

Virtual Health Services in Rural Communities – WONCA Working Party on Rural Practice Policy 2017

The purpose of this document is to provide rural family physicians, other rural clinicians & health workers, the communities they serve, their health systems and governments clear strategic guidelines to support the successful delivery of virtual health care in rural communities.

“Access is the rural health issue.” Roger Strasser (Northern Ontario School of Medicine).

Executive Summary:

Centralisation of health services is an economic decision made in many jurisdictions that can create unsurmountable barriers for rural people to access quality health care.

Distance from population centres, geography, roads, public transport, demography, financial, cultural and linguistic barriers may contribute to rurality in different contexts. The ability of centralised health services to deliver local care and affordable outreach services can be constrained by the same barriers that define rurality.

As a consequence rural communities can be characterised as places where there is a reduced equity of access to a standard of health care expected by most members of a state or country.

The use of new and emerging digital tools has the potential to transform the way healthcare is delivered around the world. Virtual services can provide support for local practitioners and health education and interventions to patients remotely.

Whilst lagging behind urban areas, rural communities do have increasing access to cellular services and the internet. Virtual health care has the potential to bridge the urban / rural divide through the application of tools that create accessible, affordable, high quality services over digital platforms.

Cloud based services and the expansive ability of mobile technologies allow the utilisation of services that can reach into the poorest and most remote communities where arguably they will have the greatest impact. Virtual health services can in collaboration with local health providers improve outcomes by raising the quality of care and supporting earlier interventions.

It is important to note that by their very nature, digital tools cannot provide the same level of care that can be provided by an appropriately trained and resourced health provider in person, especially for complex situations and emergency care.

Virtual health services are a supplement, they support rather than replace local services.

Successful virtual health services in rural communities will show:

- better health outcomes
- improved access to health services locally and remotely
- improved patient experience
- recognition of and respect for cultural and linguistic challenges
- reduced costs
- greater sustainability of local services
- improved recruitment and retention among clinicians
- empowerment of local providers to work at the top of their scope of practice

The challenge of implementing virtual health services in rural communities is substantial.

There is a need for a community to have a

- Virtual health strategy
- Virtual health policy framework
- Virtual health infrastructure
- Digital health guidelines
- Common platforms, standards and information coding
- Agreed standards regarding privacy, secondary use of data and patient safety

There is a need to invest in the technology and the providers to ensure adequate training and remuneration.

Communities need to have processes that address:

- Patient trust, expectations and capacity to afford and engage with technology
- Cultural safety and local context
- Health and digital literacy of clinicians, patients and their communities
- Issues of political and media censorship (Geo Blocking etc...)

In order to implement successful change we need to:

- establishing clear strategic guidelines for communities, health systems and governments
- identify the range of virtual health service tools available and select those appropriate for the use.
- develop the capabilities in communities to deliver new models of care
- develop clear implementation plans
- partner with information technology providers at a local, regional, national and international level
- gain support for the case for change at every level in the system

The purpose of this document is to address the first step in this process.

We build on previous statements made by the WONCA Working Party on Rural Practice addressing the use of information technology in rural communities and seek to provide rural clinicians, the communities they serve, their health systems and governments clear strategic guidelines to support the successful delivery of virtual health care in rural communities.

The scope of this document does not include the identification of a range of virtual health service tools, the development of capacity or capability in communities or implementation planning. It does however provide some guidance that should support those activities for clinicians, communities, health service planners and governments.

There is further work to be done on identifying the future role of the family doctor in a setting where there is greater access to technology that enables greater support from and to colleagues in the extended health care team, and greater access to diagnostic and treatment interventions.

Summary of Recommendations:

Recommendation 1

Planning for virtual health services must acknowledge and respond specifically to the local needs and expectations of the rural community and its health workers. The active input of rural communities and their health workers must be an integral component at all stages in the planning and implementation process for virtual health services and the associated information and communications technology.

Recommendation 2

That an integral part of establishing information and communications technology programs is to ensure that the system that is implemented adheres to data structure recommendations and communication protocols standards that afford optimum interoperability and compliance with regional, national and international systems.

Data governance, Privacy and System Security are paramount to effective delivery of a trusted e-Health ecosystem. E-Health systems must adhere to internationally accepted principles and provide clear accountability and transparency of storage and use of data for primary and secondary purposes.

Recommendation 3

Specification of security protocols in information and communications technology should adhere to internationally recognised standards. The implementation of these standards should not adversely impact on rural health workers.

Recommendation 4

Rural communities should have access to the level of telecommunications service and bandwidth capable of delivering at least the minimum level of virtual health services for their identified needs.

Recommendation 5

Rural communities should benefit from changes to the local economic environment created when communication systems are installed to support virtual health services.

Recommendation 6

Rural communities should seek to work with other interested parties in cooperative ventures to improve local communications infrastructure.

Corporate entities must follow social justice and ethical principles in partnering with rural communities to create infrastructure. A Rural community or Nation State should not be placed at a disadvantage by agreeing to ambitious programs of development and consequently risk default on unserviceable loans.

Recommendation 7

All countries, inclusive of developing countries, should be encouraged to seek ethical partnerships with relevant regional and international industrial, educational and benevolent agencies to develop and support virtual health services and technology dissemination in rural areas.

