of a new telemedicine link.[8]

Advantages: communication and support

From a formal evaluation of the Royal Adelaide Hospital's teleoncology link and literature review, a number of benefits of introducing telemedicine are clear.[5] Isolated clinicians feel better supported and clinicians in the tertiary centre report improved communication with their remote colleagues. Just the ability to participate in multidisciplinary case discussions on patient management can be a significant advantage to practitioners who practice in areas of low population density that a tertiary specialist may be unlikely to visit. It is hoped that improved communication with colleagues will increase the satisfaction gained from remote practice and retain practitioners.

The advantage for clinicians is a two-way street; there are advantages for tertiary centre clinicians in improving their understanding of practice problems facing remote clinicians and patients. Enhancement of the peer review process is also facilitated by telemedicine, as is the support allied health workers can give to patients in remote locations.

An increased chance for educational activities also occurs when a telemedicine link is established. This can be by structured programs or simply remaining on-line to discuss other cases; both can provide valuable experience. Furthermore, experts visiting a major hospital can be shared with remote practitioners using videoconferencing.

A decrease in travelling time for patients and clinicians may be an obvious benefit of telemedicine. If preliminary consultations enable treatment planning before the patients' attendances, this may shorten the time away from home for prolonged treatments such as radiotherapy. However, reducing the need to travel long distances is not universally popular; some patients welcome an opportunity to travel to big cities to see relatives or go shopping.

Difficulties: technical issues and impersonality

Technical problems still confront users of videoconferencing equipment.[5,9] Although image quality varies, it usually falls short of broadcast quality and users must allow for movement artefact and the time taken to transmit radiology and pathology images. Breakdowns are disruptive and require technical support.

Problems can arise due to the impersonal nature of the interaction. Participants may not know the clinical capabilities of users at either end. Regular telemedicine interactions can be supplemented by occasional face-to-face visits to underpin the working relationship.

In clinical consultations, telepsychiatry has been very successful.[10] A reluctance to use telemedicine in other branches of medicine has centred on the problem of giving an opinion without physically being able to examine a patient. However, a recent comparison of telemedicine and face-to-face neurological examinations showed they compared favourably.[11]

Some patients can be seen accompanied by their doctors. Sometimes, for example in an emergency neurosurgical consultation, patient examination may not be as critical for giving advice as viewing a CT scan. A model that avoids the discomfort of directly consulting with patients by videoconference is to use videoconferencing to advise the patient's doctor, who takes that advice back to the patient. This can be a useful model when consulting with a multidisciplinary specialist team.

Although yet to be tested in Australia, it is not believed that telemedicine introduces new medicolegal issues compared with other electronic transfers of patient data. [2,6,12,13] Clinicians still have the same responsibilities to patients. There could, however, be issues of the accuracy of an opinion depending on the clarity of the link.[6] There are administrative issues of liability insurance when a videoconference crosses a State boundary. The issue of reimbursement for videoconference consultations or indeed multidisciplinary meetings requires resolution before telemedicine can become more widely used.

In Australia, videophones... the internet...and cable... will increasingly give patients remote access to medical services.

I contend that there are no new ethical principles in the use of videoconferencing. Patient confidentiality issues are similar to those in other clinical settings. Patients may not know all of a group of people sitting in on the other end of a case conference but this also arises in other multidisciplinary case conferences. Consent should be obtained, for example, if students were present and part of the teleconference was used for teaching purposes.

Certainly, any electronic record of the conference has the same status as written case notes and must be protected; in telemedicine, the record must be protected from electronic tampering or broadcast.[14] Patients should always be informed that their case will be discussed and many will want a record of the meeting.

Evaluating telemedicine

There are few published studies that evaluate telemedicine programs. Many programs are small regional links and the conclusions of several of these may need to be pooled to gain a broad perspective.[4,15] This would require the development of standardised evaluation tools. It is particularly vital that more information be generated about the cost effectiveness of videoconferencing.[16]

The future

Technology will advance to make audiovisual communication cheaper, and more reliable, flexible and accessible. Digital lines and satellite communications will allow easier access to more rapid audiovisual international communications. In Australia, videophones and the growth of the internet, which use regular phone lines, and the increasing use of cable networks, will increasingly give patients remote access to medical services. We will be able to manage these changes to our practices if we seek to use, in a stepwise manner, advances in telemedicine technology as they become available.[17] MT

References

1. Kant I. Groundwork of the metaphysics of morals, 1785. Cited by Rachels J. The elements of moral philosophy. New York: Random House, 1986: 114-117.
2. Wootton R. Telemedicine: a cautious welcome. BMJ 1996; 313: 1375-1377.
3. Wootton R, Craig J eds. Introduction to telemedicine. London: Royal Society of Medicine, 1999.
4. Currell R, Urquhart C, Wainwright P, Lewis R. Telemedicine versus face to face patient care: effects on professional practice and health care outcomes. Cochrane Database Syst Rev 2000; (2): CD002098.
5. Olver IN, Selva-Nayagam S. Evaluation of a telemedicine link between Darwin and Adelaide to facilitate cancer management. Telemed J 2000; 6: 213-218.
6. Yellowlees PM, Kennedy C. Telemedicine; here to stay. Med J Aust 1997; 166: 262-265.
7. Doolittle GC, Allen A. Practising oncology via telemedicine. J Telemed Telecare 1997; 3: 63-70.
8. Robb N. Telemedicine may help change the face of medical care in eastern Canada. CMAJ 1997; 156: 1009-1011.
9. Harrison R, Clayton W, Wallace P. Can telemedicine be used to improve communication between primary and secondary care? BMJ 1996; 313: 1377-1381.
10. Kavanagh SJ, Yellowlees PM. Telemedicine – clinical applications in mental health. Aust Fam Physician 1995; 24: 1242-1247.
11. Craig JJ, McConville JP, Patterson VH, Wootton R. Neurological examination is possible using telemedicine. J Telemed Telecare 1999; 5: 177-181.
12. Sanders JH. Future trends: telemedicine. Federation Bull 1995; 82: 191-197.
13. Brahams D. Legal and ethical issues. In: Thick M, ed. Telemedicine risks and opportunities. London: Royal Society of Medicine, 1996: 54-61.
14. Stanberry B. The legal and ethical aspects of telemedicine. London: Royal Society of Medicine, 1998.
15. Perednia DA. Telemedicine system evaluation and a collaborative model for multicentered research. J Med Sys 1985; 19: 287-294.
16. Dolittle GC, Williams A, Harmon A, et al. A cost measurement study for a tele-oncology practice. J Telemed Telecare 1998; 4: 84-88.
17. Yellowlees PM, Brooks PM. Health online: the future isn't what it used to be. Med J Aust 1999; 171: 522-525.