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**Policy on  
Using information Technology  
to improve Rural Health Care**

**2002**

Wonca Rural Information Technology Exchange (WRITE)  
World Organisation of Family Doctors

rural health

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Published by:

Monash University School of Rural Health  
PO Box 424  
Traralgon Victoria 3844  
Ph: (03) 5173 8181  
Fax: (03) 5173 8182  
E-mail: rural.health@med.monash.edu.au

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## **POLICY ON USING INFORMATION TECHNOLOGY TO IMPROVE RURAL HEALTH CARE**

Endorsed  
by  
Wonca World Council Meeting  
on  
12 June 1998

This Wonca Policy on Using Information Technology to Improve Rural Health Care has been prepared by the Wonca Rural Information Technology Exchange (WRITE) a Sub Committee of the Wonca Working Party on Rural Practice.

### **Wonca RURAL INFORMATION TECHNOLOGY EXCHANGE MEMBERS**

Dr David Topps (Chair)	Canada
Dr John Togno	Australia
Dr John Wynn Jones	Wales
Mr Joe Hovel	Australia
Dr Ian Couper	South Africa
Dr Ashok Patil	India
Professor Roger Thomas	Canada
Professor Zhenglai Wu	China
Professor Roger Strasser	Canada

### **ENQUIRIES REGARDING THIS POLICY SHOULD BE DIRECTED TO:**

Professor Roger Strasser  
Founding Dean, Northern Ontario Medical School  
935 Ramsey Lake Rd  
Sudbury, Ontario, P3E2C6, Canada.  
Email: roger.strasser@normed.ca

## Executive Summary

Information and Communication Technology has considerable potential to have either positive or negative impacts on access to and delivery of rural health services. This policy statement provides the participants, funders and planners of rural health services with guidelines for the introduction and use of Information and Communication Technology to rural communities.

Rural communities have been early adopters of technology where these technologies can reduce their isolation and disadvantage in access to services. Low level, and relatively low cost, technologies have the potential to offer access to useful information resources for many rural communities, especially Internet based services. If a rural community has access to basic telephony services and a computer, then the community has access to e-mail as a basic Internet service. At this basic level, there are many opportunities to use e-mail to reduce the professional isolation of rural health workers.

Information and Communication Technology planners and designers must recognise the economic impact of such services on a rural community when specifying components and performance criteria. Many rural communities will not be able to sustain Information and Communication Technology services without significant subsidies from central funders. Funders of rural Information and Communication Technology services must also allocate sufficient levels of recurrent funding for rural health workers to have access to ongoing technical support and training, and for capital replacement, upgrade and depreciation costs of information and technology equipment

Critical factors in the planning and implementation that will determine the success and sustainability of Information and Communication Technology services include:

- an appropriate needs and assets survey of rural communities for planned Information and Communication Technology services
- a partnership involving funders and planners with the rural communities that acknowledges, respects and responds to the views and needs of local health workers at all stages in the planning and implementation of these services
- sufficient levels of funding for rural health to support a policy commitment to rural health, including Information and Communication Technology
- the potential for local, national, regional and global partnerships that may enhance the level of services provided and/or spread the cost of providing communications and information technology infrastructure, and
- consideration as to whether any regulatory barriers exist to Information and Communication Technology (especially for reimbursement of telehealth care providers), and initiatives to ensure that these are addressed prior to the introduction of such services

The introduction of Information and Communication Technology services should not have an adverse impact on access to health services by rural communities. Planning for Information and Communication Technology services must never be intended to

replace local health care services delivered by rural health workers to their community at the local level.

Any service delivery based on telehealth must acknowledge existing referral and access patterns between rural communities and secondary/tertiary providers of health care. The installation of information and communication technologies to support telehealth also provides rural health workers with the opportunity to access a wide range of continuing education services remotely.

There is a small body of evidence to date that does support the effectiveness of Information and Communication Technology, but future programs must incorporate data collection and analysis of the process, impact and outcomes of Information and Communication Technology as a core component of the planning process. Evaluation must be an integral part of any Information and Communication Technology services. Evaluation criteria must remain sensitive to local issues of the rural communities.

## **Recommendations for Rural Information and Communications Technology**

### **Community Partnership**

1. Planning for information and communications technology programs 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 information and communications technology.

### **System Specification and Design**

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 compliance with regional, national and international systems.

### **Security and Confidentiality**

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.

