Interpretative guide for TeleHealth users

Interpretative Guide to the DoHA Technical Guidelines on Videoconferencing Standards relevant to the MBS TeleHealth Initiative

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Background

The Australian Government established new TeleHealth MBS items and defined arrangements governing use of the item for TeleHealth consultations[i].

TeleHealth is defined as a consultation between a patient and a specialist performed by videoconferencing (VC).

The Department of Health and Aging (DoHA) has produced a document to provide guidance on VC technical standards.[ii] The DoHA position is that generally the technical standards space caters well for videoconferencing [iii] and that the current technological environment is sufficiently standardised to support delivery of TeleHealth services under the new (current as at 1 July 2011) MBS rebates.

This ACRRM Guide will expand on these standards and explore their implications for clinicians contemplating establishment of TeleHealth services.

ACRRM's Current Position on Technical Requirements for Videoconferencing (VC) for TeleHealth (October 2011)

The gold standard referral solution is *face to face* medical care. However *TeleHealth* can improve access to *Specialist* services. The ACRRM *Professional* standards for TeleHealth referrals (under development) will be included in the *Context* dimension in the ACRRM Standards Framework.

ACRRM and DoHA generally recommend use of videoconferencing solutions which are standards based because, *theoretically,* such systems are better engineered to achieve practical interoperability between videoconferencing products (including State Based Systems), and assure image quality and data security.

However the commencement of new MBS TeleHealth arrangements precedes ubiquitous availability of broadband and fast internet connections. The bandwidth and connectivity in many rural and remote areas is inadequate (less than the minimum requirements) required by most of the high end VC standards based systems. Issues of interoperability between standards based systems exist-e.g. State Health VC systems (available to specialists in private outpatients clinics) and standards based solutions used in the private sector cannot be guaranteed to connect.

DoHA emphasises that the decision to use, or not to use, TeleHealth together with the "*choice of particular hardware or software methods for consultation* should rest with the clinician. In making their choices, *clinicians should consider any legal (privacy and security), safety and clinical effectiveness implications*."[iv]

This decision making is termed 'fit – for –purpose' by DoHA.

ACRRM recognises the need for flexibility of this approach *in the early stages* of the TeleHealth initiative. ACRRM agrees that different types of specialist consultations can be and are being satisfactorily performed using different types of technology, taking into account the patient's particular medical condition, local infrastructure and patient/practitioner preferences.

ACRRM agrees, in consensus with DoHA, that individual 'fit for purpose solution' decisions can result in valid use of equipment and solution's which are not entirely based on open standards. ACRRM emphasises that it is important for clinicians to understand the limitations of non-standards based solutions and take into consideration the content of the consultation to reach acceptable standards.

It is ACRRM's position that such fit for purpose decisions are appropriate if an *informed* assessment of options is undertaken *(with reference to the standards*) and decisions are based on expectations of improved patient care, and privacy and security issues are considered and informed consent is obtained.

[iv] Australian Department of Health and Ageing- Guidance on Security, Privacy and Technical Specifications for Clinicians

http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/5832E4E7E50D568BCA257906000BCDD0/$File/Telehealth%20Guidance%20on%20Technical%20and%20Security.pdf

TeleHealth Technical Standards Position paper

http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/5832E4E7E50D568BCA257906000BCDD0/$File/Telehealth%20Technical%20Standards%20Position%20Paper.pdf

This document is designed to explain the technical standards to facilitate such an informed assessment of options.

AIM of the Document

This document is designed for clinicians to clarify the content and advice provided in the DoHA[iv] and other agency documents available on MBS Online[v], for conducting TeleHealth consultations via videoconferencing. This will furnish providers with a baseline for "ACRRM accepted practice" in delivery of the new MBS TeleHealth items.

As with the DoHA document this guide alludes only to the technical (chapter 1) and operational (chapter 2) aspects of the TeleHealth consult. Guidance on the clinical dimension of the consult is not a part of this guide but will be addressed in the ACRRM TeleHealth Standards Framework. The present document concludes with some suggestions about implementation specific decisions. *(This Interpretative Guide will also be included as a key component in the ACRRM TeleHealth Standards Framework.)*

Chapter 1- Technical Environment for TeleHealth Consultations

- This section covers software and hardware components to achieve the functionality of videoconferencing (such as session control, video and audio coding, transmission, display etc.)
- This area is well covered by a range of formal technical standards produced by standards development organisations [such as International Organization Standards (ISO), International Telecommunications Union (ITU), International Electrotechnical Commission (IEC)] which offer a high level of interoperability and utility for conformant products.
- Selection of systems requires adherence to fundamental standards of both kinds, with some elements not strictly definable (e.g. optimal display screen size).

1.1 What are the DoHA guidelines on technical standards for videoconferencing (VC)?

The videoconferencing protocols as mentioned in the Technical Specifications for Clinicians[vi] document are the minimum standards that are suggested as appropriate for conducting a consultation via videoconferencing.

The 2 protocols/standards that DoHA recommends are:

1 H.323 Videoconferencing protocol
2 SIP Videoconferencing

H.323 and SIP both employ packet-switched network. The core technology used in a videoconferencing system is digital compression of audio and video streams in real time. The hardware or software that performs compression is called a codec (coder/decoder).

Video services delivered over telecommunications networks today are mostly based on the ITU- Telecommunication Standardization Sector (ITU-T) H.323 protocol.

The standards specified by DoHA are based on the Unified Communications concept. Unified Communications (UC) is the integration of real-time communication services such as:

- Instant messaging (chat),
- Presence information (In computer and telecommunications networks, presence information is a status indicator that conveys ability and willingness of a potential communication partner—e.g. a user--to communicate)
- Telephony (including IP telephony)
- Videoconferencing
- Data sharing (including web connected electronic whiteboards aka IWB's or Interactive White Boards, Elluminate etc.)
- Call control and speech recognition with non-real-time communication services such as unified messaging (integrated voicemail, e-mail, SMS and fax)

UC is not a single product, but a set of products that provides a consistent unified user interface and user experience across multiple devices and media types.

An alternative technology is available in the Session Initiation Protocol (SIP) which applies mainly to the internet-based audio and video interactions. However data transferred over H.323 uses reliable transport protocol that attempts to retransmit if the call drops, and SIP entities use unreliable (UDP) transport which might cause drop outs and not reconnect.