Recommendation 8

Policy issues and decisions relating to virtual health services should not adversely affect the local delivery of healthcare in rural communities.

Recommendation 9

Regulatory issues and barriers that may impact on interstate or international delivery of virtual health services should be clearly identified and addressed at a national level.

Recommendation 10

Planning for and implementation of tele-Health services should address the issue of reimbursement of parties involved in virtual health service delivery and the reinvestment of cost savings back into local health service delivery.

Recommendation 11

Funding for virtual health services must include allocations to provide appropriate levels of recurrent expenditure for technical support, and ongoing maintenance and upgrading of equipment.

Recommendation 12

A comprehensive promotion and training program in the use and application of virtual health services including dissemination of experiences from existing projects, is a mandatory component of any information and communications technology project. Such programs should recognise the diverse and differing needs of rural health workers their clients and communities.

Recommendation 13

All projects involving the application of virtual health services should be required to have training in the operation of the technology integrated within the project and be educated in the cultural and organisational issues which are an integral part of a successful information and communications technology implementation.

Recommendation 14

The development and measurement of process, impact and outcome evaluation criteria for virtual health services should be a fundamental component of any new project and must be based on factors that are relevant and important to the rural communities involved.

Recommendation 15

Health authorities should increase the scope and level of research activities on the use of virtual health services by establishing research agendas.

Recommendation 16

Virtual health services should be used to support and improve, but not to replace the local delivery of health care services for rural communities.

Recommendation 17

Tele-Health service patterns should support and improve existing referral and access patterns of rural communities to secondary and tertiary service

Recommendation 18

Evaluation of health care services in rural communities using information and communications technology should consider local cultural and ethnic issues and negotiate such issues with those communities.

Recommendation 19

Programs addressing the recruitment and retention of health workers to rural communities should place a high priority on expanding the reach of the associated technology to improve lifestyle of health workers and rural communities.

Recommendation 20

The technology associated with virtual health services should be made available to the rural health workers to access continuing education and training.

Recommendation 21

Virtual health services have the potential to play a crucial role by providing continuing education as an integral part of the consultation process. This should be actively encouraged by:

- fostering a high degree of collegiality in the consultation process,
- allowing for the educational process in the implementation plan and
- actively encouraging the participation of the referring health worker in the consultation process

Glossary:

Digital Health:

“Digital health is the convergence of the digital and genomic revolutions with health, healthcare, living, and society. As we are seeing and experiencing, digital health is empowering us to better track, manage, and improve our own and our family's health, live better, more productive lives, and improve society.” (Sonnier, 2017).

The term digital health in this document is an overarching one that includes categories such as e-health, health information technology (IT), wearable devices, tele-Health, telemedicine, connected health and personalized medicine.

Providers and other stakeholders are using digital health in their efforts to:

- Reduce inefficiencies,
- Improve access,
- Reduce costs,
- Increase quality, safety and standards
- Make medicine more personalized, and culturally appropriate, for patients.

Patients and consumers can use digital health to better manage and track their health and wellness related activities.

The use of technologies such as smart phones, social networks and internet applications is not only changing the way we communicate, but is also providing innovative ways for us to monitor our health and well-being and giving us greater access to information. Together these advancements are leading to a convergence of people, information, technology and connectivity to improve health care and health outcomes (*Digital Health, 2017*).

Tele-Health is the use of information and communication technologies to deliver health care when patients and care providers are not in the same physical location.

Tele-Health can:

- enable people to be seen without leaving the area in which they live.
- empower people to better monitor and manage their own health.
- reduce health care costs.
- provide greater flexibility and support to health care workers. ¹

Tele-Health includes the provision of services by e-Health and telemonitoring.

e-Health is the use of mobile communications technologies in medical and public health practice including the delivery of health information, health services and healthy lifestyle support programmes. This includes SMS text messaging services as well as services delivered over a smart phone, tablet or other mobile device.

e-Health includes the provision of virtual consultations for the purposes of assessment, diagnosis and treatment for example:

¹ NZ Telehealth Forum and Resource Centre <https://www.telehealth.org.nz/>

- Synchronous e-consultations in which the patient and provider are communicating in real time from different locations
- Asynchronous, web-based e-visits over the Internet or on a smartphone
- Asynchronous “store and forward” technologies, either patient-to-provider or provider-to-provider, that enable sharing of clinical information in areas such as imaging, pathology, dermatology, and ophthalmology

Examples of e-Health include the delivery of mobile health advice via text and voice messages for expectant mothers in Ethiopia (*Mobile health advice for expectant mothers in ethiopia*, 2016) and Listen Please (Liang, 2013) a clinical translation smartphone app for patients to communicate with clinicians in an emergency situation.

The term **mHealth** is sometimes used to refer to health services that are only delivered by SMS or voice services.

Telemonitoring refers to remotely collecting and sending patient data so it can be utilised in their health care planning and support. This can include the use of home monitoring stations that measure blood pressure, weight, oxygen levels and blood sugar, but it can also include falls monitoring, treatment adherence, and environmental monitoring².

Telemonitoring can also include tools that are directly managed by the patient alone using software applications running on a user’s PC, tablet, or smartphone that may pair with a wearable or even ingestible devices to help individuals actively manage their health and wellness.

