Technology and Managed Care: Is Telemedicine the Right Tool for Rural Communities?

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ABSTRACT
Telemedicine offers a unique opportunity for the delivery of healthcare to rural communities. For this opportunity to be realized, telemedicine services need to be planned carefully with attention to acceptance by clients and providers, economic viability and effective administration. To be sustainable, services for rural populations must be supported by a well-defined and resourced infrastructure. Managed care, considered as an approach to the effective delivery of appropriate services, is indeed the right tool for rural communities. Cost savings will be an important issue for health care managers, but rural telemedicine services should be considered in a broader economic perspective, taking account of both costs and benefits from various perspectives, and considering long term outcomes.

Technology has great appeal and promise as a means of health service delivery to smaller communities that are at some distance from major health facilities. Benefits may include more rapid delivery of diagnostic and other health services, mentoring for local healthcare providers and avoidance of travel (and its economic and social consequences) for patients, their families and health professionals. Telemedicine could play a major role in changing the way healthcare and health-related information are accessed and delivered in developing and underdeveloped areas that have poor physical facilities for communication and transport and limited numbers of medical facilities. Reduction in the costs and improvement in the availability of relevant technologies will enhance the potential for telemedicine to provide coverage for the majority of the world population. Use of widely distributed technologies, including telephone and E–mail services, already permit the application of telemedicine approaches to increasing numbers of communities in developing countries.

As a means of health service delivery, telemedicine has to be planned and operated appropriately to provide acceptable and sustainable support to rural communities. Telemedicine systems for routine service are a form of managed care. The term “Managed Care” is frequently associated with approaches to health care and cost containment that have been used in the USA. The definition given by Iglehart is “a variety of methods of financing and organising the delivery of comprehensive health care in which an attempt is made to control costs by controlling the provision of services.”[1] In discussing telemedicine and rural health the term “managed care” has been used in a more general sense as “comprising various clinical, financial and organizational activities designed to ensure the provision of appropriate health care services in a cost-efficient manner.”[2]

The principle of many telemedicine applications has become well established but there is less convincing evidence that telemedicine is effective, cost-effective and acceptable in routine health care.[3, 4] A review of the socio-economic impact of telehealth as a method of delivery of healthcare and information[5] found that studies on rural telehealth (mostly of limited quality) had demonstrated the utility for broad clinical uses. However, examination of the social, organizational, and policy aspects had been largely overlooked. Other than cost, few socio-economic indicators had been addressed. As in other areas, very few studies examined the effectiveness in improving health status or the outcome of health care. Most studies were descriptive in nature, often recounting the technology and telehealth process, but not identifying suitable outcome indicators or providing evidence of an impact.

While literature on rural telemedicine services may provide relatively limited details, some requirements for such services are apparent from general considerations that are applicable to many types of telemedicine.[6] Account must be taken of technical factors, need for health services, availability of tradi-
tional health care delivery arrangements, and economic feasibility. In addition, much depends on social and organizational factors relating to rural communities and the centers of expertise that are to provide support for them through telemedicine.

Defining the Needs and Scope for Rural Telemedicine Services

Key issues to consider at an early stage of planning are “Who will be served by the telemedicine applications?,” “What services are they receiving now?,” and “Whether there are any gaps between the desired and current delivery arrangements.” This area includes matters such as distances traveled, waiting and travel times, approximate level of demand and the general availability of services. Of critical importance in the planning stage is how the delivery arrangements under telemedicine will help address the needs identified. As pointed out by Kokesh et al., an essential characteristic of a successful telemedicine program is that it is clinically driven; that a clinical need is identified and then a telemedicine solution is applied to that need.

Technical Requirements and Validation

Equipment and transmission media used for the telemedicine service must be adequate to support routine operation. There will be a need to obtain assurance that available hardware and software can provide the performance required, at a realistic cost, and that adequate technical support will be available. Major issues are validation of specifications and of performance under local conditions – technical components of telemedicine must be robust so as to give reliable support for rural health care. In addition, various telemedicine applications that are proposed should have been validated as suitable for routine clinical application. It should also be noted that for any telemedicine network it would be essential to ensure that the quality of the service provided through telemedicine is not substantially inferior to that obtained through conventional methods. It is possible that some telemedicine applications could have certain disadvantages compared to conventional methods of healthcare delivery. Even in such a scenario, telemedicine may be a valid and useful approach. However, any shortcomings need to be well-defined and considered in the overall framework of health service provision.