1.1.1. H.323 Videoconferencing protocol

The H.323 standard addresses call signalling and control, multimedia transport and control, and bandwidth control for point-to-point and multi-point conferences. Users can connect with other users over various networks including the internet and use varying products that support H.323.It is a part of the ITU-T H.32x series of protocols, which also address multimedia communications over Integrated Services Digital Network ISDN, the Public Switched Telephone Network or Signalling System 7, and 3G mobile networks. H.323 is accessible to anyone with a high speed Internet connection, such as DSL. By providing device-to-device, application-to-application, and vendor-to-vendor interoperability, H.323 allows customer products to interoperate with other H.323-compliant products. H.323 provides standards for interoperability between LANs and other networks.

The H.323 components are:

1 Terminal - Terminals represent the end devices of every connection.
2 Gateway - Gateways establish the connection in other networks.
3 Gatekeeper - Gatekeepers take over the task of translating between telephone number, e.g. in accordance to the E.164 numbering standard, and IP addresses. They also manage the bandwidth, and provide mechanisms for terminal registration and authentication.
4 Multipoint Control Units (MCUs) - MCUs are responsible for establishing multipoint conferences.

The four components communicate by exchanging information flows among each other. These are split into five categories:

1 Audio digitized and coded voice
2 Video digitized and coded full-motion image communication-
3 Data - files such as text documents or images
4 Communication control- exchange of supported functions, controlling logical channels, etc.
5 Controlling connections- connection setup and connection release, etc.

1.2 SIP Videoconferencing:

The Session Initiation Protocol (SIP) is an **Internet Engineering Task Force** (**IETF**) -defined signalling protocol widely used for controlling communication sessions such as voice and video calls over Internet Protocol (IP).

The protocol can be used for creating, modifying and terminating:

- Two-party sessions- unicast- sending of messages to a single network destination identified by a unique address OR
- Multiparty sessions- multicast- delivery of a message or information to a group of destination computers simultaneously in a single transmission from the source - creating copies automatically in other network elements, such as routers, only when the topology of the network requires it.

Sessions may consist of one or several media streams.

- Other SIP applications include
  - videoconferencing ,
  - broadcast video / webinars
  - streaming multimedia distribution,
  - instant messaging,
  - telepresence information,
  - file transfer
  - online games

There are merits and limitations to both these protocols based on their complexity, reliability, ability to support videoconferencing and other administrative requirements. However one should always remember that H.323 was designed with a good understanding of the requirements for multimedia communication over IP networks, including audio, video, and data conferencing. H.323 was designed to scale to add new functionality. The most widely deployed use of H.323 is "Voice over IP" followed by "Videoconferencing", whereas SIP was designed to setup a "session" between two points and to be a modular, flexible component of the Internet architecture. It has no support for multimedia conferencing, and the integration of sometimes disparate standards is largely left up to each vendor.

Hence it is important to evaluate the solutions taking into consideration the functionality of the two protocols mentioned in the DoHA technical guidelines document referenced in this guide.

1.3 How to make decisions about what systems to acquire or use?

Choosing TeleHealth products/solutions for your practice which are *standards based* improves chances that you will be able to use the system to 'talk' to other standards bases systems (interoperability), and that issues with technical security of data are minimised.

However, the issue of interoperability between videoconferencing products implemented by different vendors persists as an impediment to free ranging videoconferencing between arbitrary systems, despite the existence of these relevant technical standards.

Pragmatic consideration of available bandwidth, patient selection, the type of consultation you will facilitate, which specialists you refer to/which clinicians refer to you, and what systems they are using are also important considerations when establishing TeleHealth services.

ACRRM has established a Technology Directory which can be interrogated to identify and compare videoconferencing products and solutions with reference to standards and features.

1.3.1 The solutions are classified into the following categories:

- Software or Web based solutions: Videoconferencing solution (software) compatible with your office PC or Laptop. E.g. Skype, GoToMeeting, Webex etc. These options are relatively cheaper, more suited for doctors' offices but there is very little evidence that these meet all security and privacy requirements because of the different protocols they might use for establishing connection. Some options are standards based and some propriety based.
- Hardware and software or Application based solutions: Equipment (hardware) for conducting the consultations. E.g. Polycom, Cisco Telepresence, Lifesize etc. These

are based on international telecommunications standards and are more expensive than the web based and software solutions.

[Appendix 1]

A fit for purpose solution is recommended based on assessment of clinical need within the context of available TeleHealth options.

1.3.2 Videoconferencing:

- Real-time
- Generally two way transmission of digitized video images with an option of multiple locations
- Uses telecommunications to bring people at physically remote locations together for meetings
- Each individual location in a videoconferencing system requires a room equipped to send and receive video

1.3.3 Videoconferencing Systems and Video Quality:

- Dedicated VC systems have all required components packaged into a single piece of equipment.
- Desktop VC systems are add-ons to normal PC's, transforming them into VC devices.
- Simultaneous videoconferencing among three or more remote points is possible by means of a Multipoint Control Unit (MCU).
- Diagnostic Quality - Used for complex consultations for e.g. at hospitals; large clinics; and possibly residential aged care facilities
- General Quality - Used for simple diagnosis/consultations for e.g. at primary care clinics, etc.

Table 1: Capability of VC solutions

Minimum requirements specified by DoHA[vii]

(Refer - *www.ehealth@acrrm.org.au* for TeleHealth Technology Directory)

Infrastructure levels	Requirements	Recommendations
Capture	Camera	Ability to position a camera, either manually or under remote control, to provide various views of a patient. Camera resolution, focus and zoom requirements should be altered according to the consultation.
	Audio	Adequate quality audio to ensure clear communication. Echo cancellation is important and headsets can be used with in-built speakers at the specialist end.
Transport	Call Speed/ Bandwidth	Bandwidth or throughput (expressed in kilobits per second [Kbit/s] or megabits [Mbit/s] .Video calls may be made, typically at 128kbit/s, 256kbit/s or 384kbit/s, though higher speeds are supported. Speeds differ for diagnostic, non-complex, high-definition (HD) & standard definition (SD) picture quality.
	Frame rate	15 FPS can be safe and effective for a wide range of clinical applications in the hospital setting, including those where motion is important such as assessment of gait. For many interactions relevant to primary care, a frame rate of greater than 25 FPS may be unwarranted.
	Latency	Latency relates to delay. For video consultations, to avoid poor performance, the total delay for both sending the images and downloading must be lower than 300 milliseconds.
Presentation	Video resolution	Quality of video will differ for a standard display which is sufficient for a non-complex diagnosis. A high definition video resolution is required for diagnostic purposes using hardware based VC solution.
	Display	Contemporary display monitors are adequate for videoconferencing. Choice of display should be made pragmatically depending on the circumstances. For instance, if HD hardware-based VC is being used, then HD displays should be used. If a software application is to be used then a standard contemporary PC monitor will be acceptable

Chapter 2- Operational environment for TeleHealth consultations

The operational considerations for videoconferencing activity include physical and business environments. The physical environment determines administrative needs of videoconferencing systems, such as room setup, lighting, acoustics, camera and screen placement, behaviour of participants during sessions. Business requirements include scheduling, directory information, billing, recording, which are to a great extent determined and customised by individual practices in keeping with their overall business practices

2.1 What is involved in a TeleHealth consultation?

TeleHealth involves a Tele-Video consultation between GP /Medical Officer/Midwife/ Nurse Practitioner/ Aboriginal Health worker/Practice Nurse Patient-Specialist. Patient selection for a TeleHealth consultation should be determined based on need, Patient consent, Patient condition and clinical speciality. The choice should be made on case to case bases ensuring a secure consultation where the patient need and privacy is not compromised.