“Wearables”

Wearable devices are developing in accuracy and complexity all the time – they refer to tools that monitor activity (Puig-Ribera *et al.*, 2015), vital signs and other testing modalities on an ongoing basis. Most wearables share their data via Bluetooth and other wireless modalities.

The terms tele-Health, telemedicine, mHealth and e-Health are often used interchangeably.

For the purposes of this paper the term **Virtual health services** has been used to refer to the process of delivery of health services using e-health, digital health, telehealth, and telemonitoring as well as the people, infrastructure and support systems that are needed to deliver health services using that technology.

Virtual health services range from traditional administrative reporting systems to broader Health management information systems to telemedicine, electronic medical records, clinical decision support, and patient portals—and a full range of technologies, including internet and mobile applications.

1.1 *PURPOSE OF DOCUMENT*

This policy statement aims to provide guidelines which ensure that, when planning is undertaken for rural virtual health services, the range of services considered are appropriate to local healthcare needs and the clinicians who deliver them. It also seeks to ensure that the cultural and social contexts into which the services are being introduced are taken into consideration.

This document builds on previous policies developed by members of the WONCA Rural Information Technology Exchange (WRITE) (WONCA Rural Information Technology Exchange (WRITE), 2002). WRITE was formed at the First International Conference on Rural Medicine in Shanghai, May 1996 by a group of rural doctors with an interest in the appropriate use of information technology in health.

This review was implemented by the WONCA Working Party on Rural Practice in 2015 and endorsed in Delhi at the Working Party's conference hosted by the Association of Family Physicians of India in 2018.

The benefits of Virtual Health Services in Rural Communities were articulated in 2016 in a report on Digital Dividends from the World Bank, this document is informed by their review in which they state that there is:

“Early evidence to suggest that e-health solutions, while costly to implement, can bring significant cost savings. This is because the implementation of human resources information systems, logistics management information systems, clinical decision support tools, digital payments, financial management, information systems, and SMS reminder systems can address a variety of health system problems, including system inefficiencies, overuse of procedures, inappropriate hospital admissions, corruption and fraud, and missed appointments” (The World Bank, 2016).

We know that virtual health systems can:

- enable people to be seen without leaving the area in which they live.
- empower people to better monitor and manage their own health.
- reduce health care costs.
- provide greater flexibility and support to health care workers.³

We also know that “the implantation of the technology to support virtual health systems if it is shared, can have significant impact on the communities in which they are provided, increasing employment, education services, income, reducing inequalities and improving retention and recruitment of staff” (The World Bank, 2016).

³ The New Zealand Telehealth forum and Resources <https://www.telehealth.org.nz/>

1.2 POLICY COMMITMENT AND FUNDING

Funding for rural health services on a per capita basis is significantly less than that for urban health services in many countries, both developed and developing. Virtual health services have the ability to enhance and improve the delivery of health services through improved access and efficiency.

Any planning or funding decisions to introduce virtual health services to rural and remote areas must not have an adverse effect on the existing levels of funding for those areas. The introduction of virtual health services must not be used as justification for reducing levels of funding to other services. This can only be avoided by governments having a clear policy commitment to improve the health status of their rural populations. Appropriate levels of funding for rural health must support this policy commitment.

The emphasis of Virtual Health systems should be the support for well-trained local professionals to deliver expert care closer to home. The use of virtual consultants and the sharing of information should provide support to reduce transfers out of a community and improve the quality of care.

The WONCA Working Party on Rural Practice believes that virtual health services have the potential to improve the quality of health care in rural areas across the world, and supports their implementation where specific funding is made available and when virtual health services are shown to be appropriate to support and enhance local rural health services.

2 BACKGROUND

We are seeing rapid developments in interactive technologies and improved access to richer information sets and machine learning tools that are transforming access to information, and the ability to use that information to make decisions.

Technology is democratizing access to information and services across the knowledge sector at an ever increasing rate. This is impacting on the delivery of legal, financial and health services, and empowering patients in a way that has never been seen before.

One of the most critical issues in rural health around the world has been the lack of access for rural communities to the same level of health services enjoyed by urban communities. This lack of access has been created by a number of factors, including lack of health workers prepared to work in these areas, distance from the location of health services and a lack of adequate resources.

Poor access is further compounded for those health workers who choose to work in rural and remote communities' difficulty obtaining information to support the delivery of health services. This adversely affects the assessment of health needs and the effectiveness of health delivery systems, education, training and ongoing support for their roles, including adequate peer support. The result is reduced retention and recruitment of appropriately trained clinicians.

Access to reliable and adequate telecommunications services is improving, inequity of information and communication capacity between and within countries has begun to show some evidence of narrowing, but there is still a significant gap between urban and rural communities.

The World Bank reports that:

Nearly 7 of 10 people in the bottom fifth of the population in developing countries own a mobile phone.

In China more than 90 percent of villages will have fixed broadband access by the end of 2015.

Worldwide, over 79% percent of households in the bottom 40 percent of their countries' income distribution have access to a mobile phone, but 71 percent don't have access to the internet.

Adoption gaps between the bottom 40 percent and the top 60 percent and between rural and urban populations are falling for mobile phones but increasing for the internet (The World Bank, 2016).