### **Local issues**

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

5. Rural communities should not be penalised by any changes to the local economic environment created when communication systems are installed to support information and communications technologies.

### **Implementation – Local, Regional and Global Issues**

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

7. All countries, in particular developing countries, should be encouraged to actively seek regional and global partnering relationships with Universities, industry and foundations in other countries to develop and support information and communications technology dissemination in rural areas.

### **Implementation – Regulatory Issues**

8. Policy issues and decisions relating to information and communications technology should not adversely affect the local delivery of healthcare in rural communities.

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

### **Implementation – Reimbursement Issues**

10. Planning for and implementation of telehealth services should address the issue of reimbursement of parties involved in the teleconsultation process.

### **Implementation – Ongoing Funding**

11. Funding for information and communications technology must include allocations to provide appropriate levels of recurrent expenditure for technical support, and ongoing maintenance and upgrading of equipment.

### **Implementation – Staff Training**

12. A comprehensive promotion and training program in the use and application of information and communication technologies for health, 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 and the clients and communities that they provide services to.

13. All projects involving the application of information and communication technologies to health which are funded by national health authorities 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.

### **Implementation – Evaluation**

14. The development and measurement of process, impact and outcome evaluation criteria for information and communications technology services should be a fundamental component of any information and communications technology program and must be based on factors that are relevant and important to the rural communities involved.

15. Health authorities should increase the scope and level of research activities for the use of information and communication technologies in health by establishing research agendas.

At the international level, there is a need for the establishment of an evaluation resource that should be auspiced by organisations such as Wonca or WHO.

### **Impact on Rural Health Services - Access to Services and Service Delivery**

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

17. Telehealth service patterns should wherever possible reflect and support existing referral and access patterns of rural communities to secondary and tertiary services.

### **Impact on Rural Health Services - Recruitment and Retention**

19. Programs addressing the recruitment and retention of health workers to rural communities should place a high priority on information and communication technologies that can improve the working environment and lifestyle of health workers and rural communities.

### **Impact on Rural Health Services - Continuing Education**

20. The information and communication technologies installed to provide telehealth services should be made available to the rural health workers to access continuing education and training.

21. Telehealth programs 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 aspect in the budget and time management process and
- actively encouraging the participation of the referring health worker in the consultation process.

## 1. Preamble

### ***Purpose of Document***

Telehealth is delivery of health services at a distance - as such, it was the predominant focus of the previous edition of this policy document. While many of the themes and recommendations of that edition are also largely applicable to the broader theme of information and communications technology, the world has moved on and this field in particular has seen enormous changes in a short period.

This policy statement aims to provide guidelines which ensure that, when planning is undertaken for rural information and communications technology services, the range of information and communications technology services considered are appropriate to local healthcare needs and services. The cultural and social contexts into which the services are being introduced should also be taken into consideration.

Members of the Wonca Rural Information Technology Exchange (WRITE) have prepared the document. 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.

### ***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. Any planning or funding decisions to introduce information and communications technology to rural and remote areas must not have an adverse effect on the existing levels of funding for those areas. The introduction of information and communications technology 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.

WRITE believes that information and communications technology has the potential to improve the quality of health care in rural areas across the world, and supports its implementation where specific funding is made available and when information and communications technology services are shown to be appropriate to support or enhance local rural health services.

## 2. Background

One of the most critical issues in rural health around the world has been the lack of access of 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. The problem is further compounded for those health workers who choose to work in rural and remote communities by the lack of access to information to support delivery of health

services, assess health needs and the effectiveness of health delivery systems, education, training and ongoing support for their roles, including adequate peer support. The end result of this often is higher turnover of staff.

The convergence of information and communication technologies has created the technical environment where there are rapid developments in interactive technologies and improved access to richer information sets. These technologies combine the high-speed communications made possible by digital technology with very sophisticated computer based programs and applications. The interactive applications developing have high levels of functionality, at increasingly affordable prices. However, the access to reliable and adequate telecommunications services, particularly the telephone network, in most rural areas of the globe is limited and must be upgraded. The first step is to provide telecommunications services that will enable voice, fax and data communications adequate for Internet access. The next step is upgrading of telecommunications services to digital standards; and, thirdly, in the longer term to broadband services as they become available and affordable. It is recognised that for many rural communities it will not be economic to provide services beyond basic telephony. The impact of these developments remains uncertain, and the costs may still be too great for many developing countries. Nevertheless, the potential for these technological developments to enable the delivery of cost effective information and communications technology services must be acknowledged in any planning and implementation process for introducing information and communications technology to rural areas.