There are some differences between a face to face and videoconferencing based clinical consultations that need consideration.

2.1.1 Room setting

There are many Colleges and state health based systems that have guidelines for conducting TeleHealth consults. Some of the important points are highlighted on the MBS online website. Important aspect of setting up a room for a VC is ongoing staff training to get them familiarised with the equipment and requirements for different types of consultations.

Other Factors to consider for a TeleHealth VC consult are:

- Size of the room
- Lighting
- Colour
- Privacy requirements
- Noise levels
- Camera positioning
- Distance from the window and positioning of the VC equipment

The room set up has been categorised into:

- Generic room
- Clinical site set up
- Non clinical site set up
- Set up for administrative or education sessions

2.1.2 General VC Etiquette

Participating in a meeting via videoconference has subtle differences to participating in a meeting in a face to face environment. Consideration has to be made of the technology and its limits. Some VCs may be carried out at low bandwidths, and if so, the users must expect minor visual and audio distortions. Professional behaviour is necessary at all times. Assume that you are being seen and heard throughout the session.

Department of health guidance on privacy & security states that a provider should ensure all patient protection and privacy regulations are met as in a face to face consult.

Full article:

http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/connectinghealthservices-clinicalpract or Information from the Government of Western Australia, Department of Health

2.2 What are the operational decision making issues?

2.2.1 Patient selection

- Identify Patient/ Groups of patients who may benefit e.g.
    - Existing patients who are referred to specialists willing to participate in TeleHealth to Increase access to specialist care (e.g. in geographically remote areas where current services do not exist, or are infrequent (e.g. improved shared care, ongoing specialised treatment).
    - New referrals to new specialists who are TeleHealth enabled (for diagnostic purposes)

2.2.2 Assessing the case for TeleHealth at your practice

- Patient demographics
- Workflow modifications required
- Access to specialist services willing to participate
- Quality of Internet connectivity / ISDN etc.
- Capacity to accommodate ‘ more’ consultations
- Staffing
- Outreach services and need for mobile considerations
- Synergistic benefits- registrar training and

2.2.3 Patient inclusion/exclusion criteria (MBS TeleHealth Initiative)

- Service must be provided via videoconferencing (where both video and audio communication between the patient and specialist occurs)
- Patient must not be an admitted patient
- Patient must be either:
- a care recipient receiving care in a residential care service
- at an eligible Aboriginal Medical Service or Aboriginal Community Controlled Health Service in relation to which a direction made under subsection 19(2) of the Act applies; or
- located in an eligible geographical area

2.2.4 Staff eligibility (MBS online TeleHealth Initiative)

Specialist-end

Video consultations can be provided by any medical practitioner who is registered or authorised to practise (as described in the Health Insurance Act 1973), as a consultant physician, psychiatrist or specialist.

Patient-end

Clinical services can be provided at the patient end of a video consultation by any medical practitioner, participating midwife or participating nurse practitioner who has a Medicare provider number linked to an eligible patient location. In addition, a practice nurse or

Aboriginal health worker can provide a patient-end service 'for and on behalf of a medical practitioner' to a patient located in an eligible geographical area.

2.3 What are the business and administration requirements?

Some TeleHealth Solutions incorporate administration functionality e.g. scheduling/ appointment features. A list of these is provided in the ACRRM Technology Directory http://www.ehealth.acrrm.org.au/teaser/technology-directory. However, a modification of existing conventional appointment systems is also an uncomplicated practical solution.

Billing: Currently GP's can bill directly as the patient is at their end as per normal arrangement. GP and specialist come to an agreement where a separate claim with a lodgement advice sent to the patient. For the long term implementation check with your vendor if the solution has billing and appointment capability. It is suggested that users apply current mechanisms as much as possible for billing and scheduling in the early stages of TeleHealth development.

Appointment: For the short term contact the specialist using existing appointment system. There is a need to incorporate TeleHealth into the routine administrative schedule. Some TeleHealth solutions incorporate business and administration functionality. However non-technical options also be applied when facilitating a TeleHealth consultation.

Chapter 3- Implementation considerations

The recent emergence of a variety of online/web based products in this space has led to some diversity of choice with unclear criteria for minimum acceptable risk and performance, due to variety of implementation decisions and human user subjective opinion. A few tips for easy researching of solutions and technology have been provided in this chapter. The section is supported by the Appendix that provides some options for purchasing videoconferencing solutions.

3.1 What to look for when researching for vendors/solutions online?

When conducting your online research if you come across a solution that seems to fit your needs and has all the features built in, it is a very good idea to search for the data sheet or features sections, which tells you about the VC protocols on which the system is based, audio and video codecs and bandwidth needed. Another good source is the ACRRM Technology Directory has a comprehensive list of TeleHealth solutions addressing standards, protocols and all the necessary information for selection. The directory can be accessed by registering on www.ehealth.acrrm.org.au.

This information can also be gathered from *installation, product manual, user guide, system requirements or other tabs that refer to the features and functionality of solution*. Using this interpretative guide as a reference you can easily eliminate the options that do not meet all the standards protocol. Some examples of what a *data sheet* looks like can be found in the Appendix. Datasheets provide comprehensive information about solution feature, echo cancellation, support services etc... Another important consideration is *system requirements* that are needed to install solutions on your computer such as operating system, memory size, camera frame rate etc. Every vendor/solution provider will have these requirements that need consideration. If there is a dedicated IT team refer these specifications to them to get answers.

ACRRM can also provide you with objective personalized assistance to help you and your nominated specialists set a TeleHealth service for your patients.