Where adequate access is not available, communities are at significant further disadvantage to others. The United Nations Human Rights Council in June 2016 recognized internet access and the digital divide as issues that countries need to address in order to ensure the right to freedom to receive and impart information and ideas (Human Rights Council, 2016).

Some countries, such as Finland have defined access to the internet at broadband speeds as a legal right and are pursuing universal access policies.

It is important to implement a level of technology that is appropriate to the long term goals of a region. In choosing the level of technology for a particular rural community, there used to be a focus on voice or analogue (fax) data; technology has advanced beyond this.

In terms of usefulness and return on investment there is a hierarchy of specifications and needs for telecommunications methods for planners and systems designers to consider.

These are:

1. Cellphone access
2. Digital data exchange – including files, images, video
3. Real-time high bandwidth via copper wire, fibre, wireless or satellite.

The opportunity exists now for information and telecommunication technologies to have a significant impact on the health of rural communities. It is the application of these technologies to health that offers the potential to lower the barriers of distance, cost, and poor distribution of services. Support for health workers can improve the access of rural communities to the level of health services enjoyed by most urban communities.

Information and communication technology platforms (web, social media, SMS campaigns, direct access to personal data in electronic health records) can be used to enhance accountability and transparency of health provision. Empowerment of patients as active contributors and placing them in control of their own health care can lead to quality improvement.

The focus should be on user-centred virtual health services that empower the unique capacity of people to contribute information and feedback on their health and that also enables health systems to connect with patients when and where needed.

Virtual health services should allow patients to access information about their care, at their convenience and replace paper-based patient registers with electronic records that can inform local regional and national health systems around the best use of health services and budgets. Data shared can support quality research and health service planning.

There is growing evidence and case stories of the impact on rural communities of introducing virtual health services (Ferrer-Roca, Garcia-Nogales and Pelaez, 2010)(Kruse *et al.*, 2016). As this

evidence grows, it becomes less and less acceptable for those who plan and fund health services to fail to implement these improvements in their most vulnerable rural communities.

Specific issues that need to be addressed include:

- Where telecommunications infrastructure and services in rural areas are unreliable and inadequate, priority needs to be placed on improvement in speed, reliability and stability.
- The development of new models of care that will result from virtual health service implementation.
- The lack of awareness and training in the use and application of the relevant virtual health services by communities and rural health workers.
- Further research and evaluation projects need to be undertaken to determine the potential for emerging virtual health services.
- The legal and regulatory issues that may act as barriers to the effective implementation of virtual health services need to be resolved.
- The development of virtual health service policies and initiatives for health are often driven solely by commercial interests and create fragmentation in service delivery, strategic alliances should be formed across health sectors with other government, non-government, and private providers on a local and global scale.
- Understanding the Geopolitical imperatives that underpin access to and utilization of Digital technologies including but not restricted too advocacy, civil unrest and disobedience, use of technologies to promote terrorism, and use of digital data by states for purposes of discrimination and racial profiling

The World Bank conclude that national planning, enterprise architecture, standardisation, and interoperability are all essential for successful virtual health services implementation and that effective country ownership, good governance, and strong institutional and human capacity are core to the planning and implementation of virtual health services (The World Bank, 2016).

This all sounds like hard work, the good news is, judging by presentations at the WONCA Working Party on Rural Practice conferences, rural health workers are early adopters of technology and their drive will be a significant factor that will influence the introduction of virtual health services into rural communities.

3 COMMUNITY PARTNERSHIP AND NEEDS ASSESSMENT

It is essential that local needs and issues are taken into account when implementing virtual health services. Local factors must be paramount in determining what is to be implemented. Without local support, virtual health services will be seen to be imposed on them from outside, and are very likely to be unsuccessful. The rural community and their health professionals are the most reliable source of information about these factors.

Central planners should not ignore the views and needs of local health workers in the planning and implementation of virtual health services. To do so is to risk creating a local health service environment that may become severely diminished in its effectiveness compared with the previous level of services.

Prior to designing and implementing an information and communications technology network and infrastructure, it is essential to perform a *needs assessment* for and with the communities involved, with adequate opportunities for input from the rural community and its health workers. The needs assessment must look to the future needs of the community.

To ensure the successful implementation of virtual health services, the following criteria should be met:

- The needs assessment must take a holistic view of the community beyond an overall appraisal of the health needs of the community.
- It must also take into account the economic and educational status of the community, and any other local factors that will impact on the introduction of an information and communications technology system.
- It must clearly demonstrate to the community that the introduction of information and communications technology will be appropriate for that community in both health and economic terms.
- It must clearly show that the Cultural Safety, Religious and Political ideology of the community is well understood and include the risks inherent in enabling virtual health technology and the evolution of unintended consequences.
- It must clearly show that the community and its health professionals have indicated that they are prepared to accept and support the introduction of information and communications technologies
- It must clearly show that the issues of data governance in particular the storage and secondary use of data, privacy, consent and the civil and criminal penalties related to privacy breaches both at a local, state and country level have been addressed.

There is a need for all participants to have some ownership of the process and product in virtual health services.

The members of a rural community are more affected by the change in model of care than central planners. Rural communities and their health workers must have adequate input into all stages of the development of virtual health services intended for them. The balance of power in decision making about virtual health services should rest within the rural communities, and not be subject to significant commercial interests nor with central agencies.

