

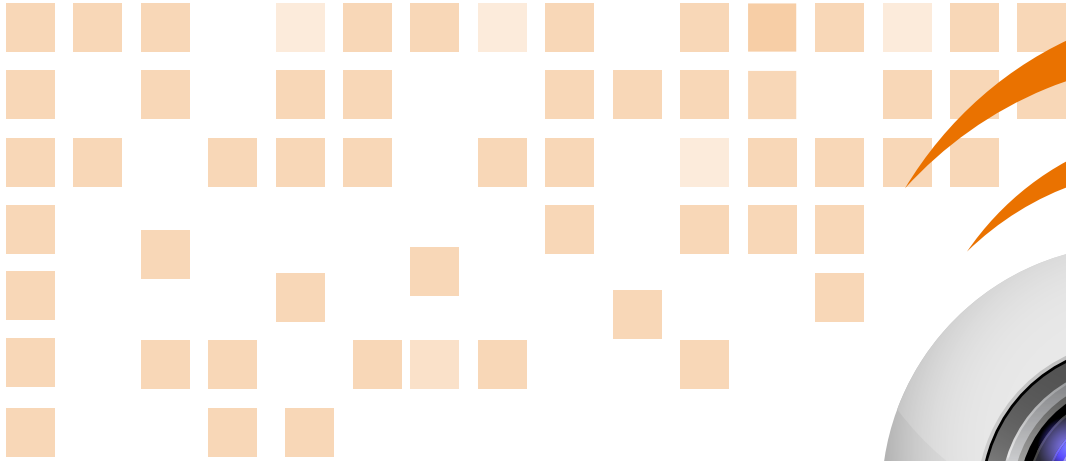


The Royal
Australian &
New Zealand
College of
Psychiatrists

Telepsychiatry



Technical Specifications for Telepsychiatry



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1 Internet connectivity

High quality internet connections provide better videoconferencing quality. Psychiatrists should consider that a good internet connection is required at both their and the patient's end to ensure minimal interruptions or disruptions to both video and audio. Connectivity will have a significant effect on the video and audio quality transmitted and received. It may sometimes be necessary to mute the audio and use a telephone to support the consultation as this would free up bandwidth to allow better visual quality. An inadequate internet connection may reduce the user experience through audio dropouts, lip sync problems, pixilation, frozen frames, video but no audio, audio but no video and total session disruption. These problems may be caused by slow transmission (known as latency), packet loss (video and audio data

being lost) or jitter (variations in the delay in sending information back and forth; faster, higher bandwidths tend to have less jitter).

Psychiatrists should consider that wireless connectivity is variable and can be subject to dropouts and contention. Wireless use should only be considered as a last resort alternative solution. Usually Wireless 3G cannot sustain 384Kbps videoconference call speeds and as a result may not be suitable for clinical determination. If the psychiatrist chooses to use a mobile unit with a wireless connection to the practice router, video consultations can experience a significant drop in quality of the video (e.g. pixilation issues) due to distance from the wireless router.

2 Upload and download data speed

The quality of the video consultation is dependent on the internet connection and the upload and download speeds should be considered. Psychiatrists should ideally seek a symmetrical connection (where upload and download speeds are the same). This would require as a minimum ADSL2 or equivalent in Cable Internet. Dial-up or ADSL is generally not sufficient. Two speeds that are referred to in relation to video consultations are 'standard definition' and 'high definition'. Many hardware manufacturers maintain that a minimum bandwidth to achieve high definition can be achieved at increasingly low bandwidths. To achieve a high definition connection an upload and download speed of over 2Mbps is required. In most circumstances, this is easy to achieve in download speed, but not so

easy in upload speed. For Telepsychiatry consultations the upload speed is just as critical as the download speed. A synchronous service, where upload and download speeds are identical, is ideal. However, a business grade, 'symmetrical' line is beyond the budget of most practices.