- Access to a directory of TeleHealth equipment and solutions which has been mapped against standards
- Access to one – on- one assistance based on an analysis of your context

For more information and to avail the service please register on our eHealth website-

www.ehealth.acrrm.org.au

3.2 What are the important interoperability considerations?

It is also important to ensure interoperability of the solutions i.e. the solution you choose to install in your practice should be able to communicate with state based and specialist end systems. Although the standards based systems ensure interoperability the reasons for failure to interoperate include errors of implementation and manufacturers 'use of proprietary or pre-standard extensions to implement new features' as mentioned in the UniQuest document by DoHA.

Interoperability is a key problem and the questions that you need to understand are – who has to ensure that the systems works? Who owns to the problem? What is in it for the

vendors? Who is accountable when it does not work? Who pays for an engineer to fix an issue – GP or specialist or??

DoHA recommends in the short-term, to communicate with endpoints on established networks, any new video consultation implementation should:

- Be either standards-based, or if proprietary, provide a mechanism to allow audio and video sessions between the proprietary and standards-compliant endpoints;
- Support a minimal subset of the following standards: H.225; H.245; H.261 QCIF, H.263, Q.931; RTP; G.711; G.722; G.728; G.723; G.729; TCP/IP;
- Manufacturers should demonstrate interoperability using the stated minimum subset in a heterogeneous environment.

3.3. What are other important implementation specific issues that need attention?

- Internet connection: Higher quality Internet connections provide better videoconferencing quality. 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 because it will require either frame rate or image resolution downgrade to human vision interpretation.
- Wireless 3G: Many TeleHealth services operate on 3G networks so these can be easily installed on your smart phones. However wireless connectivity is variable and can be subject to dropouts and contention. E.g. IPad, IPhone or Android based hardware solutions
- Wireless 4G**:** 4G network is now available and will offer better connectivity in areas where broad band has not reached. The 4G upload speed is much better than 3G. Telstra's 4G mobile network is available in capital city CBDs and 30 regional and metropolitan centres.

Typical download speeds in Capital CBDs, associated airports and selected regional locations	2Mbps to 40Mbps
Typical upload speeds in Capital CBDs, associated airports and selected regional locations	1Mbps to 10Mbps
Compatible O/S	Windows®7 (32/64 bit), Windows Vista®(SP2,32/64 bit) XP (SP3 Media Centre Editions, 32/64 bit) or Apple®Mac compatible OS 10.5.8 and later.

Quality: HD: High definition videoconferencing requires at least 1.5Mbit/sec connection – if this is not available or too expensive standard definition is more than suitable for clinical diagnosis. E.g. Polycom HD, Cisco Unified Videoconferencing 5110/5115 MCU etc...

- SD: Standard quality video compression standards will require a bandwidth which will be multiples of 64kbits. The video quality will be poorer compared to a HD system due lower aspect ratio. E.g. desktop video, video telephony deployments etc..

Support:

- Systems must be user-friendly just like your smart phones. Ensure training and assistance is provided by the vendor and internet provider. Need plenty of time for familiarisation. Need lots of practice to be confident that you can handle simple problems during consultation
- Factor in hardware/software support for the videoconferencing equipment as part of the initial purchase. Most vendors' couple the software updates to the hardware warranty. In most cases software support is important to maintain standards based capability with new systems. Also consider if the unit fails and is not supported by warranty could you afford to purchase a new unit and get it installed and working in a short timeframe, or wait for a repair to occur. Most warranties include an advance replacement service so you can get a new unit whilst waiting for a repair to occur.
- Consider if the vendor / TeleHealth service provider you are purchasing the equipment/ services from can provide remote helpdesk support for general usability issues and or technical support and troubleshooting remotely.

Configuration: Make sure your vendor and internet provider help you with setting up the network routing and phone connection needed to make calls.

Audio quality: Choice of microphones can affect the quality of audio significantly. Professional videoconferencing systems should have Acoustic Echo Cancellation (AEC) feature inbuilt. Make sure the products you purchase have AEC feature, as Echo during consultations can lead to incorrect diagnosis, and cause irritability to the patient and the specialist, thus reducing the usage videoconferencing consultations. This is also a part of VC etiquette.

Disclaimer:

Guidance in this document is restricted to use of TeleHealth within the MBS TeleHealth initiative and refers to current and old documents available on MBS online. This document has been developed within the first 6 months of the MBS TeleHealth initiative, refers specifically to the DoHA documents that were available at the time of development of this guide. The TeleHealth environment will change over time and so will the context and overview of this document. It has been developed for a lay audience, in response to requests by TeleHealth users and physicians for compilation of most relevant eHealth/ TeleHealth resources that can be used as technology and professional guidelines for conducting TeleHealth consultations. The solutions and guidance provided by the document is based on published resources as referenced in document. The document only points to the documents and resources that are available which need to be referenced further to obtain more detailed information. ACRRM does not endorse the content on other websites and articles sited in this guide.

APPENDIX I

List of solutions based on system requirements

Web-based solutions	Application-based solutions	Hardware based solutions
Confabio	Anymeeting http://www.anymeeting.com/	Polycom http://www.polycom.com/
Dimdim **http://www.dimdim.com/**	ConnectNow (Adobe) http://www.connectnow.com.au/	Cisco http://www.cisco.com/web/ANZ/netsol/en/video_conferencing/index.html
MeBeam	GoToMeeting http://www.gotomeeting.com/fec/	Tandberg http://www.tandberg.com/
Meebo **http://www.meebo.com/**	HearMe http://www.hearme.com/	Lifesize http://www.lifesize.com/
MegaMeeting **http://www.megameeting.com/**	iChat (Apple) http://www.apple.com/macosx/apps/all.html#ichat	Vidyo http://www.vidyo.com/products/vidyopanorama/
TokBox **http://www.tokbox.com/**	InstantPresenter http://www.instantpresenter.com/	
Vyew **http://vyew.com/s/**	LiveMeeting (Google) http://download.cnet.com/Microsoft-Office-Live-Meeting/3000-2075_4-55192.html	
WebEx (Cisco) **http://www.webex.com/**	Meetanywhere No link	
ZohoMeeting **http://www.zoho.com/**	Mikogo http://www.mikogo.com/	
Attendanywhere	ooVoo	

Web-based solutions	Application-based solutions	Hardware based solutions
http://www.attendanywhere.com/displaypage.aspx?pageid=399	http://www.oovoo.com/home.aspx	
	Redback http://www.redback.net.au/	
	SightSpeed http://www.sightspeed.com/	
	Skype http://www.skype.com/intl/en/home	
	TinyChat http://tinychat.com/	
	Vidyo http://www.vidyo.com/	
	WengoMeeting Link in French - http://www.wengo.fr/	
	TeleHealth solutions http://www.telehealth.net.au/	
	Spranto http://www.spranto.com/	
	Nefsis http://www.nefsis.com/	