3.1.1 Recommendation 1

3.1.2 Planning for virtual health services must acknowledge and respond specifically to the local needs and expectations of the rural community and its health workers. The active input of rural communities and their health workers must be an integral component at all stages in the planning and implementation process for virtual health services and the associated information and communications technology.

4 SYSTEM SPECIFICATION AND DESIGN

The specification and design of any information and technology system for a rural community must take into account local factors such as:

- the local environment – including dust, humidity and ambient temperature.

- physical infrastructure – including existing telecommunications services (if any), power source, condition and security of health service buildings
- geographical position and isolation – in particular the distance to the nearest referral centre and existing patient transfer processes and patterns of referral
- access to mobile phone, satellite, copper wire or optical fibre access points
- clear policies, civil and criminal frameworks that underpin safe and meaningful use of quality data

All have a role in determining what can be implemented in an information and communications technology system.

In the first stage of system specification and design of virtual health services for rural health, it is important to recognize that the economic impact of providing information and communications technology into a rural area is greater than that affecting the health service alone. Evidence from the World Bank demonstrates that introducing access improves incomes and employment, and has effects on productivity in agriculture and education sectors within communities (The World Bank, 2016).

It is important to work within the affordable budget for a community or region and active input from the community is essential in implementing any system.

Information and communications technology planners and designers must recognise the wider economic impact of virtual health services on a rural community when specifying components and performance criteria for information and communications technology.

This should be taken into account by funders when considering the fact that many rural communities will not be able to sustain virtual health services without significant subsidies from central funders. This must not be at the cost of reduced funding for other local health services.

Design principles must ensure continuing use of the technology – a system that is too complex or awkward will quickly fall into disuse. Systems designers should consider that many different categories of users may need to be accommodated in a system, and that a system should not be designed with only accredited health workers in mind as end users.

Designers should use systems that make the maximum use of tools that support improved decision making by frontline providers, including maximum use of the modern smartphone including the camera, motion sensor, broadband access and GPS capabilities they bring.

To be able to maximise the distribution of services with maximum efficiency designers should look to expand and improve the use and functionality of open-source software platforms (for example, OpenMRS⁴, OpenLMIS⁵, and iHRIS⁶) and develop new open-source platforms (for example, for health insurance and training); and support open source frameworks (for example, OpenHIE⁷) (The

⁴ <https://openmrs.org/>

⁵ <http://openlmis.org/>

⁶ <https://www.ihris.org/>

⁷ <https://ohie.org/>

World Bank, 2016). At the very least common standards for information classification, storage and transmission should be agreed upon (Aspden *et al.*, 2004).

There is a place to consider public/private partnerships and social enterprise entities such as the Gates Foundation.

There are many opportunities and examples of ways that virtual services can have an impact on the social determinants of health for example in building microbusinesses in Indonesia that empower rural women to develop business skills and income (Ibrahim and Verliyantina, 2012; The World Bank, 2012).

While local factors are the very important in designing and specifying an information and communications technology system, any system designed must conform to internationally recognized standards and protocols.

At many levels, the lack of interoperability and data and communication protocol standards has hampered the successful introduction of technology into many fields of medicine. If communities are to make optimal use of virtual health services to improve health care, it is essential that systems achieve maximum integration with regional, national and international standards of communication and health data structures. This recognizes the need to use the information and communications technology system to effectively communicate with areas and communities beyond the local scope of operations.

4.1.1 Recommendation 2

4.1.2 That an integral part of establishing information and communications technology programs is to ensure that the system that is implemented adheres to data structure recommendations and communication protocols standards that afford optimum interoperability and compliance with regional, national and international systems.

5.1.3 Data governance, Privacy and System Security are paramount to effective delivery of a trusted e-Health ecosystem. e-Health systems must adhere to internationally accepted principles and provide clear accountability and transparency of storage and use of data for primary and secondary purposes.

5 SECURITY AND CONFIDENTIALITY

An essential part of the design of any information and communications technology system is to ensure that all information transmitted by the system is absolutely secure. Any breach of confidentiality of sensitive health information could be potentially disastrous not only for individuals, but also the whole community. Designers of virtual health services should adhere to internationally recognized standards for the secure transfer of health information (such as HL7⁸). It is important

⁸ <http://www.hl7.org/>

that any security protocols can be implemented at the local level in a rural community without reducing the professional integrity and independence of the local health workers.

For people to have confidence in the system there needs to be a strong legal basis for managing health related data with appropriate safeguards, and judicial penalties, within health systems.

5.1.1 Recommendation 3

5.1.2 Specification of security protocols in information and communications technology should adhere to internationally recognised standards. The implementation of these standards should not adversely impact on rural health workers.

6 IMPLEMENTATION

6.1 LOCAL ISSUES

The local level of knowledge, skills and attitudes to information technology is an important governing factor in the implementation of a system. Local communities, health workers and planners should be made aware of the potential benefits of virtual health services and the possibilities of developing appropriate services within the limitations of available resources.

Training of local health workers to achieve an appropriate level of skills to operate and maintain the installed equipment should be seen as a mandatory component of any information and communications technology implementation.

Resource accessibility is inversely proportional to distance from population centres (WONCA Rural Information Technology Exchange; WRITE; 2002).