Depending on the technology and the resolution required, a minimum data speed of approximately 384 Kbps in each direction (upload and download) is generally required. Guaranteed upload speeds may cost considerably more than standard ADSL2 or cable connections. The use of lower bandwidths is necessary in some locations due to lack of or expense of broadband access and the need to provide services to disparate and/or remote populations.

The MBS affirms that psychiatrists should be confident that the technical solution they choose satisfies the MBS item descriptor and that software and hardware used to deliver a Telepsychiatry consultation meets the applicable laws for security and privacy. When considering a range of technology platforms, no one specification is a determining factor in success. Psychiatrists should consider any legal (privacy and security), safety and clinical effectiveness implications, the overall use for videoconferencing, the people they intend to video consult with, hardware, software, internet speeds, dedicated video equipment and their IT environment.

When choosing equipment, psychiatrists should consider the manufacturers' specifications for computer software, dedicated videoconference appliance, a bundled videoconference system to include codec, monitor, audiovisual peripherals, stand, camera and microphone and physical space limitations.

3.1 Software-based videoconferencing solutions

There is an increasing number of paid and free software options available for videoconferencing. Paid software options include GoToMeeting and Webex, whilst free software options include Skype and Jabber. Software-based systems on an internet connection (providing more than 384 Kbps upload and download speed) are acceptable for certain diagnosis, management and treatment purposes. This is, of course, a judgement call by the psychiatrist that may be made at the time of connection, especially if the connection becomes inadequate.

There is currently no clear evidence to suggest that software-based videoconferencing solutions are unsuitable for Telepsychiatry. However, there are issues that psychiatrists need to be aware of before making the decision to use software-based videoconferencing solutions.

Free software-based videoconferencing solutions

If using free software-based videoconferencing solutions, psychiatrists should consider:

- registering a name that provides some pseudonymity
- avoiding exchanging medical content, e.g. still images or desktop screen shots
- having an alternative communication mode in a situation where the connection drops out or cannot be made
- options if a connection cannot be made as there will be no technical support.

In undertaking an initial business or clinical use case assessment, consider these free software-based videoconferencing solutions as a low-cost entry point into Telepsychiatry. The use of free software-based videoconferencing solutions has a small business risk as there are no significant upfront costs or contracts. Over time, once the ongoing demand and usage have been quantified, it may be worth considering moving to a professional software or hardware solution to ensure sustainability and quality of service.

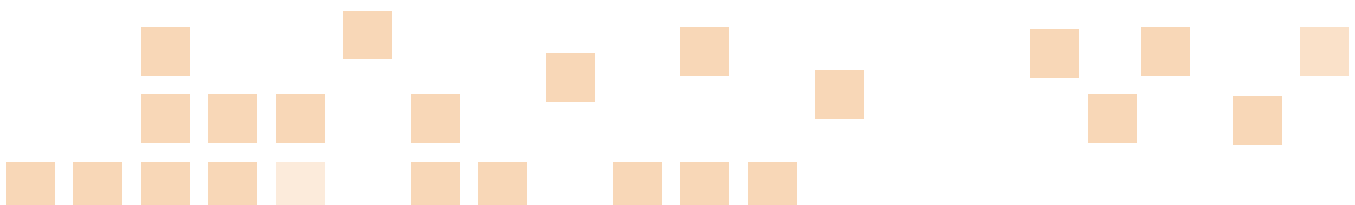
Pros and cons of software-based videoconferencing solutions

Advantages

- Usually cheaper to purchase than hardware, although recurrent licensing fees will add up for paid software.
- There is a wide range of ancillary devices that can be attached via a USB port.
- Generally consumer-based technologies, providing functionality which is feature rich. Usually built around collaboration such as sharing desktops.
- Many offer the use of 'invitations' (the person who licenses the software can invite another person (or multiple people) to join a videoconference). These invitees are not required to own/pay for any specific type of software. This is a great feature if the psychiatrist is planning on consulting with a number of different people.