It is important to implement a level of technology that is appropriate to the short term and long term goals of a region. In choosing the level of technology for a particular rural community, 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. Voice – point to point telephony
2. Voice – multi-point teleconference
3. Analog data exchange – fax
4. Digital data exchange – including files, images, datastreams
5. Real-time high bandwidth, multi-point data exchange

The opportunity exists now for information and telecommunication technologies to have a significant impact on the health of rural communities. It is the particular application of these technologies to health that offers the potential to lower the barriers of distance, cost, poor distribution of services and lack of support for health workers that at present restrict the access of rural communities to the level of health services enjoyed by most urban communities. However, whilst information and communications technology has been promoted as a means that has the potential to deliver, or improve the delivery of, health services to rural areas, there has not been much evidence to date to support this assertion. In particular, there is little evidence to support the cost-benefit of introducing information and communications technology into rural areas. This scarcity of evidence suggests that any funders planning to introduce information and communications technology services to rural areas should

carefully assess the impact of information and communications technology on funding for both existing services and any future services.

Specific issues that need to be addressed include:

- the lack of awareness and training in the use and application of the relevant information and communications technologies by many rural health workers;
- further research and evaluation projects need to be undertaken to determine the potential of the emerging information and communications technologies;
- the legal and regulatory issues that may act as barriers to the effective implementation of information and communications technology need to be resolved;
- the present telecommunications infrastructure and services for most rural areas are unreliable and inadequate for systematic and effective application to health services;
- the development of information and communication technology policies and initiatives for health are often staggered and fragmented and could benefit from strategic alliances across health sectors with other government, education and private sectors on a local and global scale.

Surveys of rural health workers suggest that as a group they are early adopters of technology. This attitude will be a significant factor that will influence the introduction of information and communications technology services into rural communities.

### **3. Community Partnership and Needs Assessment**

It is essential that local needs and issues are taken into account when implementing information and communications technology systems. Local factors must be paramount in determining what is to be implemented. Without this local support, the imposition of any information and communications technology service is 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 information and communications technology 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.

To ensure the successful implementation of information and communications technology, the following criteria should be met:

- prior to designing and implementing a 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.
- the needs assessment must take an 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 a information and communications technology system

- the needs assessment 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
- the community and its health professionals must have clearly indicated that they are prepared to accept and support the introduction of information and communications technologies

There is a need for all participants to have some ownership of the process and product in information and communications technology. Rural communities and their health workers must have adequate input at and into all stages of the development of information and communications technology systems intended for them. In this partnership approach, because they are more greatly affected by the information and communications technology system that is installed, in most cases the balance of power in decision making about information and communications technology should rest within the rural communities, and not with any more central agency or agencies.

#### **Recommendation 1**

**Planning for information and communications technology programs 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 information and communications technology.**

## **4. System Specification and Design**

The specification and design of any information and communications 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 nearest referral centre and existing transfer modalities and patterns of referral

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

In the first stage of system specification and design of information and communications technology services for rural health, it is important to recognise that there are diminishing returns as investment increases in information technology. This means that low level, and relatively low cost, technologies have the potential to offer access to useful information and communications technology services for many rural communities, especially Internet based services. It is important to work within the

affordable budget for a community or region; therefore active input from the community is essential in implementing any system.

Information and communications technology planners and designers must recognise the economic impact of information and communications technology services on a rural community when specifying components and performance criteria for information and communications technology. Many rural communities will not be able to sustain information and communications technology services without significant subsidies from central funders. This must not be at the cost of reduced funding for other local health services. This assertion is consistent with the World Bank's May 1995 *Operational Policy Directive on Telecommunications*, which notes that "The Bank encourages governments to develop strategies to extend telecommunications services throughout the population, including the least privileged groups. Services that are deemed necessary for social, development, or security reasons but that are unprofitable even under liberal entry and pricing policies can be provided to low-income (including rural) population groups through communal facilities or rendered viable through limited, targeted government subsidies."

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 health workers in mind as end users.

While local factors are the very important in designing and specifying an information and communications technology system, any system designed must conform to internationally recognised standards and protocols. At many levels, the lack of 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 information and communications technology systems 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 recognises the need to use the information and communications technology system to effectively communicate with areas and communities beyond the local scope of operations.