Table adapted from the TeleHealth Technical Standards Position Paper -Draft for Consultation 31 August 2011- Section 3.2

APPENDIX II

Examples of data sheets

- Nefsis data sheet- http://www.nefsis.com/pdf/nefsis-datasheet.pdf
- Sight speed- http://www.sightspeed.com/support/system-requirements -
- Cisco-
  - Cisco Unified Videoconferencing Manager 5.7
  - Cisco Unified Videoconferencing 3545 System Release 5.7
  - Cisco Unified Videoconferencing 3522 and 3527Gateway
  - Cisco Unified Videoconferencing 3515 MCU Release 5.7

APPENDIX III

Requirement Analysis form for TeleHealth support

Complete the following form and return via email to ehealth@acrrm.org.au

Demographic information

(If you have already registered on the eHealth website then you are not required to complete this section)

Practice name:	
Doctors name:	
Other Clinicians *(Nurse, Midwife, Aboriginal Health Worker etc):*	
Size of the practice: *(approx. patient numbers)*	
Email:	
Address:	
Phone number:	

Assistance Requirements

Indicate *Yes* or *No* for the assistance you require from ACCRM?

Help with setting up a TeleHealth consult		
Help with purchasing equipment or TeleHealth solution		
Evaluation of existing equipment or TeleHealth solution		
Contact with Specialist		
Other *(please specify)*		

Requirements Analysis

1. Indicate which end of the consult do you want to provide TeleHealth services	Yes	No
a. At the patient end		
b. As a referred consultant		

2. Indicate the room(s) set up where you want to provide Tele consultations	Yes	No
a. Office		
b. Home visit		
c. Aged care facility		
d. Outreach clinic		
e. Dedicated Conference room		
f. Other (please provide details)		

3. Indicate the type of clinical consultations do you want to encourage	Yes	No
a. Assessment		
b. Diagnosis		
c. Treatment		
d. Management		
e. Monitoring		
f. Ongoing care		

4. Indicate which specialists (and or disciplines) do you want to establish consultations with (initially)

Name	
Speciality	
Contact detail	

Name	
Speciality	
Contact detail	

5. Indicate how you plan to prioritise/ select patients for TeleHealth consultations	Yes	No
a. Existing patients currently referred and treated by a specialist		
b. Patients requiring a new referral		
c. Type of consultation required – Dermatology etc.		
d. Other *(please specify)*		

6. How many TeleHealth consultations do you think you can undertake in a typical week	

7. Indicate what equipment you plan to use for the consultations	Yes	No
a. PC		
b. Note book		
c. Tablet		
d. Room based teleconference system *(specify system name)*		
e. Don't know		
f. Other *(please specify)*		

8. Indicate the type of Operating System your computer runs on?	Yes	No
a. Mac		
b. Microsoft Windows		
c. Others *(please specify)*		

9. Indicate the type of Video Conferencing solution that you would prefer to use	Yes	No
a. Web based solution		
b. Application based solution		
c. Dedicated service		
d. Don't know		

10. Indicate which of the following health professionals will be present in the room with the patient during the consultation? (you can select more than one option)	Yes	No
a. Nurse		
b. Registrars		
c. Specialist		
d. Aboriginal Health Worker		
e. GP		
f. Others (please specify)		

11. If known, please specify the systems and equipment the specialists that you want to refer to use?

12. If not known, do you want ACRRM to contact the specialists and offer support in establishing TeleHealth consultations with your practice?	Yes	No

13. What TeleHealth equipment do you have access to? (For e.g. TeleHealth equipment in the hospital, community center etc...)

14. Indicate the type of internet connection you have	Yes	No
a. ADSL		
b. ADSL 2+		
c. cable		
d. wireless		
e. Other *(please specify)*		

15. My network provider is	Yes	No
a. Telstra		
b. Optus		
c. TPG		
d. iinet		
e. Other *(please specify)*		

16. Please provide details or your internet speed *Go to http://www.assessment.acrrm.org.au/speedtest/ for free automatic assessment of internet speed and quality or use PING*	
a. Internet speed (upload)	
b. Internet speed (download)-	

17. Indicate which practice management software do you currently use?	Yes	No
a. Best Practice		
b. Commiunicare		
c. Ferrett		
d. iSoft		
e. Medical Director		
f. ZedMed		

18. Please provide any additional information or comments you feel will be useful.

Glossary

Access to health care: Relates to the ability to obtain health services when needed. Dimensions of access include:

- availability - an issue of particular relevance to the isolated rural population, and the inner city, chronically ill, poor and disadvantaged (relates to adequacy of supply of existing services, facilities, and specialised programs and services);
- accessibility - refers to the location of supply in relation to the location of the clients, and takes into account issues of transportation, travel time, distance, and cost
- accommodation - refers to the organisational and administrative arrangements and clients' ability to accommodate to these factors, and their perception of their appropriateness;
- acceptability - incorporates cultural and/or social issues
- relative affordability

Accuracy: Extent to which a measurement in fact assesses what it is designed to measure.

ADSL Asymmetric Digital Subscriber Line:- a delivery platform that overcomes some of the limitations of twisted copper wire pairs, allowing a vastly improved array of services including videoconferencing. However it has connectivity issues- as the distance from the main line increases, number of users using the same line at one time, not available as yet in all rural and remote locations.

Analogue: Information (electronic or otherwise) that is created and transmitted as a continuous stream. Wave forms (e.g. oscilloscopes) are analogue. Standard photographs, X-rays, and the "real world" are analogue. Compare this to digital information generated by computers. Modems are used to convert digital computer data to analogue form for sending over standard telephone lines.

Appropriateness: The quality of being appropriate. In health care, appropriateness refers to the extent to which an intervention is suitable for a particular person

Archive: In an information superhighway context, an archive is a library of online information available on many online forums and networks. Materials available may include past forum postings, logs of real time meetings, files and programs contributed by members, databases, news clips, lists of frequently asked questions (FAQs) with answers, and other information

Availability of health services and professionals: Refers to the existence or supply of health care services and professionals in a defined geographic area. The Australian Institute of Health and Welfare defines availability to be *within 25 kilometres* of home and applies the following hierarchy:

- permanent - available at least three days per week
- visiting - available between 2 days per week and once per month
- not available - available less than once a month or not available at all

It is worth noting that availability does not necessarily mean that health services and professionals are accessible to all

Asynchronous: *This term is sometimes used to describe store and forward transmission of* medical images or information because the transmission typically occurs in one direction in time. This is the opposite of synchronous (see below).