Disadvantages

- Generally non-standards based and of low audio and video quality.
- Offer limited technical and other support.
- Many of these technologies provide videoconferencing as a secondary function.
- Psychiatrists will need to be able to set up and manage this software themselves as well as identify how to connect to patients and other health professionals they wish to videoconference with.
- Psychiatrists will need to set up the laptop/PC, webcam and microphone every time they want to use their videoconferencing software.



3.2 Hardware-based videoconferencing solutions

Hardware-based videoconferencing solutions (e.g. Tandberg, Polycom, Cisco, LifeSize and VidoRoom) are often considered best practice for video consultations and are used primarily in the public sector.

There are a number of hardware-based videoconferencing solutions. While not designed specifically for the clinical environment or for clinical tasks, they are used routinely to provide health services at a distance.¹

Psychiatrists selecting a hardware-based videoconferencing solution should consider the following:

- Selecting a vendor experienced in videoconferencing.
- Having a clear understanding of the cost of, and where and how to seek vendor support.
- Whether the vendor can provide remote helpdesk support for general usability issues and/or remote technical support.
- Ensuring the technical standards/protocols are supported and adhered to by the vendor/manufacturer.
- The type of service and the guaranteed response times being clearly detailed in the sale agreement or service contract.
- The implications if the unit fails and is not supported (most warranties include an advance replacement service).

Pros and cons of hardware-based videoconferencing solutions

Advantages

- Typically comply with international telecommunication standards² and offer a high degree of interoperability between vendors.
- Designed for room-to-room meetings, making users feel like their videoconference is actually taking place in the same location.
- Generally dedicated videoconferencing systems comprised of one or more large screens, external remote controlled wide-angle pan-tilt-zoom cameras that can cover every angle of the room and equipped with sensitive and external microphones that allow users to speak naturally.
- Considered to be superior in audio and video quality and provide a more comfortable videoconferencing experience that feels just like being in a normal meeting.

Disadvantages

- They often require considerable financial support and economies of scale to ensure effectiveness and viability in services.
- They are generally too large for most consulting rooms.
- Often not intuitive to operate.

3.3 Telepsychiatry standards for diagnostic and non-diagnostic management

Standard options for diagnostic or complex clinical management (diagnostic-quality VC)

Hardware-based videoconferencing solutions are recommended for this outcome. Many alternative solutions exist and the following technical standards can be referred to in comparing and selecting alternatives.

- Frame rate: 15–30 frames per second
- Minimum call speed/bandwidth: 384 Kbps
- Horizontal resolution: 460 lines (PAL)
- Focus: autofocus
- Optical zoom ratio: minimum 10x
- Standards-based far-end control of pan/tilt/zoom
- Round-trip latency must be lower than 300 ms to avoid poor performance for video consultations
- To avoid poor performance, packet loss should be less than 0.1%
- To avoid poor intelligibility, audio should be encoded at a minimum of 16Kbit/s

For non-diagnostic and non-complex clinical management (general-quality VC)

Hardware-based videoconferencing solutions are recommended for this outcome; however software solutions also exist at a lower price point which will also achieve suitable results. There are a range of alternative solutions and the following technical standards can be referred to in selecting alternatives.

- Minimum call speed/bandwidth: 384Kbps
- Minimum resolution: Video Graphics Array (VGA) (640x480)
- Frame rate: 30 frames per second (FPS) (at VGA resolution)

¹ Uniquist, *Telehealth Business Case Report, June 2011*, available at [http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/EC471B2E09EE7370CA2578A4001092BE/\\$File/UniQuest%20Telehealth%20Business%20Case%20Advice%20and%20Options.pdf](http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/EC471B2E09EE7370CA2578A4001092BE/$File/UniQuest%20Telehealth%20Business%20Case%20Advice%20and%20Options.pdf)