Development of Networks

Validation of applications and assurance of technical capability for a telemedicine system will help establish its efficacy – its performance under favorable conditions (whether it can work). The effectiveness of a telemedicine application – its performance under routine conditions (whether it will work) will be dependent on other factors, not least the views of those who will use the technology. Installing the equipment is a condition but not a guarantee; networks of persons who will operate, refer to or be clients for telemedicine services must be considered.[8] An example is provided by the project to improve health services to communities in rural and remote Queensland.[9] Consideration of local issues - local needs, existing services and community involvement were vital for the success of the project.

Many of the issues related to the use of the technology will relate to changes in work practices and routines. Active consultation with all staff members, who will be affected by introduction of telemedicine, and use of their expertise in developing programs, should be prioritized. Availability of a person to take responsibility for coordination of telemedicine applications and their assessment is essential. There is little hope that a coherent administrative and technical perspective will emerge unless there is an individual with sufficient status to provide liaison between the many players and interests in a telemedicine system.

Health care professionals who are to be involved will need to be convinced about the usefulness and feasibility of new approaches and their active involvement in telemedicine services will be important to generate enthusiasm and support. Confidence in the telemedicine approach must also be generated in patients and their families, pointing to the need for wider publicity about the service and contact with patient groups and the general public. With rural services, as with other areas of telemedicine provision, care should be taken to identify cultural issues that may need to be addressed.

These various factors associated with the implementation of rural telemedicine services give an indication of the need for a managed care approach. An example of a managed care process for implementation of rural telemedicine is provided by the ear, nose and throat (ENT) services organized by the Alaska Native Medical Center (ANMC).[7] Clinical needs were apparent with thousands of patients scattered across the diverse geography, long distances and harsh climates, and with complications related to acute and chronic ear disease frequently seen in the Alaska Native population. The technical base for the telemedicine services was achieved by providing software and building a communication network linking villages and regional hospitals across Alaska, with research on available video otoscopes, digital cameras and fiberoptic endoscopes. Familiarization and training used pre- and post-operative ear images for patient education and to follow chronic processes over time. Video otoscopes were placed in all examination rooms; all providers were trained and encouraged to use the equipment. This led to the development of a set of best practices on how to obtain good quality images. Validation of the approach, in the absence of relevant published data was achieved by undertaking a study comparing in-person examinations with reviews of images from the telemedicine system. The easy-to-use equipment and encouragement to use it led to ENT physicians and audiologists developing confidence in the system. Patient feedback showed that satisfaction with the new imaging technology was very high. This work enabled a common telehealth approach to be put in place across many centers in the Alaska health care system.

Achieving Sustainable Rural Telemedicine

Efforts to put in place a viable technical infrastructure, validation of applications and active participation by health profes-
sionals and their clients, as outlined above, are important components of a telemedicine service. However, they are only steps along the way to ensuring a sustainable program. Muttitt in commenting on telemedicine for Canadian Aboriginal communities notes that while considerable time and effort are spent on the planning and implementation of telehealth, until recently, limited time and resources have been devoted to ensuring sustainability. If this is not addressed, rural and other telemedicine projects run the risk of being only short-term enterprises.

It has been pointed out that as telemedicine moves beyond the pilot project stage, measurement of outcomes is required to give a clear picture to the decision makers regarding the performance of the telemedicine program. Measures such as number of repeat consultations, avoidance of hospitalization and use of pharmaceuticals, may provide useful intermediate outcome data. At another level, measures of health outcomes and health-related quality of life of the consumers need to be studied. In each situation, comparison with the non-telemedicine alternative will be required. Such outcome data are needed for ongoing appraisal of health service quality and require routine administrative data collection. As a telemedicine service matures, it must move toward full integration with other types of health care delivery provided to the community.

Sustainability of a telemedicine program will also depend on perception on whether the use of this technology in various applications represents good value for money. At the pilot project stage, and in preparation of business cases, projected costs of the telemedicine service will form a useful input to decisions on whether the application is feasible. As operation of the program continues, it is inevitable that its costs will receive further scrutiny, as is the case with any health care initiative. In the end, funding for telemedicine will depend on how well it compares with other forms of service delivery.