Authentication: A method of verifying the identity of a person sending or receiving information using passwords, keys and other automated identifiers.

Bandwidth: A measure of the capacity of an electronic transmission medium (i.e. a communications channel) to transmit data per unit of time – the higher the bandwidth, the more data/information can be transmitted9. Where two sites run at different speeds, it is usual for the systems to negotiate the highest bandwidth possible between sites, usually this reflects the highest common standard or protocol that can operate between two units. Typically measured in kilobits or megabits per second (Kbps, Mbps).

Bit Binary digit: the basic 0-1 unit of information used by computers for information entry, storage, and transmission. Data rates in telecommunications are often referred to in bits (abbreviated to 'b') per second i.e. bps.9

B-ISDN Broadband Integrated Services Digital Networks: A follow up to ISDN for support of data, video and voice. Uses asynchronous transfer mode (ATM) as the transport

Bluetooth Wireless: Bluetooth is an industrial specification for wireless personal area networks (PANs). Bluetooth provides a way to connect and exchange information between devices such as mobile phones, laptops, PCs, printers, digital cameras and video game consoles over a secure, globally unlicensed short-range radio frequency. The Bluetooth specifications are developed and licensed by the Bluetooth Special Interest Group.

Broadband: Communications (e.g., broadcast television, microwave, and satellite) capable of carrying a wide range of frequencies; refers to transmission of signals in a frequency-modulated fashion, over a segment of the total bandwidth available, thereby permitting simultaneous transmission of several messages. *Broadband* in telecommunications refers to a signalling method that includes or handles a relatively wide range (or band) of frequencies.

Client-server architecture: In computing, a computer network architecture that places commonly used resources on centrally accessible server computers, which can be retrieved as they are needed across the network by client computers on the network

Clinical indicators: Population based screens to detect poor processes that do, or could likely, give rise

Codec: A term used for a **'coder/decoder**' electronic device, which converts an analogue signal into a digital form for transmission purposes. It is mainly used to transform video signals into digital form for transmission over digital transmission systems. Generally speaking, this digital information must be reconverted into analogue form at its point of reception

Compressed video: Video images, which have been processed to remove redundant information, reducing the amount of bandwidth needed to capture the necessary information. Compression is useful because it helps reduce the consumption of expensive resources, such as hard disk space or transmission bandwidth. Lossy compression is most commonly used to compress multimedia data (audio, video, and still images), especially in applications such as streaming media and internet telephony.

Connectivity: The ability of systems to interact, among the various operating systems on local, regional, national, and ultimately, international scales Consultation The term consultation refers to the occasion on which a person provides their expert services for a specific purpose. In mainstream health care, this may be in the form of a:

- direct consultation, where the client is involved, or an
- indirect consultation, where the client is not involved

In telemedicine, consultation refers to the time at which the consultant provides expertise for a single telemedicine transaction

Consulting session: In telemedicine, the period of time during which a consultant handles (at one sitting) a number of telemedicine transactions

Consulting site: The physical location of the TeleHealth consultant

Continuity of care: Continuity of care refers to the extent to which medical services are received as a coordinated and uninterrupted succession of events, consistent with the medical or health needs of the patient. This term can be defined by the usual standard of general practice whereby the GP provides on going care, over time, and through various states of health and illness, to an individual patient. Within a group practice, the "continuity" for the individual patient's care may be provided by the various members of the group

Convergence: The merging of technologies and information, the coming together of computers, telecommunications and information

Data compression: Processing data to reduce storage and bandwidth requirements. Some compression methods result in the loss of information, which may or may not be clinically important.

Data integrity: Refers to the protection of data at all levels, from the operator (the human element) to the systems being used (browsers, networks, servers, and communications infrastructure).

Desktop videoconferencing: Dial up systems, including codec, camera, microphone and software, which are added to a personal computer.

Diagnosis: The process of categorising a patient or deciding the nature of a disease based on the patient's characteristics, symptoms, signs and signals (results of laboratory tests or other diagnostic intervention)

Diagnostic intervention: An intervention conducted for the purpose of establishing a diagnosis or categorising a patient for a particular purpose, usually treatment selection

DICOM Digital Imaging and Communications in Medicine: A collection of industry standards for connection of, and communication among, medical imaging devices. The most recent iteration is DICOM 3 originally developed by ACR/NEMA for CT and MRI images, now with its own standards committee

Digital: Information coded in discrete numerical values (bits). Digital data streams are less susceptible to interference than analogue data streams. Also, because they are made up of zeros and ones (bits) they can be manipulated and integrated easily with other data streams (voice/video/data)

Digital camera: Captures images (still or motion) digitally using CCD or CMOS chips, and does not require analogue to digital conversion before the image can be transmitted or stored in a computer. This conversion usually causes some degradation of the image, and a time delay in transmission.

Distant provider: Service provider who is geographically distant to the recipient of the service.

Distant site: In the context of telecommunications, any site that is geographically separated from the local site. *see Local site*

Document camera and/or stand: typically used for capturing and transmitting images of documents. Can also be used for skin lesions and the like. Typically uses a 1CCD (1-chip) camera

Download: To retrieve a file from another computer.

DICOM Digital Imaging and Communications in Medicine: A collection of industry standards for connection of, and communication among, medical imaging devices. The most

recent iteration is DICOM 3. Originally developed by ACR/NEMA for CT and MRI images, now with its own standards committee.

Encryption: A mathematical transposition or scrambling of a file or data stream so that it cannot be deciphered at the receiving end without the proper key. Encryption is a security feature that assures that only the parties who are supposed to be participating in a video conference or data transfer are able to do so. This has not been an essential feature for telemedicine systems, but with the growing concern about patient privacy in telemedicine networks, it may well become one

Firewall: A security barrier erected between a public computer network like the Internet and a local private computer network.

Frame rate: The number of images per second displayed in a video stream. Approximately 24 frames per second (fps) is considered full motion video. A frame rate of 15fps is noticeably jerky. Slower rates may be inadequate for gait and motion observations.

Frame relay: A technology for transmitting data packets in high speed bursts across a digital network encapsulated in a transmission unit called a frame. Frame relay requires a dedicated connection during the transmission period. It is not ideally suited for voice or video transmission. However, under certain circumstances, it is used for voice and video transmission.

Health status : An integrated indicator of health (i.e. wellbeing), typically incorporating biological function, physical and mental health, social and role functioning

HL7 Health Level 7: A health care specific communication standard for data exchange between computer applications. It effectively allows different health care providers to communicate with each other through their computer systems about information on a range of clinical issues. 38 Not necessarily compatible with EDIFACT.