² Uniquist, *Telehealth Assessment Report, June 2011*, available at [http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/EC471B2E09EE7370CA2578A4001092BE/\\$File/UniQuest%20Telehealth%20Assessment%20Report%20.pdf](http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/EC471B2E09EE7370CA2578A4001092BE/$File/UniQuest%20Telehealth%20Assessment%20Report%20.pdf)

4 Interoperability

Interoperability is the ability to exchange and use information between two systems and is a significant feature of Telepsychiatry consultations. Enabling interoperability between products from different vendors has become very important as health information is exchanged via new technologies. Psychiatrists should

pre-test their interoperability to GP's videoconference systems (where applicable) because without the systems, consultations cannot proceed. Psychiatrists are advised to keep a log showing the Telepsychiatry system used by GPs and other health professionals and confirmation of interoperability testing.

5 Security

When conducting a Telepsychiatry consultation, it must be secure and private. To ensure public trust in a Telepsychiatry consultation, privacy protection and security mechanisms must be integral to any implementation. Network and software security protocols to protect privacy and

confidentiality should be provided as well as appropriate user accessibility and authentication protocols. Measures to safeguard data against intentional and unintentional corruption should be in place during both storage and transmission.

6 Telepsychiatry equipment

Equipment for Telepsychiatry should be installed according to the producer's guidelines, where possible in collaboration with the other organisations/clinicians using the Telepsychiatry system. The equipment and connectivity

should be tested jointly by the participating health care organisations to ensure that they do what the producer claims that they will.

6.1 Monitors

The choice of computer screen should be made practically depending on the circumstances. Large screen displays allow the psychiatrist to see a large image of the patient and view/edit clinical information. The resolution of the

display monitor should try to match the resolution of the acquired image being displayed, or the originally acquired image resolution should be accessible using zoom and pan functions.

6.2 Cameras

Psychiatrists should pre-test the camera to ensure it is functioning correctly and ensure correct camera gaze angle so that eye-to-eye contact is achieved. Psychiatrists should

use a camera which is zoomed in on the patient. If using an external camera, check whether installation software has been provided (refer to vendor instructions).

6.3 Audio

The audio signal quality is as important as the video quality. Different platforms may have significantly different audio quality. Psychiatrists should pre-test the audio quality prior to consultation. Minimum requirements include:

- audio encoded at a minimum of 16 Kbit/s
- speakers/microphones with echo-cancelling properties should be considered to reduce echo

Audio quality can be improved by using headphones (although this is not recommended when there are two people in the room), using a high-quality webcam with a built-in high-quality microphone or using an echo cancellation box.

Using high-quality microphones and speakers in Telepsychiatry consultations can ensure effective aural and spoken communication. Psychiatrists should use microphones

which enable all participants in the video consultation to be clearly audible (e.g. remote ceiling microphones or cabled/wireless extension microphones). If using a microphone, psychiatrists should consider the type used, placement and acoustical properties of the room. 'Quiet' rooms (those with carpeting, soft furniture, acoustical treatments or other sound absorbing characteristics) allow for better intelligibility of transmitted speech.

Psychiatrists should document the checking and maintenance of videoconference equipment in the practice's equipment maintenance schedule. Should the audio quality fail, revert to the telephone. If the psychiatrist is in an area with poor internet coverage, they may save some bandwidth by muting the audio. This may increase the picture quality (use a speaker phone at the patient end to assist with communication).

7 Unexpected technical circumstances

Psychiatrists should consider that circumstances may arise when there is not always a high-quality internet connection available e.g. when electricity shortages occur. In these circumstances, psychiatrists should be aware that their computer may shut down unexpectedly or that they may lose data. Psychiatrists may be unable to continue with planned Telehealth consultations. In such a case, the psychiatrist may revert to the telephone, tablet or dial up connection via a landline (without video).

Psychiatrists should be aware that alternative arrangements may need to be made if a patient is distressed at not getting the support needed. Psychiatrists should also consider that if a session fails due to a technical failure, they may not be paid for the session.

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