#### **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 compliance with regional, national and international systems.**

## **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 information and communications technology services should adhere to internationally recognised standards for the secure transfer of health information such as HL 7 and Edifact. It is important 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.

### 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.**

## 6. Implementation

### *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 health workers and planners should be made aware of the potential benefits of information and communications technology 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 information and communications technology 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. 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 telecommunications resource. It has been widespread economic practice to subsidise 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 recognised that within the current economic structure of most health care systems, the biggest savings from the implementation of telehealth may be in travel costs for patients in remote areas. Where communities have subsidised 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, and are the responsibility of the patient, it will be more difficult to measure any direct saving.

The higher costs of implementing information and communications technology in rural areas can be reduced by the application of suitable technological methods such as microwave and satellite data transmission. Such media may still be too expensive to implement for many regions of the world, but are relatively much more achievable than previous methods of communication. There are now many examples of such technology 'leap-frogging' in developing regions, where wire based infrastructures have been completely bypassed by wireless network infrastructure.

#### **Recommendation 4**

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

#### **Recommendation 5**

**Rural communities should not be penalised by any changes to the local economic environment created when communication systems are installed to support information and communications technologies.**

### ***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 (eg mineral exploration), then it will often develop excellent communications infrastructure to support personnel. Local communities should consider forming liaisons 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 information and communications technology services, considerable cost savings can be realised by organisations that share the use of broad-based communications. These same cost saving issues apply to areas other than the provision of health care. Municipal administrations, law enforcement agencies, health service administrations, industrial administrations<sup>1</sup> can all benefit from improved communications infrastructure, and reduce the overall costs of telecommunications services.

Implementation issues of partnering for developing countries have a global perspective. All countries should be encouraged to seek regional and global partnering relationships in information and communications technology. Mary Oakes Smith, 1997 World Bank Learning and Leadership Center Fellow, Information Technology and Distance Learning in *World Bank Bulletin No 1* raises the concern of

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<sup>1</sup> Link Centre project between Canadian Association of Petroleum Producers (CAPP) and Shock Trauma Air Rescue Society (STARS), Calgary, Alberta, June 1996.

global outreach. This refers to “developing country access to delivery of health, education, public information, commercial and other services using appropriate communications technology - and it is outreach to the poorer parts of the developing world that requires the strongest partnering relationships.” It is also important not to ignore the potential of regional partnerships for developing countries. Regional partnerships, where practicable, may result in significant savings on the cost of information and communications infrastructure.

Oakes Smith emphasises the key issues of “partnering among industry, academia, foundations, international organizations and with developing country stakeholders will be needed to realize the potential for successful application of (telehealth) in the poorer countries and among the poor that need health services the most.”

In describing the impact of partnering, Oakes Smith envisages a “new partnering relationship based on a networking of comparative but differing skills (that) would support innovations in health service delivery and would spread the financial risks that need to be taken to realize the potential for telemedicine applications in the poorer parts of the globe”. This view recognises the reality that “the information age is interactive, instantaneous and networked, and above all global.” In information and communications technology, the sustainability of regional and global programs will depend on the willingness of participants to share expertise and advice freely.

Online access to full text medical journals has recently been greatly improved for developing nations by the WHO initiative in collaboration with a consortium of publishing houses led by the BMJ Publishing Group. This previously prohibitively expensive resource has been made available at very equitable rates for some of the poorer nations around the world. This initiative holds great promise for improving the distribution of essential medical information to those areas in greatest need. It is hoped that this example will promote similar philanthropic collaborative efforts in other fields of information and communications technology, such as with the major computer software publishers.

#### **Recommendation 6**

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

#### **Recommendation 7**

**All countries, in particular developing countries, should be encouraged to actively seek regional and global partnering relationships with Universities, industry and foundations in other countries to develop and support information and communications technology dissemination in rural areas.**

## **Regulatory Issues**

Planners of information and communications technology 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 telehealth services
- policy governing legal liability for healthcare decisions by local and remote health care workers based on information provided via telehealth services
- policy governing legal liability for interstate or international health workers providing consultative and diagnostic services by telehealth services;
- policy governing privacy and security of health information that does not recognise the use of telecommunications as a modality for health service delivery;
- regulations regarding sharing of medical information that do not recognise 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.
- standards of technology;
- regional/district 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.

It is important that any decisions about the provision of information and communications technology 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.