HTML Hypertext Markup Language: The simple system of codes used to construct Web home pages. In Internet addresses, it is always all lower case

HTTP Hypertext Transmission Protocol: The Hypertext Transfer Protocol (HTTP) is a networking protocol for distributed, collaborative, hypermedia information systems.[1] HTTP is the foundation of data communication for the World Wide Web.

Indigenous status: An Aboriginal or Torres Strait Islander is a person of Aboriginal or Torres Strait Islander descent who identifies as an Aboriginal or Torres Strait Islander and is accepted by the community in which he or she lives.

Context: Given the gross inequalities in health status between Indigenous and non-Indigenous peoples in Australia, the size of the Aboriginal and Torres Strait Islander populations and their historical political context, there is a strong case for ensuring that information on Indigenous status is collected for planning and service delivery purposes and for monitoring Aboriginal and Torres Strait Islander health.

Informatics: The application of computer science and information science to the management and processing of data, information and knowledge

Internet : A loose aggregation of thousands of computer networks forming an enormous worldwide WAN. 9 *see How the Internet Works at* www.whatis.com/tour.htm

Interoperability: Interoperability refers to the ability of two or more systems (computers, communication devices, networks, software, and other information technology components) to interact with one another and exchange data according to a prescribed method in order to achieve predictable results (ISO ITC-215).

Internet Protocol: The Internet Protocol (IP) is the protocol by which data is sent from one computer to another on the Internet. Each computer on the Internet has at least one address that uniquely identifies it from all other computers on the Internet. IP is a connectionless protocol, which means that there is no established connection between the end points that are communicating. The IP address of a videoconferencing system is its phone number.

Intervention: An action that intends to change the course of events (to achieve a desired, or to avoid an undesirable, outcome). In healthcare, a process (or an action that is part of a process) that intends to improve a patient's health status. Healthcare interventions may be classified as preventative, diagnostic, therapeutic or rehabilitative. They comprise a technology and its delivery mechanisms

Intranet: A 'private internet' that employs TCP/IP communications protocols used over the Internet. The intranet may be linked to the public Internet through a tightly managed, controlled gateway. Intranets within different businesses may be linked by an extranet.

IP address: The address of a computer on the Internet (via its Internet Provider), that permits it to send and receive messages from other computers on the Internet.

ISDN Integrated Services Digital Network: A low-to-medium speed technology that uses digital telephone lines instead of analogue lines. Usually transmits at 64-128 Kbps, although higher speeds are possible. It delivers multiples of 64 Kbps capacity which is more than twice as high as ordinary phone line's capacity, enabling video, voice and data to be delivered more efficiently. Basic Rate Interface (BRI) generally provides a 128kbps rate while Primary Rate Interface (PRI) can provide up to 1.54 Mbps

ISO International Standardization Organisation: Establishes and coordinates worldwide standards for electronic information exchange

ISP Internet Service Provider: The company or organisation that offers access to the Internet to individuals or organisations

ITU International Telecommunication Union: The United Nations agency responsible for telecommunications

LAN Local Area Network: A computer network linking computers, printers, servers and other equipment within an enterprise. Can support audio, video and data exchange

Local provider: Service provider who is located geographically close to the originating site

Local site : In the context of telecommunications, the site that is geographically connected to the reference point

Log: A transcript of an online session, often used to record the exchanges of a real time meeting. The software for some commercial services includes a log function that

MCU Multipoint Control Unit ;In telehealth, a device that enables participants at three or more sites to participate in a video/audio/data conference. 9 *also called a Bridge or Data bridge*

MIME Multipurpose Internet Mail Extensions: A TCP/IP standard used on the Internet to allow electronic mail headers and mail bodies to contain information other than plain text. It enables mail transfer in complex Organisations

Modem Modulator/Demodulator: Enables transmission of digital data (by transforming it to and from analogue waveforms) over standard analogue phone lines and cable video systems

Mobile Telehealth: The provision of health care services with the assistance of a van, trailer, or other mobile unit in which the health care provider might provide patient services at

a distance from a normal medical facility. Services may also be provided through mobile technologies that allow a mobile vehicle equipped with medical technologies to attach to an existing health care facility, such as mobile CT, MRI, or TeleDentistry.

Multimedia email: Refers to the development of store-and-forward electronic mail, allowing transmission of not just text, but also audio, still images and video.

MPEG- Moving Picture Experts Group: The Moving Picture Experts Group (MPEG) is a working group of experts that was formed by ISO and IEC to set standards for audio and video compression and transmission.

Network: An assortment of electronic devices (computers, printers, scanners, etc) connected (by wires or wireless) for exchange of digital information.

PACS Picture Archival and Communications System: These systems, although generic in concept to apply to many medical and non-medical applications, are generally associated with the digitisation of radiology departments. PACS consist of various modules integrated to form a coherent system:

- image acquisition;
- digital networks;
- image archives; and
- image display workshops

also known as digital image management systems and digital image networks

Peripheral devices: Attachments to a system to increase its capabilities. In TeleHealth peripheral devices are used to augment communications and/or medical capability by capturing images, anatomic sounds or other physiological parameters and include items such as electronic stethoscopes, oto-/opthalmoscopes, dermascopes, document camera and/or stands, video cameras and scanners. Non-medical peripheral devices useful in telemedicine may include document/graphics camera, VCR, slide projector, fax machine and personal computer.

Pixels: An abbreviation of **'picture element'** - the smallest identifiable points on a computer or television screen

Point of Presence (POP): the location of an access point to the Internet. A POP necessarily has aunique IP address. POP also refers to the building or site where a high bandwidth telecommunications line terminates; subsidiary lines then emanate from the POP

Point to point: Direct connection between systems via a communications link

POTS Plain Old Telephone Service: Conventional analogue telephone service. Also known as PSTN

Referral: The process of obtaining the expertise of a consultant by the originator.

Referral data: Any data, such as patient history, radiographs, or EEG, transmitted from the referring site to a consulting site.

Referring practitioner: Healthcare provider who initiates a physical referral or telemedicine referral following a primary examination.

Referring practitioner satisfaction: In a clinical context, this term refers to the satisfaction or otherwise of the referring practitioner. Satisfaction may relate to:

- degree of comfort with technology;
- diagnostic certainty;
- confidence in management plan proposed;

- satisfaction of the client;
- ease of access;
- user friendliness;
- personal convenience

Referring site : Site at which the primary assessment, examination or activity is conducted and from which a referral is made to another practitioner. *see also Originating site*

Router: This device provides an interface between two networks or connects sub-networks within a single organization. It routes network traffic between multiple locations and it can find the best route between any two sites. For example, PCs or H.323 videoconferencing devices tell the routers where the destination device is located and the routers find the best way to get the information to that distant point.