When this principle is applied to information and communication technology, communications companies will charge more for remote access to telecommunications systems. A key implementation issue is responsibility for ongoing funding of the service, in particular the recurrent communications costs, which must not be detrimental to existing levels of local funding for health services.

Rural and remote communities should not be penalised with higher costs for accessing adequate telecommunications resource. It has been widespread economic practice to subsidize rural and remote communities in many areas of infrastructure support e.g. roads, water supply. The relative costs of equalising the cost of supply of telecommunications and information are far less and the potential benefits are far greater.

However, it must be recognized that within the current economic structure of most health care systems, the biggest savings from the implementation of virtual health may be in travel costs for patients from remote areas. Where communities have subsidized travel arrangements for the transfer of patients, this saving may be easily identified. In health care systems that do not directly pay for travel costs which remain the responsibility of the patient, it will be more difficult to measure any direct saving.

The higher cost of implementing virtual health services in rural areas needs to be balanced with the wider economic impacts of introducing those services on the community.

There are many benefits that can be demonstrated by the introduction of m-health (voice only or SMS based) services in rural communities⁹, technology solutions that can deliver effective e-health (smartphone and internet based) solutions may be considered an expensive alternative to implement for many regions of the world, but the impacts are broad and much more achievable than in the past.

There are now many examples of technology 'leap-frogging' in developing regions, where wire based infrastructures have been completely bypassed by wireless network infrastructure¹⁰.

6.1.1 Recommendation 4

6.1.1.1 Rural communities should have access to the level of telecommunications service and bandwidth capable of delivering at least the minimum level of virtual health services for their identified needs.

6.1.2 Recommendation 5

6.1.2.1 Rural communities should benefit from changes to the local economic environment created when communication systems are installed to support virtual health services.

6.2 LOCAL, REGIONAL AND GLOBAL RESOURCE SHARING

Information and communications technology offers the possibility of building bridges to link rural communities, health workers and others. Planning for implementation should also consider the potential for resource sharing between the government and private sectors. If the private sector has a vested interest in a rural area (e.g. mineral exploration), then it will often develop excellent communications infrastructure to support personnel. Local communities should consider forming public private partnerships with the private sector where these opportunities exist and form cooperative ventures wherein both can benefit from the improved communications.

By making more efficient use of scarce resources during the implementation of virtual health services, considerable cost savings can be realized by organizations that share the use of broad-based communications. These same cost saving issues apply to areas other than the provision of health care. Government administrations, law enforcement agencies, education, health services and industry can all benefit from improved communications infrastructure, and reduce the overall costs of introducing telecommunications services.

⁹ http://www.who.int/goe/publications/goe_mhealth_web.pdf

¹⁰ <https://www.economist.com/news/special-report/21731038-technology-africa-making-huge-advances-says-jonathan-rosenthal-its-full>

6.2.1 Recommendation 6

6.2.1.1 Rural communities should seek to work with other interested parties in cooperative ventures to improve local communications infrastructure.

7.2.1.2 Corporate entities must follow social justice and ethical principles in partnering with rural communities to create infrastructure. A Rural community or Nation State should not be placed at a disadvantage by agreeing to ambitious programs of development and consequently risk default on unserviceable loans.

6.2.2 Recommendation 7

6.2.2.1 All countries, inclusive of developing countries, should be encouraged to seek ethical partnerships with relevant regional and international industrial, educational and benevolent agencies to develop and support virtual health services and technology dissemination in rural areas.

6.3 REGULATORY ISSUES

Planners of virtual health services must determine whether any regulatory barriers to information and communications technologies exist.

These barriers may include:

- Telecommunications policy that does not support subsidies for rural areas.
- Licensing issues for interstate or international health workers providing consultative and diagnostic services by tele-Health services.
- Policy governing legal liability for healthcare decisions by their own country's local and remote health care workers based on information provided via tele-Health services.
- Policy governing legal liability for international health workers providing consultative and diagnostic services by tele-Health services.
- Policy governing privacy and security of health information that does not recognize the use of telecommunications as a modality for health service delivery.
- Regulations regarding sharing of medical information that do not recognize the use of telecommunications as a modality for health service delivery.
- Regulations and standards for information management, including coding and classification systems that do not take rural, cultural and ethnic variations into account.
- Regulations regarding standards of technology.
- Policies regarding funding arrangements for information and communications technology.
- Customs, excise and export policies that hinder the dissemination of information and communications technologies that would be of benefit to the health of rural communities.
- Lack of clear articulation of the importance of transparency in data governance, secondary use of data, and the penalties both civil and criminal for misuse.

It is important that any decisions about the provision of virtual health services to rural communities made on the basis of existing policy, or policy designed to overcome these regulatory barriers, does not have an adverse impact on local health services.

The WONCA Working Party on Rural Practice recommends the “rural proofing” of all policy¹¹.

6.3.1 Recommendation 8

6.3.1.1 Policy issues and decisions relating to virtual health services should not adversely affect the local delivery of healthcare in rural communities.

6.3.2 Recommendation 9

6.3.2.1 Regulatory issues and barriers that may impact on interstate or international delivery of virtual health services should be clearly identified and addressed at a national level.

6.4 REIMBURSEMENT

In many countries fee for service is the predominant method for reimbursing health practitioners. In these countries, the regulations of national governing bodies usually prohibit reimbursement in cases where there has not been a physical presence or contact between the physician and the patient. This principle was designed to prevent what is seen as an abuse of billing when for example providing telephone advice.