### **Recommendation 8**

**Policy issues and decisions relating to information and communications technology 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 information and communications technology services should be clearly identified and addressed at a national level.**

## ***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 the abuse of billing eg for 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 telehealth. Regulatory or legislative change may be necessary to permit this. The administrators of managed care health systems will also need to incorporate funding for telehealth services into their payment structures.

The maximum gain from the teleconsultation process 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. Objections to this principle that are raised by the funding bodies on the basis that there is no precedent, should be vigorously opposed with the observation that this is a totally new mode of consultation.

### **Recommendation 10**

**Planning for and implementation of telehealth services should address the issue of reimbursement of parties involved in the teleconsultation process.**

## ***Ongoing Support and Maintenance***

Information and communications technology systems will need maintenance once installed and will quickly fall into disrepair unless there is adequate technical support. Funders of rural information and communications technology services must allocate sufficient levels of recurrent funding to ensure that rural health workers have access to ongoing 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 information and communications technology services. There is a continual need to upgrade information and communications technology systems to keep up with global developments and trends.

Remote diagnostic and technical support is increasingly employed in information and communications technologies. This will help to cut support costs but centrally based

support groups should be knowledgeable of the local factors that affect their remote users and communities.

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.

#### **Recommendation 11**

**Funding for information and communications technology must include allocations to provide appropriate levels of recurrent expenditure for technical support, and ongoing maintenance and upgrading of equipment.**

#### ***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 information and communications technology installations. It is important that the attitudes of rural health workers be targeted in education and training to create realistic expectations about the performance of information and communications technology services.

There is a general lack of awareness on the part of rural health workers regarding the information and communication technologies available and their applications to health. 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; and
- application of the technologies to clinical health services;
- application of the technologies to evaluate and improve the delivery of health services.

Each of these areas has particular issues associated with them.

#### **Recommendation 12**

**A comprehensive promotion and training program in the use and application of information and communication technologies for health, 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 and the clients and communities that they provide services to.**

**Recommendation 13**

**All projects involving the application of information and communication technologies to health which are funded by national health authorities 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.**

***Evaluation***

There is very little international evidence evaluating the effectiveness of information and communications technology activities in the delivery of primary health care services, particularly to 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 information and communications technology services installed in rural communities. These criteria must also take into account local cultural and ethnic variations in rural communities.

**Recommendation 14**

**The development and measurement of process, impact and outcome evaluation criteria for information and communications technology services should be a fundamental component of any information and communications technology program 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 information and communications technology services are needed. The collection of data on information and communications technology services is critical to ensuring that information and communications technology services are effective in meeting clinical, economic and performance criteria. Research and development on data items for measuring the evaluation criteria is essential.

**Recommendation 15**

**Health authorities should increase the scope and level of research activities for the use of information and communication technologies in health by establishing research agendas.**

**At the international level, there is a need for the establishment of an evaluation resource that should be auspiced by organisations such as Wonca or WHO.**

## 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 information and communications technology services to rural communities.

### ***Access to Services and Service Delivery***

The introduction of information and communications technology services should not have an adverse impact on access to health services by rural communities. Planners must take into consideration the effects of information and communication technology on the skill levels and local expertise in rural communities and the relationships between local health workers and their communities. Planning for information and communications technology services must never be intended to replace local health care services delivered by rural health workers to their community at the local level.

However, any service delivery based on information and communications technology must complement existing referral and access patterns between rural communities and secondary/tertiary providers of health care. If not, then both the community and the health workers may bypass the information and communications technology services, which would have a significant impact on the viability of the information and communications technology service. Any variation of existing referral and access patterns for health services must be fully justified and explained to the rural 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.

### **Recommendation 16**

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

### **Recommendation 17**

**Telehealth service patterns should wherever possible reflect and support existing referral and access patterns of rural communities to secondary and tertiary services.**

**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.**

***Recruitment and Retention***

The introduction of information and communications technology 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. However, this potential has not yet been clearly established, and needs to be carefully evaluated and researched.

**Recommendation 19**

**Programs addressing the recruitment and retention of health workers to rural communities should place a high priority on information and communication technologies that can improve the working environment and lifestyle of health workers and rural communities.**

***Continuing Education***

The installation of information and communication technologies 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 by the technical performance of the systems installed. However, the systems should be made available to rural health workers as part of an overall strategy to reduce professional isolation.