Some of the discussion on telemedicine costs is influenced by perceptions of costs to particular budgets, rather than a broader economic perspective. Jennett et al found that persons working with rural telehealth programs voiced the need for appropriate funding for telehealth projects and expressed their frustrations in obtaining them. Need for funding to support innovation as well as for sustaining the telehealth services was suggested. Approaches suggested included lengthening timelines to reflect long-term investment and placing less emphasis on cost-benefit analyses or business case analyses by recognizing that utilization itself denotes “success”.

Decision makers often have an immediate interest in cost details of the telemedicine application and its effect on the health care system in question. However, economic analysis is also concerned with measurement of benefit, including improvement in quality of life. Also, decisions on broad programs such as those related to rural telemedicine need to take account of different perspectives including those of health care professionals, patients and health care funding organizations.

An example of results from differing perspectives is provided by a study of two rural health centers in New Zealand that were linked to a specialist hospital for tele-dermatology services. Marginal costs of teledermatology compared to conventional services, where patients would travel to a specialist clinic, were lower from a societal perspective, but over four times higher from the perspective of the provider. Such studies provide useful input to policy decisions. Costs from the provider’s perspective will need to be considered, but may be one of several factors influencing a decision. In this case, the authors concluded that introduction of a routine tele-dermatology service was justified, taking the societal perspective.

Kennedy and Yellowlees have suggested that videoconferencing is a crucial part of enhancing psychiatry services in rural areas, but that it is not necessarily cost-effective for all consumers, general practitioners, psychiatrists or public mental health services. Decision makers will need to take these perspectives into consideration when determining the future of a telemedicine service beyond the pilot project stage.

Cost analysis will provide one input to policy decision on the future use of a telemedicine service, but non-monetary factors associated with the effectiveness of the service must also be considered. An approach that has been suggested for the economic appraisal of telemedicine is social audit analysis, in which a matrix of data on monetary items plus information on non-monetary benefits is produced. Particular benefits which apply to each group of major participants in the telemedicine application can then be considered. This approach was used by Doze and Simpson in a Canadian study of rural telepsychiatry services. Non-monetary impacts in the areas of travel, waiting time for consultation, client choice and quality of life were identified, considering perspectives of the psychiatrist and local service provider as well as those of the client. This information provided a useful addition to the data obtained in a cost analysis of the service.

Economic decisions on rural telemedicine services may also need to take account of aspects that may be less apparent to decision makers. In the study by Doze and Simpson, important benefits identified by clients in rural centers included an improved sense of privacy and consumer control. Another suggestion that emerged from this work was that additional costs to patients in the absence of telepsychiatry (because of the need to travel to a specialist clinic) might well deter them from seeking psychiatric consultations, so that mental health services were not delivered. Foregoing psychiatric consultations as a result of social or financial pressures might lead to the use of other health services in the longer term, with associated costs to the government. The availability of a telepsychiatry facility was seen as a major help in avoiding such social and financial disadvantages.

A further dimension in establishing sustainable rural telemedicine services is the development of policies and procedures to apply across the network. Jennett et al have identi-
fied written policies as a means to build on ‘structural readiness’ for adoption of telehealth.\(^2\) They noted that issues related to physician reimbursement, liability, cross jurisdiction and privacy often become complicated in rural areas. The need for policies covering allied health professionals who work in telehealth has recently been considered for the Canadian Arctic territory of Nunavut.\(^6\) Consultants who provide telehealth services are frequently located outside the territory, so that local providers required a framework to define their roles, responsibilities and supporting infrastructure. Topics covered in documents that have been developed for several service areas include scope and limitations of telehealth services, staff responsibilities, training and reporting, professional standards, and cultural considerations. Generic policies covering issues related to jurisdiction, licensure and liability were also addressed.

A managed care approach to rural telemedicine can take account of these many components needed for a successful service. Decisions on development and operation of rural telemedicine should be informed by data on comparative costs and outcomes. Adoption of a societal perspective to rural health services and avoidance of a narrow focus on achieving cost savings may be desirable approaches, but like other aspects of health care, it will need to gain bureaucratic and political support.

**References**