In those countries where there is a predominantly state health funded system, reimbursement of health services is often on a national scale with provider-purchaser splits regulating the level of payment. Where this health funding system is in place, existing contractual and funding agreements may not address service delivery by virtual health. Regulatory or legislative change may be necessary to permit this. The administrators of managed care health systems will also need to incorporate funding for virtual health services into their payment structures.

The maximum gain from a virtual health service is obtained when the referring health worker is included in the process. If the referring health worker is an independent practitioner, then consideration should be given to providing adequate reimbursement of the referring worker.

6.4.1 Recommendation 10

6.4.1.1 Planning for and implementation of tele-Health services should address the issue of reimbursement of parties involved in virtual health service delivery and the reinvestment of cost savings back into local health service delivery.

6.5 ONGOING DEVELOPMENT SUPPORT AND MAINTENANCE

Virtual health services need ongoing development, support and maintenance once implemented and will quickly fall into disrepair and disuse unless there is adequate professional development, continuous quality improvement and technical support.

¹¹ <http://www.globalfamilydoctor.com/groups/WorkingParties/RuralPractice.aspx>

Funders of rural virtual health services must allocate sufficient levels of recurrent funding to ensure that rural health workers have access to ongoing professional and technical support.

Wherever practicable, this access should be at a cost of no greater than a local telephone call to the rural health worker. Access to prompt repair and maintenance of equipment is crucial.

It is also essential to allocate recurrent funds for ongoing maintenance, capital depreciation, reinvestment in and upgrades of the information technology and communications equipment installed in rural communities for virtual health services. There is a continual need to upgrade virtual health services to keep up with global developments and trends.

The cost of maintenance and upgrades should not be underestimated – total cost of ownership figures for information and communications technology over a three to five-year term when broken down typically demonstrate that 80% of the total cost is expenditure on maintenance and upgrades. Again, these costs must not be borne disproportionately by the rural communities.

6.5.1 Recommendation 11

6.5.1.1 Funding for virtual health services must include allocations to provide appropriate levels of recurrent expenditure for technical support, and ongoing maintenance and upgrading of equipment.

6.6 QUALITY IMPROVEMENT, AWARENESS AND TRAINING

In addition to being provided with technical support, rural health workers must be provided with appropriate education and training to enable them to operate the technology and deliver virtual health services. It is important that the attitudes of rural health workers be targeted in education and training to create realistic expectations about the performance of virtual health services.

There is a can be a lack of awareness on the part of communities and rural health workers regarding the virtual health services available and their applications to health¹². Implementation strategies for information and communications technology should identify the need for training in the:

- operation of the communication technologies for supporting health applications;
- application of the technologies for the continuing education of health workers;
- application of the technologies to clinical health services and
- application of the technologies to evaluate and improve the delivery of health services.

Each of these areas has particular issues associated with them.

¹² http://www.who.int/goe/publications/goe_mhealth_web.pdf

6.6.1 Recommendation 12

6.6.1.1 A comprehensive promotion and training program in the use and application of virtual health services including dissemination of experiences from existing projects, is a mandatory component of any information and communications technology project. Such programs should recognise the diverse and differing needs of rural health workers their clients and communities.

6.6.2 Recommendation 13

6.6.2.1 All projects involving the application of virtual health services should be required to have training in the operation of the technology integrated within the project and be educated in the cultural and organisational issues which are an integral part of a successful information and communications technology implementation.

6.7 EVALUATION

There is growing international evidence of the effectiveness of virtual health services in the delivery primary health care services; however more research needs to be done particularly in rural communities in developing countries.

Evidence is needed to justify the expenditure of scarce resources on expensive programs that may not improve local health services. Evaluation criteria must be designed to measure the process, outcomes and impact of the implementation and performance of virtual health services in rural communities. These criteria must also take into account local cultural and ethnic variations in rural communities.

6.7.1 Recommendation 14

6.7.1.1 The development and measurement of process, impact and outcome evaluation criteria for virtual health services should be a fundamental component of any new project and must be based on factors that are relevant and important to the rural communities involved.

Indicators to measure the performance of the development and delivery of virtual health services are needed. The collection of data on virtual health services is critical to ensuring that virtual health services are effective in meeting clinical, economic and performance criteria. Research and development on data items for measuring the evaluation criteria is essential.

6.7.2 Recommendation 15

6.7.2.1 Health authorities should increase the scope and level of research activities on the use of virtual health services by establishing research agendas.

7 IMPACT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY ON RURAL HEALTH SERVICES

The following issues should be also be taken into consideration in the design and implementation of virtual health services to rural communities.

7.1 ACCESS TO SERVICES AND SERVICE DELIVERY

Virtual health services have the capacity to enhance and complement existing referral and access patterns between rural communities and secondary/tertiary providers of health care. Virtual health services can fundamentally change the model of care and significantly impact on patient access to services however there can be unintended consequences of change.

Introduction of virtual health services should not have an adverse impact on access to health services by rural communities. Planners must take into consideration the effects of new projects on the skill levels and local expertise in rural communities and the relationships between local health workers and their communities. Planning for virtual health services must not be intended to replace local health care services delivered by rural health workers to their community.