**Recommendation 20**

**The information and communication technologies installed to provide telehealth services should be made available to the rural health workers to access continuing education and training.**

Rural health workers may develop the perception that telehealth simply represents an opportunity for specialists to extend their influence. A criticism of telehealth is that it has potential for encouraging dependency on specialist input, and not fostering a problem-solving attitude amongst rural health workers. The Wonca Policy Document on Training for Rural Practice stresses the need to avoid creating such an environment of Learned Helplessness.

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

Telehealth consultations should not be a forum for displaying the skills of the specialist, with little benefit from the consultation process for the referring physician. To ensure that there is mutual benefit from the telehealth process for all parties involved, it is necessary to ensure that the dynamics of a telehealth 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 telehealth consultation recognise 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.

#### **Recommendation 21**

**Telehealth programs 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 aspect in the budget and time management process and**
- **actively encouraging the participation of the referring health worker in the consultation process.**

## 8. Conclusion

There are no guarantees that the introduction of information and communications technology services will automatically be a benefit for rural health workers and the communities that they serve. However, it is possible with careful planning to maximise the potential for successful and sustainable information and communications technology services to rural communities. This document provides generic recommendations for information and communications technology policy planners that can 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. Imposing information and communications technology 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 information and communications technology services to ensure that the introduction of information and communications technology does not have any adverse effects on health care delivery to, and the economic well being, of rural communities.

Whether an information and communications technology project is implemented as part of a local, national, regional or international partnership, it is imperative that funding for evaluation of information and communications technology be an integral component of the project.

Finally, information and communications technology 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.

## 9. Glossary

<b>Analogue</b>	A signal, taking a representative value rather than a unitary one, that takes on a continuous range of values. Analogue data is often transmitted as sound waves. This means it can be transmitted over standard telephone or radio networks.
<b>Bandwidth</b>	The capacity to transmit data by a communication technology. The higher the bandwidth the faster the transfer of data, which is usually measured in bits of data per second. Higher bandwidth is almost always more expensive to install and use.
<b>Communication technology</b>	Technologies used to transmit data. May be either analogue or digital. There is a wide range of communication technologies available. These fall into two broad groups of either cable (land) based or wireless. Wireless technologies include radio, microwave and satellite. Wireless technologies generally require less infrastructure, but can be more expensive to use than cable based technologies
<b>Digital</b>	Digital data is transmitted in digital "bits" of data, usually as "1s" and "0s" or binary code.. It requires a digital connection, or it must be converted to analogue data by a modem. Digital connections are much faster than analogue networks, but are currently very expensive to install and maintain.
<b>EDIFACT</b>	A security protocol and set of standards being developed and implemented, mainly in the European Community. Not necessarily compatible with HL 7.
<b>E-mail</b>	Electronic text messages exchanged between computers. This can take place on a local level over a network or on a global level over the Internet. It can operate effectively at any connection speed. E-mail is subject to standards and protocols to ensure that it can be exchanged regardless of the computer systems of the end users. Email messages can also carry attached files.
<b>Fax or facsimile</b>	Transmission of printed material over standard telephone lines between dedicated fax machines
<b>Full duplex voice</b>	Voice Connection between two parties where both parties can talk transmit (including speak) at any time, eg most telephones.
<b>Half duplex voice</b>	Voice connection between two parties where only one party can talk at any time. Common in radio transmissions.
<b>HL7</b>	A security protocol and set of standards being developed and implemented, mainly in the USA. Not necessarily compatible with EDIFACT. HL7 is a security protocol and set of specifications for a health data-interchange standard designed to facilitate the transfer of health data resident on different and

disparate computer systems in a healthcare setting. HL7 facilitates the transfer of laboratory results, pharmacy data and other information between different computer systems.

**Information technology**

Technologies based on the use of computers and other integrated circuits to process data and produce information.

**Internet**

The Internet is a global network of computers that provides the infrastructure for e-mail, the WWW and a number of other modalities. In the context of this document, the use of the term “the Internet” commonly refers to e-mail only. The rural regions of most parts of the world do not have the telecommunications infrastructure to provide the access speeds required for the WWW.

**World Wide Web**

The World Wide Web (WWW) is the graphical interface to the Internet. It requires a relatively high-speed connection to the Internet. The WWW is governed by a set of standards and protocols to ensure that it can be accessed regardless of the computer systems of the end users.

**WHO**

World Health Organisation