Standard: A statement established by consensus or authority, that provides a benchmark for measuring quality, that is aimed at achieving optimal results (NIFTE Research Consortium, 2003).

Switch: A switch in the videoconferencing world is an electrical device that selects the path of the video transmission. It may be thought of as an intelligent hub (see hub above) because it can be programmed to direct traffic on specific ports to specific destinations. Hub ports feed the same information to each device.

Synchronous: This term is sometimes used to describe interactive video connections because the transmission of information in both directions is occurring at exactly the same period.

System/Network Integration: The use of software that allows devices and systems to share data and communicate to one another.

Server: A computer on a network that stores commonly used resources such as data or programs, and makes these available on demand to clients on the network. 17 s*ee also Client, Client-server architecture*

Store and Forward (S&F): S&F is a type of TeleHealth encounter or consult that uses still digital images of a patient for the purpose of rendering a medical opinion or diagnosis. Common types of S&F services include radiology, pathology, dermatology and wound care. Store and forward also includes the asynchronous transmission of clinical data, such as blood glucose levels and electrocardiogram (ECG) measurements, from one site (e.g., patient's home) to another site (e.g.,home health agency, hospital, clinic

TCP/IP Transmission Control Protocol/Internet Protocol: The most popular open standard protocols used in data networks today. TCP is the underlying protocol that the Web server and its clients use to communicate HTTP requests. The IP is used to route pockets of data on a network.

T1/DS1: A digital carrier or type of telephone line service offering high-speed data, voice, or compressed video access in two directions, with a transmission rate of 1.544 Mbps.

T3/DS3: A carrier of *45* Mbps.

Technical data evaluation: Evaluation of the technical data in a telemedicine system relates to the functionality and performance of the technology and its ability to meet the demands of the telemedicine applications for which it is being employed. Evaluation should include:

- value of individual system features specific to individual
- telemedicine applications;
- ease of use of each system component;

- necessity of available features or components;
- features which are unavailable but necessary;
- functionality;
- user friendliness; and
- quality of still images, video and/or audio

Teleconsultation: Clinical consultation carried out using technology-assisted communication. Includes real time, store and forward, and videoconferencing technologies

Tele-education: Education and training activities carried out using technology-assisted communication includes videoconferencing, audio graphics, Internet etc.

Telehealth: 'Telehealth' is a way of talking to and seeing health professionals, from all around Queensland, by simply using a TV screen and camera, in order to provide you with the best health care, without the need to travel too far from home. Telehealth can help people in rural and remote areas who need follow-up care and other specialist health care. There are no extra charges to you for this kind of consultation. TeleHealth is the name given to a health delivery system, which provides health-related activities at a distance between two or more locations using technology-assisted communications.

TeleHealth session: Any health-related activity occurring while using telecommunications technology for the purposes of delivering health service, providing professional support and peer supervision, or conducting educational and administrative interactions between two or more locations. ATeleHealth session may be between:

- a client and a healthcare worker;
- a client, a healthcare worker, and another person such as an
- interpreter, another healthcare worker, or family member/carer;
- two or more healthcare workers; or
- people involved in educational and administrative interactions,
- which may or may not include healthcare workers.

TeleHealth target populations

- rural and remote communities;
- underserved;
- urban;
- indigenous;
- corrections;
- military; and
- developing countries

TeleHealth technologies: Health information can be communicated through a number of different mechanisms. In telehealth, videoconference, image transfer and data transfer are the three main formats utilised. The technology employed to support these formats include:

- audio-conference equipment;
- video-conference equipment
- computer networking (including LANs and WANs);
- audiographics;
- interactive (computer-based) multimedia (IMM);
- the internet and world wide web;
- interactive satellite television (ITV);
- broadband network

Telemedicine: In Australia over the last few years, telemedicine has fallen out of favour as a general term for the provision of health-related activities at a distance, using telecommunications and information technology, for being too medically and clinically focussed. It has been replaced by the term telehealth. Telemedicine still continues to be used, however its use refers specifically to clinical, but not necessarily medical, applications, as per the following definition: "The delivery of health care services between geographically separated individuals, using telecommunication systems eg videoconferencing".

Telemetry: A way of monitoring and studying physiological functions of a human being or animal (eg heart rate or blood pressure), from a remote site.

Telepathology: Practice of diagnostic pathology at a distance using computer and telecommunications technologies

Telepresence; A technique in which a person has the virtual feeling of being present at a chosen site even though he/she is not physically at the site

Teleradiology: A system that transmits radiographic images over a distance, between enterprises, using leased or switched transmission lines. 9 *Compare to PACS which deals with image transmitted within an enterprise*

URL Uniform Resource Locator: The addressing system used on the Internet to identify a resource on the WWW. The URL tells the Web browser which computer to connect to and where on the computer a required Web page is located

Videoconferencing: Real-time, generally two way transmission of digitized video images between multiple locations; uses telecommunications to bring people at physically remote locations together for meetings. Each individual location in a *videoconferencing* system requires a room equipped to send and receive video. Connection of two or more people or locations via video camera and monitors, allowing all parties to speak to each other, see each other and in some cases exchange data simultaneously

Videoconferencing Systems: Equipment and software that provide real-time, generally two way transmission of digitized video images between multiple locations; uses telecommunications to bring people at physically remote locations together for meetings. Each individual location in a *videoconferencing* system requires a room equipped to send and receive video.

WiFi: Originally licensed by the Wi-Fi Alliance to describe the underlying technology of wireless local area networks (WLAN) based on the IEEE 802.11 specifications. It was developed to be used for mobile computing devices, such as laptops, in LANs, but is now increasingly used for more services, including Internet and VoIP phone access, gaming, and basic connectivity of consumer electronics such as televisions and DVD players, or digital cameras. (Wikipedia)

WAN Wide Area Network: Wider in geographic scope than a LAN, which is confined to within an organisation. Provides digital communications (voice, video, and data) over switched or unswitched networks (some consider commercial dial-up networks such as America OnLine and the Internet to be WANs).

Whiteboard: In telemedicine, a document-conferencing function that lets multiple users simultaneously view and annotate a document with pens, highlighters and drawing tools. More advanced whiteboard programs handle multipage documents and provide tools for delivering them as Presentations

World Wide Web (WWW, the Web or W3): A powerful internet tool; for retrieving and distributing information, which uses a system of linking pages of related information together (hypertext). It acts as a global publishing system

Reference:

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http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/connectinghealthservices-itemlist

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