Information and communications technology has great potential in evaluating the health needs of rural communities and the delivery of health services to address those needs. However, the evaluation criteria and methodologies used must take into account local cultural and ethnic variations in rural communities. Rural communities must be involved in the establishment of such criteria. Changes that are implemented as a result of such evaluations should be with the agreement of the communities involved.

7.1.1 Recommendation 16

7.1.1.1 Virtual health services should be used to support and improve, but not to replace the local delivery of health care services for rural communities.

7.1.2 Recommendation 17

7.1.2.1 Tele-Health service patterns should support and improve existing referral and access patterns of rural communities to secondary and tertiary service

7.1.3 Recommendation 18

7.1.3.1 Evaluation of health care services in rural communities using information and communications technology should consider local cultural and ethnic issues and negotiate such issues with those communities.

7.2 RECRUITMENT AND RETENTION

The introduction of virtual health services, with the associated information and telecommunication technologies, has the potential to improve recruitment and retention of rural health workers by reducing the sense of professional isolation experienced by many of these workers.

The implementation of virtual health services will have the greatest impact if it also has an impact on the community in which those services are delivered. Information and communications technology has the potential to improve the wellbeing of the health care worker's family, to provide access to education services for children and employment opportunities for a partner as well as access to social and entertainment services that are available in urban centres.

7.2.1 Recommendation 19

7.2.1.1 Programs addressing the recruitment and retention of health workers to rural communities should place a high priority on expanding the reach of the associated technology to improve lifestyle of health workers and rural communities.

7.3 CONTINUING EDUCATION

The technology associated with virtual health services provides rural health workers with the opportunity to access a wide range of continuing education services remotely. The opportunities for distance education will be limited only by the technical performance of the systems installed.

7.3.1 Recommendation 20

7.3.1.1 The technology associated with virtual health services should be made available to the rural health workers to access continuing education and training.

Rural health workers may develop the perception that virtual health services simply represent an opportunity for specialists to extend their influence. A criticism of tele-Health services (where a patient is accessing care over a phone or videoconference) that link specialists directly to patients is that it has potential for encouraging dependency on specialist input, and that this does not foster a learning environment and problem-solving attitude amongst rural health workers. The WONCA Working Party on Rural Practice Policy Document on Training for Rural Practice stresses the need to avoid creating such an environment of Learned Helplessness (Wonca Working Party on Training for Rural Practice, 1995).

This attitude shift also extends to the patients. Experiences of specialist input on management of complex problems tends to raise expectations that same degree of consultation should be available in cases that are well within the capabilities of the rural health worker. This has the potential to reduce the skills and motivation of the rural health worker

Tele-Health consultations involving someone with specialist knowledge should be an opportunity for learning and to ensure that there is mutual benefit from the tele-Health process for all parties involved, it is necessary to ensure that the dynamics of a tele-Health consultation:

- foster a strong collegial atmosphere between the referring community and consulting specialist.
- Mutual respect for the abilities of each party greatly increases the acceptance of input into the consultation and the acceptance of the recommendations that arise from the consultation.
- Ensure that all parties involved in a tele-Health consultation recognize the potential for education in the process.
- The referring parties benefit from the experience of the consulting physician, with the likelihood of being able to handle similar future cases with less need for consultation
- The consulting specialist benefits from the local knowledge of the referring physician about the patient, local expectations, conditions and customs. The specialist also

develops a greater level of familiarity with the abilities and uncertainties of the referring physician, and the capabilities of the local resources.

Ideally the specialist concerned has visited the community and had face to face contact with the referring provider they are supporting so they fully understand the context of care they are supporting.

7.3.2 Recommendation 21

7.3.2.1 Virtual health services have the potential to play a crucial role by providing continuing education as an integral part of the consultation process. This should be actively encouraged by:

- **fostering a high degree of collegiality in the consultation process,**
- **allowing for the educational process in the implementation plan and**
- **actively encouraging the participation of the referring health worker in the consultation process**

8 CONCLUSION

Careful planning can maximize the impact of virtual health services in rural communities, affecting the broader community in which those services are situated and avoid unintended consequences on the sustainability of what are often fragile health systems.

This document provides generic recommendations for health providers, communities and policy planners to guide them to achieve this outcome for the health workers and residents of rural communities around the world.

The key to achieve this desirable outcome is for planners to include rural communities and their workers in a partnership role from the earliest possible stage in planning for services.

Allowing market forces to drive virtual health service development, or imposing virtual health services onto communities that have not been involved in planning will be very unlikely to be successful or sustainable.

In this partnership role, it is important to address key issues of funding, training and ongoing support for information and communications technology from the perspective of the community.

The onus is on the promoters and planners of virtual health services to ensure that their introduction does not have any adverse effects on health care delivery to rural communities, and to ensure that the whole community benefits from the broader economic and social developments that introducing information technology can bring.

Whether a virtual health service project is implemented as part of a local, national, regional or international partnership, it is imperative that funding for evaluation of the impact on service delivery as a whole is an integral component of the project.

Finally, virtual health services should never be intended to replace direct service provision at the local level by suitably trained and supported health professionals. Rather, information and communications technology should be a valuable adjunct to the support the standard of care that is delivered to people who live in the rural communities of the world.

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